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FULL REPORT | SEPT 2018

CLOSING EUROPE'S CARBON LOOPHOLE IN CLIMATE POLICY



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EXECUTIVE SUMMARY: CLOSING EUROPE'S CARBON LOOPHOLE

The European Union is broadly credited with reducing its emissions of greenhouse gases (GHGs) and is on track to meet its goal of a 20% reduction in GHGs in 2020 compared to 1990 levels. But a full lifecycle accounting of European member state carbon emissions, including those emissions caused by the consumption of imported goods, tells a different story: Under this accounting method, **EU emissions have remained almost the same versus 1990 levels**, as a result of an increasing surplus of consumption-based emissions, now exceeding total production-based emissions by 25-30% - with some nations seeing substantially higher consumption-based emissions growth than others.

These nations are taking advantage of the “carbon loophole” - an artifact of climate policy that fails to consider a nation's imports when calculating national emissions and associated climate commitments. Research shows that approximately a quarter of global greenhouse gas emissions pass through this loophole, originating in regions with little or no carbon emissions regulation and ending in nations with an increasingly regulated carbon market.ⁱ

Unless and until the carbon loophole is closed, the world will struggle to meet global emissions targets and avoid dangerous climate change. We cannot keep pushing industrial carbon emissions around the world in an unaccountable manner.

For the European EU-27¹ region, despite laudable efforts to curb emissions under global agreements such as the now-expired Kyoto Protocol, total carbon emissions did in fact not decrease over the period 1990 to 2015 under a consumption-based approach.² A sharp increase in consumption-based emissions³ can be seen in the period 2002 to 2008, as a result of China joining the WTO, which enabled increased trade flows between China and other countries, further fueled by an economic boom in Europe. Small increases in trade volume from carbon-intensive countries like China can therewith lead to proportionally high increases in imported carbon.

After the onset of the global financial crisis, consumption-based emissions have dropped from their pre-2009 highs, although recent years suggest a stagnation. In 2015, total consumption-based emissions roughly equaled both Europe's production- and consumption-based emission totals in 1990 again –which at the time were still at quite similar levels, versus the 25-30% consumption-based emission excess nowadays.

Top Carbon Importers

Within the European Union, a number of countries can be considered to be top importers of carbon. Based on 2015 data, Germany, UK, France, Italy, and Spain were the top importers of carbon in absolute terms, with Germany and UK's imported emissions combined nearly equaling those of all other EU countries outside the top 5.

¹ The 27 European Union member states; from 1 July 2013 the EU has 28 member states

² The production based approach is the official means of reporting on a country's carbon footprint, and refers to the emissions that occur within national territory and offshore areas over which the country has jurisdiction.

³ Consumption-based carbon emissions refer to all embedded carbon emissions attributed to consumption, regardless of where they occur, including both domestically generated emissions as well as emissions caused by the production of imports

Considering these same emissions on a per capita basis, as well by Gross Domestic Product (GDP), leads to some perhaps surprising findings; all three Scandinavian EU countries feature amongst the six highest ranked countries for absolute imported carbon per capita; all of the three Baltic States feature in the top 5 of highest absolute importers of carbon by GDP.

Top absolute importers of carbon – in Mt CO ₂	
Germany	395 Mt
UK	368 Mt
France	281 Mt
Italy	233 Mt
Spain	184 Mt
<i>Rest of EU</i>	<i>809 Mt</i>

Top importers of carbon/capita - in ton CO ₂ per person		Top importers of carbon/GDP - in ton CO ₂ per 1 million US\$	
Luxembourg	27.1	Slovakia	472
Finland	7.9	Lithuania	419
Slovakia	7.6	Estonia	310
Austria	7.3	Latvia	294
Sweden	6.7	Cyprus	283
Denmark	6.3	Luxembourg	267

* Net embodied carbon, as balance (in %) between embodied carbon in a country's imports vs. exports

In essence, the “reduction” in European individual countries' territorial carbon footprints has, in part or in full, been cancelled out by the simultaneous rise in consumption-based

carbon emissions from imports. Although this report provides a case study for Europe, its findings and recommendations are likely to bear relevance to many non-European countries, such as the United States, Japan, Canada and Australia.

Government Response

Research for selected European countries also shows that regular, annual consumption-based carbon accounting is not yet commonplace. Moreover, the methodologies applied require more standardization and harmonization between countries, while many governments have a need for better guidance on how the results of such an exercise can effectively inform a country's climate policies.

For the private sector, mandatory Scope 3 reporting for companies has yet to be introduced, except for France where the Energy Transition Law and subsequent decrees now require listed companies to disclose significant indirect emissions occurring in their supply chain. This means that for the most part, the disclosure of such data entirely relies on the level of commitment a company shows to investigating and disclosing its full carbon impact, in part brought on by external pressure that may spur a company into reporting on Scope 3 carbon. Major hurdles however exist that slow down the uptake of reporting at country and company level, not in the least that it can make the reporting party look a lot worse than if it only were to report on production-based respectively Scope 1 and 2 carbon emissions.

Likewise, when we analyze the specific policy responses beyond reporting, that governments in Europe have put in place to address embodied carbon, it can be concluded that almost none of the current policies has been explicitly intended and (co)designed to address imported carbon. Nonetheless, a wide range of policy options are already available to European policy makers to close the carbon loophole, as shown by research conducted by the EU funded Carbon-CAP project. Although this

could take the form of introducing entirely new policy instruments, in many cases optimizing and expanding existing policy instruments to actively consider the embodied carbon emissions in goods and services will go a long way towards addressing the issue.

Key Recommendations

First of all, we think it is key that countries start to **acknowledge** the issue of carbon emissions from imports and the need to address these emissions. This in turn can provide the basis for the development of a *strategic framework and action plan for curbing emissions from consumption*. Ultimately, countries will need to set targets to reduce imported carbon in order to ensure focus and commitment, as well as to measure progress.

Subsequently, European countries with material carbon emissions from import should take the necessary steps to start to **measure and report annually** on their consumption-based carbon footprint and strive for greater **harmonization** between the methodologies and models used.

In parallel, countries need to **act** to reduce their consumption-based emissions through policy options. Six potential policy instruments are discussed in more detail in this report, ranging from proven, bottom-up to more experimental, top-down policy measures. They consist of (1) introducing regular and harmonized country-level reporting; (2) using embodied carbon as a green procurement tool; (3) introducing mandatory Scope 3 reporting in combination with Scope 3 Science-Based Targets for companies already subject to mandatory Scope 1 and 2 reporting; (4) introducing Scope 3 hotspot analysis for companies; (5) establishing consumption-based carbon clubs; and (6) introducing a carbon inclusion mechanism.

Both expert feedback and recent experience from the introduction of the Buy Clean Act in California, U.S., tell us that in particular mandatory **climate-aligned public procurement** (measure 2) may hold promise as a powerful tool to help leverage countries' existing climate commitments.

By applying these three steps '**acknowledge, measure, act**' in relation to imported carbon, the carbon loophole can be addressed, solving an important piece of the emissions pie to ensure total emission reductions are commensurate with the global agreement made in Paris in 2015 to limit global warming to below 2 degrees.

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DEFINITION OF KEY TERMS

In this document carbon refers to carbon emissions and other greenhouse gas emissions, that can cause global warming. *Consumption-based carbon emissions* refer to all embedded carbon emissions attributed to consumption, regardless of where they occur, including both domestically generated emissions as well as emissions caused by the production of imports. Production-based carbon emissions on the other hand – also called territorial or domestic emissions - refer only to emissions generated within a country's border and overseas territories under its control.

Imported carbon emissions refer to carbon emissions attributed to the consumption of products and services imported from other countries. Due to many EU countries importing a significant portion of their manufactured products from other countries, the two concepts do considerably overlap for the countries under consideration.

Scope 3 emissions refer to indirect carbon emissions as a result of a company's activities, such as the extraction and production of purchased materials and fuels, and transport-related activities in vehicles not owned or controlled by the reporting entity, outsourced activities, waste disposal, etc. It does not refer to indirect emissions from the consumption of purchased electricity, heat or steam. In this report, the main focus is on upstream Scope 3 emissions as occurring in the supply chain.

Scope 1 and 2 emissions on the other hand refer to carbon emissions from sources that are owned or controlled by the organization (Scope 1), such as emissions from stacks, manufacturing processes and vents, and from company-owned/controlled vehicles; and to indirect emissions associated with the organization's consumption of imported/purchased electricity, heat, steam and/or other energy sources (Scope 2).

INTRODUCTION

This report first provides a concise overview of the extent of the EU's carbon loophole, providing evidence that imported carbon is a 'material'⁴ issue for Europe. Since the 1990s Europe has witnessed a rapid increase in imported carbon as a result of companies outsourcing part of their production to overseas locales, and has seen a further spike in such emissions after China's admittance to the WTO in 2002. Small increases in trade volume from carbon-intensive countries can therewith lead to proportionally high increases in consumption-based carbon emissions.

Several Scandinavian countries for instance have experienced a considerable increase in consumption-based carbon emissions, having become net importers of carbon emissions considering the trade balance between embodied emissions from exported and imported goods. Not only can we speak of a carbon loophole: the consumption of imported goods often also comes with an elevated embodied land, materials, and water footprint, pointing towards the existence of various resource loopholes.

Subsequently the report investigates the uptake of (mandatory) Scope 3 reporting for private companies, as well as the state of play for consumption-based carbon accounting at a country level for a select number of European Union countries. The latter comprise the UK, Sweden, Denmark, The Netherlands, Belgium, France, Ireland, and Luxembourg. For most countries considered, annual consumption-based carbon accounting turns out to not be commonplace yet; and with a need for more

⁴ Material and 'materiality' relates to the significance of the issue under consideration

standardization and harmonization around the methodologies used, as well as how the results of such exercises can effectively inform a country's climate policies.

Add to this that mandatory Scope 3 reporting for companies has hardly been introduced yet in Europe. This means that the disclosure of such data entirely relies on the level of commitment a company shows to investigating and disclosing its full carbon impact, in addition to the level of external pressure from other sources that may spur a company into reporting on Scope 3 carbon. A number of reasons exist, as discussed in the report, that impede the uptake of consumption-based / Scope 3 carbon reporting at a country or company level, including: that it could make the reporting party look worse than if it would report only on production-based respectively Scope 1 & 2 carbon emissions; lack of data; and methodological complexity.

A non-exhaustive overview of current and emerging policy responses from the same set of countries, as well at the E.U. policy level, show that most policies in Europe have not explicitly been intended and designed to address imported carbon. Those policies that do very directly and purposely target imported carbon, have so far not been effected and implemented and therewith remain in the proposal stage.

Nonetheless, recent European Union funded research as conducted by the Carbon-CAP project provides early insights in what effective policy instruments to curb imported carbon emissions may look like. In addition, a number of policy suggestions are provided that can help policy makers to expand on, enhance and/or optimize existing or emerging policies to also or better incorporate consumption-based carbon emission considerations.

This report concludes with a set of conclusions and recommendations, outlining main actions for policy makers in the various European countries to start creating greater

awareness and transparency around the issue of imported carbon emissions and to help nudge stakeholders to identify ways to close the carbon loophole.

Annex 1 and 2 further elaborate on the recommended actions policy makers can take, and provide details on goal, rationale, and implementation of a concise set of recommended policy measures that use different approaches and mostly build on existing or emerging policies to start tackling imported carbon. Of these proposed measures, particularly using the power of the public purse to reduce emissions by introducing, strengthening, and scaling up green procurement practices, appears to receive the critical buy-in from a wide range of stakeholders that would allow for such policies to be rapidly effected and implemented.

IMPORTED CARBON EMISSIONS, AN OVERVIEW

Disclaimer: *comprehensive, publicly available data sets on consumption-based carbon emissions are relatively limited beyond the few European countries, which actively gather and publish such data on a regular basis. The data, figures and tables included in this section have been derived from studies published between 2012 and 2015, providing data no more recent than 2009. A new 2018 report, commissioned by ClimateWorks Foundation, helps further quantify the global loophole of carbon embedded in traded goods. In addition, the focus for this section has been on using data to show general trends and subsequently inform policy, rather than a focus on exact values.*

Although easily overlooked, the embodied carbon emissions associated with the consumption of imported goods has been on a significantly upward trend in Europe in the past two decades, often cancelling out part or all of the domestic carbon reduction gains achieved by individual countries.

When considering the worldwide carbon emissions embodied in trade for instance, approximately 8.9 gigatons (Gt) of CO₂, or 25% of all carbon emissions from fossil-fuel burning according to 2015 data, were emitted for the production of goods ultimately consumed in a different country.

Figure 1 displays arrows for the embodied emissions in trade by the largest net exporters and net importers of such emissions, based on the top 30 of global flows of embodied carbon. Countries on the map are color coded according to their consumption-based carbon emissions per capita (yellow = highest; dark green = lowest). The United States and European Union come out first and second in terms of net carbon importing countries/regions. ⁱⁱ

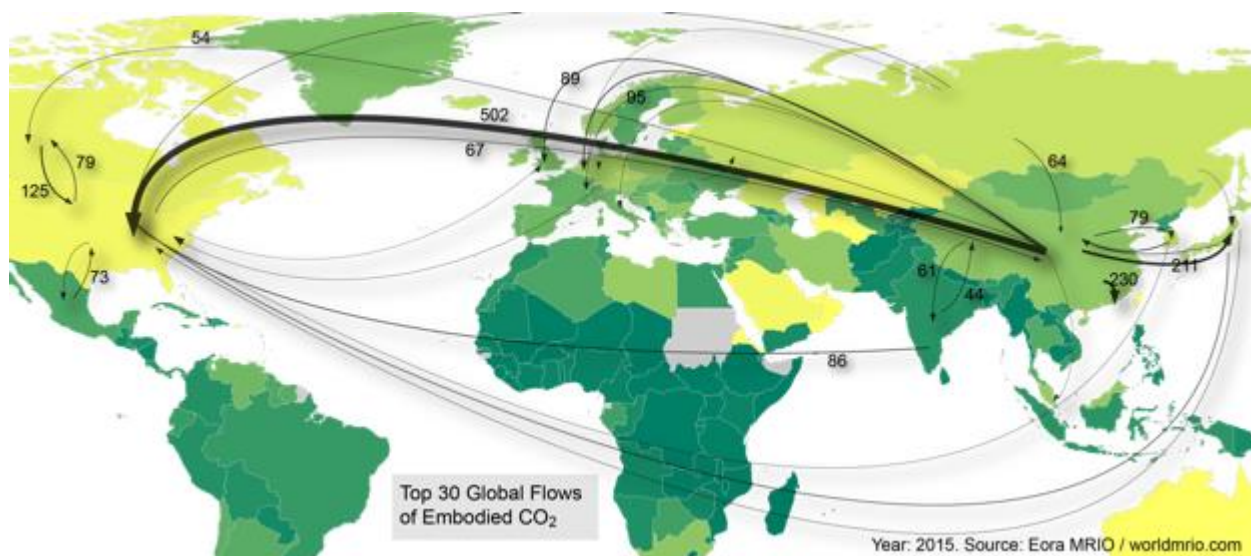


Figure 1 Largest interregional fluxes of emissions embodied in trade (Mt CO₂ y⁻¹).ⁱⁱ

Europe's imported carbon surplus

For the European EU-27⁵ region, total carbon emissions over the period 1990 to 2015 were on average 21% higher under a consumption-based approach than under a

⁵ The 27 European Union member states; from 1 July 2013 the EU has 28 member states

production-based approach, with differences of 25-30% in recent years^{6,ii} A sharp increase in consumption-based emissions can be seen from 2002 onwards, when China joined the WTO, therewith enabling increased trade flows between China and other countries. ⁱⁱⁱ

The EU-27 carbon emissions consumption surplus reached an absolute peak in the years leading up to 2008, relapsing in 2009 as a result of the global financial crisis.

⁶ The production based approach is the official means of reporting on a country's carbon footprint, and refer to the emissions that occur within national territory and offshore areas over which the country has jurisdiction.

Figure 2 shows the absolute annual emissions of consumption- vs. production-based CO2 emissions for the EU-27 region. It exemplifies how consumption-based emissions experienced a peak after 2002 once China was admitted to the WTO, and the subsequent drop in these emissions after 2008 with the onset of the financial crisis. Although emissions have not reached 2008 levels again, the difference between consumption- and production-based emissions isn't decreasing, pointing towards a persistent 'carbon loophole'.

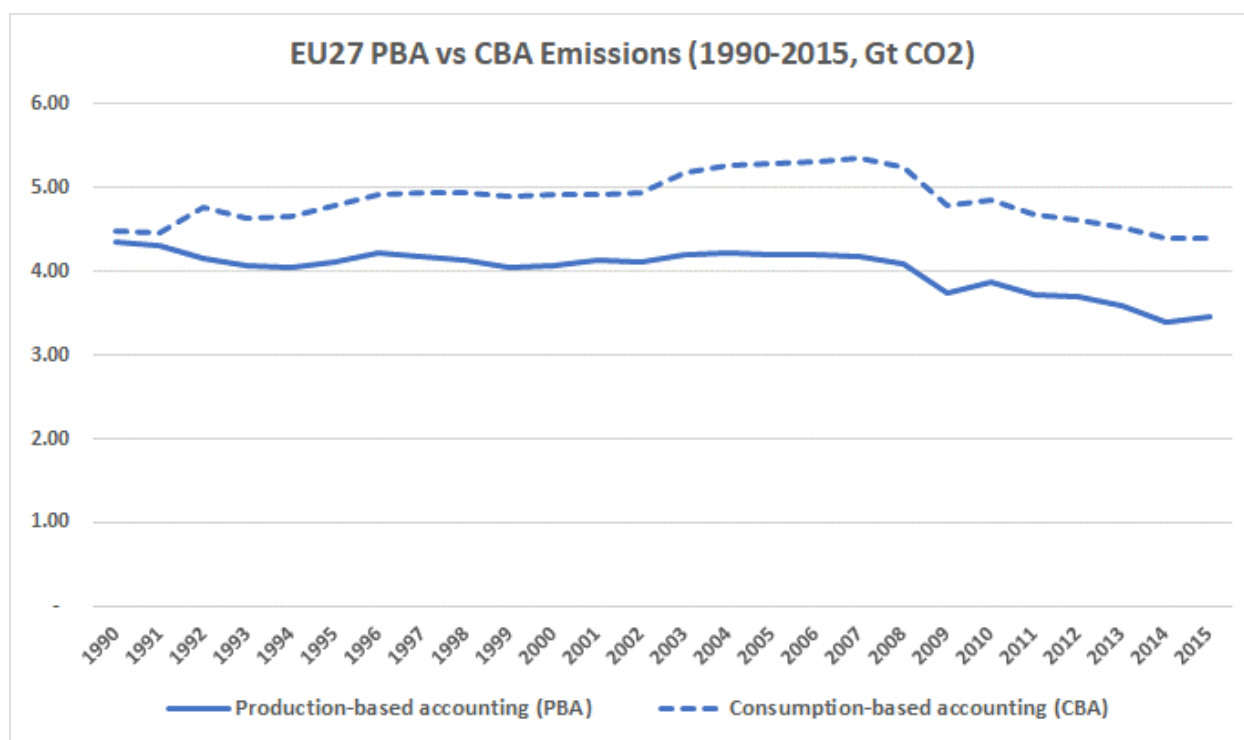


Figure 2 Difference between annual production-(PBA) based vs. consumption-(CBA) CO2 emissions for EU-27, period 1990 – 2015.ⁱⁱ

Top importing countries

Within the European Union, a number of countries can be considered to be top importers of carbon. Based on 2015 data, Germany, the UK, France, Italy, and Spain instead constituted the top importers of carbon in absolute terms. **Error! Bookmark not defined.**

Top 5 absolute importers of carbon – in Mt CO ₂	
Germany	395 Mt
UK	368 Mt
France	281 Mt
Italy	233 Mt
Spain	184 Mt
Rest of EU	809 Mt

** Net embodied carbon, as balance (in %) between embodied carbon in a country's imports vs. exports*

Table 1 Top 5 of importers of embodied carbon in the European Union, as net and absolute importers based on 2015 data ⁱⁱ

If we subsequently consider the absolute import of carbon per capita and per each 1 million US dollar of Gross Domestic Product (GDP), countries such as Luxembourg, Slovakia, and Lithuania score high in both lists as per 2015 data. Although tiny Luxembourg takes first place for percentage of net carbon imports, it is worth keeping in mind that the country's population roughly doubles on weekdays with commuters from Belgium, France and Germany coming in. This is further exacerbated by Luxembourg's 'tank tourism', whereby residents from nearby countries fill up their car's petrol tank in Luxembourg to take advantage of lower prices. Countries featuring in the top 5 of absolute importers per capita (Table 1) do relatively well for absolute import per capita and per GDP, with only the UK making it into the top 10.

Top 10 importers of carbon/capita - in ton CO ₂ per person		Top 10 importers of carbon/GDP - in ton CO ₂ per 1 million US\$	
Luxembourg	27.1	Slovakia	472
Finland	7.9	Lithuania	419
Slovakia	7.6	Estonia	310
Austria	7.3	Latvia	294
Sweden	6.7	Cyprus	283
Denmark	6.3	Luxembourg	267
Netherlands	6.2	Greece	264
Lithuania	5.9	Bulgaria	261
Ireland	5.7	Czech Republic	260
UK	5.7	Slovenia	235

Table 2 Top 10 of importers of embodied carbon in the European Union, as absolute importers per capita and per Gross Domestic Product (in millions US\$), based on 2015 data ⁱⁱ

While nearly any imported product is responsible for a certain amount of carbon emissions generated in its value chain up to the point of import, imports from key trade partners in emerging economies are often more carbon intensive in their manufacturing processes than similar products imported from other European countries. Considering many European countries have outsourced an increasing number of products to overseas developing and emerging economies such as China and India since the 1990s, we can witness the emergence of so-called 'carbon leakage', whereby the production of domestic products is moved to more carbon-intensive economies and with the resulting products subsequently imported.

Carbon intensity per unit

If comparing the carbon intensity on a per unit basis, importing a product from such economies can be significantly more carbon intensive. Figure 3 shows the mean carbon intensity of imports & exports (2015 data) to and from the largest net importing/exporting countries. In this overview, products exported from Russia came with the highest carbon intensity per each US dollar of trade, while products exported from France came with the lowest carbon intensity. On the basis of these data it can be concluded that the mean carbon intensity of products made for instance in:

- Russia was almost 14 times higher than in France;
- India was about 13.5 times higher than in France; and
- China was nearly 10 times higher than in France.

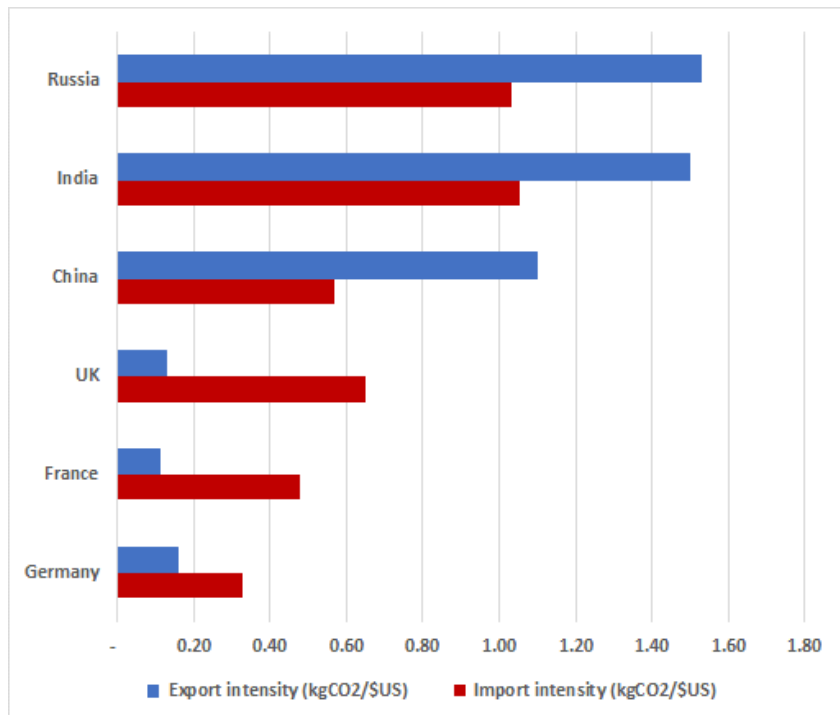


Figure 3 Mean CO₂ intensity of imports & exports as kgCO₂ per 1 USD of trade (2015 data) ⁱⁱ

It is worth keeping in mind hereby that France's low emission profile may in part be due to its widespread use of nuclear power for energy generation, although the carbon intensity of product manufacturing the UK is not far off.

Imported carbon surplus by consumption category

To get an understanding of which categories of products are mainly responsible for the import of carbon emissions, the example of an average household in Stockholm, the capital city of Sweden, is being used.

Figure 5 show two bar charts, representing the carbon footprint of an average Stockholm, Sweden based household, consisting of 2 people and with an annual income of US\$47,000.

The carbon footprint is broken down by category, comprising transportation, housing, food, goods, and services. Figure 4 shows the sub-categories included in each main consumption category, with **blue** indicating direct emissions (motor vehicle fuel and onsite energy sources) and **green** indicating indirect emissions (all other categories).

Figure 5 subsequently shows for the same consumption categories the imported (“abroad”) versus domestic emissions. A surplus can be noticed for imported emissions in the consumption categories food, goods, and to a lesser extent services, while for transportation imported emissions also take up a significant share of total emissions.^{iv}

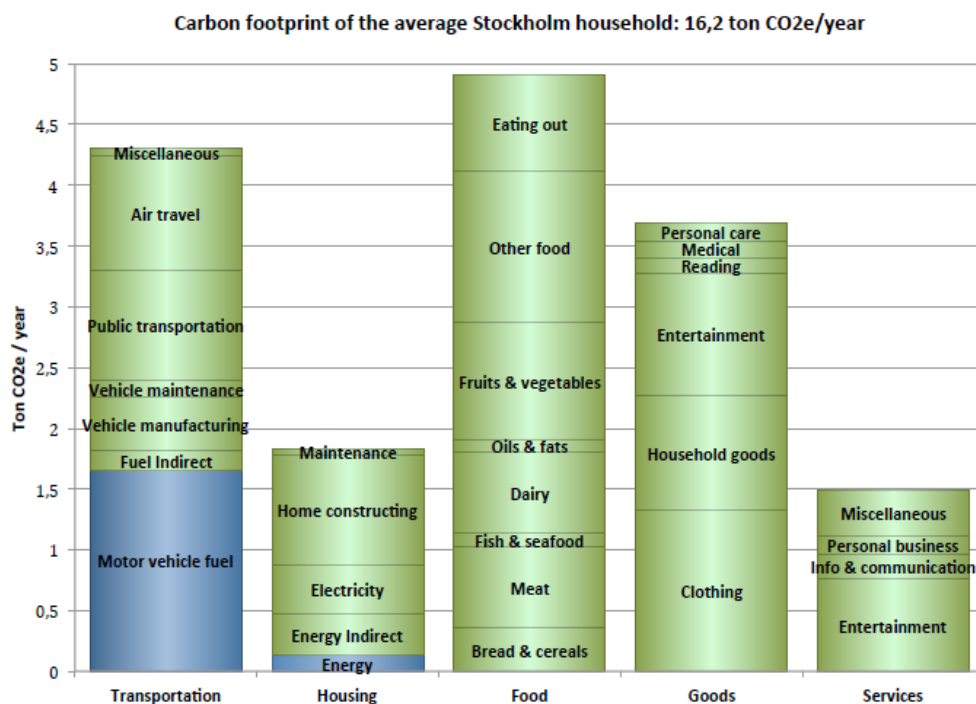


Figure 4 Consumption-based carbon footprint of an average Stockholm-based household by (sub)category, and by direct (blue) and indirect (green) emissions ^{iv}

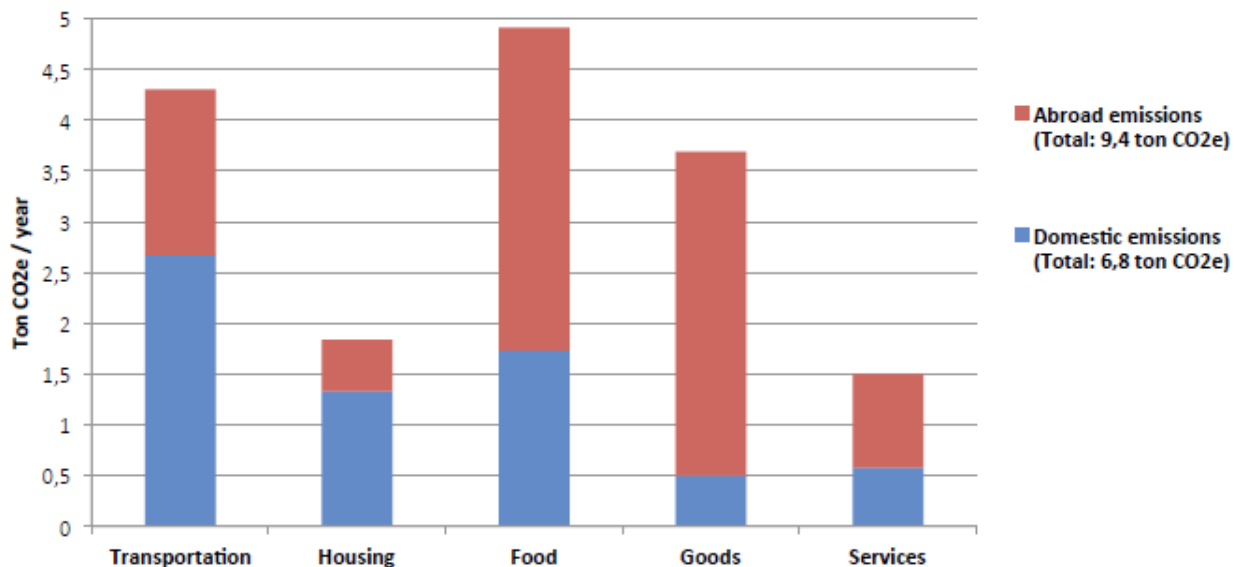
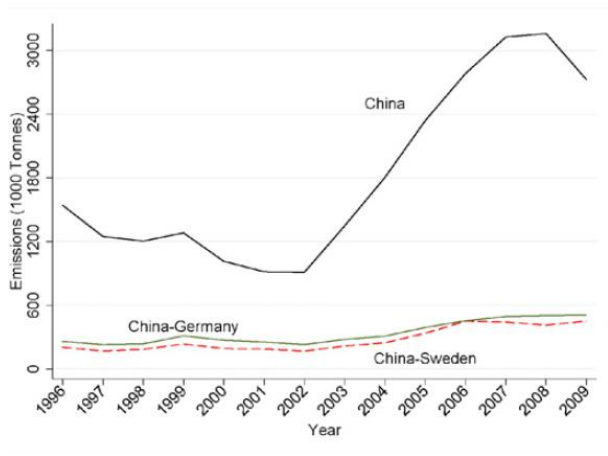


Figure 5 Consumption-based carbon footprint of an average Stockholm-based household, by category and by domestic and imported emissions ^{iv}

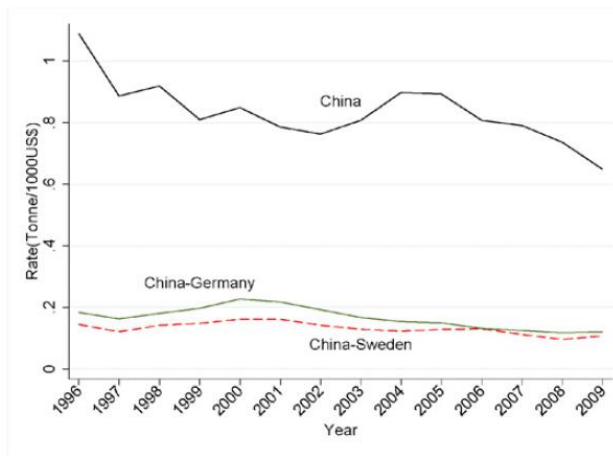
An interesting comparison exercise in this respect would be to compare the actual imported carbon emissions as a result of flows from a (presumed) carbon-intensive economy with the estimated imported carbon emissions if these imports would have been substituted by imports from other European countries.

Such a substitution exercise has been conducted for Denmark for the period 1996 to 2009. Denmark shows a sharp increase in Danish imported emissions after the 2002, when China was admitted to the WTO. Denmark's other major trade partners are Sweden and Germany. If the Danish imports coming from China would have been fully substituted by imports from Sweden and/or Germany, the spike in embodied emissions from import observed after China's admittance to the WTO would likely not have occurred, resulting in considerably lower embodied emissions from import. Small increases in imports from China therewith have a relatively large influence on total imported emissions.^v

Figure 6 shows the results of the substitution exercise, as actual emission levels (on the left) and as emission intensity (on the right) for the period 1996 to 2009, based on carbon intensities for sectors covered in input-output tables. The black lines show actual emissions resp. the emission intensity of goods imported from China. The green lines show the actual emissions and emission intensity if those goods would have been produced and imported from in Germany. The red dashed line shows the same for those goods if they had been produced in Sweden. It is worth noting that if Danish imports from China would have been replaced by imports from Sweden and Germany, the total cost of such imports would likely have been higher, one (although not the only) reason being the higher cost of cleaner production.



(a) Counterfactual Emissions Levels



(b) Counterfactual Import Emission Intensity

Figure 6 Comparison of embodied carbon emissions if Denmark's imports from China would have been substituted by imports from Germany or Sweden ^v

CONSUMPTION-BASED CARBON REPORTING – STATE OF PLAY

Company level

When considering the role of companies in consumption-based carbon as a result of imports, we refer mainly to 'Scope 3' emissions, which are indirect carbon emissions as a result of a company's activities including outsourcing.

Various schemes exist around the world that mandate companies to report on Scope 1 and 2 emissions. Mandatory Scope 3 reporting however is currently still almost non-existent in Europe. Table 3 provides an overview of mandatory reporting schemes as per mid-2015. Although Scope 3 reporting is being encouraged under several schemes, the only mandatory Scope 3 reporting occurred as part of the California / United States schemes for a small number of companies, being entities that supply fuels and greenhouse gases, such as carbon and methane. These companies have to report on the resulting emissions if the products they supply were completely combusted, released, or oxidized, such when used as sold products to power vehicles (downstream Scope 3 emissions). They do not have to report on Scope 3 emissions upstream in the supply chain, such as from the extraction of fuels.^{vi}

JURISDICTION	LEVEL OF REPORTING	DIRECT EMISSIONS (SCOPE 1)	INDIRECT EMISSIONS FROM PURCHASE OF ELECTRICITY, HEAT, OR STEAM (SCOPE 2)	OTHER INDIRECT EMISSIONS (SCOPE 3)
Australia	Corporate and facility	✓	✓	Encouraged
California	Facility (and corporate) ^a	✓	b	✓ ^a
Canada	Facility	✓		
European Union	Facility	✓		
France	Corporate	✓	✓	Encouraged
Japan	Corporate and facility	✓	✓	Encouraged
Mexico	Corporate and facility	✓	✓	
Turkey	Facility	✓		
United Kingdom	Corporate	✓	✓	Encouraged
United States	Facility (and corporate) ^a	✓		✓ ^a

Table 3 Overview of mandatory carbon reporting schemes around the world ^{vii}

For Europe, so far only the UK and France have introduced mandatory carbon reporting, covering Scope 1 and 2, for select companies. They both apply the ‘comply or explain’ approach and don’t mandate a specific methodology for reporting, although the use of accepted reporting standards is encouraged. This could potentially make the comparability of reported data challenging.

In the UK, quoted companies are required to report their annual GHG Scope 1 and 2 emissions in their directors’ report, or if they are of strategic importance, in the strategic report, from October 2013 onwards. Quoted companies are considered those that are UK incorporated and whose equity share capital is officially listed on the main market of the London Stock Exchange or in a European Economic Area; or is admitted to dealing

on either the New York Stock Exchange or NASDAQ. Reporting of Scope 3 emissions is encouraged, albeit entirely voluntary. Reported emissions must also be expressed as an intensity ratio, such as emissions per unit of sales revenue or floor space.^{vii}

For France, mandatory reporting was introduced for publicly listed and non-listed companies with more than 500 employees and more than a €100 million turnover from mid-2011 onwards, and from mid-2017 financial institutions will have to report on their emissions as well. These include e.g. asset managers, insurance companies, and pension and social security funds. In 2015 the reporting requirements for listed companies were strengthened, as part of the Energy Transition Law, through a 'comply or explain' approach. This means that listed companies are now expected to also disclose significant indirect emissions occurring in their up-and/or downstream supply chain. France is herewith playing a European and global frontrunner role.^{viii}

Country level

Increasingly European countries are reporting on their consumption-based carbon footprint, although very few countries do so on a regular, annual basis. Table 4 shows an overview of the state of consumption-based carbon reporting at a select number of European Union countries. Of these countries, only the government of the UK reports annually, while both Sweden and the Netherlands have expressed interest in doing so. France reports its consumption-based emissions every few years, usually at 3 year intervals.

Country	Government initiated	Annual reporting	Data series	Methodology
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UK	Yes, DEFRA	Yes	1997-2013	MRIO
Sweden	Yes, EPA	No, 2010 & 2015 studies	2003 data	EE-MRIO
Denmark	Yes, Danish Energy Agency	No, 2014 study	2003 data	EEIO (FORFAST model)
The Netherlands	Yes, Statistics Netherlands	No, 2014 study	1995-2011	MRIO (WIOD and GTAP databases)
Belgium	Yes, Flemish Environmental Society	No, 2010 study	2004 data	n.d.
France	Yes, French Environment Ministry	No, every 3-5 years	1990-2015	IO & trends in import/export volumes
Ireland	Yes, ESRI	No, 2008 study	1990-2005	n.d.
Luxembourg	No	No, 2014 study	1995-2009	Hybrid EEIO-IO model

IO Input-Output model

MRIO Multi-region Input-Output model

EEIO Environmentally Extended Input-Output model

Table 4 Overview of consumption-based carbon reporting at select EU countries

The majority of countries use Multi-region Input-Output models (MRIO) and/or Environmentally Extended Input-Output models (EEIO). MRIO models extend country based input-output models to dynamically incorporate flows between multiple regions. EEIO extend the

Multi-region Input-Output (MRIO) tables show the economic interconnections among various industries located in different geographic regions. A MRIO table records the flow of products from each industry in each included country as a producer to each of the industries in each of the countries as consumers.

Input-output analysis can be “**environmentally extended**” (EEIO)) by integrating information on, for example, energy or material use or pollution. Because the input-output model is in monetary units and the environmental extension is in physical units (e.g. tons of carbon) a number of assumptions have to be made in order to properly integrate these inputs and interpret the results.

economic input-output models with environmental data to quantify environmental impacts.

With countries using different models, at the moment there is no standardized methodology yet to report on consumption-based carbon emissions, although there is widespread agreement on using EE-MRIO models as being a favorable approach.

Barriers to uptake

A number of barriers hinder and slow down the uptake of Scope 3 / consumption-based carbon emission accounting and reporting at respectively a company and country level. These include:

- Data and methodology issues raising concerns about administrative hurdles and adding to companies' regulatory burden;
- Concerns about WTO compliance / free trade rules;⁷
- The risk of increased 'carbon leakage' if increasing regulatory pressure on companies, which -is feared- could lead to such companies (further) relocating their offices and production to low-cost, less regulation-heavy and therewith potentially more carbon-intensive economies overseas;⁸

⁷ Measures aiming to regulate the embodied carbon of products may fall within the ambit of WTO's Technical Barriers to Trade (TBT) agreement and/or the General Agreement on Tariffs and Trade (GATT), and pending how they are designed might be considered non-compliant with WTO rules.

⁸ Under current EU-ETS rules for example, industries subject to the European carbon emission trading scheme BUT considered at risk of 'carbon leakage' receive up to 100% free allocation of carbon credits. Research by CE Delft found that under the 2009 EU-ETS third trading period credit allocation, about 60% of sectors had been deemed at risk of carbon leakage, representing 95% of industrial emissions covered by the system.

- Ramifications regarding multilateral policymaking on climate change mitigation (UNFCCC);⁹
- Lack of standardized accounting guidelines at country level; and
- Last but not least, reporting and subsequent disclosure can make many European companies / countries look like poor carbon performers compared to their respective Scope 1 and 2 / production-based carbon emissions performance.

The UK for instance serves as a clear example of the importance of the last barrier mentioned. In 2006 UK's DEFRA commissioned a study in order to produce a time series of the UK's consumption-based carbon emissions. When it came to publishing the results, it met considerable opposition from politicians and senior civil servants which resulted in a significant delay in the release of the data. The findings of the study showed that consumption-based emissions from import had gone up by 20% from 1990, while territorial emissions had come down by 20% over the same period.

As such, the analysis questioned prevailing views on the success of climate policy in the UK and was likely to generate considerable media attention. The UK government response was one of defense, failing to see these additional data as an opportunity for policy making. Eventually it took the UK 8 years to go from first estimates to serious consideration of imported emissions by the Committee on Climate Change.^{ix}

⁹ For instance, 'penalizing' goods from carbon-intensive countries like China can affect sentiments when it comes to jointly rallying for a strong global climate agreement

POLICIES ADDRESSING IMPORTED CARBON

This section provides an overview of policies commonly applied across EU countries, which either indirectly (no explicit policy intent) or directly (explicit policy intent and design) target imported carbon emissions. In addition, the effectiveness of policy measures is briefly considered, based on the European research project Carbon-CAP, which has assessed a range of potential policy measures for EU countries to curb 'Scope 3' carbon emissions arising from the consumption of products and services. Finally, a number of recommendations for policy action are provided -mostly building on existing or emerging policy-, which policy makers can pursue to start tackling imported carbon pending the level of ambition and the preference for a top-down or bottom-up approach.

Indirect policy measures

Based on an assessment of direct and indirect policies targeting consumption-based carbon emissions in a select number of (considered) progressive EU countries, it can be concluded that a majority of the countries assessed¹⁰ as well as the overarching EU legislation have not designed policy measures to specifically target imported carbon emissions.

Many EU countries however have policies and/or programs in place, which indirectly may impact on reducing the embodied carbon of imported goods, even if there has been no explicit design intent. They provide for example support to or have in place a

¹⁰ The UK, Sweden, Denmark, The Netherlands, Belgium, France, Ireland, and Luxembourg; in addition, Norway as a close neighbor to the Scandinavian EU countries was included as well.

sustainable trade program, may have initiatives around sustainable procurement, aim for reducing their dependency on imported fossil fuels, and increasingly look into the concept of circular economy in order to promote greater efficiency and effectiveness in resource use. The EU as well as quite a few EU member countries have also introduced mandatory sustainability reporting for companies over a certain size. Finally, a minority of countries have considered taxing meat consumption as a result of its high environmental impacts.

The following list of measures provides a concise overview of the main indirect policy instruments introduced by the EU or its member states, accompanied by examples:

- Sustainable trade programs – mainly addressing agro/forestry commodities produced in developing countries
 - **Sustainable Trade Initiative (IDH):** Established in 2008 as a joint initiative of the Dutch government, private companies, NGOs and trade unions. Switzerland and Denmark contribute financially as well. IDH engages with stakeholders in about 40 countries around the world to drive greater sustainability in the value chains, with a focus on smallholders. It runs programs through precompetitive public-private partnerships, and co-invests (max 50%) in 11 agricultural sector programs and in sustainable land management models for 11 high biodiversity-value landscapes. IDH also engages with over 250 global corporates, and has set targets such as 100% sustainable palm oil by 2020.^x
 - **Roundtables on sustainable commodity production (e.g. soy, palm oil, etc):** The Roundtable on Sustainable Palm Oil (RSPO) for instance was established in 2004 with the objective of promoting the growth and use of sustainable oil palm products through credible global, voluntary standards, certification, and engagement of stakeholders to create demand for sustainable, certified palm oil.^{xi}

- **Certification of 'fair'/sustainable products:** The FAIRTRADE Max Havelaar label from the Netherlands, the world's first Fairtrade certification mark, was launched in 1988 to distinguish Fairtrade products from conventional ones. Starting off with coffee, the label now covers many food and beverage products. It has a range of different standards, all of which include a number of social and environmental criteria including carbon emissions. It also has a Climate Standard for smallholder producers and rural communities that want to gain access to the carbon credits markets through their products.
- Sustainable government procurement programs – addressing the purchasing of products whether domestic or imported
 - **Sustainable purchasing criteria by product/service group & goal:** In 2007 the Dutch government started developing sustainable purchasing criteria for all major product and service groups, with minimum criteria which are regularly evaluated and if needed amended in order to raise the bar amongst suppliers. A range of environmental impacts including carbon is assessed and converted to monetary values, with an imposed aggregated cap per specified unit. The national government aims to use the criteria for 100% of its purchases and since 2010 achieves or comes very close to this goal (99.8%).^{xi}
 - **Mandatory procurement rules:** In Denmark, central government departments and related agencies are required to procure sustainable timber for buildings, furniture and paper.
 - **Voluntary programs and guidelines:** The European Commission's voluntary Green Public Procurement (GPP) initiative has been designed to let purchasers across the public sector take account of environmental factors. GPP sets minimum, 'core' criteria as well as best practice 'comprehensive' specifications for each product group, As GPP is a voluntary instrument, EU

member states are free to determine to what extent they wish to implement it.^{xii}

- Circular economy (incentive) programs
 - **“The Netherlands as a Circular Hotspot” program:** The campaign aimed at positioning the Netherlands internationally as a circular hotspot during the time of the Dutch EU presidency in 2016 and at sharing best practices and learnings with companies and governments around the world through a variety of channels.
 - **Circular economy business model funding competitions:** The UK government has run several competitions through the Technology Strategy Board / InnovateUK for innovative CE concepts. For instance by providing a capped investment for collaborative R&D, encouraging companies to rethink the design of products, components and/or services, with the potential to reduce their environmental impact by a factor of four.^{xiii}
 - **Pilot projects for integrated supply chain management:** The Flanders federal government has made integrated supply chain management one of its focus points towards creating a circular Flemish economy. Initial target sectors for strategic pilot projects are the construction sector, chemical and plastics industry, textile and carpet industry and the paper.^{xiv}
 - **Tax cut for product repairs:** In 2017 the Swedish government started introducing VAT tax breaks and tax credits on certain product repairs, in order to prolong the lifetime of specific product groups and therewith positively impact on resource use and embodied carbon emissions.^{xv}
 - **Circular economy policy package:** In December 2015, the European Commission published its CE Policy Package, which aims to extract the maximum value and use from raw materials, products and waste by stimulating re-use and industrial symbiosis; promoting reparability, durability,

recyclability and, where applicable, bio-degradability of products; developing quality standards for secondary raw materials; and fostering energy savings and reducing GHG emissions.^{xvi}

- Mandatory sustainability reporting
 - **EU Directive on Non-Financial Reporting:** The Directive requires European companies with more than 500 employees to produce an annual sustainability report. Europe wide more than 6000 companies are affected by the Directive. EU member states were given two years to include the directive in their national policy frameworks, with companies having to submit their first reports in 2018.^{xvii}
 - **'Comply or explain' mandatory reporting:** Several governments, stock exchanges, and financial market or industry regulators have introduced 'comply or explain' mandatory reporting. UK and France for instance have introduced mandatory carbon reporting, covering Scope 1 and 2, for select companies, applying a 'comply or explain' approach.

This means that companies which are obliged to report, do not always have to comply with every rule in the reporting guidelines if a certain rule is deemed inappropriate due to particular circumstances. The company must, however, clearly state that it has not complied with the rule, along with an explanation of the alternative solution and the reasons for this. The company's explanation should illustrate how its practices are consistent with the relevant principle and contribute to good governance.

- Fossil fuel phase out¹¹
 - **Carbon tax on fossil fuels:** In 1991 Sweden introduced a CO₂ tax on fossil fuels in 1991, with exceptions on ethanol, methanol, other biofuels, peat and wastes. A diversified tax level is applied, with consumers paying more than industry. The imposed tax does not differentiate between the carbon intensity levels of taxed fuels, with for instance low and heavy fuel oil being taxed similarly.^{xviii}
 - **Renewable energy / energy efficiency subsidies & support programs:** At least 20 out of the 28 EU countries have introduced Feed-In-Tariffs to promote local renewable energy production. In some countries the FIT comes combined with quota systems.
 - **Electric and low-emission vehicle subsidies & support programs:** in Sweden, very low emission vehicles can receive a rebate, while gas-powered cars, plug-in hybrids and electric cars are eligible for a tax reduction until the end of 2019. Furthermore, the Swedish government considers the introduction of a bonus-malus scheme for cars, that pushes the Swedish fleet composition more rapidly towards the EU objectives of average CO₂ emissions of 95 g/km for new cars by 2021.^{xix}

- Tax on meat
 - **Sweden:** Proposals have been raised in Sweden in 2013 and 2015 to tax meat products heavily; although to date no such legislation has been introduced.^{xx}

¹¹ Many countries import fossil fuels to power energy generation for purpose of e.g. supplying electricity or to fuel vehicles. The extraction, processing and transport of these fossil fuels is associated with embodied carbon emissions

- **Denmark:** In early 2016 Denmark considered proposals to introduce a tax on red meat. A government think tank recommended an initial tax on beef, with a view to extending the regulation to all red meats and in future having it apply to all foods at varying levels depending on climate impact.^{xxi}

Direct policy measures

A limited number of policy measures have been proposed by the EU or its member states to directly target imported emissions. These mainly include border tax adjustments and considering setting a reduction target for imported emissions. So far none of these has made into enacted policy or legislation.

Direct policy measures as proposed by the EU or its member states comprise:

- Border tax adjustments / carbon inclusion mechanism
 - **Tax imports of energy intensive goods:** The European Union has been discussing taxing imports of energy intensive goods as part of pending EU-ETS reform.
 - **Carbon tariff:** In 2008 the EU considered introducing a carbon tariff on goods imported from countries where carbon emission policies do not match EU standards; the importing companies would have to buy EU-ETS carbon credits. France was strongly in favor of this approach, as it would create a greater level playing field for heavy industries in the EU competing with similar but more polluting industries overseas.^{xxii}
 - **Carbon Inclusion Mechanism - I:** In 2014 France proposed a Carbon Inclusion Mechanism for certain sectors. Importers would be included in EU-ETS and surrender volume of carbon allowances equivalent to what a European manufacturer would have acquired on the market for the same quantity of product. France did not receive EC support for its proposal for fear of such a

mechanism being a deal-breaker in the then upcoming climate talks at COP21 in Paris in late 2015.^{xxiii}

- **Carbon Inclusion Mechanism - II:** In early 2016 France brought up the Carbon Inclusion Mechanism again, as part of a proposal by France to include a soft price collar for EU-ETS in light of a pending overhaul of the carbon trading scheme.
- Target for carbon emissions attributed to foreign imports
 - **Setting a reduction target for imported carbon:** This has been actively considered by Sweden in 2015, although eventually the government decided on deferring the decision for time being.

Effectiveness of policy measures

The effectiveness of policy measures to curb consumption-based emissions differs considerably. In order to get a first feel for how effective policies are likely to be, it is worth considering the outcomes from the Carbon-CAP project (Consumption-based Accounting and Policies), a European project which ran from October 2013 to December 2016. Carbon-CAP aimed to identify an effective climate policy mix – in the EU and internationally – to address the increase in consumption-based emissions. Furthermore, the project aimed at quantifying the mitigation potential of underexploited strategies that target the consumption of products, and therewith influence emissions embodied in trade.^{xxiv}

Carbon-CAP assessed 33 policy instruments, covering products and services in the transport, manufacturing, food, buildings, paper/plastics and textiles sectors. These sectors were considered to provide high potential for embedded carbon reduction through targeted policy measures. An overview of all 33 policy measures assessed by

the Carbon-CAP team, with a brief description of each policy measure, is included in the appendix.

All policies considered targeted Scope 3 carbon emissions, while policies that are directly targeted at Scope 1 emissions associated with product characteristics (e.g. vehicle, building and appliance efficiencies), as well as traditional supply-side policies targeted for instance at clean energy production were excluded from the assessment. Included were policies that can affect consumer choices over modes and use patterns, and consumer influence over Scope 2 emissions, such as enhancing low carbon energy production.

Carbon-CAP subsequently divided these policies into three categories being (i) government policies aimed at influencing final consumer choices; (ii) government policies aimed at the intermediate stages of production; and (iii) government policies targeting supply chain management. Subsequently each policy was assessed against a number of criteria typically used in making policy decisions. A list of all policy measures considered is provided in Annex 3.

Carbon-CAP criteria applied for the ranking of policy instruments:

1. *Is an instrument likely to be sufficiently acceptable in order for it to be implemented? – considering four aspects of ‘acceptability’:*

- *Economic: Does the instrument place the economic burden on members of society best able to bear that burden, or onto the poorest members?*
- *Legal: Is the instrument likely to face legal challenges it will be unable to withstand?*
- *International/ political: Will the instrument raise trade concerns that may affect international political acceptability?*
- *Institutional: Will the instrument encounter administrative challenges due to constraints on institutional capacity?*

2. *If an instrument was implemented, how well could it bring about changes in consumer behavior?*

A key finding of the Carbon-CAP project has been that instruments, which change the characteristics of products available to consumers should have priority¹², while policies that affect consumer choices between products on the market should be applied at a second stage and as a way to support the priority measures. A main reason for this prioritization is that mainstream consumer choice is quite difficult to influence, when consumers have equal access to high and low carbon goods that meet the same needs.

Table 5 provides an overview of Carbon-CAP's ranking of selected policies (not including all 33 policies considered), with the first tier or "rank" containing a list of instruments that are judged to score strongly across the four *criteria of acceptability* applied by the project. These are economic burden (distributional impact on consumers), legal challenges (WTO rules and EU legislation), international/political acceptability, and institutional capacity challenges. The third ranked instruments are policies for which there is deemed to be at least one significant barrier to acceptance. Instruments covered by the second rank have scored only medium in acceptability on most categories.

¹² An example of a policy measure affecting the characteristics of available products are the requirements put in place through the European Ecodesign Directive, which effectively bans the least energy efficient appliances from access to market. Although the Ecodesign directive is focused on operational energy use, similar 'minimum entry requirements' could be put in place for the embodied carbon content of products.

1 st rank	2 nd rank	3 rd rank
<ul style="list-style-type: none"> • Approved technology lists • Supply chain procurement requirements • Carbon-intensive materials charge • Infrastructure improvements • Product location at sale • Retailer product choice 	<ul style="list-style-type: none"> • Regulatory standards • EGS trade agreement • Recycling requirements, waste targets & prices • Voluntary agreements by trade associations • Business emission agreements & allowances 	<ul style="list-style-type: none"> • Government procurement • Information campaigns • Ranking & award campaigns • Voluntary trade body standards • Minimum price limits

Table 5 Overview of priority ranking of policies considered under the Carbon-CAP project ^{xxiv}

Nonetheless, the mentioned instruments are likely to be most effective when introduced as complementary portfolios. This helps spread the responsibilities for reducing embodied carbon across many stakeholders, from consumers to producers, while addressing emissions arising at the many different levels and intervention points in the product supply chain.

With consumer choice being difficult to influence when consumers have equal access to high and low carbon goods that meet the same needs, instruments that alter the range of products available, their ease of access and/or the cost (due to carbon charges) are considered to be priority policy instruments and recommended to be applied first. The second and third ranked instruments, although not ‘must-haves’, can be considered enablers that help support the instruments in the first tier, leading to a complementary portfolio of policies.^{xxv}

Carbon-CAP 1st ranked policy measures:

1. *Approved technology lists:* List of specific low carbon technologies that are given preferential procurement
 2. *Supply chain procurement requirements:* Consumer-facing outlets establish embodied carbon requirements on intermediate producers, with refusal to procure unless the requirements are met
 3. *Carbon embodied tax:* Explicit price attached to products related to embodied and /or usage carbon
 4. *Infrastructure improvements:* Investment in public transport, low carbon power, etc to enable decisions by consumers to switch to low carbon alternatives
-

Although the exact ranking and effectiveness of specific policy measures may differ per country, the above exercise provides useful guidance on the wide range of instruments available to address consumption-based emissions, how to assess them for acceptability, and whether product or consumer behavior focused policies are likely to yield greater impact.

Recommendations for policy action

Consumer awareness of the adverse impacts of consumption is on the rise and climate conscious consumers increasingly consider the impact of their purchase decisions. At the same time, low-cost / high carbon intensity outsourcing locations are faced with increasing pressure from domestic and/or overseas stakeholders to start reducing emissions. Nevertheless, without concerted policy efforts, mainstream consumer adoption of low embodied carbon products and services -in favor of high embodied carbon equivalents- is unlikely to occur some time soon.

Governments have a range of policy instruments available to them that can be used to directly or indirectly influence the embodied carbon contents of what we purchase and consume. They can build on existing instruments and optimize and enhance them to ensure they actively consider embodied carbon as part of broader policy, or tap into a range of emerging policy instruments that are being developed specifically with embodied carbon in mind.

The Carbon-CAP project outlined a number of policy instruments assessed for their suitability for use within the European Union policy context. Here a set of five recommended policy instruments that may hold promise in various parts of the world are very briefly discussed, ranging from proven, bottom-up to more experimental, top-

down policy measures. A more detailed elaboration of each instrument, including their goal, rationale, and implementation can be found in Annex 2.

Enhancing Existing Policy - Using embodied carbon as a green procurement tool

Embodied carbon can be incorporated in the supply chain in green procurement standards and criteria for public and corporate procurement decisions. Both governments as well as major companies increasingly deploy green purchasing and procurement strategies in order to acquire more sustainable products and services. They therewith live up to internal commitments, respond to external stakeholder pressure, and/or lead by example, helping to create a market for these more environmentally friendly products and services.

Governments as well as companies with a considerable Scope 3 carbon footprint can show true leadership by including requirements that favor low embodied carbon products and services in their existing purchasing and procurement processes, with several proven and more experimental options for addressing embodied carbon already being applied by governments in Europe.

Leadership by the Netherlands exemplifies that a target of 100% of procurement processes incorporating sustainability criteria can be achieved in as little as five years. Further afield, recent success in California, US, shows how unusual allies can band together to advocate for mandatory consideration of carbon intensity when producing industrial out-of-state products for infrastructure projects. Within less than two years, this collaboration between green and labor stakeholders led to the [Buy Clean Act](#) (AB262) being passed with broad bipartisan support, which will ensure that from January 1, 2019 California procures products such as steel and glass in line with its stated climate ambitions.^{xxvi}

Expanding Existing Policy - Mandatory Scope 3 reporting and Scope 3 Science-Based Targets

This policy would require companies already subject to mandatory Scope 1 & 2 reporting -such as is the case for certain companies in both the UK and France- to report on Scope 3 emissions as well, where these Scope 3 emissions cover a significant portion (greater than 40% of total Scope 1, 2 and 3 emissions) of a company's overall emissions. Scope 3 emissions - also known as supply chain emissions- often represent the largest source of carbon emissions for a company and in some cases can account for up to 90% of the total carbon impact.

Over time this measure can be extended with a requirement to set Science-Based Targets¹³ for the reduction of Scope 3 emissions, where such emissions are considered material. This lets private sector participants take accountability and responsibility for the carbon emissions generated as a result of the products and services they import for consumption by European consumers. Nonetheless, mandatory Scope 3 reporting comes with a number of hurdles, which have so far prevented it from becoming a widespread policy measure.

Building on Emerging Policy - Scope 3 hotspot analysis for companies

Instead of introducing mandatory Scope 3 reporting, governments can also require companies already subject to mandatory Scope 1 & 2 reporting to additionally conduct a carbon hotspot analysis for their Scope 3 emissions. Over time this measure can be expanded with a requirement for companies with a 'material' Scope 3 footprint

¹³ Targets that they are in line with the level of decarbonization required to keep global temperature increase below 2°C compared to pre-industrial temperatures, as described by the IPCC

to assess and report to government on main alternatives / measures that could be taken to reduce the carbon intent of the hotspots as well as their high-level feasibility.

A hotspot analysis allows companies to apply an '80/20% rule' approach in the analysis of such emissions, while incentivizing companies to think about where most carbon occurs in their up- (and down) stream supply chain. Gradually this could be taken a step further by also requesting companies to consider and report on the alternatives, even though they would not be mandated to actually implement the identified measures. Nonetheless, the simple act of having to investigate potential low-carbon alternatives and conduct a simple and high-level cost-benefit analysis on them, while subsequently reporting outcomes to an external party, creates internal pressure and can help companies to act on these findings.

Expanding Emerging Policy - Establishing consumption-based carbon clubs

Countries with a shared objective of reducing consumption based carbon emissions may jointly establish a carbon club. The concept occurred as part of the discussions leading up to COP21 in Paris in December 2015, with various parties suggesting that countries who wished to move faster than their declared (domestic) carbon emission reduction trajectories, should be incentivized to do so.

This concept has been called "fast-sliding", which would aim to motivate countries to pick accelerated low-carbon development pathways. This selective approach to ambitious action could be coupled with the establishment of 'club' or opt-in arrangements between groups of countries, which include support for capacity-building, technology facilitation, financial support or access to carbon markets.

Carbon clubs can motivate countries to overstep their initial trajectory in order to take advantage of opt-in arrangements, they may have lower incidence of free-riding, and

help create enabling conditions for more advanced action and innovation, with the potential for dissemination of these practices to broader circles beyond the club. A carbon club may therefore be a useful means to incentivize countries to think about the role and size of their consumption-based carbon emissions and explore opportunities to act on it.

Remodeling Proposed Policy - Carbon inclusion mechanism

Some parties have suggested to introduce a Carbon Inclusion Mechanism for (sub)sectors with high embodied carbon emissions in the global supply chain -such as cement- , imposing a levy on imports based on the carbon emitted during the production of those goods and the price of carbon faced by comparable goods in the importing country.

France has in past years multiple times proposed the introduction of such a mechanism, as part of EU-ETS reform. So far, none of these proposals has been successful. A Carbon Inclusion Mechanism falls basically in the category of the so-called Border Adjustment Mechanisms (BAMs)¹⁴. They can come in a number of forms, but the essential aim of all is to equalize the carbon prices faced by imports and domestically produced goods. This, goes the argument, should also help reduce carbon leakage.¹⁵

BAMs are quite controversial though in trade policy circles, with concerns focusing on that they might be subject to countries' protectionist influences, may be difficult to design in a manner consistent with WTO rules and could be administratively complex,

¹⁴ France has stated though that from a technical point of view, their proposal would not equate a border tax

¹⁵ Carbon leakage refers to an increase in carbon emissions overseas resulting from unilateral carbon mitigation policies in the home country

potentially restricting trade above and beyond their intended effects. A further concern is that they could complicate international trade and climate change negotiations, giving rise to retaliation between countries.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the research presented for a select number of European countries, the following main conclusions can be drawn:

- Imported carbon in Europe has increased rapidly since the 1990s as a result of companies outsourcing part of their production to overseas locales and has seen a further spike after China's admittance to the WTO in 2002;
- Small increases in trade volume from carbon-intensive countries like China can lead to proportionally high increases in imported carbon;
- Annual consumption-based carbon accounting is not yet commonplace for most countries, and there is a need for more standardization and harmonization around the methodologies used, as well as how the results of such an exercise can effectively inform a country's climate policies;
- Mandatory Scope 3 reporting for companies is still almost non-existent in Europe -with France being the exception for select companies-, hence the disclosure of such data entirely relies on the level of commitment a company shows to investigating and disclosing its full carbon impact, in addition to the level of external pressure from other sources that may spur a company into reporting on Scope 3 carbon;
- A number of barriers to uptake of reporting at country and company level exist, not in the least as it could make the reporting party look a lot worse than if it would report only on production-based respectively Scope 1 & 2 carbon emissions;
- Most policies in Europe that address imported carbon have not explicitly been intended and designed for that purpose. Of the policies that directly and purposely target imported carbon, none to date has actually been effected and implemented;

- Nonetheless, a wide range of policy options is available to European policy makers to address imported carbon, as shown by the research conducted by the EU funded Carbon-CAP project. In many cases, rather than introducing entirely new policies, policy makers can expand on, enhance and optimize existing policies to also or better incorporate consumption-based carbon emission considerations, with select examples provided in Annex 2.

Recommendations

With imported carbon emissions from consumption considered a material issue for most European countries, there are three main overarching actions countries can start to take now in order to create greater awareness and transparency around the issue and to help nudge stakeholders identify ways of addressing these emissions.

-
1. Countries to **acknowledge**:
 - a. the significance of their consumption-based carbon footprint as a result of imports, and
 - b. the need to address these emissions
 2. Countries to **measure** their consumption-based carbon emissions by
 - a. reporting annually on these emissions, and
 - b. creating a harmonized approach to measuring and reporting them
 3. Countries to **act** on reducing their consumption-based emissions from import through policy measures
-

Three Steps towards addressing imported carbon

Consumption-based carbon emissions from imported goods and services are an overlooked issue in the carbon reduction target setting and subsequent carbon mitigation policy foci of many European countries. It is therefore first of all key that countries **acknowledge** the issue of carbon emissions from imports and the need to address these emissions. This in turn can provide the basis for the development of a *strategic framework and action plan for curbing emissions from consumption*. Ultimately countries will need to set targets to reduce imported carbon in order to ensure focus and commitment and to measure progress.

In addition, European countries with material carbon emissions from import should take the necessary steps to start to **measure and report annually** on their consumption-based carbon footprint and strive for greater **harmonization** between the methodologies and models used.

In parallel, countries need to **act** to reduce their consumption-based emissions through policy options. This could take the form of introducing entirely new policy instruments, although in many cases optimizing and expanding existing policy instruments to actively consider the embodied carbon emissions in goods and services will go a long way towards addressing the issue. There is a wide range of policy options available to governments to help them close the carbon loophole.

A summary of the options proposed by the EU Carbon CAP project is included in the Annex 3, along with in **Annex 2** a further elaboration on the five main policy options beyond regular reporting, that have emerged during the course of this report and which are considered most promising. As mentioned earlier, of these different options, green public procurement has emerged as currently being the most actionable policy measure. **Annex 1** provides further detail and examples on the three recommended key steps.

With these three steps 'acknowledge, measure, act', in relation to imported carbon, the carbon loophole can be addressed and emissions reduced commensurate with the global agreement made in Paris in 2015 to limit temperature rise to below 2 degrees.

ANNEX 1 – HOW TO ACHIEVE THE THREE STEPS TOWARDS ADDRESSING IMPORTED CARBON

As the old management adage goes: “you can't manage what you don't measure”. Countries that aim to reduce the embodied carbon emissions from import and get stakeholders to buy in to this effort, can greatly facilitate these efforts by putting the rights methods and mechanisms in place that allow for tracking these emissions over time and sharing the results with their stakeholders.

A key action for countries would therefore be to complement and streamline existing efforts towards **regular and harmonized reporting** of consumption-based carbon emissions, described in greater detail below. Countries that want to be seen as frontrunners in addressing the adverse emission impacts of consumption would subsequently aim to set a stretch goal of adopting a **country level reduction target** for consumption-based carbon emissions. This will help articulate internal government ambitions, show clear direction towards public and private sector stakeholders, as well as provide a benchmark for tracking progress over time and holding parties accountable.

Key Action - Regular and harmonized country level reporting

Goal: A key action would be for countries in Europe to regularly report on consumption-based carbon emissions and to ensure harmonization of their methodology with other countries. Regular reporting in this context would preferably occur on an annual basis, with results publicly disclosed and with such results also being presented as part of a time series in order to track the in- or decrease in emissions over time. The preferred approach for reporting would be the use of an EE-MRIO model.

Rationale: By tracking, reporting and disclosing consumption-based carbon emissions, governments and other stakeholders enhance their insights in the extent and nature of such emissions. This is already commonplace for production-based carbon emissions. With the exception of select EU countries, far fewer data are being collected and disclosed on consumption-based emissions. Regular tracking and reporting on these emissions, in a harmonized manner, allows for comparison of the carbon trajectories between different countries. Furthermore, it helps both inform policy design as well as evaluate the effectiveness of implemented policy measures.

Implementation: In addition to countries to commit to regular reporting, there is a clear and recognized need for European countries to also establish standards in conjunction with others for the harmonization of consumption-based carbon accounting methods, to ensure robustness and consistency between country estimates. Both the UK and France already report and disclose regularly, while the UK also helps lead on harmonization. Several other countries collect consumption-based data on an annual basis, however do not yet annually report their data to the public. In addition, countries currently all use (slightly) different IO modelling approaches and/or databases.

Furthermore, it would be beneficial for research to be conducted as to how the EE-MRIO approach can be integrated with commonly used scenario-generating models used by countries to inform their climate mitigation policies. One of the disadvantages of using EE-MRIO models is their static nature. Linking EE-MRIO results to the more dynamic models already common place in climate policy assessments can therefore help overcome barriers to applying its outcomes in policy making. It can also provide a framework for understanding the growing importance of imported emissions.^{xxvii}

Select efforts already exist to move towards greater harmonization - or at least increase our understanding of the gaps – and to better understand how to link the emissions

data to good policy design. A promising development in this regard is a number of subsequent European collaboration projects, known as EIPOT (started in 2009), DESIRE (started in 2012), and Carbon-CAP (started in 2013), which meanwhile have all been completed.

The EIPOT project (2009) identified the Environmentally Extended Multi-Region Input-Output model (EE-MRIO) as a favorable approach for consumption-based carbon footprint accounting, and assessed the strengths and weaknesses of taking such an approach.

EIPOT also explored various possibilities of hybridization between models, such as hybrid IO - LCA studies to create greater granularity for certain product categories. Nonetheless, setting up an EE-MRIO system is time consuming, IO data sets may have time gaps or partially rely on assumptions, and such approaches are not very suitable for assessing individual product categories such as e.g. the 'CO2 emissions per capita from the housing and infrastructure sector'. On the other hand, IO analysis avoids the 'truncation errors' common in LCA approaches, whereby as a result of the complexity of supply a portion of the upstream chain is often cut off from the analysis.

xxviii

These three European research projects show that harmonized and regular reporting for European countries is possible and feasible, even in the short term. In addition to further research to close the gaps, it will require countries to make a clear reporting commitment, to foster collaboration with other European nations and beyond in order to work towards a goal of (data) harmonization, and for suitable bodies to issue clear guidelines on the use of EE-MRIO for consumption-based carbon accounting.

Stretch Goal - Setting a country level reduction target

Goal: As regular and harmonized reporting takes off, a logical next step in the (near-)future would be for countries to establish a reduction target for consumption-

based carbon emissions. Considering the absence of such reduction targets today, for most countries this will be considered a stretch goal.

As part of e.g. the Kyoto Protocol, the European “2030 climate & energy framework” and national policy, the European Union and its member states have set targets for the reduction of production-based (domestic) carbon emissions. To our knowledge, only Sweden so far has seriously considered introducing a reduction target for consumption-based carbon emissions.

Rationale: Targets –whether voluntary or mandatory- help a government to provide structure, articulate internal ambitions, and allow it to carve out a common vision while also providing a benchmark for tracking progress and holding parties accountable. Targets therewith help governments achieve a variety of ends.

In addition, it sends a clear message that consumption-based emissions matter and can provide local communities and companies with new business and employment opportunities, spurring low-carbon product and service innovation.

Implementation: Before developing a consumption-based target and a roadmap towards achieving it, linking numbers to policy actions and outcomes, it will be key for decision makers to consider what makes for a good target.

In order to set a meaningful **consumption-based carbon emissions reduction target**, it's worth considering:

- what will be the *Scope* of a consumption-based carbon target - such as only imported emissions or all consumption generated emissions;
- what will be the *baseline or starting point* - a 1990 baseline such as commonly used for production-based carbon reduction targets may not be feasible due to lack of long-term data series on consumption emissions;
- what is the *reliability and granularity* of the current data - including the ability to break down emissions by sectors;
- what will be the *timeframe* - e.g. 2030 and 2050 are commonly used in production-based carbon reduction targets;

Nobody enjoys watching a match where the teams run up and down the field without scoring. But this is essentially what most governments are still doing when it comes to carbon emissions generated as a result of our consumption patterns. For governments that don't want to leave the reduction of consumption-based carbon emissions to chance, it is key to have a clear goal and a bold vision with accountability and motivational milestones along the way. Setting a reduction target is a powerful tool to rally stakeholders behind a common vision and accelerate low-carbon development and innovation.

ANNEX 2 – SELECT ADDITIONAL POLICY MEASURES

Consumer awareness of the adverse impacts of consumption is on the rise and climate conscious consumers increasingly consider the impact of their purchase decisions. At the same time, low-cost / high carbon intensity outsourcing locations are faced with rising pressure from domestic and/or overseas stakeholders to start reducing emissions. Nevertheless, without concerted policy efforts, mainstream consumer adoption of low embodied carbon products and services -in favor of high embodied carbon equivalents- is unlikely to occur some time soon.

Governments have a range of policy instruments available to them that can be used to directly or indirectly influence the embodied carbon contents of what we purchase and consume. They can build on existing instruments and optimize and enhance them to ensure they actively consider embodied carbon as part of broader policy, or tap into a range of emerging policy instruments that are being developed specifically with embodied carbon in mind.

Five policy instruments are discussed here, ranging from proven, bottom-up to more experimental, top-down policy measures. They consist of using embodied carbon as a green procurement tool, introducing mandatory Scope 3 reporting in combination with Scope 3 Science-Based Targets for companies already subject to mandatory Scope 1 & 2 reporting, introducing Scope 3 hotspot analysis for companies, establishing consumption-based carbon clubs, and introducing a carbon inclusion mechanism.

Enhancing Existing Policy - Using embodied carbon as a green procurement tool

Goal: To incorporate embodied carbon in the supply chain in green procurement standards and criteria for public and corporate procurement decisions.

Rationale: Both governments as well as major companies increasingly deploy green purchasing and procurement strategies in order to acquire more sustainable products and services. They therewith live up to internal commitments, respond to external stakeholder pressure, and/or lead by example, helping to create a market for these more environmentally friendly products and services.

Implementation: As part of such procurement strategies, purchasing/procuring parties have several options available to incentivize suppliers to provide more low-carbon products and services. For instance, they can ask their suppliers to disclose the carbon footprint of the products and services they offer. They can also create 'demand pull' by specifying the performance and (low-carbon) outcomes that need to be met and leave it to suppliers to come up with innovative solutions to meet that need, while a third option would be to reward companies actively partaking in and certified for their low-carbon improvement efforts with a competitive advantage versus their competitors in a procurement process.

Governments as well as companies with a considerable Scope 3 carbon footprint can therefore show true leadership by include requirements that favor low embedded carbon products and services in their existing purchasing and procurement processes.

Three best practices examples of using embodied carbon as a green procurement tool give us a good insight in how government can use the power of the public purse to help drive demand for lower carbon products and services:

- In 2008, three central UK government departments embarked on a pilot project, committed to **strengthening engagement with suppliers and have them start reporting and reducing their embedded carbon impacts**. The pilot was so successful that in 2009, fourteen central government bodies collaborated to approach over 250 government suppliers with a single request to disclose their carbon emissions through CDP. Several of these government suppliers went on to participate in CDP's Supply Chain program, engaging themselves with more than 2,350 suppliers combined.
- The UK government is also experimenting with its **Forward Commitment Procurement (FCP) model**, which has been developed to provide 'demand pull' for new environmentally friendly products and services. FCP looks at purchasing from the outcome-based specification need instead of purchasing for the immediate perceived need. By using this model, the public sector alerts the market to their need and offers to purchase the solution, if the need is met, once the solution is available, at an agreed price and specification. This allows for including performance outcomes on embedded carbon.
- In the Netherlands, Dutch 'ProRail' developed in 2009 a **scheme ("CO2 prestatieladder") to incentivize enhanced carbon performance of both its own operations and its suppliers**. The scheme has meanwhile been adopted by many other Dutch companies in the construction sector, either suppliers or procurers, as well as by a range of Dutch government bodies from the national to the local level, using the scheme for procurement purposes. Since 2011 the scheme is being managed by an independent organisation. Suppliers partaking in this scheme are incentivized to constantly keep improving their carbon performance. They receive a certificate with their current CO2 performance level, which can be used to their advantage when bidding for tenders. Pending their performance level they will receive a financial 'fictional' benefit in bidding processes compared to competitors with no or a lower certified CO2 performance level.

xxix, CDP¹⁶, ProRail¹⁷

¹⁶ Formerly known as the Carbon Disclosure Project

¹⁷ ProRail operates and maintains the Dutch railway infrastructure

Expanding Existing Policy - Mandatory Scope 3 reporting and Scope 3 Science-Based Targets

Goal: Requiring companies already subject to mandatory Scope 1 & 2 reporting to report on Scope 3 emissions as well. Over time this measure can be extended with a requirement to set Science-Based Targets¹⁸ for the reduction of Scope 3 emissions, where such emissions are considered material.

Rationale: Countries like the UK and France already mandate certain companies to report on Scope 1 and 2 emissions. There is no requirement for mandatory Scope 3 reporting, even though it is well known that Scope 3 emissions - also known as supply chain emissions- often represent the largest source of carbon emissions for a company and in some cases can account for up to 90% of the total carbon impact.

Mandatory reporting of Scope 3 emissions, in combination with a requirement to set a science based reduction target where such Scope 3 emissions cover a significant portion (greater than 40% of total Scope 1, 2 and 3 emissions) of a company's overall emissions, lets private sector participants take accountability and responsibility for the carbon emissions generated as a result of the products and services they import for consumption by European consumers.

Implementation: The GHG Protocol Scope 3 Standard, also called the GHGP Corporate Value Chain (Scope 3) Accounting and Reporting Standard, and the accompanying

¹⁸ Targets that they are in line with the level of decarbonization required to keep global temperature increase below 2°C compared to pre-industrial temperatures, as described by the IPCC

Technical Guidance for Calculating Scope 3 Emissions, provide an acknowledged and clear source of guidance for companies on calculating Scope 3 emissions. The Standard provides guidance on emissions arising from 15 categories of Scope 3 activities, both upstream and downstream of companies' operations, and was developed over a 3 year period with broad involvement from stakeholders in 55 countries. In addition, Scope 3 accounting and reporting guidance has been made available for a few select industries known for high carbon emissions. These include for instance the Cement Sector Scope 3 GHG Accounting and Reporting Guidance.

For the purpose of subsequently setting Science-Based Targets (SBT), the Science Based Targets initiative¹⁹ has recently made a manual available to describe the accepted methods currently available for setting a SBT for Scope 1, 2 and 3 emissions, as well as the desirability of different ways of setting an actual target for Scope 3 emissions.

The challenges of mandating Scope 3 reporting:

With 15 different Scope 3 categories to report carbon emissions that occur both upstream and downstream of an organization, conducting a Scope 3 footprint can be cumbersome, time consuming, as well as challenging because Scope 3 emissions are indirect emissions, requiring access to supplier data.

The volume of information required to calculate a comprehensive Scope 3 footprint can pose a hurdle for companies with complex value chains, consisting of a wide variety of Tier 1, 2 and 3 suppliers. This can also result in considerable variety in the quantity and quality of data companies may be able to obtain, while having limited influence on the data collection process, and a broader need for using secondary data, assumptions and modeling.

¹⁹ An initiative by CDP, the UN, World Resources Institute, and WWF

Building on Emerging Policy - Scope 3 hotspot analysis for companies

Goal: Requiring companies already subject to mandatory Scope 1 & 2 reporting to additionally conduct a carbon hotspot analysis for their Scope 3 emissions. Over time this measure can be extended with a requirement for companies with a 'material' Scope 3 footprint to also assess and report to government on main alternatives / measures that could be taken to reduce the carbon intent of the hotspots and their high-level feasibility.

Rationale: With mandatory Scope 3 reporting for companies facing a number of hurdles, which make it less likely that such requirements will be introduced in many countries soon, an alternative option is to request companies already subject to mandatory Scope 1 & 2 reporting to additionally conduct a carbon hotspot analysis for their Scope 3 emissions.

Implementation: Rather than imposing a requirement for full Scope 3 reporting and disclosure, a hotspot analysis allows companies to take an '80/20% rule' approach in the analysis of such emissions, while incentivizing companies to think about where the majority of carbon occurs in their up- (and down)stream supply chain. To determine the relative contribution of its Scope 3 emissions to its total emissions profile (Scope 1, 2 and 3), companies can first of all conduct a value chain mapping exercise, in order to arrive at a rough percentage of the contribution of Scope 3 emissions to their total footprint. An accepted means of value chain mapping is described in the GHG Protocol Scope 3 Standard, also called the GHGP Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011).

Criteria	Description
Size	They contribute significantly to the company's total anticipated Scope 3 emissions
Influence	There are potential emissions reductions that could be undertaken or influenced by the company
Risk	They contribute to the company's risk exposure (e.g., climate change related risks such as financial, regulatory, supply chain, product and customer, litigation, and reputational risks)
Stakeholders	They are deemed critical by key stakeholders (e.g., customers, suppliers, employees, investors, or civil society)
Outsourcing	They are outsourced activities previously performed in-house or activities outsourced by the reporting company that are typically performed in-house by other companies in the reporting company's sector
Sector guidance	They have been identified as significant by sector-specific guidance
Other	They meet any additional criteria for determining relevance developed by the company or industry sector

Table 6 Criteria for identifying relevant Scope 3 categories, adapted from GHG Protocol Scope 3 Standard ^{xxx}

The GHG Protocol also provides a free Scope 3 screening tool, which can be used by companies for calculating an approximation of their full Scope 3 footprint, on the basis of a series of questions about organizational structure and activities. Linking these inputs to a combination of input-output and process life cycle inventory data, the tool provides the user with a Scope 3 inventory for up to 15 different categories, which can be used as an initial basis for reporting on Scope 3 emissions and identifying action areas. Similar, paid or unpaid, value chain 'hotspotting' tools are available from a few organizations, aimed at providing companies with a quick means to identify Scope 3 carbon hotspots.^{xxx}

An alternative or additional option for identifying carbon hotspots in its upstream supply chain would be to ask companies to encourage their main suppliers to respond to the

emissions questionnaire available via CDP²⁰, which can help both the purchasers as well as the suppliers better understand the challenge and mitigation options they have.

Over time this could be extended with a requirement for companies to also assess and report on main alternatives / measures that could be taken to reduce the carbon intent of the hotspots and their high-level feasibility. This could range from switching over part of their supply chains to suppliers offering lower-carbon products, for instance using a supplier which applies recycled and reused rather than virgin materials, to actively engaging with current suppliers to help them enhance their practices.

Although companies would not be mandated to actually implement such measures, the simple act of having to investigate potential low-carbon alternatives and conducting a simple and high-level cost-benefit analysis on them, while subsequently reporting the outcomes to an external party, creates internal pressure and can help companies to act on these findings.

Such a mechanism bears considerable similarities with mandatory building energy audits, as already in place in many countries. The latter requires building owners to conduct an audit of building energy use with a certain minimum set level of comprehensiveness and granularity (level 1, 2 or 3 energy audit). Subsequently they're often required to look into measures to lower energy use –although without mandating their implementation- and report on the outcomes to the relevant authorities. In the case of buildings, owners do generally have full control over their building, whereas the 'power to act' on Scope 3 emissions from manufacturing lies mainly with suppliers. Nonetheless, companies do have a choice of suppliers, as well as the ability to engage

²⁰ Formerly the Carbon Disclosure Project

with their suppliers and set certain minimum standards for conducting business with them.

Expanding Emerging Policy - Establishing consumption-based carbon clubs

Goal: Countries with a similar objective of reducing consumption based carbon emissions jointly establish a carbon club, the concept of which is briefly explained here.

Rationale: As part of the discussions leading up to COP21 in Paris in December 2015, various parties have suggested that countries who wish to move faster than their declared (domestic) carbon emission reduction trajectories, should be incentivized to do so. This concept has been called “fast-sliding”, which would aim to motivate countries to pick accelerated low-carbon development pathways with the particular requirements of their existing industries and social development needs in mind. This selective approach to ambitious action could be coupled with the establishment of ‘club’ or opt-in arrangements between groups of countries, which include support for capacity-building, technology facilitation, financial support or access to carbon markets.

Implementation: Fast-sliding clubs can motivate countries to overstep their initial trajectory in particular sectors in order to take advantage of opt-in arrangements. Clubs will also have lower incidence of free-riding, while creating enabling conditions for more advanced action and innovation, with the potential for dissemination of these practices to broader circles beyond the club. Countries who do not participate in the club could be penalized, for example by facing a uniform percentage tariff on imports into the club region. A variety of clubs could be envisioned, with countries participating

in one or more. One such club could revolve more specifically around consumption-based emissions.

Part of the challenge for instance with national low-carbon development comes from understanding the implications of economic activities (both production and consumption) that will need to evolve in order to align with the long term aims of the regime. Consumption-based carbon accounting can highlight areas that require support, help identify supply chain or delivery chain risks attributable to climate change and the degree of exposure society or an industry may have. It can also help point out opportunities in new niches for production or new markets to approach, and present policy guidance to the extent that substitutions for domestic goods or services may come to light which may lower a country's resource security and resilience to external shocks. A carbon club may therefore be a useful means to incentivize countries to think about the role and size of their consumption-based carbon emissions and explore opportunities to act on it.^{xxxii}

Remodeling Proposed Policy - Carbon inclusion mechanism

Goal: To introduce a Carbon Inclusion Mechanism for (sub)sectors -such as cement- with high embodied carbon emissions in the global supply chain, existing of a levy imposed on the imports based on the carbon emitted during the production of those goods and the price of carbon faced by comparable goods in the importing country.

Rationale: France has in the past years multiple times proposed the introduction of a Carbon Inclusion Mechanism, as part of pending EU-ETS reform. So far, none of these proposals has been successful. A Carbon Inclusion Mechanism falls basically in the

category of the so-called Border Adjustment Mechanisms (BAMs)²¹. BAMs are levies imposed on imports based on the carbon emitted during the production of those goods and the price of carbon faced by comparable goods in the importing country. They can come in a number of forms, but the essential aim is to equalize the carbon prices faced by imports and domestically produced goods.

This, goes the argument, should also help reduce carbon leakage. The latter refers to an increase in carbon emissions overseas resulting from unilateral carbon mitigation policies in the home country. Leakage can arise for instance as a result of domestic producers subject to EU-ETS losing market share to imports as a result of their higher carbon costs in comparison to those faced by competitors outside the ETS; a diversion of investment from countries with ambitious carbon policies to those with less ambitious ones; and through (fossil-fuel) energy markets, as energy and carbon mitigation policies can cause a reduction in the demand for energy in the home country, putting downward pressure on global energy prices which can help boost energy consumption overseas.

²¹ France has stated though that from a technical point of view, their proposal would not equate a border tax

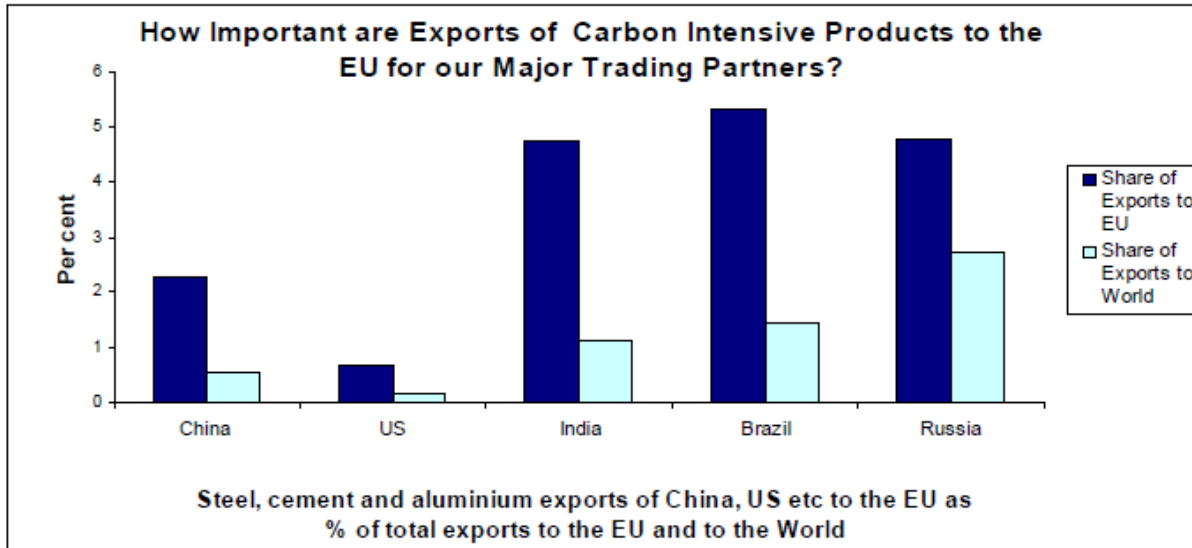


Figure 7 Importance of carbon-intensive products in trade to the EU and the World

Implementation: BAMs are often proposed/introduced to address carbon leakage, as well as to deal with competitiveness concerns of domestic industry, and to put pressure on trading partners that have failed to sign-up to sufficiently ambitious climate change commitments.

BAMs are quite controversial in trade policy circles, with concerns focusing on that they might be subject to countries' protectionist influences, may be difficult to design in a manner consistent with WTO rules and could be administratively complex, potentially restricting trade above and beyond their intended effects. A further concern is that they could complicate international trade and climate change negotiations, giving rise to retaliation between countries.

WTO rules may hinder or impede the implementation of policy measures targeting imported carbon emissions:

For WTO, regulatory measures aiming to regulate the embodied carbon of products may fall within the ambit of the Technical Barriers to Trade (TBT) agreement and/or the General Agreement on Tariffs and Trade (GATT). The TBT Agreement applies to technical regulations, standards and conformity assessment procedures relating to (1) products, and (2) product-related Processes and Production Methods (PPMs).

Regulatory standards may also be construed as "law, regulations and requirements" affecting GATT Article III.4 on national treatment. Both prohibit **de jure and de facto discrimination** between domestic and like imported products, with the aim of avoiding protectionist domestic measures.

Nonetheless, BAMs are likely to address carbon leakage more effectively than the generous free allocation of carbon credits to sectors facing international competitive pressures, as currently occurs in EU-ETS. Furthermore, to reduce administrative complexity, a BAM could be applied only to certain less complex sectors with continued free allocation of EU-ETS credits to those that are more complex.^{xxxii}

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The European Union could therefore consider a more selective introduction of a Carbon Inclusion Mechanism for specific sectors - such as steel, aluminum and cement. Subsequently the free allocation of ETS carbon credits in those sectors would be reduced, in order to create a level playing field on carbon mitigation between EU and non-EU based competitors. Important in this regard though would be for the resulting revenues to not be used as general funds, but to be channeled back to the participating (overseas) sectors to support them with low-carbon industrial development.

This way the Mechanism doesn't only create pressure on participants to improve their emissions profile, but also provides them a helping hand in doing so. Furthermore, by

extending this support to importing parties from non-EU regions, one can accelerate low-carbon innovation in exporting countries with high-carbon intensities and avoid the Mechanism to be seen as a protectionist measure, which would clash with WTO rules. Nonetheless, the current state of play on EU-ETS overhaul will likely make it a challenging proposition to create sufficient buy-in from European member states for the introduction of a select Carbon Inclusion Mechanism.

ANNEX 3 – CARBON CAP LIST OF POLICY MEASURES

The Carbon-CAP project (Consumption-based Accounting and Policies), as discussed in the section on “Effectiveness of Policy Measures”, was a European project which ran from October 2013 to December 2016. It aimed to identify an effective climate policy mix – in the EU and internationally – to address the increase in consumption-based emissions, and to quantify the mitigation potential of underexploited strategies that target the consumption of products, and therewith influence emissions embodied in trade.

Carbon-CAP assessed 33 policy instruments, covering products and services in the transport, manufacturing, food, buildings, paper/plastics and textiles sectors. These sectors were considered to provide the greatest embedded carbon reduction potential through targeted policy measures. An overview of all policy measures assessed by the Carbon-CAP team is included here below.^{xxxiv}

Carbon-CAP list of policies considered to reduce consumption-based emissions:

1. *Regulatory standards*: Direct regulation on the performance of products available to the consumer at point of sale
2. *Sector trade body standards*: Voluntary product performance standards set by trade organizations and to be followed by all outlets in that trade
3. *Product labels*: Requirement of embodied and/or usage carbon information on labels of products available to either the outlet or the consumer
4. *Carbon embodied tax*: Explicit price attached to products related to embodied carbon
5. *Information campaign*: Information provision to outlets and consumers regarding carbon implications of consumption patterns for that product
6. *Consumer carbon budget/personal carbon allowances*: Consumers are provided an annual carbon budget and cannot exceed this, perhaps (but not necessarily) with allowance for trading
7. *Business emission agreements/allowances*: Businesses are required to acquire allowances for Scope 1 & 2 (at least) emissions, generally with trading

8. *Subsidy*: Government or trade subsidy of low carbon products on offer to the consumer
9. *Product user fees*: A fee is attached at point of sale based on carbon associated with subsequent use
10. *Licenses*: License is required either to sell or purchase low carbon products
11. *Refund mechanism*: Part of the price of purchase is refunded based on lower than average usage carbon
12. *Product location at point of sale*: Low carbon products are given preferential placement at retail stores, internet sites, etc
13. *Supply chain procurement requirements*: Consumer-facing outlets establish embodied carbon requirements on intermediate producers, with refusal to procure unless the requirements are met
14. *Government procurement*: Government gives preferential procurement to low carbon options
15. *Voluntary agreements by trade organizations*: Trade organizations adopt voluntary commitments to reducing embodied and/or usage carbon of products offered to consumers
16. *Recycling requirements*: Retailer and/or consumer have responsibility for recycling a product, with a ban on landfilling
17. *Product ban*: Products are banned based on criteria of embodied and/or usage carbon
18. *Retailer product choice*: Point of sale operators voluntarily restrict products to lower embodied and/or usage products
19. *Waste targets, requirements and/or prices*: Product recycling is motivated through waste policies that place either a requirement for, or a price on, waste generation (see also item 16)
20. *Rankings and award campaigns*: Product manufacturers and/or sellers are given publically celebrated awards for low carbon performance through government, trade or third party organizations
21. *Deposits on purchased goods*: Deposits are initiated to enhance recycling of goods to reduce raw materials requirements
22. *Minimum price limits*: Very low prices are banned in order to remove from the markets those products that have less incorporation of externalities
23. *Approved technology lists*: List of specific low carbon technologies that are given preferential procurement
24. *Product tax incentives*: e.g. Enhanced tax depreciation based on product performance/embodied carbon
25. *Trade on Environmental Goods and Services (EGS) agreements*: Tariff reductions on EGS products
26. *Limits on percentage ownership or use*: Nations or municipalities restrict the number of a given product (such as cars) that can be purchased and/or owned

27. *Enabling recycling*: Programs – usually private sector – that provide the infrastructure for re-cycling of goods that have remaining utility.
28. *Extension of product lifetime*: Requirements for extending the useful lifetime of a product, including a ban on ‘planned obsolescence’; this can include enhancing the ability of a product to be repaired rather than discarded
29. *Enabling sharing of products*: Government or private sector development of programs that allow for individuals to share the product rather than own it solely, such as car sharing
30. *Mandatory metering*: Provision of meters for power and natural gas use in buildings to send consumption signals to occupants
31. *Graduated tax on advertising of durable goods*: Taxes are applied to advertising of goods, with the magnitude of the tax increasing with the carbon content; this may influence consumer choice, the price of high carbon goods and ultimately the range of products available at point of sale
32. *Preferential finance terms*: Financiers offer reduced interest rates on lower carbon goods and services
33. *Infrastructure improvements*: Investment in public transport, low carbon power, etc to enable decisions by consumers to switch to low carbon alternatives

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