Trade and Investment Requirements for Zero Carbon

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GREEN HOUSE THINK TANK
GEF GREEN EUROPEAN FOUNDATION

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Foreword

As moves are being made to introduce a Climate & Ecological Emergency Bill in the UK, and a new Trade Bill is progressing through parliament post-Brexit, it's an important time to be considering the implications of zero carbon.

As moves are being made to introduce a Climate & Ecological Emergency Bill in the UK, and a new Trade Bill is progressing through parliament post-Brexit, it's an important time to be considering the implications of zero carbon for global trade and investment decisions.

This report proposes a much-needed toolkit to help policy makers face up to climate reality and address the wider environmental impacts and the imbalances of power and wealth that underlie our global trade.

The report reminds us that the UK's biggest imports and exports by weight are fossil fuels. We also import vast quantities of wood pellets to feed power stations, mostly from the USA and Canada. No account is taken of the carbon impacts of logging and shipping this fuel.

I was surprised to discover that our biggest export by air is salmon – and while we fly salmon to China and the US, we ship similar quantities back. The report also highlights the staggering quantities of clothing and flowers flown into the UK, and the scale of our food imports through global supply chains.

The report is a wake-up call as to what decarbonising the UK economy means. We must rethink our dependence on materials and products sourced from around the world. A good example is steel. Currently, we export more scrap steel to Turkey than we re-melt each year. If this was better sorted, and our blast furnaces replaced with regional electric arc furnaces, the UK could be self-sufficient in steel. This would decarbonise one of the UK's biggest climate polluters and need to be part of a just transition to alternative climate jobs.

Trade can be very beneficial for both parties – it has helped lift many people around the world out of immediate poverty. But it has major social and environmental costs that have been ignored for too long.

The current thrust of UK trade policy – tied to airport expansion, giant container ports, and race-to-the-bottom trade deals with the US and other countries – is taking the UK in the wrong direction. Instead, this report sets out a climate compatible vision for sustainable trade. We need to acknowledge the UK's responsibility for 'embedded emissions' that are generated elsewhere.

Urgent action is needed to change course, and this report sets out how this can be done.

> **The report is a wake-up call as to what decarbonising the UK economy means.**

Ellie Chowns
International Spokesperson for the Green Party of England and Wales

Zero Carbon Trade and Investment Toolkit

TRANSFORMING BUSINESS-AS-USUAL

THEREFORE OUR GOVERNMENT MUST

THEREFORE OUR SOCIETY MUST

Blockers perpetuating unjust business-as-usual

Locking in Harm p.16

Building infrastructure that will produce emissions in the future and existing high-carbon infrastructure which has not reached the end of its operational life.

E.G. FOSSIL FUEL CARS, POWER STATIONS

SMALLER SHORTER

Buying Dirty p.17

International trade obscures the damage done by a material or product, as consequences such as pollution or deforestation happen in a different country from where the product is consumed. E.G. IMPORTING BIOMASS

SMALLER

Pointless Trade p.17

Our economy currently produces a lot of emissions by importing similar goods to that which we export. This makes no contribution to our wellbeing or happiness.

E.G. SALMON AND STEEL 'LIKE-FOR-LIKE' TRADE

SHORTER

Rubbish In, Rubbish Out

'Cheap' imports often create pollution, health and resilience problems for our society in the long-term by moving, rather than addressing underlying issues.

E.G. LIVESTOCK FEED IMPORTS

SMALLER SHORTER

Asking the Wrong Questions p.19

Having the wrong objectives, not measuring what actually matters, or focusing on misleading metrics, block us from reaching zero carbon.

E.G. MEASURING GDP RATHER THAN WELLBEING

SMALLER SHORTER SLOWER

Sponsoring Harm p.19

If national governments or the European Union are serious about reaching zero carbon, the first thing they must do is stop subsidising greenhouse gas emissions.

E.G. FOSSIL FUEL AND AVIATION SUBSIDIES

SMALLER SHORTER SLOWER

Choosing the Wrong Scale

We don't consider the wider implication of the scale at which activities are done, so build the wrong scale of infrastructure for resilient local economies.

E.G. CLOSE LOCAL AND BUILD BIG NEW FACILITIES

SMALLER

Feeding the Monster p.21

Investments in carbon intensive infrastructure perpetuate the status quo. National infrastructure plan risks creating new demand for hard to decarbonise activities.

E.G. PENSION FUNDS INVESTING IN FOSSIL FUEL COMPANIES

SMALLER SHORTER SLOWER

Idolising Efficiency p.22

There is a trade off between economic efficiency and resilience. There should be sufficient diversity and surplus capacity in our economy and vital services.

E.G. CENTRALISED DISTRIBUTION NETWORKS

SLOWER

False Horizons

Obsessing about technological solutions or getting distracted by consumer facing issues, rather than confronting the scale and extent of the climate challenge.

E.G. CARBON CAPTURE AND STORAGE, PLASTIC BAGS

SMALLER SHORTER SLOWER

SMALLER

Reducing the scale of trade and material consumption to that which improves our wellbeing.

SHORTER

Localising supply chains to reduce the distance goods travel unnecessarily.

SLOWER

Where possible goods should take the slow boat rather than being airfreighted.

Enablers of a zero carbon sustainable future

Sufficient Action

To stay within a fair carbon budget, certain actions must be achieved in a certain time. This needs clear annual targets for what needs scaling-up and scaling-down.

E.G. MW/Y OF ONSHORE WIND INSTALLED PER YEAR

SMALLER SHORTER

Quality not Quantity

What matters isn't the amount of goods we trade, or products we consume, but the benefit we derive from them. Focus on low emission products which improve wellbeing.

E.G. IMPORTS SPICE NOT FOOD WE COULD GROW HERE

SMALLER

Investing in What We Already Have

Valuing time maintaining, repairing, repurposing, renovating, retrofitting and reusing assets rather than committing more energy and materials replacing them.

E.G. RENOVATE INSTEAD OF DEMOLISHING BUILDINGS

SLOWER

Government Setting Direction

Government needs to lead on certain key infrastructure decisions to enable a zero carbon economy. They need to lay out a clear plan to create economic certainty.

E.G. CHOICE BETWEEN HYDROGEN OR ELECTRIC HEATING

SMALLER SHORTER SLOWER

Taxing Harm

p.20

Resource depletion and pollution (including carbon emissions) should be taxed in proportion to their harm to our climate, environment and society.

E.G. CARBON TAX, POLLUTION TAX

SMALLER SHORTER SLOWER

Public Money for Public Goods

Our taxes should be used to lay the foundations of a zero carbon economy either by subsidising or directly commissioning the enterprises and infrastructure we need.

E.G. ELECTRIFYING RAILWAYS, PLANTING TREES

SMALLER SHORTER SLOWER

Empowering Local Solutions

Where and how decisions are made matters. Strong local and 'bioregional' economies require decision making to be participatory and take place at the lowest possible level.

E.G. CITIZENS' ASSEMBLIES, REGIONAL ASSEMBLIES

SMALLER SHORTER

Managing Demand

Reaching zero carbon requires certain activities to happen less. Therefore our government needs to plan and build public support for certain behavioural changes.

E.G. PUBLIC INFORMATION CAMPAIGNS

SMALLER SHORTER

Making Things that Last

p.22

Goods must be designed and built for modification, upgrade and deconstruction so products and infrastructure can be adapted to society's changing needs.

E.G. LONGER PRODUCT GUARANTEES

SMALLER SHORTER SLOWER

Changing Culture

p.23

Reaching a sustainable society requires more than technological change. We must embrace collective education to equip us for the new society we create.

E.G. CULTURE OF SHARING RATHER THAN OWNING

SMALLER SHORTER SLOWER

Introduction: The Great Climate Omission

It should not be news that humanity must exist within climate and environmental limits, or that currently we aren't doing so.[1] This lack of sufficient action is particularly true in our response to climate change in 'hard to abate' sectors. Since 1990, whilst domestic emissions of carbon dioxide and other greenhouse gases have fallen in some EU countries (including the UK), global emissions due to industrial processes, transport, and manufacturing and construction have increased by 174%, 71% and 55% respectively.[2] Around one third of total global emissions are embodied in goods and services that are traded internationally.[3]

Although trade affects many environmental issues, its most significant direct impact is the carbon dioxide emissions from the burning of fossil fuels to power ships, lorries and planes. International aviation and shipping alone emitted 1.24 billion tonnes of greenhouse gases in 2017.[4] Road transport accounts for just over half of global, trade-related carbon emissions, and the domestic leg of global supply chains

1 Stockholm Resilience Centre (no date), 'The Nine Planetary Boundaries' (accessed August 2020); Welcome to the Anthropocene (no date), 'The Planetary Boundaries Concept...' (accessed August 2020).

2 Ge, M, and Friedrich, J (6 Feb 2020), '4 Charts Explain Greenhouse Gas Emissions by Countries and Sectors', *World Resources Institute* (accessed July 2020).

3 Kanemoto, K, and Moran, D (2019), 'Carbon-Footprint Accounting for the Next Phase of Globalization: Status and Opportunities', *One Earth* 1:1, 35–38.

4 Last reported year – Ritchie, H, and Roser, M (May 2017, rev. Dec 2019), 'CO and Greenhouse Gas Emissions', *Our World in Data* (accessed July 2020).

typically accounts for around 30% of trade-related emissions.[5] Yet international trade lies outside the Paris Agreement and is excluded from negotiations under the United Nation's Framework Convention on Climate Change (UNFCCC). This is a gaping hole in the global climate agreement. And it's getting bigger. Despite efficiency gains, global freight emissions are predicted to rise until at least 2050.[6,7] Shipping and aviation emissions are expected to triple from 2015 to 2050 unless action is taken.[8,9] The UK's Climate Change Act, passed in 2008 and amended in 2019, established a legally binding target for the UK to bring all greenhouse gas emissions to net zero by 2050.[10] This is not soon enough – scientists have calculated that in order to take our fair share of a global carbon budget, the UK must reach net zero by 2030 or earlier.[11]

This is a big ask of our society, and one our current politics are struggling to rise to. To take the example of trade, the UK must address the scale of international trade, the distance goods are transported and the modes of transport used. This will necessitate strong demand management alongside technical efforts[12] to allow rapid phasing out of fossil-fuel-powered shipping and aviation, even whilst alternative fuels are not yet commercially feasible.[13] The complex and fundamental nature of the challenge is mirrored in other 'hard to abate' aspects of our economy, and the points of intervention are interrelated across our economy's systems. In response this report explores the ways that trade locks in carbon emissions and proposes a toolkit which draws together an economy-wide set of blockers and enablers needed to reach zero carbon. These are considered below using trade flows as a window into our current economy.

5 International Transport Forum (2015), 'The Carbon Footprint of Global Trade: Tackling Emissions from International Freight Transport'.

6 Bows-Larkin, L (2015), 'All Adrift: Aviation, Shipping, and Climate Change Policy', *Climate Policy* 15:6, 681–702.

7 Bows-Larkin, L, et al. (2015), 'Shipping Charts a High Carbon Course', *Nature Climate Change 5*, 293–295.

8 International Transport Forum (2015), 'The Carbon Footprint of Global Trade: Tackling Emissions from International Freight Transport'.

9 ICAO (no date), 'Trends in Emissions that Affect Climate Change' (accessed August 2020).

10 UK Government (2019), 'The Climate Change Act 2008 (2050 Target Amendment) Order 2019' (accessed July 2020).

11 Jackson, T (2019), 'Zero Carbon Sooner', *CUSP Working Paper 18*, CUSP.

12 Broderick, J (2018), 'Aviation CO_4 Emissions in the Context of the Paris Agreement on Climate Change', *Tyndall Centre for Climate Change Research*.

13 Allwood, J, et al. (2019), 'Absolute Zero: Delivering the UK's Climate Change Commitment with Incremental Changes to Today's Technologies', *UK FIRES*.

Our Traded Economy

Around a half of the UK's greenhouse gas emissions are imported.[14] The mode of transport used to carry goods from one place to another is a key aspect of their climate impact. The faster freight travels, the greater its impact. The UK government has calculated the emissions caused by transporting one tonne of freight one kilometre – expressed as a tonne-kilometre, or tkm – for different transport modes. They found the climate impact of airfreight is typically 262 times that of oil tankers, 73 that of container ships, 36 times that of rail and 9 times that of road transport (see **Figure 1**).[15]

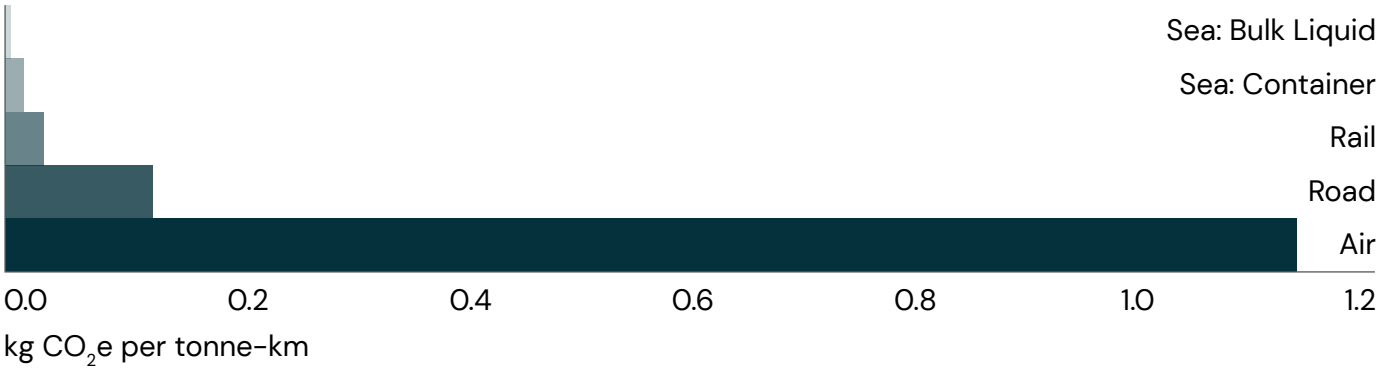


Figure 1: CO_2e Intensity of Freighting Goods

Source: UK Government GHG Conversion Factors for Company Reporting, published by BEIS 2019 (v1.2)

The financial cost of travelling faster is far less than the increased carbon emissions so the move from sea to air and to faster ships[16] appears economically attractive and is driving up emissions. In 2019 airfreight represented 47.8% of the UK's exports to non-EU countries by value and 35.4% of imports from those countries. UK exports are already twice as likely to be airfreighted as Germany's (by value) and in the EU, only Ireland exports a higher percentage by air.[17]

This report analyses UK trade data to explore the carbon impacts of the UK's trade in selected commodity types.[18] The carbon footprints of shipping, air freighting, and road and rail freight are 21, 11 and 4 million tonnes CO_2e respectively. This 2019 trade carbon footprint is summarised in **Table 1**.

The overall size of the UK's trade carbon footprint is significant. This is estimated as 20 million tonnes CO_2e/year for UK imports and 10.6 million tonnes CO_2e/year for UK exports. These figures suggest the UK's trade carbon footprint is still rising and is far more significant with the rest of the world than with the European Union.[19] This trade carbon footprint would add 7% to the UK's territorial emissions and represents

15 BEIS (2019), 'Greenhouse Gas Reporting: Conversion Factors 2019' (accessed May 2020), with an uplift of 2 for radiative forcing of aviation.

16 The largest oil tankers and container ships are tending to speed up, so are polluting more. See Olmer, N, et al. (2017), 'Greenhouse Gas Emissions from Global Shipping, 2013-2015', *The International Council on Clean Transportation (ICCT)*.

17 Steer (2018), 'Assessment of the Value of Air Freight Services to the UK Economy', *Airlines UK*.

18 Unless otherwise stated, data is taken from uktradeinfo.com, a website managed by HM Revenue & Customs, which publishes statistics on trade between the UK and other countries. Methodology for the analysis of this data, along with additional data tables, can be found in the Technical Annex published separately. $MtCO_2$e = million tonnes of carbon dioxide equivalent – see Technical Annex.

19 Committee on Climate Change (2011) Review of UK Shipping Emissions estimated UK shipping imports of 12 $MtCO_2$e in 2006. Here shipping imports are estimated as 14.5 $MtCO_2$e in 2019.

an average of 6% of the carbon footprint embedded in our traded goods.[20,21] This trade carbon footprint is integral to our economy, so should be accounted for in our plans to achieve a zero carbon economy.

The next section looks at the climate impacts of trade in high value commodities which are often airfreighted, including seafood, fruit and flowers. The UK's trade carbon footprint is also boosted by trade in goods that are shipped huge distances in vast quantities, including fossil fuels and wood pellets – imported to feed Drax power station – and steel. These are also explored later in the report.

	Rest of the World				European Union			
	Goods		Emissions		Goods		Emissions	
Commodity Group	**Mt**	**Mt CO_2e**	**Sea**	**Air**	**Mt**	**Mt CO_2e**	**Sea**	**Air**
Food: animal	1.1	1.0	19%	78%	5.5			
Food: Plant	9.7	2.5	46%	50%	13.6			
Food: Processed	4.7	1.2	66%	26%	15.6			
Fossil & Biomass Fuels	137.2	7.5	100%	0%	77.5			
Natural Fibres, Timber & Flowers	1.8	0.5	48%	41%	7.3			
Stone, Ores & Minerals	11.8	0.9	99%	1%	15.1	5.7	40%	14%
Manufactured: Construction Materials	2.9	0.8	68%	28%	7.8			
Manufactured: Goods	21.4	10.2	41%	55%	42.5			
Chemicals	6.2	1.6	44%	48%	19.4			
Textiles	2.6	1.9	25%	68%	1.5			
Wastes	16.3	2.4	98%	1%	8.8			
Total	**216.3**	**30.6**	**62%**	**34%**	**214.7**	**5.7**	**40%**	**14%**
Total Imports	**168.9**	**20.0**	**66%**	**30%**	**110.4**	**3.1**	**40%**	**14%**
Total Exports	**47.5**	**10.6**	**54%**	**42%**	**104.3**	**2.6**	**40%**	**14%**

Table 1: Overall Breakdown of Carbon Footprint of UK Imports and Exports

20 Total 435.2 $MtCO_2e$ estimated for 2019. This figure does not include international trade freight, international travel or the emissions 'embodied' in what we import. BEIS (2020) 2019 UK greenhouse gas emissions, provisional figures.

21 WWF (2020) calculated the embodied emissions in UK imports and exports totalled 364 and 140 $MtCO_2e$ in 2016.

Trade Stories

Seafood

One fish – salmon – accounts for 74% of our fish-trade carbon footprint. In 2019 we exported 125,000 tonnes of salmon, 48,000 of it by air, over half of which was flown to the USA and China. Shockingly, we also imported almost as much from overseas: 101,000 tonnes. The airfreighted fresh and chilled salmon we exported was *64 times* more carbon intensive than the almost identical (albeit cheaper at the point of sale) salmon we imported. If the UK could supply its domestic market first and switch exports from air to sea we could reduce transport emissions by 300-400 thousand tonnes of emissions *for salmon alone.*[22]

A similar story is told for other fish and shellfish. In 2019 we exported over 35,000 tonnes of crabs and lobsters, 16% of which was airfreighted. Yet we also imported 54,000 tonnes, mainly prawns. And for every two lobsters flown out of the UK we flew one in (over 1,200 tonnes). Eliminating pointless trade, reversing the UK's current preference for prawns over crabs and ending the airfreight of fish would reduce our fish-trade carbon footprint by 90%. Such unnecessary trade should be the first to be minimised and abolished.

Figure 2: Salmon Imports and Exports

Sponsoring Harm | Taxing Harm | Public Money for Public Goods | Changing Culture

Fresh Fruit and Vegetables

In 2019 just 16% of the fruit and 54% of vegetables consumed in the UK were grown here – the lowest level in over 20 years.[23] The UK has a climate suitable for growing apples and pears, yet in 2019 we imported 438,000 tonnes more than we exported. Although the majority came from France, the greatest carbon impact came from those imported furthest – from South Africa and New Zealand.

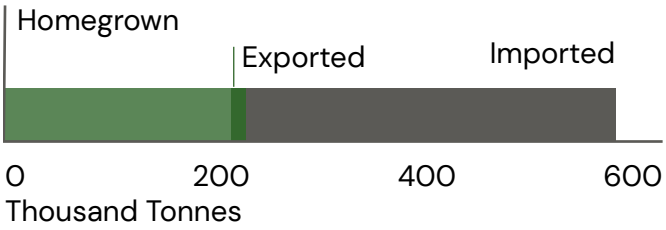


Figure 3: 3 of 5 apples are imported
Source: Defra Horticulture Statistics 2019

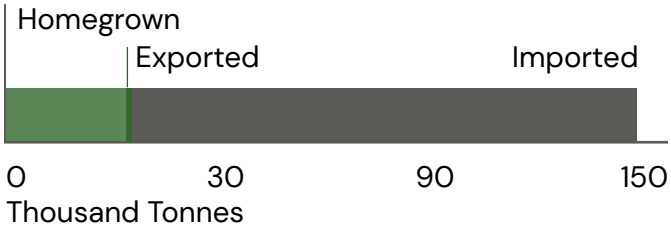


Figure 4: 4 of 5 pears are imported
Source: Defra Horticulture Statistics 2019

23 Defra (2020), 'Horticulture Statistics 2019'.

By contrast, bananas and mangoes will never be a home-grown product, but how we import them makes a big difference. In 2019 we imported just over a million tonnes of fresh bananas by sea (73% from Colombia, Costa Rica, the Dominican Republic and Ecuador), with a carbon footprint of 127,000 tonnes CO_2 equivalent (CO_2e). Meanwhile, we flew in just short of 20,500 tonnes of mangoes, which flew a similar distance (over 7000 km) mainly from France[24], Peru, Brazil and Pakistan , with a much greater carbon footprint of at least 250,000 tonnes CO_2e – that is over 25 times more carbon intensive than shipping bananas.

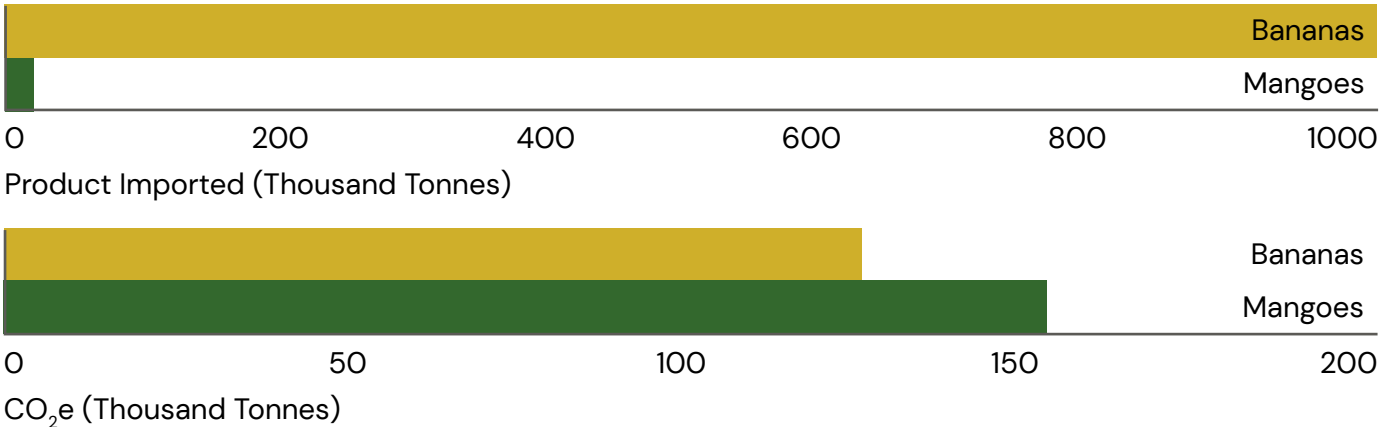


Figure 5: Relative Trade Footprints of Mangoes and Bananas

A large part of reaching zero carbon for trade in the food sector is the elimination of airfreighted fruit and vegetables, either by changing the types of produce we import, or by importing them as juice, dried or canned rather than fresh, so they can be shipped. It also means growing more fruit and veg locally and shifting our diets to eat more seasonally. Green beans flown in from Kenya and asparagus from Peru are significant contributors to our food-trade carbon footprint, together accounting for 270,000 tonnes CO_2e.

Pointless Trade | Sponsoring Harm | Taxing Harm | Change Culture

Roses

We have a huge appetite for freshly cut flowers in the UK. Imports totalled £660 million in 2019, of which roses made up 22% by value but around 60% by carbon footprint – contributing just over 100,000 tonnes CO_2e as they have flown an average of 4,000 km to the UK, making them one of the top ten airfreighted imports by carbon impact.

Over half of cut roses come direct from Africa (mostly Kenya and Ethiopia). Most of the rest are imported from companies based in the Netherlands although the majority of these have themselves been previously imported. Just over a million roses a *day* fly to the UK via the Netherlands, mostly from Africa.[25]

Sponsoring Harm | Taxing Harm | Managing Demand | Change Culture

24 A fifth of mangoes were imported from companies based in France so the carbon impact of shipping from where these mangoes were grown is not included.

25 Africa supplies 85% of the imported roses – See CBS (13 Feb 2015), 'Nederland haalt 2,8 miljard rozen uit Afrika' [trans. 'The Netherlands Gets 2.8 Billion Roses from Africa'), with analysis of Netherlands 2019 import and export statistics for roses from www.cbs.nl.

Clothing

The trade footprint of clothing is frequently underestimated as raw materials are often exported for making into textiles, before onward shipment to be made into garments, from where they are shipped again for sale – and even the shipment of finished products alone is significant.

In 2019 the UK clocked a million tonnes of CO_2e from the import of textiles and finished garments by air alone. This is dominated by finished clothing, with 'articles of apparel and clothing, knitted and not knitted' accounting for two thirds of this carbon footprint. Airfreight accounted for 6.6% of the weight, but 79% of the carbon footprint.[26]

Research for WRAP[27] estimated that the carbon footprint of shipping finished clothing to the UK is just one third of the total transport footprint (which includes transport of yarn and fabric). Quantis[28] global carbon footprint estimates for the clothing sector are based on 8% of clothing being airfreighted. Yet for the UK in 2019 this was 10.5%. Taking these two factors together the total footprint of UK fashion imports is likely to be nearer 64 million tonnes CO_2e, with around 2 million tonnes CO_2e from international transport alone.[29]

For UK imports, the shipping of clothing adds around 3% to the carbon footprint of clothing's production, but airfreighting adds some 37%. Airfreighting clothing makes up 79% of the clothing-transport carbon footprint. The trend in fast fashion has led companies such as Boohoo and ASOS to re-localise some garment assembly back to the UK but the UK still air freights of 85,000 tonnes of finished garments from China, India, Bangladesh and Pakistan accounted for over 700,000 tonnes of CO_2 emissions, half of the total for all textile and clothing imports.[30]

Decarbonising clothing and textiles means fewer, higher-quality garments manufactured each year, which then are used for longer. They must either be produced locally or imported by ship. This either means slower fashion, or fashion based more around modifying, repairing and adapting existing clothes. Airfreighted sourcing of textiles or delivery of disposable fashion is not compatible with a zero carbon world.

Buying Dirty | Rubbish In, Rubbish Out | Feeding the Monster | Sponsoring Harm

Quality not Quantity | Reinvesting in What We Have | Taxing Harm | Managing Demand

26 Airfreighted clothing imports accounted for 692 out of a total of 876 $ktCO_2e$ carbon footprint, even though this accounted for only 79,000 of 1.2 million tonnes in 2019.

27 WRAP (2017), 'Valuing our Clothes: The Cost of UK Fashion'.

28 Quantis (2018), 'Measuring Fashion: Environmental Impact of the Global Apparel and Footwear Industries Study.'

29 Clothing accounts for 1.1 million of the 2 million tonnes CO_2e for all of clothing and textiles (based on our analysis of Uktradeinfo data – Commodity Codes 41-43,50-65,67). However, Quantis estimates suggest this could be nearly double this, around 2 million tonnes CO_2e, based on 3% of their overall carbon footprint.

30 See for example Hendriksz, V (14 Dec 2016), 'Asos Aims to Double its UK Manufacturing', *FashionUnited* (accessed June 2020), Labour Behind the Label (no date) 'boohoo' (accessed June 2020) as well as our analysis of UK trade info data.

Fossil Fuels

Fossil fuels make up the largest part of the UK's trade carbon footprint, 21% of the total in 2019. This alone caused an estimated 7.7 million tonnes of carbon emissions.

In 2019 the UK traded vast volumes of:

- **Coal:** *Import* 7 million tonnes, primarily from Russia, USA and Australia (70% of the carbon footprint); *Export* 1 million tonnes.
- **Crude oil:** *Import* 49 million tonnes, mostly from the Norwegian continental shelf (46%) and the USA (22.5%), Algeria, Russia and Nigeria; *Export* 45 million tonnes, mostly to the Netherlands, China and Germany.
- **Refined oil:** *Import* 34 million tonnes; *Export* 22 million tonnes.
- **Gas:** *Import* 33 million tonnes, mostly from the Norwegian continental shelf (66%) and Qatar; *Export* 10 million tonnes – to Europe via the UK–Belgium pipeline.

The UK government aims to maximise economic recovery of the North Sea (i.e. squeeze out every possible drop of oil and gas).[31] Yet the National Grid's modelled rates of decarbonisation required to meet the net zero by 2050 target (let alone by 2030 as needed) shows we must reduce our rate of consumption far more quickly than the UK's North Sea reserves are declining.[32] A managed decline of oil and gas production (and writing reserves off oil companies' balance sheets) is required to remain within our carbon budget whilst avoiding a potential economic crash.[33] This means eliminating fossil fuel imports, not substituting them with domestic production (or import of wood pellets – see below), and committing to phase out existing domestic production. We should not be sponsoring harm by profiting from the export of fossil fuels that we can't burn within our own carbon budget.

FOSSIL FUEL SUBSIDIES

Eleven EU countries spend almost €90 billion annually (2014–2016 average) subsidising fossil fuels.[34] Given that total EU energy subsidies in 2016 were estimated as €169 billion, of which just €76 billion were for renewables, it is clear that currently we are still 'Sponsoring Harm' more than we are using 'Public Money for Public Goods'.[35] In 2016 the UK, Germany and France (respectively) were the biggest subsidisers of fossil fuels. In 2018 the UK spent £2 billion underwriting fossil fuel projects abroad.[36] Since the beginning of the pandemic in early 2020, the G20 countries have earmarked at least £120 billion to support fossil fuels, dwarfing the G20's £71 billion stimulus spending on clean energy.[37]

Buying Dirty | Feeding the Monster | Sponsoring Harm | Sufficient Action
Government Sets Direction | Taxing Harm | Managing Demand

31 See Oil and Gas Authority (6 May 2020), 'Consultation on New OGA Strategy' (accessed July 2020).
32 See the Community Renewables scenario for delivering zero carbon in: National Grid (July 2019), 'Future Energy Scenarios' (accessed July 2020).
33 Carbon Tracker (1 Nov 2019), 'Balancing the Budget: Why Deflating the Carbon Bubble Requires Oil & Gas Companies to Shrink' (accessed July 2020); Carbon Tracker (4 June 2020), 'Decline and Fall: The Size & Vulnerability of the Fossil Fuel System' (accessed July 2020).
34 Gençaü, I, et al. (2017), 'Phase-out 2020: Monitoring Europe's fossil fuel subsidies', *CAN Europe*.
35 European Commission (2019), 'Energy Prices and Costs in Europe, 2018 Report'.
36 Watts, J (27 June 2019), 'UK Committed Nearly £2bn to Fossil Fuel Projects Abroad Last Year', *Guardian* (accessed 5 June 2020).
37 Energy Policy Tracker (updated 12 Aug 2020), 'G20' (accessed July 2020).

Biomass

In 2019, imports of wood accounted for at least twice the UK production of timber. UK consumption of timber has almost doubled since 2000. Virtually all of this increase is in the form of wood pellets for burning as fuel, which has increased from 0.05 to over 9 million tonnes, mostly to supply Drax power station in North Yorkshire.[38] Two more wood-burning power stations will burn a further 3 million tonnes of imported wood pellets once operational. Four fifths, close to 7 million tonnes, of the wood pellet imports came from the USA and Canada. The trade carbon footprint of wood fuel imports totalled 650,000 tonnes of CO_2 in 2019. Whilst the direct emissions from transporting around the world are significant. The total impact of burning wood in UK power stations, including land use change overseas and combustion emissions in the UK, may be much greater (perhaps worse than that of coal).[39]

Much is made of the potential of carbon capture and storage (CCS) technology to work with biomass energy, yet CCS will not be viable at scale before we must reach zero emissions. Whilst the small-scale burning of locally produced biomass may provide low or net zero emission heat for certain rural communities (where the air pollution impact is manageable), it is not an industrial scale solution. Wood should not be burned but instead used for wood products.[40]

Buying Dirty Feeding the Monster Sponsoring Harm Taxing Harm

Iron and Steel

Importing and exporting steel, and the raw materials to make it, mean the UK steel-trade carbon footprint was over 2.5 million tonnes CO_2e in 2019.

The UK has a large and growing trade deficit in steel as UK production has halved since 1990.[41] Two thirds of the two million tonnes of higher grade steel used in UK car manufacture is imported.[42] This offshoring of production is a predictable result of our industrial policy, which shifted UK production such that imports now account for half our total carbon footprint.[43] Until the 1950s, the high costs of transporting iron ore (then typically 60% of production costs) meant that the steel industry was located near sources of raw materials. Now, thanks to the availability of cheap fossil fuel energy, we import iron ore and coal from as far away as Brazil and Australia.[44]
Yet evidence suggests the UK would be well placed to meet its steel demand from domestic scrap.[45] We currently export four fifths of our scrap steel, which should be seen as an important national resource for making new steel. Shifting the industry

38 Zwolinski, D (2015), 'UK and EU Trade of Wood Pellets', DECC.

39 Calculations for different land-use scenarios range from carbon neutral to five times worse than coal – which should be reflected in the USA's carbon accounts. See Evans, S (2014), 'Is Burning Wood for Energy Worse for the Climate than Coal?', *Carbon Brief* (accessed June 2020); and Stephenson, A, and MacKay, D (2014), 'Life Cycle Impacts of Biomass Electricity in 2020' UK Government.

40 Searchinger, T, et al. (2018), 'Europe's Renewable Energy Directive Poised to Harm Global Forests', *Nature communications* 9:1, 1–4.

41 Rhodes, C (2018), 'UK Steel Industry: Statistics and Policy', *House of Commons Library*, UK.

42 Grant Thornton (4 June 2018), 'Is the key to transforming UK steel the auto industry?' (accessed June 2020).

43 WWF (2020), 'Carbon Footprint: Exploring the UK's Contribution to Climate Change'.

44 Hildyard, N, and Sol, X (2017), 'How Infrastructure is Shaping the World: A Critical Introduction to Infrastructure Mega-Corridors', *The Corner House*.

45 Allwood, J, et al. (2019), 'Steel Arising: Opportunities for the UK in a Transforming Global Steel Industry', *University of Cambridge*.

away from using imported iron ore in coal-powered blast furnaces to recycling scrap metal in renewable-powered electric arc furnaces alone would reduce emissions from the industry by up to 75%.[41,46]

To reach zero carbon trade we must stop importing coal, shorten supply chains and reduce demand for steel.[47,48] This rightly represents far more than a technological shift as we must reach zero carbon before we can develop and roll out at scale the technologies which would be needed for zero carbon virgin steel production and shipping.

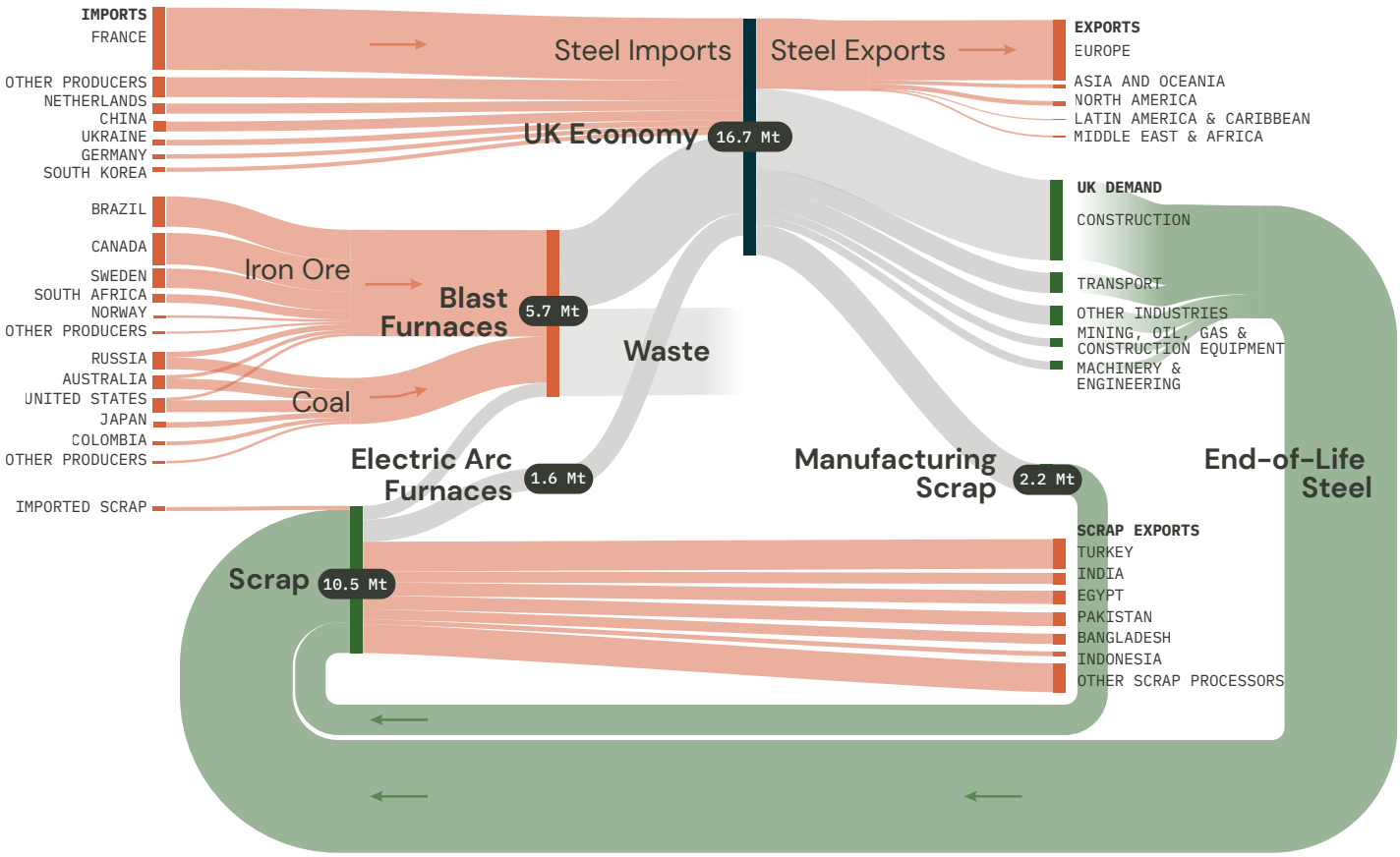


Figure 6: UK Steel Trade

Fossil fuel imports are estimate of CO_2e as includes coke which has be produced from coking coal in other countries.

Source: All data from uktradeinfo.com except: UK steel production figures (2018) in MakeUK (2019) UK Steel Key Statistics 2019; Manufacturing wastage is 1800kt by observation from Allwood, J et al (2019) Steel Arising: Opportunities for the UK in a transforming global steel industry. University of Cambridge, UK, p6.; Sector breakdown for demand in 2015 from Grant Thornton UK LLP (2017) Future Capacities and Capabilities of the UK Steel Industry. BEIS Research Paper Number 26: Technical Appendices, p45. BEIS, UK with minimal change in overall UK demand since then included in MakeUK (2019).

Pointless Trade | Choosing the Wrong Scale | Sufficient Action | Taxing Harm
Government Sets Direction | Public Money for Public Goods | Managing Demand

46 Envirotec (27 May 2019), 'Transition to Green Steelmaking Vital to UK Industry's Long-term Future, Says Report' (accessed July 2020).
47 Allwood, J, and Cullen, J (2012), Sustainable Materials: With Both Eyes Open (Cambridge: UIT Cambridge).
48 Allwood, J, et al. (2019), 'Absolute Zero: Delivering the UK's Climate Change Commitment with Incremental Changes to Today's Technologies', *UK FIRES*.

Transforming Business-as-Usual

Our current interconnected system of global trade is totally incompatible with dealing with climate change. If our society is to flourish within climate and environmental limits, certain things must happen, and certain things must stop happening. The overall trade analysis and stories above explore the impact of reducing the scale of international trade and the distance and speed that goods are transported globally.

The following sections explore some of the required changes to our society and economy through ten of the enablers and blockers in the Zero Carbon Trade and Investment Toolkit (see pages 4–5). These are intended as a tool for policy makers and campaigners to engage with changes that are need for zero carbon trade and investment. For the changes made to be judged as sufficient, the scale and pace at which we phase certain practices out, and build certain infrastructure, must be defined, agreed and stuck to.

Blocker: Locking in Harm

Until we stop constructing things which burn fossil fuels, emission reductions will be very limited. For example, building a gas power station commits us to not only a certain level of carbon emissions in construction, but then 'locks in' further emissions every year, for the lifetime of that plant. The same is true for new fossil-fuel-powered vehicles or gas heating systems in new houses. If we are to reduce emissions at the rate required (24% per year[49]) then we must stop locking in future emissions. In certain areas this needs to go hand in hand with enabler **Government Sets Direction** , as alternative technologies may require new communal infrastructure.

There is also the unavoidable issue of existing fossil fuel assets, whether power stations, aircraft, ships, or related infrastructure.[50] Some of these need to keep operating to pay off construction costs; other sectors (notably coal) are shielded from changing economic circumstances by long-term contracts and state price guarantees.[51]

POLICY RECOMMENDATIONS

- Only planning applications which are zero carbon compatible to be approved.
- State support for a just transition for workers, and refinancing tools to support phase out or retrofit of high carbon assets.[52]
- Phase out and regulate the sale of new fossil fuel dependant assets, such as petrol and diesel vehicles and gas boilers.

49 Figure 2 in Jackson, T (2019), 'Zero Carbon Sooner', CUSP Working Paper 18, *CUSP*.

50 Halim, R, et al. (2018), 'Decarbonization Pathways for International Maritime Transport: A Model-based Policy Impact Assessment', *Sustainability* 10:7.

51 Carbon Tracker (30 June 2020), 'How to Retire Early: Making Accelerated Coal Phaseout Feasible and Just' (accessed August 2020).

52 Ibid.

Blocker: Buying Dirty

International trade obscures the damage done sourcing materials or products, as consequences such as pollution or deforestation happen in a different country from where the product is consumed. This is particularly true for biomass and fossil fuels (see **Trade Stories**). The first step in addressing this is to ensure that embedded emissions are required as part of import/export declarations. The second step is to tax dirty imports based on these declarations.

POLICY RECOMMENDATIONS

- Mandatory declaring of emissions embedded in all imports.
- Carbon tax on emissions embedded in imports in line with domestic emissions.
- Import tariffs on goods which don't meet sustainable production standards.
- Government to research and lobby internationally to ensure that in each sector there is one international sustainable production certification scheme, which is robust and meaningful.

Blocker: Pointless Trade

Like-for-like trade clearly does little to improve our wellbeing, as the fish trade story highlights. Yet it is a significant source of carbon emissions. It is important to look at the root causes of so called 'pointless trade'. It is an inevitable consequence of the fact that current economic decision making doesn't properly account for environmental harms or limited resources – let alone global equality or justice concerns. It has no need to take the long view, instead favouring local or sectoral booms following new discoveries, booms that often don't last when resources run out or externalities become unacceptable. The policy recommendations in blocker **Sponsoring Harm** and enabler **Taxing Harm** would go a long way to rebalancing economic conditions that currently promote pointless trade.

A separate UK economic issue must also be addressed. The UK has run a trade deficit (including services) every year since 1998, and last ran a significant surplus in the 1980s.[53] This creates a motivation to increase high value exports, which can lead to pointless like-for-like trade. This is particularly pronounced when it comes to food, where the trade gap reached £24.3 billion in 2018.[54] Salmon is a good example: one reason why the UK exports expensive salmon and imports cheaper salmon is to reduce the trade deficit. But instead of urging UK producers to export more, we should increase production in the UK, especially in the areas where the food trade deficit is greatest, such as fruit and vegetables, which are a keystone for public health.[55]

POLICY RECOMMENDATIONS

- A Food Resilience and Sustainability Act to resolve the food trade deficit.[56]
- Address wider trade deficit to reduce need to maximise high value exports.

See also: blocker **Sponsoring Harm** and enabler **Taxing Harm**.

53 ONS (2019), 'UK Balance of Payments - The Pink Book Time Series' (accessed July 2020).
54 Lang, T (2020) *Feeding Britain: Our Food Problems and How to Fix Them* (London: Pelican).
55 Timothy Lang (Ibid) notes that the UK had a £9.85 billion trade deficit in fruit and vegetables in 2018.
56 Ibid.

SUFFICIENT INTERNATIONAL AGREEMENTS

As well as very valid calls for a fossil fuel non-proliferation treaty, there is also a clear need for all human-made greenhouse gas emissions to be attributed to a country. Just because some European countries have offshored production of many of the goods we consume, we can't dodge responsibility for the emissions caused by our consumption. All national carbon budgets as part of UNFCCC need to address consumption, including aviation and shipping. However, countries must not lose sight of the emissions they facilitate that are embedded in their exports. Similarly, climate and wider ecological impacts should be embedded at the heart of trade agreements and investment decisions, alongside measures to address poverty and avoid unequal trade.

Our Government Must

To achieve the pace of change required, we must change the rules of the game. Democratically elected governments must intervene in our economy to both lay out a new path, and ensure that financial incentives are aligned with the benefits and harms to society. The economy requires clear and stable policies for change.[57] This requires a combination of:

- **Direct intervention by national and local governments**
- **Indirect intervention by changing market conditions (taxes and subsidies)**
- **Indirect intervention by changing consumption patterns (including via public information campaigns).**

Blocker: Asking the Wrong Questions

If we have the wrong aims, don't measure the things that actually matter, or focus on misleading metrics, we won't reach zero carbon. Policy must be based on climate and environmental limits, and the justice and wellbeing of communities globally, rather than economic growth or GDP. Focus should be on the sectors or localities furthest from meeting targets (e.g. those with largest carbon footprint). If aviation and shipping aren't included in carbon budgets, their impact won't be measured or managed.

Investment decisions are typically political or based on cost-benefit analysis and rarely take account of the full impacts of emissions, resource extraction and pollution.[58,59] Whilst enabler **Taxing Harm** and blocker **Sponsoring Harm** will address this, it is not possible for the financial benefits of a project to wholly compensate for greenhouse gas emissions, as absolute rather than relative emissions reductions are critical.

57 Jones, A, and Hafner, S (12 June 2019), 'Finding the $500 Billion', *CUSP* (accessed June 2020).

58 Stern, N (2006), 'Introduction to review', *Stern Review: The Economics of Climate Change* (Cambridge: Cambridge University Press).

59 Helbling, T (2010), 'What are Externalities?', *Finance & Development* 47:4 (accessed July 2020).

POLICY RECOMMENDATIONS

- Replace GDP with wellbeing as the key policy objective.
- Reform the UK Treasury's Green Book[60] so that greenhouse gas implications and cost implications are compared side by side.
- All products or services traded to have embedded emissions figure shared with purchaser.
- Require all UK businesses with turnover above £1m to have a carbon audit and implement Road to Zero Carbon plans.

Blocker: Sponsoring Harm

If a state or union of states is serious about reaching zero carbon then it must stop subsidising greenhouse gas emissions. Such subsidies currently take both direct forms and indirect forms.[61] The biggest way UK subsidies currently harm the climate is by subsidising the fossil fuels industry (see **Fossil Fuels** story). However, the taxpayer also subsidises car use (spending billions on building new roads), aviation (exempting airlines from fuel duties), and material consumption (by funding household waste collection and processing). Climate Action Network Europe has laid out proposals for how fossil fuel subsidies could be phased out from 2020 in the EU.[62]

POLICY RECOMMENDATIONS

- Phase out all government subsidies to aviation and fossil fuels within two years.
- Review whether current public sector capital projects (e.g. the road building programme[63]) facilitate rapid decarbonisation, and reallocate funding if not.

Enabler: Taxing Harm

The emission of greenhouse gases also has negative consequences for society, so should be taxed, just like nicotine and alcohol are. If all products are taxed according to the harm they do to the climate, carbon taxation will discourage consumers from choosing goods or services that have a heavy carbon footprint. Manufactures and retailers will therefore be incentivised to design and offer alternatives with lower embedded emissions.

As there is a pressing need to achieve annual reductions in emissions, the rate of the annual tax increase (or escalator) will need to be both steep and constantly reviewed. Having a clear ten-year tax escalator plan will provide clear signals to both business and investors, allowing them to plan ahead and adapt their business models.

The two other big harms which currently go untaxed are the extractions of limited resources (this deprives future generations of access to those resources) and the creation of pollution. How best to tax these harms requires further exploration, but we propose that ideas such as a tax on the extraction or import (by mass) of non-renewable resources should be considered. There are existing structures for regulating

60 See UK Government Treasury Green Book.
61 CAN Europe (2017), 'Europe in Motion: Ending all Public Financial Support for Fossil Fuels'.
62 Ibid..
63 https://www.theguardian.com/uk-news/2020/mar/11/chancellor-announces-27bn-for-roadbuilding-in-budget

or taxing many forms of pollutions, but many of these (e.g. road vehicle duty) fail to properly correlate with the harm done.[64]

POLICY RECOMMENDATIONS

- Introduce an escalating carbon tax levied on fuels at source, planning applications, imports & non fuel industrial emissions.[65]
- Investigate a mass-based extraction tax on all non-renewable resources' extraction and import.
- Review pollution regulation and taxation structures/rates in the context of the polluter pays principle.

Blocker: Feeding the Monster

Committing to limit global temperature rise to no more than 1.5°C, in line with a climate emergency, means that there are already 9 times more proven fossil fuel reserves than can be burned.[66] The potential global scale of stranded assets has been estimated as $1–4 trillion, with companies engaged in fossil fuel extraction making up a significant proportion of this.[67] Over 30% of global oil and gas reserves are owned by European registered public companies which in turn are financed by a broad mix of pension funds, other private companies, insurers, government funds and the general public.[68] A quarter of corporate shares listed on the stock market and half of corporate bonds are 'carbon entangled' and $1 trillion is spent annually expanding the fossil fuel industry.[69] There is an urgent need for investors to stop putting good money into the carbon bubble, as this is a blocker to sufficient action and managing demand, as well as being a risk to their assets and the wider economy. A carbon tax escalator, as outlined in enabler **Taxing Harm**, will help provide a clear signal to investors.

POLICY RECOMMENDATIONS

- Mandatory emissions / stranded asset exposure reporting against a 1.5°C carbon budget for all pension and investment funds.[70]
- Emissions budgets set for national government departments and local and regional government based on a fair share of global emission budgets and the application of the precautionary principle.[71]
- Mandatory construction and operational emissions reporting for all public sector projects.

64 European Commission (2018), 'Multimodal Sustainable Transport: Which Role for the Internalisation of External Costs?'.

65 Policy Exchange investigated this as alternative to the Emission Trading Scheme in a 2018 report called: 'The Future of Carbon Pricing'. (accessed August 2020)

66 Taking 9 years budget remaining at current emission levels (Table 4) relative to 85 years (weight average from 2018 coal/oil/gas emission split) of reserves remaining at current production levels (Table 5) from Carbon Tracker (1 Nov 2019), 'Balancing the Budget: Why Deflating the Carbon Bubble Requires Oil & Gas Companies to Shrink' (access August 2020).

67 Carbon Tracker (3 May 2019), 'Reporting for a Secure Climate: A model disclosure for upstream oil and gas' (accessed August 2020).

68 InfluenceMap (2018), 'Who owns the World's Fossil Fuels' (accessed August 2020).

69 Carbon Tracker (4 June 2020), 'Decline and Fall: The Size & Vulnerability of the Fossil Fuel System' (accessed August 2020).

70 CAN Europe (2017), 'Europe in Motion: Ending all Public Financial Support for Fossil Fuels'.

71 Jackson, T (2019), 'Zero Carbon Sooner', CUSP Working Paper 18, CUSP; Read, R (no date) 'Precautionary Principle', *Green House Think Tank* (links to other Green House works on the subject).

Our Society Must

Finally we must, as a society, review and revise our assumptions about what matters, what should be prioritised and how we make decisions. New rules of the game will redefine what 'optimal' means for our economy, one which we as society must both embrace and develop.

Enabler: Making Things that Last

Responding to climate change means consuming less – and therefore consuming better. As the fashion trade story highlights, to reach zero carbon we must use clothes for longer so we can receive the same benefits whilst buying fewer garments. This requires clothes to be better made, and for us all to embrace a culture of adapting, repairing and personalising our clothes.

As the steel trade story highlights, we must reduce demand for carbon-intensive materials and the products made from them. To maintain the benefit our society derives from them, we must design for deconstruction, modification and repair as well as maintenance to maximise lifespan.[72] Across the board, the current trend towards short product lifespans must be swiftly reversed.[73] There are many factors which affect how long products are maintained and used; some require **Changing Culture** (see enabler below), some require new business models,[74] and others require policy interventions.

POLICY RECOMMENDATIONS

- Mandatory 5/10/15 year guarantees.
- Introduce a 'Right to Repair' requiring items to be repairable or leased with an obligation on manufacturers to repair.

Blocker: Idolising Efficiency

Current economic thinking is that 'efficiency' is almost always good, and we should strive for more of it. There are significant questions to be asked about whether efficiency is always useful in its own right, and how it should be measured.[75,76] Labour productivity is a very common measure of economic efficiency, but it is based on GDP and therefore ignores whether that labour is making a positive contribution to our wellbeing or prosperity.[77]

There is a trade-off between efficiency and resilience. We must ensure that there is sufficient diversity and surplus capacity in our economy and vital services.[78] The pandemic has highlighted the importance of maintaining hospital capacity and

72 Allwood, J, and Cullen, J (2012), Sustainable Materials: With Both Eyes Open (Cambridge: UIT Cambridge).
73 European Environment Agency (2017), 'Circular by Design: Products in the Circular Economy'.
74 See como.org.uk and riversimple.com.
75 de Decker, K (2018), 'Bedazzled by Energy Efficiency', *Low-tech Magazine* (accessed August 2020).
76 Pemberton, E (20 July 2020), 'The Limits of Efficiency: Can Capitalism be More Resilient in the Face of Crisis?', *Speri* (accessed July 2020).
77 Chu, B (6 Oct 2017), 'What Is Productivity? And Why Does it Matter That it Is Falling Again?', *Independent* (accessed July 2020).
78 Ellen MacArthur Foundation (6 June 2012), 'Circular economy' (accessed July 2020).

contact tracing systems. It is clear from trade analysis that to reach zero carbon we need slower and shorter supply chains, but there is also a wider need to recognise that the pursuit of energy and resource efficiency alone will not be sufficient.[79] We therefore must also 'Manage Demand' and legislate for resilience in critical sectors (e.g. food[80]).

POLICY RECOMMENDATIONS

- Legislate to require surplus capacity and diversity of supply in vital services and key section of the economy.

See also: blockers **Sponsoring Harm**, **Asking the Wrong Questions**, and enabler **Managing Demand**.

Enabler: Changing Culture

Reaching a prosperous, sustainable, zero carbon society isn't going to be simple. It requires more than choosing one technology over another.

We must, as individuals and collectively, become people able to thrive within the new zero carbon society we create. Sustainable prosperity is as much a journey as a destination, and one where collective education is key. By embracing a society in which products are personalised and cared for, in which we design buildings and devices to be upgraded, repurposed and deconstructed, we will change our society's culture. Or perhaps a shift in our values will enable our economy to focus on **Making Things that Last** and **Investing in What We Already Have**. Either way this requires a commitment to a much more fundamental and ongoing form of education than formal education today offers.[81] We must accept that this transition will change our culture, but also that the end point of this journey will only become clearer as the transition develops.

POLICY RECOMMENDATIONS

- Public information campaigns promoting reuse, repair, upgrading, renovation and sharing rather than owning.
- Public education campaigns to support a 'Great Food Transformation' by equipping citizens with the skills needed to cook more nutritious and seasonal everyday foods.[82]
- Invest in transformative education for all, both as part of formal education and embedded in communities.[83]

See also: enablers **Investing in What We Already Have** and **Making Things that Last.**

81 Rowson, J (2019), 'Bildung in the 21st Century – Why Sustainable Prosperity Depends upon Reimagining Education', *CUSP*.

82 Lang, T (2020) *Feeding Britain: Our Food Problems and How to Fix Them* (London: Pelican), 453–457.

83 Rowson, J (2019), 'Bildung in the 21st Century – Why Sustainable Prosperity Depends upon Reimagining Education', *CUSP*.

GREATER CARBON IMPACT OF TRADE OUTSIDE OF THE EU

Brexit could be an opportunity implement a new zero carbon trade policy for the UK, and address the blockers and enablers this report lays out, as Green House's recent report 'Another Brexit is Possible' explores.[84] However the current government's plan is the opposite of this, suggesting we should increase trade with countries on the other side of the world and expand airports to support additional airfreight.[85,86]

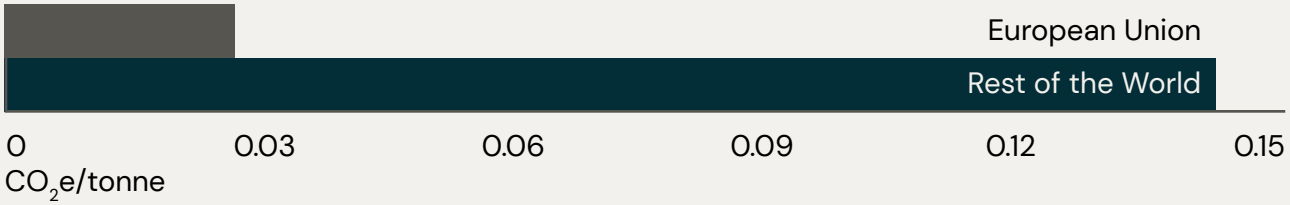


Figure 7: UK Trade Carbon Intensity with EU vs. Rest of the World

84 Read, R, and Dawnay, E (2020), 'Another Brexit is Possible: Strategy for Brexit in the Era of COVID-19 and Climate Chaos', *Green House Think Tank*.

85 Ibid.

86 RiverOak Strategic Partners (9 July 2020), 'Manston Airport', *National Infrastructure Planning* (accessed August 2020); Care, A (29 Apr 2019), 'The Big Plan to Transform East Midlands Airport', *Derby Telegraph* (accessed July 2020).

Conclusion

In order for global trade to become zero carbon and exist within planetary boundaries, the analysis in this report shows that three interventions are needed:

1. **Smaller:** Reduce the scale of trade. A certain amount of trade clearly enriches people's lives, for both the UK and our trading partners. However a significant amount of current trade serves little purpose in increasing wellbeing. The scale of trade should be reduced to minimise its impact on the climate and should be focused on that trade which has the highest quality-of-life gain relative to impact.
2. **Shorter:** Reduce the distance that goods travel. This means that heavier and more perishable goods (e.g. construction materials and food) are first priority to be produced locally to meet demand.
3. **Slower:** Reduce the speed of trade. Shift the bulk of trade to slower forms of transport (e.g. shipping rather than by air) to minimise unavoidable emissions. Immediate targets should include ship speed reductions, which could reduce shipping emissions by 43%.[87,88]

This report proposes that in order to achieve these changes, as well as those needed to reach zero carbon in the industrial and infrastructure sectors, we must block the blockers to zero carbon, and enable the enablers. These blockers and enablers are laid out on pages 4 and 5 and the policy interventions needed to achieve this are explored on pages 16–23. Some of these enablers and blockers outline what must happen, some highlight what governments (and therefore political parties) must take responsibility for, and some outline changes to how our society operates that our wider economy must confront.

Addressing these proposals will take a complicated set of interventions, which presents a challenge for policy makers and the public alike. However, this complexity must not be denied. The global economic, trading and material system in which we are embedded is complicated and strengthens the inertia of 'business as usual'. There is no silver bullet or win–win solutions that alone will break the current momentum and take us to a zero carbon society. This global system has been painstakingly created by humanity over centuries, to serve its purposes as they were defined in the past. Once we are clear on how our priorities and objectives have changed, we can begin the task of picking apart our current system, and reshaping it to fit our new purposes.

The government must take the lead in **setting the direction** and planning for **sufficient action**. It must shift from subsidising to **taxing harm**, so **public money is allocated to public goods**, lest we carry on **feeding the monster** and **buying dirty**. It must 'change the rules' so we **choose the right scale** instead of **idolising efficiency** and **asking the wrong questions**. This means making sure infrastructure and economic rules allow subsidiarity, sharing and collaboration first rather than increasing economic scale to maximise both comparative and absolute advantage.

The public sector must shift from commissioning infrastructure that drives private sector growth to creating jobs that deliver the climate and equity shifts needed. Without this change, we will continue to **lock in harm** rather than

87 Halim, R, et al. (2018), 'Decarbonization Pathways for International Maritime Transport: A Model-based Policy Impact Assessment', *Sustainability* 10:7, 2243. A speed reduction of 10% translates into an engine power reduction of 27%.

88 Walsh, C, et al. (2017) 'Charting a Low Carbon Future for Shipping: A UK Perspective', *Marine Policy* 82.

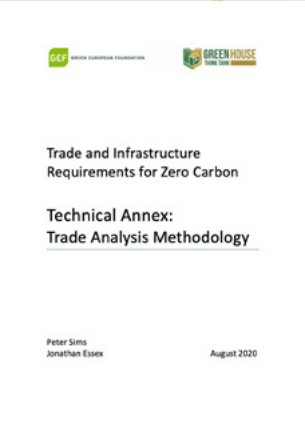
managing demand and **empowering local solutions**. We must recognise innate value by **making things that last**, choosing **quality over quantity**, and **investing in what we already have** to reduce the quantity of material consumption and therefore extraction. We must see beyond **false horizons** and be clear on our purposes so we can phase out **pointless trade** and stop **creating rubbish by consuming rubbish**. This all requires **changing our culture** to place greater value on sharing, repairing and wellbeing.

The report has laid out a toolkit along these lines, but exploration of the implications of this toolkit necessarily surpasses this report. There is no shortage of work looking the pivotal issue of trade, but much takes a very specific focus, and is often very technical. A whole system perspective is critical for sufficient action to be taken in the face of the triad of threats presented by climate change, biodiversity loss and resource limits. Green House presents this toolkit as a tool to facilitate both policy makers and activists engaging with infrastructure, trade and industry, and the economic systems which link them.

The trade analysis which underpins this is explored in more detail in the Technical Annex published separately to this report, and further aspects will be explored in future publications on this theme.

Zero carbon global trade will be smaller, with shorter supply chains and slower transport. Analysis of UK trade highlights how we can stop trade and investment locking in carbon emissions. A toolkit of key pointers is introduced to aid policymakers to shift trade and investment choices from global growth to facing up to the climate emergency.

RELATED GREEN HOUSE WORK



Trade and Infrastructure Requirements for Zero Carbon: Technical Annex

Another Brexit is Possible
June 2020

What would a UK climate emergency plan that faces up to climate reality really look like?
May 2020