

A pricey omission: not charging ships for their pollution costs the UK £1.6bn/yr

Lack of proper regulation for shipping emissions is costing the UK dearly

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Summary

New analysis by Transport & Environment (T&E) shows that in 2021, carbon dioxide (CO₂) emissions from UK shipping were **22 million tonnes (Mt) - equivalent to 11 million cars**. If included in the UK Emissions Trading Scheme (ETS), these emissions would generate **~£1.76bn** for the Exchequer. This amount, annually, would cover the government's own estimated **~£800m/yr** cost of cleaning up the domestic shipping sector's emissions twice over.

Sadly though, this is not yet the plan despite the recommendations of the UK Climate Change Committee. If the government implements its proposals to expand the UK Emissions Trading Scheme (UK ETS) to shipping, T&E analysis shows that **only ~10% of those 22Mt** would be included in the ETS, generating just **~£170m/yr**. At present levels of emissions, the government would be walking away from **£1.6bn/yr** and leaving **~90%** of UK shipping emissions unregulated.

There are serious problems with how the government calculates UK shipping emissions, how it assigns responsibility for them and how it plans to regulate and, ultimately, abate them. To begin addressing these issues, the government must first ensure that the UK shipping emissions inventory is accurate and **switch to an activity-based measure based on UK Monitoring, Reporting and Verification (MRV) data** for all its shipping emissions. It should then expand the scope of the ETS to **include all vessels above 400 gross tonnage (GT)** and include **50% of emissions from UK international voyages**.

A visionary policy and regulatory framework is needed to eliminate UK shipping emissions in line with Net Zero and the Paris Agreement, and the above measures would make a strong foundation if implemented.

1. Introduction

In June 2022, the UK government consulted on expanding the UK Emissions Trading Scheme (ETS) to include shipping emissions¹. We await the government's response, but if the proposals are implemented as set out in the consultation, the ETS will include emissions² from vessels above 5000 gross tonnage (GT) making UK domestic voyages³, from “the mid-2020s”. Gross tonnage refers to a ship's capacity by volume, and 5000GT would roughly be a mid-sized ferry - for example, the Caledonian Isles⁴. International voyages and smaller vessels are not in scope.

The ETS proposal for shipping is critical. At present it is the only regulatory measure on the table to address UK shipping emissions. Key to the success of the measure is therefore the quantity of emissions that will actually be included, if the proposals set out in the consultation are implemented.

In order to determine UK shipping emissions, the government has a dedicated monitoring, reporting and verification (MRV) regulation. However, in December 2022 the government postponed the date that ship operators must report their emissions under the UK MRV requirements until 2025, which means that there will be a period of at least four years without official data for UK shipping emissions. Furthermore, the government has still not published its estimated (as opposed to monitored) annual data of UK shipping emissions for 2021.

It is, however, possible to calculate UK shipping emissions using internationally-recognised scientific methodology, given the automatic identification systems (AIS) installed in ships above 300GT. To calculate an accurate UK maritime emissions inventory for 2021, T&E has therefore commissioned the analysis of AIS data for all commercial shipping making UK port calls in 2021. The analysis allows us to determine how effective the expected UK ETS proposal would be in regulating UK shipping emissions.

¹ Developing the UK Emissions Trading Scheme. Accessed at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1067125/developing-the-uk-ets-english.pdf

² It should be noted that whilst T&E's data covers emissions of CO₂ only, the ETS proposal as described in the consultation would measure emissions of carbon dioxide equivalent (CO₂e): CO₂, methane (CH₄) and nitrous oxide (N₂O) as set out in the UK GHG conversion factors. For the purposes of this briefing, this difference is not significant. However, T&E agree that CO₂e should be included in the shipping ETS, but that the government should do so through revising the UK MRV regulation (to include either the IMO or EU lifecycle (well-to-wake) methodology), rather than requiring the use of the UK GHG conversion factors.

³ A domestic voyage is defined by the government as a voyage “where both the port of departure and the port of arrival are a UK port; this may either be two different UK ports or the same UK port”. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1092399/uk-domestic-maritime-decarbonisation-consultation-plotting-the-course-to-zero.pdf Page 7

⁴ MV Caledonian Isles. Retrieved from <https://www.calmac.co.uk/fleet/mv-caledonian-isles>

1.1. Methodology

Our data covers 18 commercial vessel types⁵ of all sizes⁶ that made UK port calls in 2021. The data covers emissions from main propulsion engines as well as auxiliary engine emissions both at sea and at berth. Geographical scope of the analysis includes voyages to the UK from other countries (inbound), to other countries from the UK (outbound) and intra-UK (domestic), which is fully aligned with the UK's official monitoring rules mentioned above.

The data provides a comprehensive commercial UK shipping emissions inventory for 2021. It also shows precisely which vessels, and therefore what percentage of the UK shipping emissions inventory⁷, would be included in the ETS under the government's expected proposal. We can therefore determine the climate effectiveness of the UK's upcoming carbon pricing rules and, by extension, the revenues that will be generated from a maritime ETS.

INFO BOX: AIS DATA

Under the International Convention for the Safety of Life at Sea, all vessels above 300 gross tonnage (GT), and all passenger vessels, must be fitted with an Automatic Information System (AIS) transceiver. Information provided by AIS equipment includes a vessel's unique identification number, position, course and speed. Data is updated hourly. It is intended to assist a vessel's officers and allow maritime authorities to track and monitor vessel movements.

Global AIS transceiver data collected from both satellite and internet-connected shore-based stations are aggregated and made available on the internet through service providers. This data can be viewed on any internet-capable device to provide near global, real-time position data from anywhere in the world. By cross-referencing AIS data with other information from the global fleet data (available in IHS Markit and Clarkson's databases) using the open-source scientific methodology from the International Maritime Organisation's 4th GHG Study, it is possible to calculate with considerable accuracy a vessel's emissions of greenhouse gases and other pollutants globally and nationally.

⁵ Oil tankers; LNG and LPG carriers; bulk carriers; container vessels; vehicle carriers; Ro-Ro vessels; ferries; cruise ships; yachts; offshore and service; fishing vessels and the remaining categories grouped as miscellaneous

⁶ "Sizes" refers to GT. Because our analysis is based on AIS data, this refers to all commercial cargo vessels above 300GT and all passenger vessels.

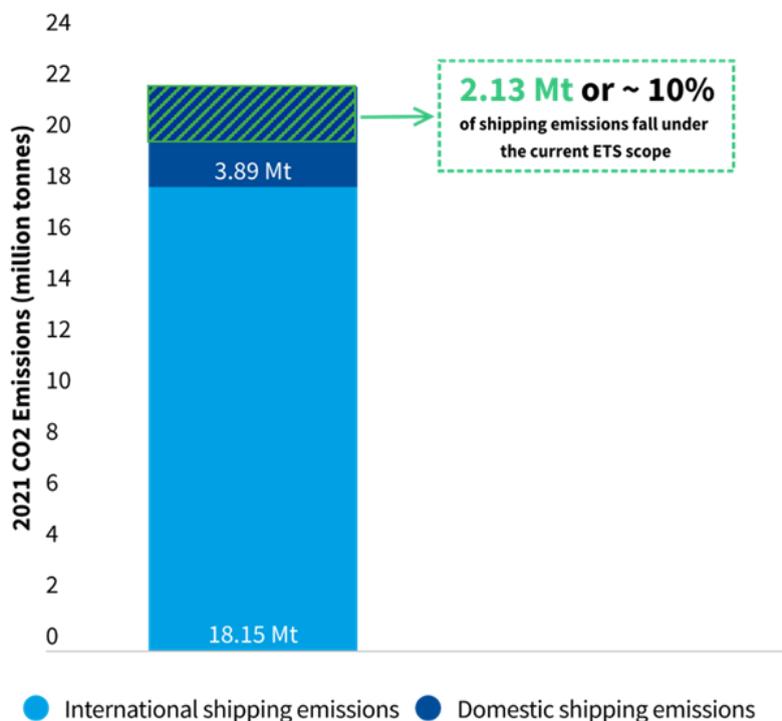
⁷ In calculating the emissions that would fall within scope of the UK's expected ETS proposal, we have assumed that at-berth emissions would be included.

1.2. Findings

UK maritime CO₂ emissions were just over **22 million tonnes**⁸ (megatonnes, Mt) in 2021. Of those, **~18Mt** were from UK international voyages⁹ and **~4Mt** from UK domestic voyages (i.e. emissions from voyages starting and ending in UK ports).

Applying the proposals from the ETS consultation to the data, we find that **just ~10% of these emissions, i.e. 2.13Mt, would be included in the ETS while 90% would be exempted.**

UK shipping emissions to be included in the ETS



At a carbon price of £80/tonne, 2.13Mt of CO₂ would generate revenues of **~£170m/yr**¹⁰. In contrast, including all UK shipping emissions in the ETS, 22Mt, would generate **ten times as much: ~£1.76bn/yr.**

A more detailed breakdown of 2021 UK maritime emissions can be found at Annex A below.

⁸ This is more than all the cars in the following UK cities combined: Greater London, Edinburgh, Glasgow, Cardiff, Birmingham, Manchester, Leeds, Sheffield, Liverpool, Bristol, Leicester, Nottingham, Southampton, Coventry, Aberdeen, Belfast, Newcastle. Retrieved from:

<https://www.gov.uk/government/collections/vehicles-statistics#vehicle-licensing-data-tables>

⁹ Under the UK MRV regulation, an international voyage is any voyage that either begins or ends in a UK port, and we attribute 100% of the emissions from those voyages to the UK, similar to the UK MRV regulation.

¹⁰ Based on an approximate average UK ETS carbon price of £80/tonne in 2022. Accessed at:

<https://www.statista.com/statistics/1322275/carbon-prices-united-kingdom-emission-trading-scheme/>

2. Discussion: why the ETS needs a re-think

As shown here, the ETS proposal would mean leaving **~90% of UK shipping emissions unregulated** and **foregoing ~£1.6bn in much-needed ETS revenues**. This is twice the government's estimated maximum annual cost of decarbonising the UK's domestic shipping sector¹¹, or around the cost of the government's recently-announced home energy efficiency retrofit programme in England¹². At a time of climate emergency when UK shipping emissions need to fall to half their 2008 levels by 2030¹³, the ETS proposal is inadequate.

2.1. Troubled waters: wrongly accounting for emissions

The design of an effective regulatory framework for UK shipping emissions is hampered by how the UK calculates them. The domestic emissions inventory is currently based on terrestrial AIS data from the UK Maritime and Coastguard Agency (MCA)¹⁴. This methodology is satisfactory because it is based on the activity undertaken by each vessel in scope, and so provides an accurate record of emissions.

Conversely, international emissions are calculated based only on fuel volumes sold in the UK (and then multiplying those volumes by the appropriate emissions factor). This does not distinguish between fuel used on domestic versus international voyages, so does not apportion emissions accordingly. Also, due to the ease of bunkering in other nearby jurisdictions such as Rotterdam, UK-only fuel sales do not accurately reflect emissions from UK international voyages. In practice, most vessels undertaking UK international voyages do not bunker in the UK. Calculating emissions based on fuel sales therefore skews the emissions inventory downwards.

Under the UK MRV requirement¹⁵, vessels making UK port calls must record and report their international emissions. So there is no reason why the UK cannot report its international shipping emissions based on MRV data; indeed, as well as being recommended by the Climate Change Committee as an approach the UK should explore¹⁶, this is also the approach followed by the EU.

¹¹ UK Domestic Maritime Decarbonisation Consultation, Plotting the Course to Zero. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1092399/uk-domestic-maritime-decarbonisation-consultation-plotting-the-course-to-zero.pdf

¹² £1.5bn to improve energy efficiency and slash bills, accessed at <https://www.gov.uk/government/news/15-billion-to-improve-energy-efficiency-and-slash-bills>

¹³ Decarbonising Shipping - Policy Briefing <https://documents.manchester.ac.uk/display.aspx?DocID=62470>

¹⁴ Transport Energy and Environment Statistics: Notes and Definitions. Accessed at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/890898/energy-and-environment-notes.pdf

¹⁵ MIN 669 (M+F) Reporting Emissions Data into the UK MRV Regime. Accessed at: <https://www.gov.uk/government/publications/min-669-mf-reporting-emissions-data-into-the-uk-mrv-regime/min-669-mf-reporting-emissions-data-into-the-uk-mrv-regime>

¹⁶ 2022 Progress Report to Parliament. Accessed at <https://www.theccc.org.uk/publication/2022-progress-report-to-parliament/> Page 554

2.2. More trouble: legal responsibility for international emissions

In our analysis we have included all of the international shipping emissions for which the UK is responsible: in other words, emissions resulting from shipping activity undertaken at the behest of the UK. However, the government argues that the International Maritime Organization (IMO) is responsible for the UK's international shipping emissions (as illustrated in both the Course to Zero¹⁷ and ETS¹⁸ consultations). This is in spite of the MRV requirement, which includes international emissions and therefore demonstrates the government's acceptance of responsibility for them. In practice, saying the IMO is responsible for international emissions means that the UK is outsourcing responsibility for the vast majority of its shipping emissions (~18Mt in 2021, or ~80% of the total, as shown by our analysis) to the IMO.

Legal analysis undertaken previously¹⁹ demonstrates unequivocally that under the Paris Agreement, the UK is responsible in law for the abatement of all of its emissions. The same analysis finds that the UK cannot discharge that responsibility to the IMO when the latter has no emissions reduction framework in place compatible with the temperature objective of the Paris Agreement (nor any guarantee that one will be agreed or implemented).

In its complacency, the government is taking a horrible risk. Relying exclusively on the highly-uncertain IMO process for the regulation and abatement of 18Mt of UK shipping emissions is tantamount to gambling with the UK's legally-binding emissions reduction obligations under domestic and international climate law. More and more legal experts^{20 21} conclude that all national shipping emissions (domestic and international) fall under the scope of the Article 4.4 of the Paris Agreement, which requires governments to implement economy-wide emissions abatement measures²². The Paris Agreement places the primary obligation on states to abate shipping emissions through national action. Any international efforts, including those that take place at the IMO, are of a secondary nature only.

¹⁷ UK Domestic Maritime Decarbonisation Consultation, Plotting the Course to Zero. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1092399/uk-domestic-maritime-decarbonisation-consultation-plotting-the-course-to-zero.pdf

¹⁸ Developing the UK Emissions Trading Scheme. Accessed at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1067125/developing-the-uk-ets-english.pdf

¹⁹ UK Legal Obligations on International Shipping. Accessed at https://www.transportenvironment.org/wp-content/uploads/2022/09/OG-study-UK-legal-authority-on-international-shipping_13_Sept.pdf

²⁰ Don't Sink Paris: Legal basis for inclusion of aviation and shipping emissions in Paris targets. Retrieved from <https://www.transportenvironment.org/discover/shipping-and-aviation-are-subject-to-the-paris-agreement-legal-analysis-shows/>

²¹ UK Legal Obligations on International Shipping. Accessed at https://www.transportenvironment.org/wp-content/uploads/2022/09/OG-study-UK-legal-authority-on-international-shipping_13_Sept.pdf

²² UK Legal Obligations on International Shipping. Accessed at https://www.transportenvironment.org/wp-content/uploads/2022/09/OG-study-UK-legal-authority-on-international-shipping_13_Sept.pdf

International shipping emissions will be included in the UK Carbon Budgets from 2033 onwards. Absent any effective policy and regulatory framework for decarbonising UK international shipping, 18Mt of unregulated emissions will drive a large hole through the Carbon Budgets. This will require even greater emissions reductions in other sectors and would in all likelihood mean the need for additional greenhouse gas removals.

2.3. Still more trouble: the polluter isn't paying

The government is required in law to apply the polluter pays principle when making policy²³. In so doing, it must consider the costs and benefits associated with the polluter paying for environmental damage, and how proportionate the payments are to wider societal costs and benefits.

A fair application of the government's environmental principles in the design of the ETS would be to include all the UK's shipping emissions, meaning that the wealthiest part of the sector - the large, international operators - would contribute the bulk of the revenues. Including only domestic shipping places the compliance costs on the part of the sector least able to absorb the costs whilst exempting the operators producing the majority of the UK's shipping emissions. The polluters would mostly not pay.

The blanket exclusion of the UK's international shipping emissions raises serious questions around the government's application of its own statutory environmental principles policy statement²⁴.

2.4. The course forward

In this briefing we show the true extent of UK shipping emissions in 2021, and what regulating all of them through the UK ETS could mean in fiscal terms. The ETS has the potential to be a much more effective instrument in the regulation of shipping emissions than the current proposals suggest, and as a first step towards realising that potential, the UK should include in the ETS 50% of its international emissions. This would align with the recommendations of the Climate Change Committee²⁵ and also the EU's approach, and allow the UK to increase the scope: for example, to 100% by the end of this decade if a similar approach is not adopted by other countries.

In addition, as we have recommended previously²⁶, the government should reduce the minimum ETS threshold from 5000GT to 400GT and include all vessel types. As our data shows, domestic emissions from

²³ Draft Environmental Principles Policy Statement. Accessed at <https://www.gov.uk/government/publications/environmental-principles-policy-statement/draft-environmental-principles-policy-statement#fnref:1>

²⁴ Draft Environmental Principles Policy Statement. Accessed at <https://www.gov.uk/government/publications/environmental-principles-policy-statement/draft-environmental-principles-policy-statement#fnref:1>

²⁵ Letter: Development of the UK Emissions Trading Scheme (UK ETS). Accessed at <https://www.theccc.org.uk/publication/letter-development-of-the-uk-emissions-trading-scheme-uk-ets/>

²⁶ Consultation Response to "Developing the Emissions Trading Scheme". Accessed at <https://www.transportenvironment.org/wp-content/uploads/2022/06/TE-Consultation-Response-Developing-the-UK-ETS.pdf>

vessels below 5000GT are nearly half (45%) the domestic total, whilst vessels below 5000GT also contribute significantly to the international emissions inventory. A 400GT threshold is in line with pre-2018 IMO legislation (EEDI, EEXI and SEEMP) and evidence suggests that in other jurisdictions it would not cause an additional administrative burden²⁷. Only the smallest vessels' emissions (~0.3Mt²⁸ or 1.4% of total UK shipping emissions) would be excluded.

3. Conclusions

The development of an effective UK policy and regulatory maritime emissions abatement framework is being seriously hindered by the lack of transparency around shipping emissions and the government's unwillingness to account for them correctly or take appropriate responsibility for them. Against this background, constraining the effectiveness of the shipping ETS and turning away from a revenue stream based on a proportionate application of the polluter pays principle (that could fund UK maritime decarbonisation twice over or be put to excellent use elsewhere in the economy), is not the action of a climate leader.

The UK is still in a strong position to become a leader on zero-emission shipping, but a radical change of course is required. If it seeks inspiration, the UK need only look across the Channel. 50% of international emissions will be included in the EU ETS as of next year²⁹, whilst the FuelEU Maritime regulation proposes to introduce a fuel greenhouse gas intensity standard and clean fuel mandate on all ships calling at EU ports³⁰ - meaning those on both European and international voyages. These measures are already driving large-scale investment in zero-emission fuels³¹. The UK's commitment in the Clean Maritime Plan to "move faster than other countries and faster than international standards³²" on maritime decarbonisation is starting to look a little threadbare.

The UK must begin by:

- ceasing its emissions accounting anomaly and historical reliance on the ineffective IMO for the regulation and abatement of its international shipping emissions;

²⁷ Climate Impacts to Exemptions to EU's shipping proposals. Accessed at https://www.transportenvironment.org/wp-content/uploads/2022/01/Climate_Impacts_of_Shipping_Exemptions_Report-1.pdf

²⁸ This figure is approximate as there is no AIS requirement for non-passenger vessels below 300GT. Some data is therefore missing. Emissions from vessels below 400GT are: extra-UK voyage = 0.04Mt, intra-UK voyage = 0.15Mt, intra-UK port = 0.1Mt. Total 0.29Mt

²⁹ Reducing emissions from the shipping sector. Accessed at https://climate.ec.europa.eu/eu-action/transport-emissions/reducing-emissions-shipping-sector_en

³⁰ Fuel EU Maritime - Sustainable maritime fuels. Accessed at <https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-fuel-eu-maritime>

³¹ Maersk moves to establish large-scale green methanol production in Spain. Retrieved from <https://splash247.com/maersk-moves-to-establish-large-scale-green-methanol-production-in-spain/>

³² Clean Maritime Plan. Retrieved from <https://www.gov.uk/government/publications/clean-maritime-plan-maritime-2050-environment-route-map>

- accounting for all its emissions on an activity basis, for example by basing the inventory on monitoring, reporting and verification (MRV) data;
- adhering to the regulatory requirement³³ to report shipping emissions each year; and
- properly applying the polluter pays principle and ensuring the ETS includes all vessels above 400GT making UK port calls. The ETS should capture 50% of international emissions initially, with a view to increasing to 100% by the end of the decade in the absence of similar action by other countries.

We look in more detail at the ETS and a broader policy and regulatory framework for UK maritime decarbonisation in our forthcoming briefing.

Further information

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³³ The Merchant Shipping (Monitoring, Reporting and Verification of Carbon Dioxide Emissions) (Amendment) (EU Exit) Regulations 2018. Accessed at https://www.legislation.gov.uk/ukxi/2018/1388/pdfs/ukxi_20181388_en.pdf

Annex A

Breakdown of 2021 UK shipping emissions inventory

<i>Emissions (Mt CO₂)</i>		
	Up to 5000 gross tonnage	5000+ gross tonnage
<i>EXTRA-UK (inbound and outbound)</i>		
Voyage emissions	1.42	15.70
In-port emissions	0.14	0.89
TOTAL EXTRA-UK	18.15 (~82%)	
<i>INTRA-UK</i>		
Voyage emissions	1.29	1.63
In-port emissions	0.47	0.5
TOTAL INTRA-UK	3.89 (~18%)	

<i>TOTALS</i>		
	Emissions	% Total
Total	22.03	100
Total international	18.15	82.4
Total domestic	3.89	17.7
Total included in the UK ETS proposal	2.13	9.7