



Government call for evidence: Extending the emission control area to all UK waters

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Government call for evidence:

Extending the emission control area to all UK waters <https://www.gov.uk/government/calls-for-evidence/extending-the-emission-control-area-to-all-uk-waters>

Response from researchers at the Tyndall Centre for Climate Change Research, University of Manchester, February 2024

Question 1

Do you consider the air pollutant emissions from ships in waters not currently included in an ECA to be a significant problem? Include evidence to support your answer.

Yes. The evidence for this is clearly set out in the 2019 analysis from UMAS and Frontier Economics, published by DfT alongside the call-for-evidence.

Question 3

In your view, should we extend the existing North Sea ECA to all UK waters or designate a geographically distinct new ECA along the west coast of Great Britain and Northern Ireland? Include evidence to support your answer.

Option 3 - extending the North Sea ECA to include the Irish Sea and down to the English Channel - has the greatest coverage and the largest net benefits, as set out in the 2019 analysis for the Department for Transport.

Question 5

Apart from a new ECA in UK waters, what, if any, other measures do you think we should take to address air pollutant emissions from shipping in UK waters? Please include evidence to support your answer.

We suggest three measures to complement the extension of the ECA:

- 1) Ban the Use of Scrubbers:** ECAs have been very successful in reducing SO₂ emissions. The main methods of compliance are the use of either open or closed cycle scrubbers, or using a lower sulphur fuelⁱ. However, use of scrubbers in particular can have negative impacts on other environmental factors. For example, the consultation report notes that the use of scrubbers increases GHG emissions, and states that *“Therefore, complementary policy would be needed to provide appropriate incentives to reduce greenhouse gas emissions, while also remaining compliant with air pollution regulations”*. Scrubber waste-water discharge can also pollute the marine environment^{ii iii}. We note that multiple ports and nations have already either banned or restricted the use of open-loop scrubbers, for example France, Germany and Belgium and the UK ports of Bristol, Felixstowe and Tilbury^{iv}. The UK could complement its IMO-ECA proposal with a ban on the use of scrubbers in UK waters on the basis of a need to align with at least ‘strive’ IMO greenhouse gas emission targets for 2030^v.
- 2) Introduce complementary CO₂ policy:** A broader issue is that maritime policy should be designed to meet both air quality and climate change objectives, at both UK and IMO levels, rather than have strategies for one which work against the other^{vi}. This is particularly

important given that there are practical solutions that can technically deliver on both objectives, and the urgency with which implementation of innovation is needed from a climate change perspective. Unfortunately, recent strategies have worked directly against each other. For example, air pollution regulations have led to the greater use of LNG, which has major methane slip problems that can lead to higher full lifecycle GHG emissions than even conventional fuels^{vii}. The UK should investigate complementing air pollution and ECA policy by setting strict standards for GHG emissions from ships entering UK territorial waters and/or ports, for example requiring vessels to meet A ratings under the IMO's CII regulation^{viii}.

- 3) Set stricter emissions requirements at berth:** Air pollution from ships will tend to have the greatest impact on health while they are close to population centres, such as in ports. Although sulphur emissions in UK ports are already limited to 0.1%, we note that this is still a level which is 100 times higher than the equivalent sulphur regulation for road vehicles. The UK has long acknowledged the benefits of shore-power for reducing air pollution and GHG emissions from vessels; the Clean Maritime Plan refresh should commit to implementing a Zero Emission Berth standard at UK ports, complemented by economic policy instruments to reduce the market-distorting incentives currently favouring the use of more polluting fuel oils – the exemption from taxes for most marine fuel oil use, and the high taxes on use of electricity^{ix}. The EU has recently introduced a comprehensive and integrated policy package which supports shore power – the use of regulations on both ships and ports, the inclusion of maritime in the EUETS, and revisions to the Energy Tax Directive.

Question 9

Do you have any feedback on the analysis of benefits included in the research published alongside the call for evidence?

We would make three points here.

First, the research published alongside the call-for-evidence acknowledges that it is based on valuations using assumptions valid in 2019. Since then DESNZ has updated its values for GHG emissions^x putting a higher value on GHG emissions. In addition, since this research was published the UK has legislated to include international shipping greenhouse emissions as part of its carbon budgets from the 6th Carbon Budget period onwards: this broadens the scope of what should be considered a “UK impact”.

Second, the research acknowledges that the valuations of air pollution damages are averages. In practice air pollution reductions nearer population centres will have greater benefits than this average. This is a further argument for complementary UK policy in addition to the IMO-ECA extension, to further reduce air pollution in UK ports. It is also an argument in favour of the western extension of the IMO-ECA: the benefits to the UK of pollution reduction in the West are higher because of the predominant direction of prevailing winds in the UK.

Third, we note that in the DfT's accompanying analysis to this call-for-evidence, all options have net benefits in the cost-benefit analysis, with greater benefits for the more comprehensive geographic coverage. There is also a further argument in favour of broader coverage. The CBA values present net benefits, without explicit discussion of who are the beneficiaries and on whom the costs fall. The costs to the existing situation are to the UK population, from reduced ill-health. The optimal remedy

to this should not be via a cost-benefit analysis on net benefits, but via the application of the UK Government's polluter pays principle. This states that:

"The polluter pays principle means that, where possible, the costs of pollution should be borne by those causing it, rather than the person who suffers the effects of the resulting environmental damage, or the wider community. The polluter pays principle serves several functions and may be used through different phases of policymaking. It can be used in the design of a policy (before the damage has occurred) to prevent or deter environmental damage. In cases where pollution cannot be avoided or is caused by accident, the polluter pays principle can be used to restore or redistribute the costs of environmental damage^{xii}".

For the proposed IMO-ECA, therefore, the polluter pays principle is in effect being applied, to establish a regulation to prevent or deter environmental damage. The proposal should be explicit that this principle is a driving reason for its implementation, rather than the fact that its CBA result is positive. The fact that the CBA is positive is of interest, but if the CBA had given a net negative benefit the policy goal should still be to prevent the environmental damage. We note too that in the ongoing absence of regulation, the polluter pays principles are not being used to "restore or redistribute the costs of environmental damage" from the current and historic air pollution and CO2 damages being imposed on UK and other populations by ship operations, as this pollution is not factored into the fuel costs faced by ship operators.

Question 12

Do you have any feedback on the analysis of costs included in the research published alongside the call for evidence?

Same response as for Question 9. We would make three points here.

First, the research published alongside the call-for-evidence acknowledges that it is based on valuations using assumptions valid in 2019. Since then DESNZ has updated its values for GHG emissions^{xiii} putting a higher value on GHG emissions. In addition, since this research was published the UK has legislated to include international shipping greenhouse emissions as part of its carbon budgets from the 6th Carbon Budget period onwards: this broadens the scope of what should be considered a "UK impact".

Second, the research acknowledges that the valuations of air pollution damages are averages. In practice air pollution reductions nearer population centres will have greater benefits than this average. This is a further argument for complementary UK policy in addition to the IMO-ECA extension, to further reduce air pollution in UK ports. It is also an argument in favour of the western extension of the IMO-ECA: the benefits to the UK of pollution reduction in the West are higher because of the predominant direction prevailing winds in the UK.

Third, we note that in the DfT's accompanying analysis to this call-for-evidence, all options have net benefits in the cost-benefit analysis, with greater benefits for the more comprehensive geographic coverage. There is also a further argument in favour of broader coverage. The CBA values present net benefits, without explicit discussion of who are the beneficiaries and on whom the costs fall. The costs to the existing situation are to the UK population, from reduced ill-health. The optimal remedy to this should not be via a cost-benefit analysis on net benefits, but via the application of the UK Government's polluter pays principle. This states that:

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Question 13

What additional analysis and research would you like to see undertaken?

The UK currently has limited evidence on the true impact of ship emissions on port communities. For example, to our knowledge, no studies have been done specifically considering the impact of the UK’s prevailing winds on West coast UK port communities where ECAs are currently not limiting pollution, and studies are limited even in areas where the ECA has been operating. Broad literature reviews such as Mueller et al., (2023)^{xiv} have considered all studies globally that have been undertaken research on shipping and port-sourced pollution, and from this it appears there is an absence of studies specifically focused on the UK to understand the true impact of shipping pollution on its population. The one study that is referenced (Lindgren, 2021)^{xv} has considered the impact of the 2015 Sulphur cap on infant birthweight in English local authority areas in East and South regions only, but other studies typically focus on modelled emission changes and monetised costs and benefits, rather than population health. The known health impacts of shipping emissions on coastal areas are in themselves sufficient to warrant action now to reduce exposures in line with current ECA standards. However, it is recommended that UK should commission work to better understand the true impact on people, and hence benefit of more strictly limiting emissions from ships calling at UK ports and travelling in territorial waters and those within relative close proximity (e.g. Irish Sea), with a particular emphasis on the West Coast, given the prevail wind regime and understood UK climatology. In line with the precautionary principle, action should be taken now to reduce exposures in line with current ECA standards, with results of additional research being used to tighten standards further if health impacts remain.

Question 14

In your view, how effective is the current at berth requirement for controlling air pollutant emissions at UK ports outside an ECA? Include evidence to support your answer.

The current at-berth requirement for air pollutant control is insufficient. We reiterate our points at question 9 that air pollution damages from emissions at port are higher than for emissions at sea, given their greater proximity to population centres, and that the 0.1% sulphur standard for vessels in

ports is 100 times higher than the sulphur standard for road transport vessels. The UK should implement a Zero-Emission Berth standard.

Question 15

In your view, should any future ECA in UK waters apply to both sulphur oxides (SOx) and nitrogen oxides (NOx) or only SOx? Include evidence to support your answer.

The future ECA should apply not only to both SOx and NOx but other harmful air pollutants.^{xvi} The main issue here is that ECA regulations only apply to NOx and SOx, when other air pollutants are very harmful – the consultation itself cites the £1.5 billion health cost from shipping PM2.5s. This is a further reason for complementary policy. For example, greater use of fully-electric and hybrid electric vessels, and greater deployment of wind-assist retrofits, would reduce both air pollution beyond NOx and SOx, and also GHG emissions, and should be incentivised in the Clean Maritime Plan refresh. This point about the need to integrate sulphur reduction and greenhouse gas reduction policy was made by a Tyndall Centre researcher as early as January 2014^{xvii}

Question 16

In your view, how long would the shipping industry require to adapt to the requirements of a SOx ECA in UK waters? Include evidence to support your answer.

At present, ships already adjust their fuel use to comply with existing regulations in other areas, so there should be no delay in implementing an ECA extension.

Question 17

In your view, how long would the shipping industry require to adapt to the requirements of a NOx ECA in UK waters? Include evidence to support your answer.

At present, ships already adjust their fuel use to comply with existing regulations in other areas, so there should be no delay in implementing an ECA extension.

Question 18

In your view, are there any risks of unintended consequences from the introduction of a new ECA (for either SOx or NOx)?

There are risks and consequences from not taking a comprehensive approach to all maritime air pollutants and GHGs. It is essential that any change in pollution control takes a systems perspective and explicitly considers the consequences for GHG emissions when implemented, and introduces supplementary measures to ensure that there is no trade-off in terms of GHG emissions when extending the ECA.

GHG emissions accumulate over time. The longer it takes to cut such emissions, the more steeply they will need to be cut in future – elevating the costs of their mitigation. Furthermore, the sector is already committed to a quantity of future greenhouse gas emissions due to the long lifetimes of existing shipping infrastructure^{xviii} and cutting CO₂ on existing ships is a critical part of successful decarbonisation. There are already practical solutions that limit all emissions – battery electric,

shore-power, wind-propulsion retrofit. It is therefore important that an extended ECA and its supplementary polices incentivise these options as a priority.

Wind propulsion has been shown to cut annual fuel use by over 20% in areas of beneficial winds^{xix}, which produces cuts to all emissions. Research highlights that routes connected to the UK in the North Atlantic Ocean and North Sea are particularly favourable for the technology. Introducing a new UK ECA that incentivises both the pollution and GHG benefits provided by wind propulsion technologies could support uptake of the technology in these surrounding areas. Wind propulsion technologies are available to install today to cut committed emissions from the existing fleet, with over 30 retrofit ships currently operating and 8 more ships wind ready. Sixteen further retrofit installations are planned in 2024, alongside five primary wind ships over 400 Gt, which use wind as the primary energy source.

Question 25

What other measures could shipping take to reduce their air pollutant emissions? Include details of any technology or other measures and provide evidence to support your answer.

One issue currently on the horizon is the use of new alternative fuels to substitute for fossil fuels. Analysis of how 'green' these fuels can be based on limited assumptions, given that their use in practice (e.g. ammonia) is very limited. It is known that the combustion of ammonia produces NOx emissions, but often lesser known is that it also produces N2O emissions – a potent GHG – if combusted in a ship's engine^{xx}. Whilst there may be mitigations to address this such as scrubbers (also as yet untested and with potential unintended consequences of their own) – any measure taken to limit air pollution now must consider the transition that the industry is currently undergoing to meet climate targets, to ensure that the same mistake, as has been made to incentivise LNG, does not happen again. This requires the development of complementary policy which takes a future scenarios approach, and considers not only the unintended consequences of implementing an extended ECA that limits its focus to Sulphur and NOx emissions today, but also the unintended consequences for climate change given the fuel mix of the future is likely to be very different.

Question 26

Do you have any other information or evidence that you would like to submit as part of your call for evidence response?

The Government's 2019 Clean Air Strategy requested Port Air Quality Strategies (PAQS) from ports handling cargo in excess of 1 million tonnes a year. The Government issued guidance in 2019 for ports to produce and submit these PAQS: <https://assets.publishing.service.gov.uk/media/5d24a9aa40f0b660ad3b68b3/port-air-quality-strategies.pdf>. This guidance stated that strategies should be submitted by end 2019, with the DfT providing feedback before final strategy submission by end July 2020, and then *"Following submission of the final PAQS the Department will review and provide feedback on any concerns and will 6 weeks from submission, publish hyperlinks to the ports' individual websites on Gov.UK to assist the public in accessing the information."* The Government also stated that: *"Once a final PAQS is completed and published, there is an expectation that it will be a living document that will be reviewed and updated periodically to reflect actions taken and the monitoring programme in place. The strategy should be resubmitted to the Department every 3 years from initial submission. The Department will, in conjunction with DEFRA, undertake a review of the efficacy of this system in 2020"*

following the first round of submission, this review will consider if the approach being taken is effective and what improvements could be made to the system, its application, and to this guidance”.

However, there has been nothing further published on this in the 4+ years since.

PAQS could be a powerful complementary tool alongside ECAs. Could the DfT issue an update on the progress on PAQS, and how they will be used to reduce air pollution ill-health?

Submitted by: Simon Bullock, Christopher Jones, Alice Larkin, James Mason, Tyndall Centre for Climate Change Research, University of Manchester, February 2024.

ⁱ Zis, T., et al., 2021. Economic and environmental impacts of scrubbers investments in shipping: a multi-sectoral analysis. *Maritime Policy and Management*.

<https://www.tandfonline.com/doi/full/10.1080/03088839.2021.1937742>

ⁱⁱ Du, L., et al., 2022. Is polycyclic aromatic hydrocarbon concentration significantly underestimated in scrubber effluent discharge? *Ocean and Coastal Management*.

<https://www.sciencedirect.com/science/article/abs/pii/S0964569122000680>

ⁱⁱⁱ Osipova, L., et al., 2021. Global scrubber washwater discharges under IMO's 2020 fuel sulfur limit.

<https://theicct.org/wp-content/uploads/2021/06/scrubber-discharges-Apr2021.pdf>

^{iv} ICCT, 2023. Global Update on scrubber bans and restrictions. https://theicct.org/wp-content/uploads/2023/06/Scrubbers_policy_update_final.pdf

^v Bullock, S., et al., 2023. Are the IMO's new targets for international shipping compatible with the Paris Climate Agreement? *Climate Policy*. <https://tinyurl.com/IMOParis>

^{vi} Gilbert, P., 2014. From reductionism to systems thinking: How the shipping sector can address sulphur regulation and tackle climate change. *Marine Policy*.

<https://www.sciencedirect.com/science/article/pii/S0308597X13001516?via%3Dihub>

^{vii} Comer, B., et al, 2024. FUGITIVE AND UNBURNED METHANE EMISSIONS FROM SHIPS (FUMES): CHARACTERIZING METHANE EMISSIONS FROM LNG-FUELED SHIPS USING DRONES, HELICOPTERS, AND ON-BOARD MEASUREMENTS. ICCT.

^{viii} Transport and Environment, 2024. Long, Loud and legal – the case for zero-emission UK shipping.

https://www.transportenvironment.org/wp-content/uploads/2024/01/Long-loud-and-legal_-maritime-energy-policy-recommendations-for-the-UK-Jan-24-3.pdf

^{ix} <https://research.manchester.ac.uk/en/publications/call-for-evidence-on-shore-power-response-from-tyndall-port-of-ab> and <https://research.manchester.ac.uk/en/publications/call-for-evidence-on-shore-power-response-from-tyndall-centre-uni>

^x <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal#full-publication-update-history>

^{xi} <https://www.gov.uk/government/publications/environmental-principles-policy-statement/environmental-principles-policy-statement>

^{xii} <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal#full-publication-update-history>

^{xiii} <https://www.gov.uk/government/publications/environmental-principles-policy-statement/environmental-principles-policy-statement>

^{xiv} Mueller, N., Westerby, M., and M. Nieuwenhuijsen, Health impact assessments of shipping and port-sourced air pollution on a global scale: a scoping literature review, *Environmental Research*, 216, 1, 2023, <https://doi.org/10.1016/j.envres.2022.114460>.

^{xv} Lindgren, S., 2021. The coast is clear: shipping emission standards, air quality and infant health. *Transportation Research Part D: Transport and Environment*.

<https://www.sciencedirect.com/science/article/pii/S1361920921003643>

^{xvi} Gilbert, P., From reductionism to systems thinking: how the shipping sector can address sulphur regulation and tackle climate change, *Marine Policy*, 43, 2014. <https://doi.org/10.1016/j.marpol.2013.07.009>

^{xvii} Gilbert, P., From reductionism to systems thinking: how the shipping sector can address sulphur regulation and tackle climate change, *Marine Policy*, 43, 2014. <https://doi.org/10.1016/j.marpol.2013.07.009>

^{xviii} Bullock, S., **Mason, J.**, Broderick, J., Larkin, A. (2020) Shipping and the Paris climate agreement: a focus on committed emissions, *BMC Energy* 2, 5. <https://doi.org/10.1186/s42500-020-00015-2>

^{xix} **Mason, J.**, Larkin, A., Bullock, S., van der Kolk, N., Broderick, J. (2023) Quantifying voyage optimisation with wind propulsion for short-term CO₂ mitigation in shipping. *Ocean Engineering*, 289, 116065. <https://doi.org/10.1016/j.oceaneng.2023.116065>.

^{xx} Tomos, BAD., Stamford, L., Welfle, A., and A. Larkin, Decarbonising international shipping – a life cycle perspective on alternative fuel options, *Energy Conversion and Management*, 299, 2024. <https://doi.org/10.1016/j.enconman.2023.117848>