



Department
for Transport

Port Air Quality Strategies



Moving Britain Ahead

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Port Air Quality Strategies

Introduction

The Clean Air Strategy (CAS) published by DEFRA on 14 January 2019¹ is the most ambitious Air Quality Strategy in a generation. It aims to cut down air pollution across all sectors (including transport) to protect public health and the environment.

Previously, the priority has been to tackle the biggest individual sources of pollution, but as these major sources of emissions have decreased, due to intervention, the relative contribution of smaller and more diffuse sources of air pollution has increased.

For Transport the primary focus has been on road vehicles as the main source of pollution, particularly in relation to nitrogen oxide concentrations. This work continues, but other emitters, including shipping and ports, are now being asked to play a larger part in delivering the Government's objective of clean air for all.

The Maritime section in the Transport chapter of the CAS sets out a number of commitments focussed on opportunities to reduce emissions from domestic shipping and ports activities. On this basis, major ports in England are being asked to develop their own air quality strategies setting out plans to reduce emissions across port operations.

This work is not happening in isolation as the international shipping industry is transitioning in 2020 to more stringent global limits on the sulphur content of fuel, and the North Sea and Channel Approaches will become an internationally designated NOx emissions Control Area for shipping in 2021. Additionally the Government is currently reviewing the wider use of emissions control areas for shipping in UK waters, and will be consulting on options in mid-2019.

In January 2019, the Department for Transport ("the Department") published Maritime 2050: Navigating the Future²; a strategy setting out the Government's vision and ambitions for the future of the British maritime sector. The environment is a key theme of this strategy, which introduces the Clean Maritime Plan as the environmental route map which will set out a number of domestic policies to reduce greenhouse gases and pollutant emissions from shipping in parallel and will ensure that any short-term solutions to reduce pollutant emissions are not dealt with in isolation and are underpinned by a holistic, longer-term plan which enables the UK to take advantage of the clean growth opportunities associated with zero emission shipping. Short-term actions will focus on opportunities to reduce emissions from domestic shipping and ports activities.

¹ <https://www.gov.uk/government/publications/clean-air-strategy-2019>

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/773178/maritime-2050.pdf

Port Air Quality Guidelines

These guidelines are intended to provide a framework for a port to produce a Port Air Quality Strategy (PAQS). They include advice on the territorial scope ('who' is asked to produce a PAQS), place the strategies in the wider context of UK Air Quality (the 'why') and provide advice on content and structure including a checklist that can serve as a ready reckoner for planners (the 'how').

The intention of a PAQS is twofold, to establish a minimum level of understanding of air quality in ports, and to reflect actions that the port is taking to address emissions under their control. The long term goal is to encourage port planners to understand the air quality impact of their operations, and seek opportunities to mitigate these.

It has been recognised that many ports already have some, or all of these issues captured in their own planning and management schemes, in these cases the production of a PAQS allows the port to demonstrate the steps it is taking in a public facing document and will assist in ports sharing good practice by providing a common reporting structure.

The plans are voluntary in nature, and the Department has been reassured by the high level of engagement from ports in the development of the guidelines and evidence that some ports are already thinking proactively about reducing air quality impacts. The CAS does however include a requirement for Government to review the effectiveness of the plans, if it becomes clear that the plans are not achieving positive environmental effects, then further steps may need to be taken including the possibility of regulation. This review process is explained more fully in the guidance.

These Guidelines arise from the CAS, and as such are applicable only within England at the present time. However, much of the material presented here is universal and may be of value to ports wherever they are based.

These guidelines are not intended to be prescriptive, their purpose is to establish a set of common, basic, parameters to facilitate the development of individual air quality strategies. On this basis, this document should be regarded as supporting best practice and not prescriptive to every port, the resulting strategies are expected to vary accordingly.

Who is in scope to produce a PAQS?

The Clean Air Strategy requests PAQS from larger English ports. Essentially this limits the request to ports in England, handling cargo in excess of 1mt per year.

'Port' in this context specifically means the 'Statutory Harbour Authority' in their role as the overarching authority for the port. It is recognised that in some cases an individual terminal in a port may have a disproportionately large share of cargo within the port, and this scenario is provided for in the detailed scope.

Wider Context - UK Air Quality

Air pollution is a major public health risk, ranking alongside cancer, heart disease and obesity and it poses the single greatest environmental risk to human health. Recent

research commissioned by Public Health England has found that the health and social care costs of air pollution in England could reach £5.3 billion by 2035.

The latest research estimates that the actions outlined in the Government's Clean Air Strategy could cut the costs of air pollution to society by £1 billion every year by 2020, rising to £2.5 billion every year from 2030. This underlines the importance of the UK Clean Air Strategy, published by DEFRA in January 2019.

To date, domestic policy on transport-related air pollutant emissions has largely focused on roads (particularly in relation to nitrogen dioxide concentrations), as set out in the UK plan for tackling roadside nitrogen dioxide concentrations. In addition, the Government's Road to Zero Strategy³ sets out the long term plan and targets for reducing emissions from road transport and as these begin to decrease, the relative contribution of other sources of air pollution, including the maritime sector, will increase.

The government is committed to driving down national emissions from ships and reducing the impact of emissions from the maritime sector on the environment and public health. In 2016, domestic shipping (ships that start and end their journey in the UK) accounted for 10% of the UK's total domestic NOX emissions, 2% of primary PM2.5 and 7% of SO₂, however these figures do not include the emissions from visiting international ships in UK ports.

It is recognised that port operators may not have the ability to directly influence emissions from their users, particularly in cases where vessels are subject to existing international rules. It is also accepted that ports may not have inventory information for these sources at the present time. In these Guidelines the concept of 'influence' is used to describe situations where the port may have some ability to influence aspects of behaviour, but does not have direct control of them as they would for (for example) their own vehicle fleet.

The Government is working to reduce emissions from shipping, and in parallel to these Guidelines is issuing (in mid-2019) a call for evidence relating to domestic vessels, and a consultation on the further use of IMO-derived emissions control areas.

The environment is a key theme of the Maritime 2050⁴ strategy. The Clean Maritime Plan 2019 will set out a number of domestic policies to reduce greenhouse gases and pollutant emissions from shipping in parallel and to ensure that any short-term solutions to reduce pollutant emissions are not dealt with in isolation and are underpinned by a holistic, longer-term plan which enables the UK to take advantage of the clean growth opportunities associated with zero emission shipping.

Short-term actions will focus on opportunities to reduce emissions from domestic shipping and ports activities while wider international effort focuses on reducing emissions from internationally trading ships.

³https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739460/road-to-zero.pdf

⁴ <https://www.gov.uk/government/publications/maritime-2050-navigating-the-future>

What is the role of ports in this context?

The Clean Air Strategy sets the context of this work:

The strategies will set out plans to reduce emissions across the ports and associated waterways, including both emissions from shore activities and visiting ships.

It is recognised however that ports have different levels of influence, and that while they will have direct control of some activities, others fall outside of their immediate control.

In essence ports should understand the emissions that arise from their core operations, have an appreciation of the emissions that arise from other maritime activity (such as shipping and cargo operations) in areas under their jurisdiction, and develop responses to these emissions at an appropriate level that reflects their ability to influence the emissions source.

PAQS will give ports the opportunity to demonstrate their commitment to tackling air quality issues, and their proactive engagement with businesses, Government, local authorities and communities to reduce pollutant emissions from their operations.

The resulting strategies will provide ports with a public statement of aims and goals to contribute towards the improvement of air quality in the port estate, whilst setting out an action plan with mitigation measures to reduce emissions from port activities.

Which Ports should produce strategies?

These guidelines apply to operations located within England only. Any port handling cargo volumes of at least 1 million tonnes annually⁵ is considered to be in scope. For the purpose of this iteration of the guidance we are considering cargo for 2016 as the benchmark to define a current 'major port'.

The Statutory Harbour Authority has overall responsibility for producing the PAQS for the port itself.

As some major ports contain independent terminals that account for the majority of commercial activity within the port area it may be necessary to develop a plan with separate annexes for these locations, particularly if they have their own air quality monitoring or inventory system, or if they have site specific initiatives to reduce emissions. Port and terminal operators should cooperate in developing the overall plan for the port area.

Where ports are geographically close, or sharing waterways, it is recommended that they work together towards a combined plan or goals, with complimentary actions and targets as far as is practicable without sharing confidential or sensitive information. If there is no agreement to collaborate then the plans should not create actions that would negatively impact on neighbouring port operations.

⁵ <https://www.gov.uk/government/statistics/transport-statistics-great-britain-2017>

What is the process for developing a strategy?

Following consultation with the sector, and recognising the importance that adequate time is provided for ports to develop robust, meaningful strategies a two-step process has been established for the development of strategies.

Ports are asked to submit an initial commitment to considering air quality through a PAQS and the steps that they expect to take to prepare their final strategy by 31st December 2019. The Department will consider these initial documents and will provide feedback if needed in order to better inform the final strategy documents.

The final strategy should be submitted by 11 July 2020. The PAQS are intended to be public facing and should be published on the port's website.

A checklist is provided in an Annex, which outlines the expected content of both stages. In both cases, submissions can be made to domesticshipping@dft.gov.uk

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.

Subsequent Steps

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.

Preparation of a Port Air Quality Strategy - Detailed Guidance

This section of the Guidance outlines what should be in the statement of intent and final strategy documents, and provides advice on monitoring programmes, inventories and practical matters for consideration. It is non-exhaustive and should be considered in light of the specific nature of the port.

Content of the Statement of Intent

- 1 The Statement of Intent is intended to be a short document that covers the general goals and commitments in relation to air quality and demonstrates that there is a plan in place to deliver a Port Air Quality Strategy.
- 2 The statement should include a clear commitment from the board, or relevant senior staff that underlines the ports commitment to this work.
- 3 The checklist annexed provides suggestions on what could be considered when developing this statement.

Content of PAQS

- 4 The PAQS is intended to be a public-facing document that allows an intelligent, non-specialist reader to understand the steps that the port is taking to understand and address its own air quality impacts.
- 5 The Checklist annexed includes a non-exhaustive list of issues to be considered when developing a Final Strategy, it is recognised that every port is different and the exact content will vary by location.
- 6 A relevant baseline should be established within the Strategy that provides an understanding of current impacts in the port, and allows for improvements to be monitored. These guidelines provide some examples of inventories held by Government and includes links to information on emissions factors that can be used to calculate air pollution impacts.
- 7 It is recommended that the PAQS should cover significant sources of emissions to air and any relevant actions to reduce them relating to the ports area.
- 8 The geographic area relevant to the air quality strategy is defined as;
 - all areas of port and maritime related activity within the ports jurisdiction;
- 9 If actions are to be delivered by third parties and tenants they should also be included if relevant to the area affected, but it is recognised that the port may have less immediate influence on delivery by third parties.
- 10 All actions likely to produce improvements since the baseline year should be included

in the document, even if already planned or implemented. This is to recognise those ports where action is already underway to address emissions.

Engagement in developing the Strategy

- 11 Engagement with port tenants, users and other stakeholders is an important step in developing the Strategy, and in securing buy in from those who may have some ability to support efforts to reduce emissions.
- 12 Where the port is within an Air Quality Management Scheme or similar it should work with the local authority to understand the context and any opportunities for cooperation to improve air quality.
- 13 Comprehensive engagement with all tenants, shipping operators and other stakeholders may not be possible by December 2019, however stakeholder engagement is encouraged. Those relevant should be identified in the initial strategy and engaged with before publication of the final document.

Timeframe for the Strategy

- 14 It is recommended that the PAQS should consider both the short term (1-3 years) where concrete actions may be planned, and present a clear vision of the future in terms of the direction out to 2050. Although it is difficult attempting to predict how the maritime sector will look in 2050, there is an expectation that any long-term ambitions should link with the government's wider environmental aspiration of a proactive transition to zero emission shipping⁶ and the zero emission shipping ambitions of the Clean Maritime Plan 2050. 2050 is also a key date in the UK's net zero domestic carbon targets.
- 15 For ease of reference Maritime 2050 envisages that:
In 2050, zero emission ships are commonplace globally. The UK has taken a proactive role in driving the transition to zero emission shipping in UK waters and is seen globally as a role model in this field, moving faster than other countries and faster than international standards. As a result, the UK has successfully captured a significant share of the economic, environmental and health benefits associated with this transition.
- 16 The PAQS could be reviewed alongside the relevant port master plan (if completed) to align both documents and the actions within them, or be kept as a standalone document should it be more appropriate for the port.

Monitoring and Reporting

- 17 Understanding the current air quality situation in a port, and the inventory of emissions within the ports influence is key to developing an effective PAQS.
- 18 In order to understand the impact of actions taken under the PAQS, and to maintain awareness of any new impacts ongoing monitoring and review will be necessary. This could include the repetition of the baseline inventory as well as the use of long-term ambient monitoring results where available.

⁶ <https://www.gov.uk/government/publications/maritime-2050-navigating-the-future>



Figure 1 Monitoring and action plan cycle

Baseline inventory

- 19 The provision of a robust baseline is necessary to understand the current air quality impact of port operations, identify sources outside of the port's influence, and provide a baseline against which future changes can be assessed.
- 20 It is recommended that (where available) baseline data from 2016 is used as this aligns with other air quality planning approaches nationally. If data is not available then another year can be used. In cases where there are gaps in baseline data the PAQS should instead identify how the data gap is to be addressed.
- 21 Potential sources of advice on both the detailed methodology and emission factors are included at the end of this document.
- 22 All significant sources within the scope of the strategy should be included in the inventory.
- 23 When setting any targets the wider context of the Governments UK-wide target to achieve domestic net zero emissions of Greenhouse Gas by 2050, and significant pollutant reduction targets at 2020 and 2030 (Table 1) may provide useful context. More directly the port should also consider any relevant, binding targets associated with local government.

	Sulphur Dioxide	Nitrogen Oxides	Primary particulate Matter	Non-methane volatile organic compounds
	SO2	NOx	PM	NMVOCs
2020	59%	55%	30%	32%
2030	88%	73%	46%	39%

Table 1 Table 1 UK National economy wide target levels based on 2005 baseline

Ambient monitoring

- 24 It is likely to be useful for PAQS planners to have an awareness of background ambient air quality, both to judge the impact port operations may have and to identify if port air quality is being impacted by external sources.
- 25 There are a number of recognised ways to monitor changes in the ambient air pollution. Many are already used by ports and local authorities and these have different uses depending on the target set.
- 26 Real time monitoring is relevant where the emission source moves along a set route, and therefore the density and frequency of journeys will affect the overall ambient air, in addition to the chosen technology. Long-term monitoring allows both trends and local exceedances to be understood.
- 27 Diffusion monitoring is suitable for considering any exceedances against EU levels in areas of concern, or in specific hotspots if such modelling is undertaken or available from other sources.

Project based monitoring

- 28 Ports may see the value in including pre and post project monitoring for specific actions in the strategy to improve understanding of the savings. This would also help demonstrate the efficacy of solutions, should they not have been previously used in the sector.

Action plan

This section of the Guidance provides advice on how actions being taken by the port or third parties can be reflected in the Final Strategy and offers some specific advice in relation to some common emissions sources.

Actions taken by ports will be location specific and it is recognised that every port will have differing levels of knowledge, influence and control in relation to third parties. The suggestions made below are non-exhaustive and may not be appropriate for all ports but are provided as examples of steps that could be taken.

In identifying actions ports are also encouraged to consider available local government modelling of sensitive sites in their vicinity that may be particularly impacted by some port operations, and to consider if actions can be designed to support air quality improvements for those sites.

Inclusion of Actions in a PAQS

- 1 Planning the implementation and timescales for actions is key to an effective strategy for reducing emissions in ports.
- 2 It is recognised that there are a number of variations in the way an action can be taken, the time it will take to deliver, how long it will take to have an effect as well as the scale of impact that it might have.
- 3 Table 2 identifies three key variables that should be considered when designing action – the level of influence a port can have, the time period for the intervention to have effect, and the impact. As an example, a long-term strategy by a port to replace cargo handling equipment with hybrid systems would be a ‘direct’ influence, with ‘long-term’ impact.
- 4 There may be actions that have already been planned or that have been implemented since the baseline year. These should also be included in the strategy. This is particularly important where long-term actions have been put in place already by a port.
- 5 It is recommended that the strategy should include an action plan with short, medium and long term interventions and mitigation measures towards the final goal. It is suggested to consider anything below three years to be short term; from three to 10 years as medium term; and anything beyond 10 years to be long term.

Ports ability to influence	Term	Impact
Direct	Short term	Small, local reduction
Indirect	Medium term	Medium, estate level reduction

Ports ability to influence	Term	Impact
Encourage/influence	Long term	Large, regional reduction

Table 2 Table 2 Common terminology for actions within the Port Air Quality Strategy

Shipping & Harbour craft

- 6 It is recommended that actions be developed in consultation with the shipping companies to identify any meaningful solutions (including infrastructure) that could be utilised to bring about measurable reductions in emissions to air.
- 7 Any actions to provide infrastructure for shipping, to reduce the emissions from ships both at berth and in transit should be considered in discussion with the local operators and with consideration of safety, practicality, economic viability and GHG impacts.
- 8 Consideration may also be given to efficiencies in port calls to optimise speeds relative to engine efficiencies, as an example just in time delivery is believed to create significant reductions in emissions for some trades.

Fuel types

- 9 All vessels should already be using compliant fuel or a technical equivalent in port limits in line with existing IMO and UK requirements.
- 10 Where shipping is using scrubbing technology to meet required levels ports are encouraged to provide appropriate services (for example, the details of a contractor) to discharge the waste material in line with the existing Port Waste Reception Facilities Regime.
- 11 There may be infrastructure changes that could permit some vessels to switch to lower emission solutions like biofuels, shore power, LNG or more innovative energy solutions. This is an area of rapid technological change and it is recommended that ports continue to liaise with their users to assess the demand for such alternatives and the practical implications for port operations.

Incentives

- 12 Ports could consider implementing a charge or discount scheme where appropriate to create incentives to improve user behaviour, and clearly promote such a scheme to operators and visiting vessels.
- 13 Any such schemes would need to be relevant to the specific local port operations and air quality.

Technology

- 14 It is recommended that ports consider the growing range of innovative systems and technologies that provide integrated solutions to facilitate the reduction of emissions, for example use of wind, solar and tidal energy, as well as battery arrays to manage peak load, and store excess generation.

- 15 Such approaches may also be helpful when considering changes to port vehicles and equipment – connecting hybrid or electric vehicles to in-port microgeneration for example.

Port Estate

- 16 Ports have fleets of a variety of vehicles for different purposes. While it is expected that this fleet will naturally be switched to lower emission models during replacement, these improvements should be acknowledged through the inventory when implemented and consideration should be given to taking further steps to provide zero local emission vehicles on port estate.
- 17 Ports use a variety of non-road equipment of various ages and sizes. Regular and proactive maintenance is necessary to counter deterioration in emissions performance as the equipment ages. However, as technology improves to meet regulatory changes⁷ and low emission/zero emission equipment enters the market it is recommended that if appropriate consideration is given to a retrofitting or replacement plan.
- 18 When continuing to use existing equipment, it may still be possible to reduce emissions by switching to lower emission fuels or optimising utilisation.

Vehicles

- 19 Optimisation of road transport is likely to already be a focus of ports, particularly within local AQMAs through tools like vehicle booking systems (VBS), as this traffic may contribute to a large part of the emissions. Actions to continue to address road transport emissions should be included in the strategy and overall port inventory.
- 20 Improved utilisation of rail freight may be an option for some ports, where available, to reduce the cargo carried on the roads and resulting emissions from vehicles.
- 21 In the longer term consideration of the wider environmental impacts of siting of logistics hubs near the port operations during port master planning, and influencing planning around the port boundaries may also reduce emissions from port related use.
- 22 Third party improvements could be encouraged by the ports as part of the tenancy, operating agreements or provision of incentives.

⁷ Examples and guidance on regulation and monitoring relevant to port equipment is available at <http://nrmm.london/>

Resources for baseline inventory

(non-exhaustive list)

Port Inventory Methodology (IMO/IAPH/GLOMEEP)

<https://glomeep.imo.org/wp-content/uploads/2018/10/port-emissions-toolkit-g1-online.pdf>

NAEI shipping methodology (National Emissions Inventory)

http://uk-air.defra.gov.uk/reports/cat07/1712140936_ED61406_NAEI_shipping_report_12Dec2017.pdf

Emission Factors – shipping (IMO GHG and other emissions for shipping)

<http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Documents/MEPC%2067-INF.3%20-%20Third%20IMO%20GHG%20Study%202014%20-%20Final%20Report%20%28Secretariat%29.pdf>

Emission Factors - NAEI (UK emissions factors for shoreside sources)

http://naei.beis.gov.uk/reports/reports?section_id=1

<http://naei.beis.gov.uk/data/ef-all>

Annex: PAQS Checklist

	Statement of Intent		Final Strategy	
		Checklist		Checklist
Commitment				
Senior level commitment	Yes		Yes	
Financial aspects considered	Identified		Yes, as required	
Partners & Stakeholders	Identified		Identified & Engaged	
Consultation timescales	Planned		Delivered	
Actions published	N/A		Yes	
Action				
Identification of broad scope of emissions	Yes		Yes	
Short, medium and long term actions	Being considered		Yes	
Shore, traffic and vessel actions	Being considered		Included where applicable	
Consideration of unintended consequences and/or impact on other environmental protections	N/A		Yes	
Cost benefit analysis	N/A		Yes	
Reduction of Greenhouse Gases	N/A		Considered	
Local requirements (i.e. AQMA)	Identified		Incorporated into PAQS	
Targets	Being considered		Yes	

Baseline				
Identification of data and significant emission sources	Included or plan to identify established		Included, where available, plan in place to address identified gaps	
Baseline year (2016 or alternative as identified)	Data identified where it exists		Baseline identified where available or alternative identified	
Identification of the parameters to be monitored	Identified		Identified	
Inventory	Planned & scoped		Completed & submitted where possible, and steps to rectify gaps identified	
Monitoring				
Monitoring plan	Scoped		Plan established	
Project monitoring			Included	
Review dates			Included	
Reporting of targets and review of progress			Included	
Shore, traffic and vessel monitoring areas			Included as appropriate	
Short, medium and long term reductions			Included as appropriate	

