

AIR QUALITY STRATEGY 2024

THE PORT OF LONDON AUTHORITY CUSTODIANS OF THE TIDAL THAMES

The Port of London Authority is a trust port, responsible for the navigational safety of 95 miles of the tidal river Thames from Teddington to the North Sea.

We aim to keep commercial and leisure users of the river safe, promote river activities and protect and enhance the environment. As Britain's biggest port and busiest inland waterway, the Thames is a popular yet historic landmark of London, and with the government's recent commitments to achieving a Net Zero economy by 2050, this initiated the PLA's Thames Vision 2050 plan, which was launched in 2022.

The Thames Vision outlines the ports goals to become the UK's largest Net Zero port and hub for tourism, trade and nature recovery by working closely with stakeholders from various sectors to achieve these objectives. We want to achieve these goals alongside making the river more accessible and inclusive, and to ensure the port's resilience for the future. The PLA's Environment team is responsible for overseeing those actions associated with the 'Natural Thames' theme in the Vision. The goal of Natural Thames is to achieve:

"A CLEAN RIVER, FREE OF SEWAGE, WASTE AND OTHER POLLUTION, SUPPORTING GREATER BIODIVERSITY AND RECREATIONAL USE. VALUED FOR ITS CLEAN AIR, NATURAL FLOOD DEFENCE, WILDLIFE AND AS A CARBON SINK."



ACRONYMS

AQS	Air Quality Strategy
CO2	Carbon Dioxide
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EI	Emissions Inventory
GHG	Greenhouse Gas Emissions
GLA	Greater London Authority
HVO	Hydrotreated Vegetable Oil
IWV	Inland Waterway Vessels
LAEI	London Atmospheric Emissions Inventory
MEP	Maritime Emissions Platform
NAEI	National Atmospheric Emissions Inventory
NO2	Nitrogen Dioxide
OGV	Ocean Going Vessels
PLA	Port of London Authority
PM	Particulate Matter
TfL	Transport for London



THE AIR QUALITY STRATEGY

“VALUED FOR CLEAN AIR”

Poor air quality is the largest environmental risk to public health in England and the cause of a growing number of premature deaths. According to the 2019 LAEI authored by the GLA, emissions from river-based sources in the UK (including commercial, passenger and private vessel activity) contribute less than 2% of annual nitrogen oxide emissions, but this figure is predicted to increase as river transport becomes more popular as a consequence of both tightening legislation on vehicles and port development.

The PLA was the first UK port to publish an Air Quality Strategy (AQS) in 2018¹. Being the largest UK port by volume situated in the highly populated south-east of England, taking actions reducing emissions from river-based sources is a priority.

The AQS outlined a five-year action plan with a total of 19 actions to be carried out with the objective of emission reduction across the PLA's jurisdiction. In 2020, the strategy was updated to address new legislative changes and interim progress². In this update, 11 new actions were included and categorised by expected completion in the short, medium, or long term.

The 2024 strategy is to take a more strategic approach, putting the learnings we have taken from the past five years with the foresight of the future to instruct and facilitate river-wide action to improving air quality on the Thames.



PROGRESS ON IMPROVING AIR QUALITY IN THE THAMES

COMPLETED

- Alternative Fuels Trial
- Retrofit Trial
- Update Port Wide Inventory
- To carry out modelling of river emission dispersion
- Diffuse monitoring of river emissions
- Feasibility study for the use of LNG, CNG and other potential alternative fuels
- Shore-side power feasibility study
- Cost Benefit Investigation into Abatement
- Black Carbon Exposure Analysis
- NOX abatement project
- Host an environmental technology EXPO
- Publish best practice guidance for inland fleet operators
- Guidance for developers
- Review and improve the green tariff

ONGOING

- Appropriate standards for emissions
- Develop River Ultra Low Emission Zone
- Encourage freight service on the river
- Installation of green technology
- Develop a Demonstration Project
- Identify and secure funding and support for R&D
- Lessons learnt from trials in advancement of vessel technology
- Retro-fitting fleets
- Exhaust monitoring
- Ambient monitoring for marine emissions
- Ambient Monitoring at Greenwich Ship Tier
- PLA's Fleet Review and Upgrade
- Net Zero PLA Commitments

NOT YET STARTED

- Port Call Optimisation
- Port Wide Inventory (NRMM)
- Investigate Energy Infrastructure

NOT PURSUED

- Diffuse monitoring of river emissions of O3

SUMMARY:

14	13	3	1
ACTIONS COMPLETED BY 2023	ACTIONS ONGOING UNTIL 2030/50	TO BE INITIATED FROM 2023	ACTION HALTED

ACTION HIGHLIGHTS: MONITORING OUR IMPACT

MONITORING OF EMISSIONS ON THE THAMES

Real-time AQ mesh monitors have been in situ at various riverside locations since 2019. They monitor five key pollutants: NO₂, PM_{2.5}, PM₁₀, Ozone (O₃) and Sulphur Dioxide (SO₂). This data is managed by Ricardo Energy and Environment Ltd who provide annual reports for each site. This data can then be compared to National Air Quality Objective Limits.

The PLA diffusion tube network has been established at river-side sites in various locations since 2018. Results of this monitoring, alongside the AQ mesh data, has revealed that most locations are under legislative limits for NO₂, however, high concentrations at sites within the City of London and Westminster were recorded which correlates with the high ambient pollutant concentrations here according to the NAEI.

Monitoring of these pollutants has allowed us to build an evidence base for identifying those areas of concern and a baseline for these areas of the river.

AIR QUALITY MONITORING LOCATIONS IN 2024

- 2024 AQ Mesh Locations
- 2024 Diffusion Tube Locations

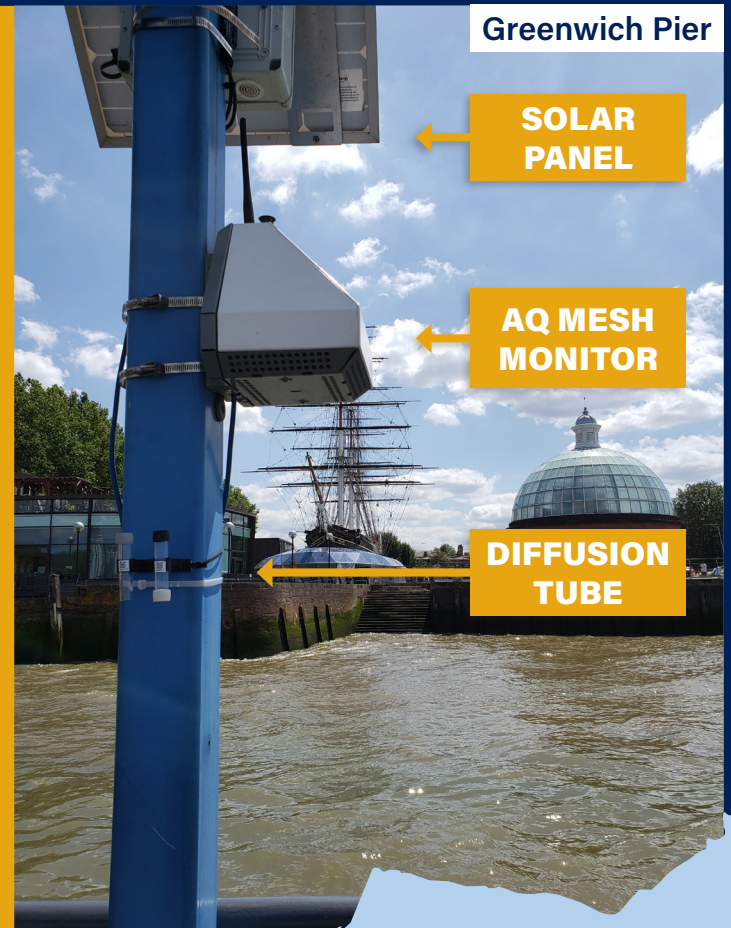
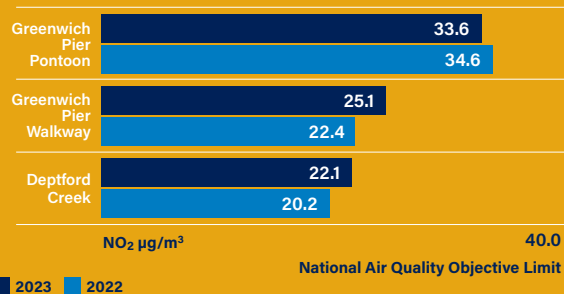


CASE STUDY: GREENWICH SHIP TIER MONITORING

The first 7 air quality monitoring sites were established around Greenwich Ship Tier, which was an action of the AQS. This was a focal area due to the public concern of the impact of cruise vessels mooring here. Since cruise vessels can safely navigate the Thames, they are welcome on the river and Greenwich Ship Tier is one of the few areas of the river they can safely moor.

A report was published in 2020 that reassured the public that cruise vessels did not have an impact on air quality as no correlation was observed between cruise vessel presence and spikes in air pollutant levels. Monitoring since this study has continued to evidence that levels of pollution around Greenwich Ship Tier are under national air quality limits. However it is still a focal area for air quality action.

DIFFUSION TUBE DATA



Greenwich Pier

SOLAR PANEL

AQ MESH MONITOR

DIFFUSION TUBE

ACTION HIGHLIGHTS: UNDERSTANDING OUR IMPACT

PORT WIDE EMISSIONS INVENTORY

In order to understand and explain our river-side monitoring results, it is necessary to observe what kind of river-based activity is occurring on the river and how this is contributing to pollution levels. Due to the diversity of river-users on the Thames, this needed to be explored to a granular level. With this level of detail, it is clear to see hotspots of vessel emissions on the river and even which vessel types are more polluting than others, which subsequently evidences which operators/vessel types/boroughs need to be the focus of future action to achieve river-wide emissions reductions.

At a high-level, inventory data is allowing us to understand our impact relative to other industry and is contributing to our Scope 3 emissions calculations. We also provide this data to the GLA to inform the shipping emission calculations in the annual London Atmospheric Emissions Inventory (LAEI).

“WE WHOLEHEARTEDLY SUPPORT THIS AMBITIOUS AIR QUALITY STRATEGY AND LOOK FORWARD TO SUPPORTING THE PORT OF LONDON AUTHORITY WITH ITS DELIVERY.”

Ruth Calderwood, Air Quality Manager at City of London

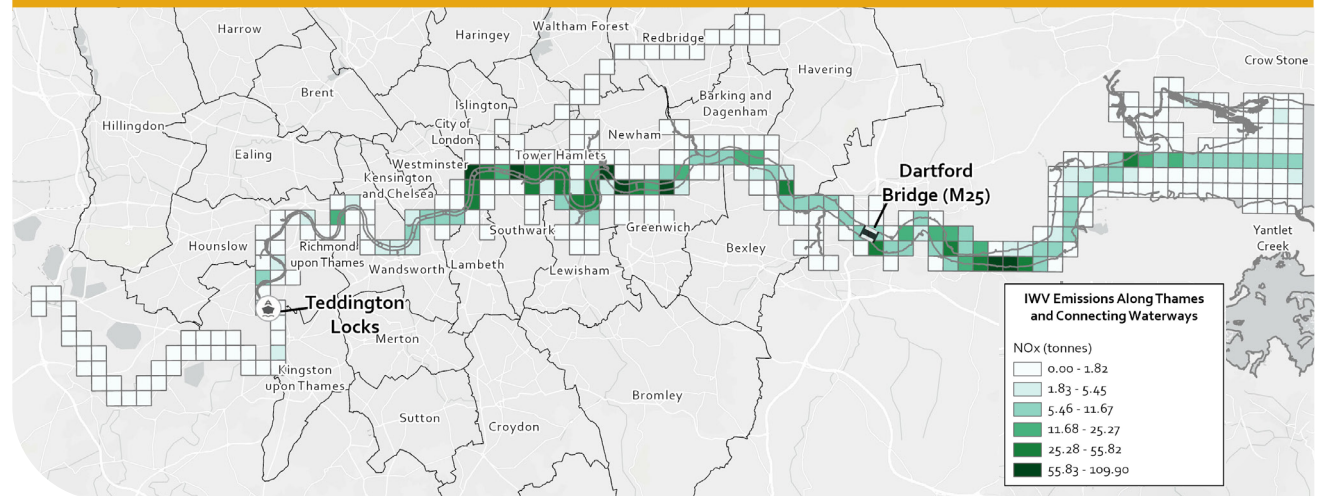


CASE STUDY: 2021 EMISSION INVENTORY (EI) FINDINGS

An EI is an accounting of emissions discharged into the atmosphere. The significant findings of the EI were that chemical/LNG/LPG, container, cruise, dry cargo, ro-ro/vehicle carriers, and tug and supply vessels sub types are the dominant contributors, making up 75% of energy consumption in the IWV inventory. For both IWV and OGV, auxiliary engines are the dominant emissions source as vessels spend most of their time in the port in stationary mode. Tug and supply vessels made up nearly half of the IWV emissions and energy consumption in the inventory despite this vessel type only being 18% of the unique IWV identified.

A heatmap of the results highlighted the fact that the highest emissions were arising from activity east of the Queen Elizabeth II Bridge (QEII), consistent with the large cargo-handling terminals situated there. Within the GLA boundary, areas around Tower Hamlets, Westminster and Greenwich were also highlighted as areas of high IWV activity.

VESSEL TYPE	PM ₁₀ TONNES	PM _{2.5} TONNES	NO _x TONNES	SO _x TONNES	CO TONNES	VOC TONNES	BC TONNES	CO ₂ E TONNES	ENERGY KWH	UNIQUE VESSEL COUNTS
OGV	105.8	92.3	3,723.6	157.4	169.3	136.2	2.8	261,609	365,389,303	1,508
IWV	26.8	24.7	2,118.0	0.6	95.1	80.7	19.3	105,306	176,091,544	761
Total	132.6	117.0	5,842	158.1	264.4	216.9	22.1	366,915	541,480,847	2,269
OGV	80%	79%	64%	100%	64%	63%	13%	71%	67%	66%
IWV	20%	21%	36%	0%	36%	37%	87%	29%	33%	34%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



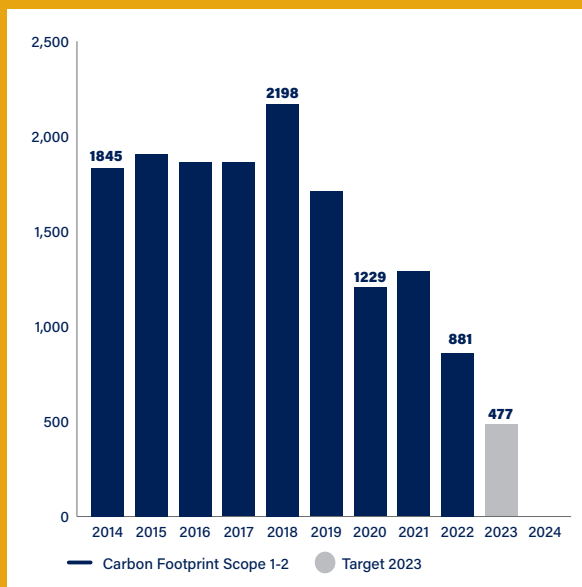
ACTION HIGHLIGHTS: EVIDENCING THE IMPACTS



CASE STUDY: PLA HVO TRANSITION

As a result of alternative fuels testing and feasibility study completed in collaboration with University College London (UCL), the PLA trialled the use of alternative biofuel HVO on our own vessel fleet. It was observed that there was no adverse impact to engine performance but great benefits to emission reduction, particularly NOx and PM. This led to full fleet transition to HVO in 2022.

The HVO used in our vessels is second generation, so it comes from waste sources. This transition reduced the PLA's vessel fleet GHG emissions by 55%, putting the PLA two years ahead of current internal interim targets for achieving net zero by 2040.



TRIALLING, INCENTIVISATION AND INNOVATION

As a regulatory body for the river Thames, the PLA feel that, as well as helping facilitate change, it is also important that we are forerunners in evidencing best practice in emission reduction technologies and behaviours. This is why feasibility study and knowledge sharing was such an important aspect of the previous strategies.

Internally, we wanted to take action to demonstrate the benefits of alternative fuels and technologies available to operators to reduce their emissions. We have trialled alternative fuels and selective catalytic reduction technology and shared these positive results publicly in hopes of encouraging other river operators to follow suit. Prominent operators on the Thames including Svitzer and Cory have made the transition to HVO after demonstrating no impact to engine performance or operation. These operators became part of the voluntary PLA run **'Thames Green Scheme'** in 2021 and have since been receiving financial incentives for making this important transition. We hope to continue to influence the operators on the Thames to make innovative changes to their fleet in the interest of air quality. We also plan to work with government regulators to address the lack of incentivisation for biofuels to increase the uptake of this interim emission reduction measure.

Externally, we have been involved in projects that have given rise to the first electric workboat on the Thames and two projects revolving around hydrogen as a fuel of the future. Soon we will be operating an unmanned hydrogen powered survey vessel alongside the development of a hydrogen generation and storage facility, and we are currently in the development stage of our Hydrogen Highway feasibility project.



WHERE IS ACTION NEEDED?

TRENDS



Consistently recorded high emission outputs from vessel activity at container port terminals around the City of London/Southwark.

For inland vessels, tugboats were identified as a significant contributor to emissions in 2021. For ocean going vessels, Ro-Ro and vehicle carriers were the main contributor.

There is increasing interest in reducing exposure to air pollution at national government and local level.

OPPORTUNITY?



With the evidence, we can target tugboat and Ro-Ro operators to understand their barriers to transitioning to alternative fuels. Some tug operators have already made a transition to HVO so this may act to incentivise others.

Working on an international scale to uncover opportunities for green corridors for trade and international travel.

Many stakeholders are engaged with the issue so the likelihood of support for air quality agendas is high.

CHALLENGES?



Market fluctuation in cost of alternative fuels and electricity.

Lack of infrastructure in place for alternative propulsion methods and energy requirements in most parts of the world.

Lack of government guidance, policy and incentivisation on alternative propulsion in the maritime industry.

Unforeseen changes in government policy and/or targets.



OUR STRATEGY FOR TACKLING AIR POLLUTION

The 2024 strategy update identifies five consistent and over-arching themes. These themes will allow continuity of the strategy over time and will allow our actions to be more targeted towards our ambitions. Some ongoing actions from our previous strategies have been consolidated within these themes.



1. Build on the evidence base on air quality



2. Target hotspots and areas of concern



3. Support the transition to low to zero emission fuels



4. Advocate for better air quality on and around the river



5. Embed air quality considerations into our own decision making

New actions:

Track progress on shipping emissions through our Maritime Emissions Portal (MEP)

Consolidated carried over actions:

Continue ambient emissions monitoring on the Thames

Continue to evidence the air quality impacts of trialled technologies

Consider the shoreside contribution to emissions on the Thames

New actions:

Work with tugboat operators to support their transition to alternative fuel

Target vessel types or points of interest on the river where pollution needs to be improved

Consolidated carried over actions:

Continue to evaluate the appropriateness of an 'emission control area' on the Thames

Continue to consider appropriate standards for vessel emissions

New actions:

Follow international trends on future fuels to marshal opportunities for green corridors

Consolidated carried over actions:

Support and facilitate the installation of green technologies on the Thames

Demonstrate the use of green technology on the Thames

Investigate the availability and necessity for green technology

New actions:

Work with stakeholders to advocate for government guidance or legislation on the future fuels of the maritime industry

Assist local authorities and other stakeholders in their efforts to improve air quality in riparian boroughs

Consolidated carried over actions:

Encourage freight service on the river

New actions:

Include air quality and sustainability considerations in the PLA Masterplan project

Investigate the licensing of zero emission vessels

Consolidated carried over actions:

Advocate for continuous improvement in port optimisation in the interest of improving the ports air quality impact

Integrate air quality considerations into our Net Zero Strategy

THE AQS ACTION TIMELINE

The AQS timeline is categorised into short, medium, long term and ongoing actions. Those actions identified for the short-term aim to be delivered by 2026, those identified for the medium-term aim to be delivered or in progress by 2030, and those for the long-term are objectives for up to 2050.

Several actions in the AQS are complimentary to those outlined in the **Net Zero River Plan (NZRP)** published by PLA in 2024. The NZRP is a 3-year action plan to tackle decarbonisation on the river that was developed through the work of the Net Zero Coalition.



FUTURE AMBITIONS FOR OUR TARGETS

The PLA is committed to leading the way on emission reduction action in the UK maritime industry and determined to work closely with operators to overcome challenges to fleet transitions.

Since the first AQS was published in 2018, global market fluctuations owing to Covid-19 and political turmoil have impacted the maritime industry on a global scale. Vessel activity has returned to pre-Covid levels and we have access to more robust and up to date data sources³ that have put us in a stronger position to calculate emissions. As a result of this, the PLA will be re-baselining its emissions for 2023.

Re-baselining our emissions will have an impact on our targets previously published in the 2020 AQS, so we plan to refresh our emissions targets for the next iteration of the strategy in 2026. These targets we have stated are intentionally ambitious and reflective of the emission reduction goals set out by the Clean Air Strategy (by DEFRA)⁴ and the Clean Maritime Plan (by DfT)⁵ both published in 2019.

DEFRA INTRODUCED NEW LEGISLATIVE TARGETS ON PM2.5 EMISSIONS IN 2023. THESE TARGETS AIM TO ACHIEVE A POPULATION EXPOSURE REDUCTION OF 35% ACROSS ENGLAND BY 2040 COMPARED TO A 2018 BASELINE. THIS WILL BE CONSIDERED, ALONG WITH OUR TARGETS IN A 2026 STRATEGY PROGRESS DOCUMENT.



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