



Improving air quality and reducing emissions at ports

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Main activities on the river

Teddington to
Putney



Putney to
Thames Barrier



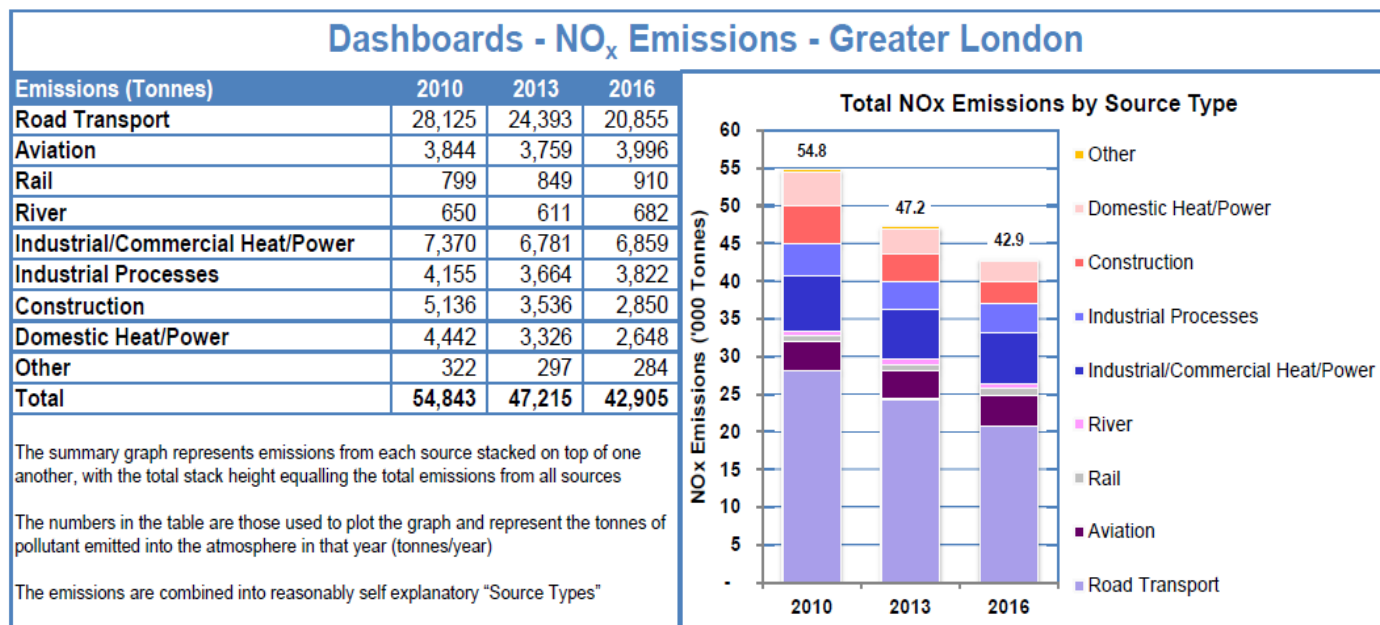
Thames Barrier
to Estuary



Much lower legal standards for marine engines

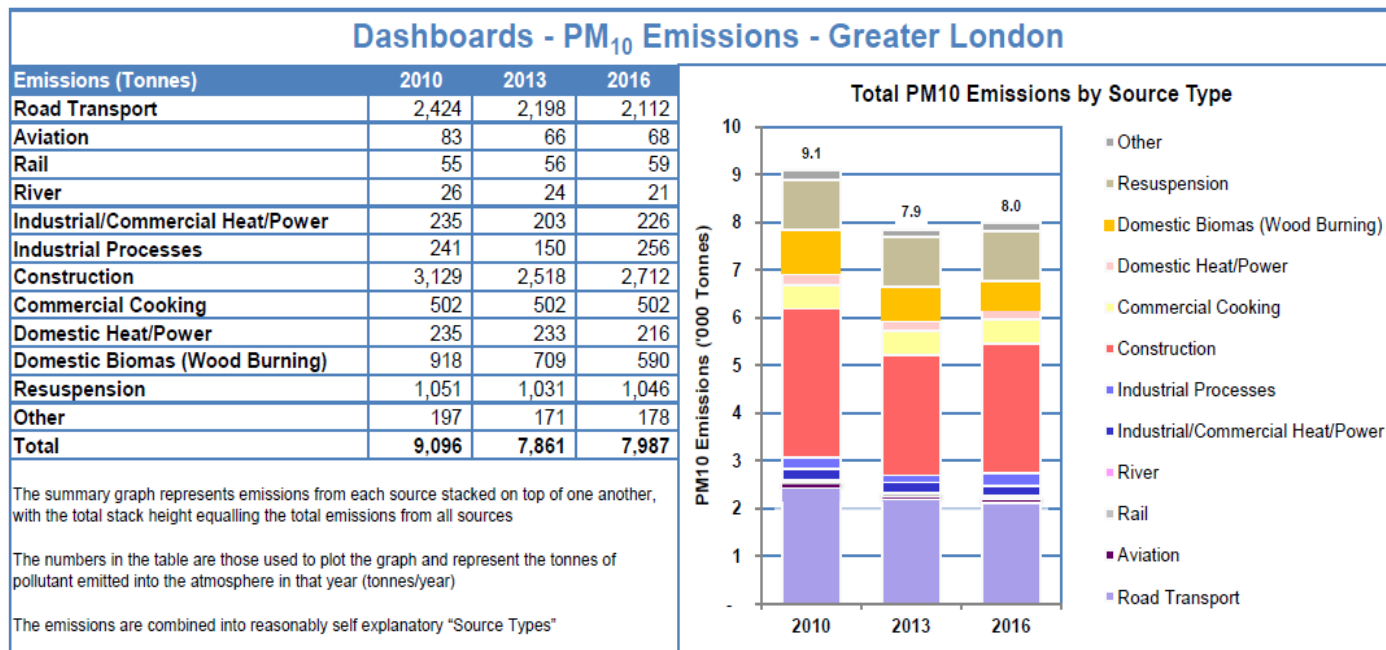
	CO ₂ (g/kWh)	NOx _(g/kWh) h)	SOx	PM (g/kWh)	Regulatory source	Year
Euro VI Truck	4	0.46		0.01	EU Diesel Road	2013
Stage III	5	11.2 (HC inclusive)		0.5	EU Inland Waterways	2009
Stage V	5 - 3.5	4.7- 1.8		0.015	EU Inland Waterways	2019
Tier II		7.7 - 14.4			IMO Annex VI	2011
Tier III		2-3.4			IMO Annex VI	2021

Percentage of NO_x in London



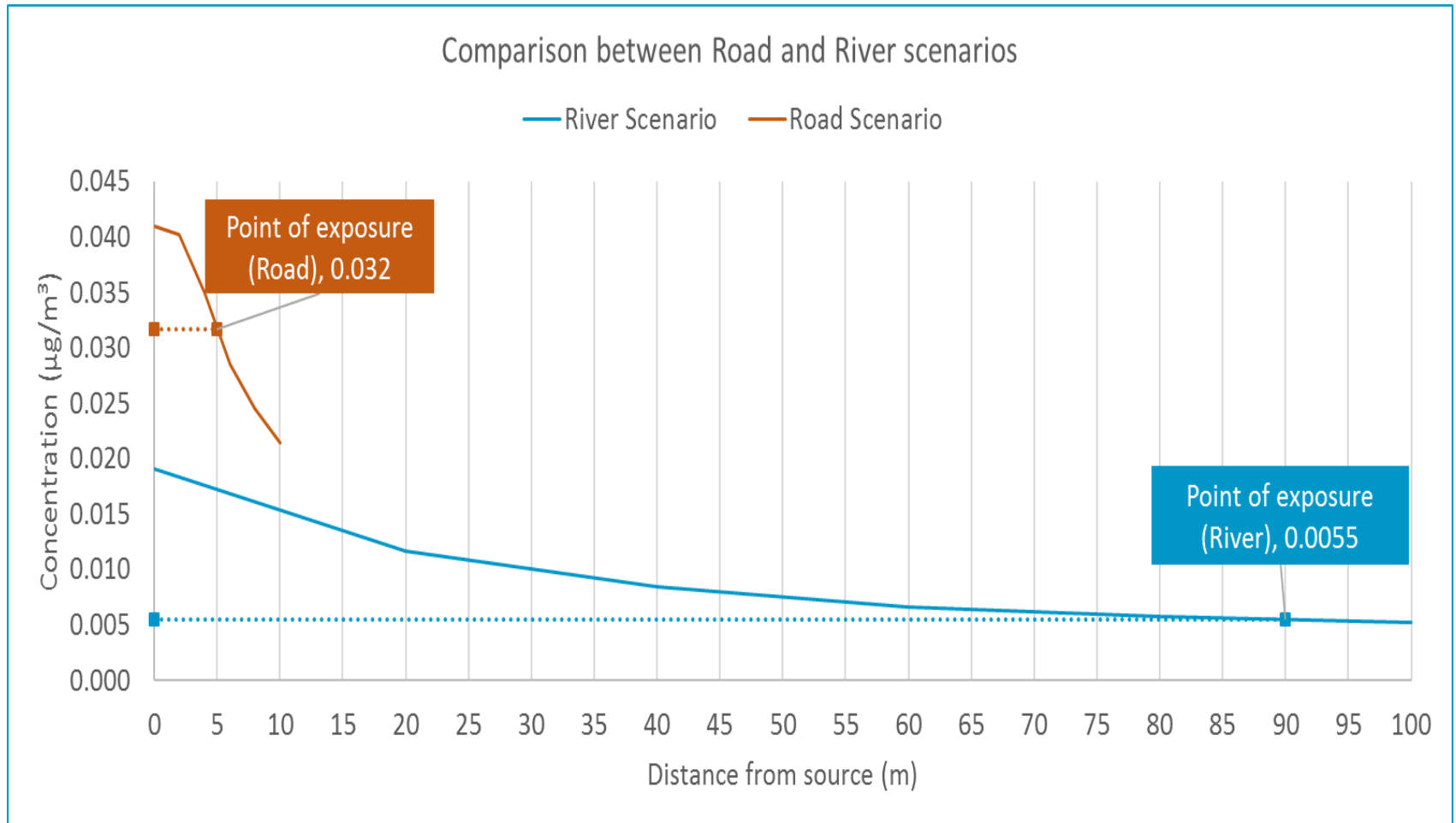
- Equivalent to 2.09% of Road Emissions rising to 3.27% in 2016
- 1.4% of London's total rising to 1.59% in 2016
- Between 2013 and 2016, there was a 10% increase in NO_x emissions from the Thames' vessels (12% in Greater London).

Percentage of PM in London



- Emissions from the river increased
- Declined by 19% across London as a whole

Low exposure levels for the riverbanks



What could we do?

Regulatory

Byelaw

- Ambient Levels with MCA support

- Speed limit review for emission impact

River Works/Mooring Licence

- Requirement to implement green technology

Financial

- Discount or charge to operators to make changes on land or water.

- Increase scope and scale of green tariff to encourage change in international shipping

Research

- Dispersion model

- Feasibility of LNG and required infrastructure

- Convene an EXPO with operators and manufacturers

- Monitor benefits of alternative propulsion for vessels in the Thames

- Effectiveness of add-ins into marine fuel

Investment

- Trial of shore power installation

- Low emission technology to encourage manufacturers

- Exemplify use alternatives improve own fleet

- Monitoring of ambient levels at relevant sites

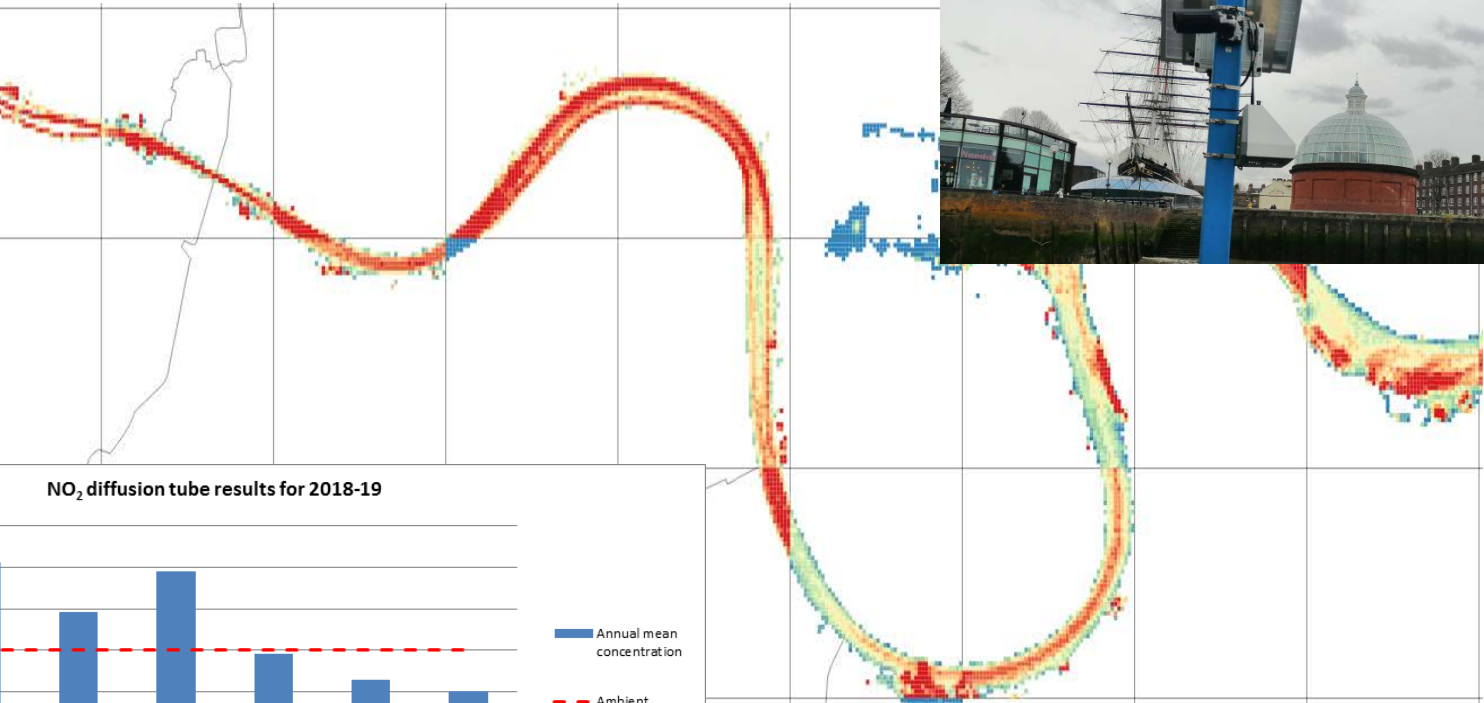
- Trial alternative propulsion for own vessels

What reduction targets have we set?

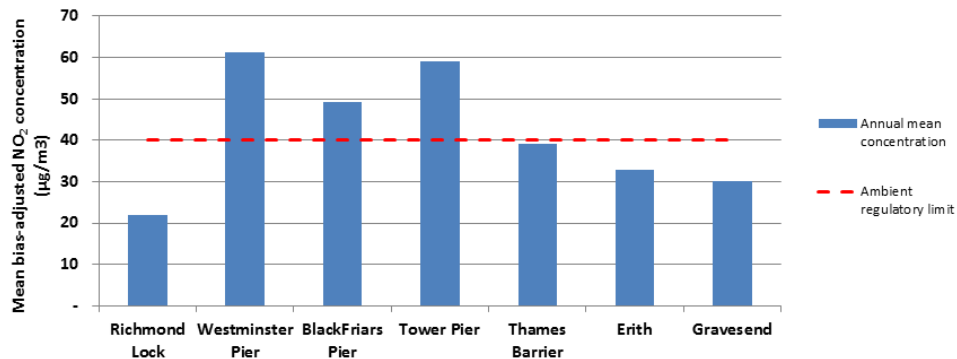
- Measuring against the Thames 2016 inventory

2026	2031	2041	Overarching
- PM - 20% reduction. - NOx- 20% reduction.	- PM- 40% reduction. - NOx- 40% reduction.	- PM- 50% reduction. - NOx- 50% reduction.	Reduction in GHG Reduction in all other emissions produced on the Thames.

Monitoring



NO₂ diffusion tube results for 2018-19



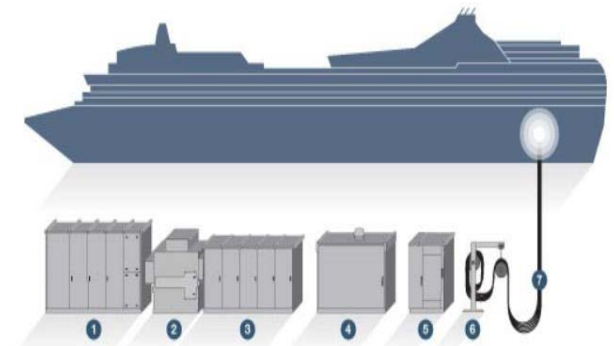
Inland Fleet

- Guidance
- Operational saving
- Fuel switch
- Shore power
- Hull coating



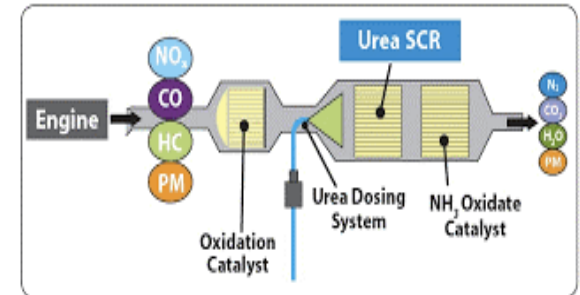
Shipping

- Rotor Sails
- Green Tariff
- Shoreside power
- Alternative fuels



Unintended consequences

- Cost benefit
- LNG
- Scrubbers
- Infrastructure





Questions