



Air Pollution in London – Changes and new challenges

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 - Air pollution past
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Air pollution past





Air pollution past

Air pollution has been with us since people first sat around a camp fire

Problems worsened as a consequence of the development of cities and industrialisation

- 1300's burning of sea coal prohibited in London
- 1661 John Evelyn presented Charles II with a treatise on the problem of smoke *Fumifugium: or the Inconvenience of the Aer and Smoake of London Dissipated.*

Brimblecombe P. 1988. The Big Smoke: A History of Air Pollution in London since Medieval Times. London: Routledge.





London air as painted (and breathed) by Monet

Claude Monet. *London. The Waterloo Bridge*. 1903. Oil on canvas. The Carnegie Institute, Museum of Art, Pittsburgh, USA.





Post war – an afternoon stroll along the Embankment

Photos Mus. of London and Corbis





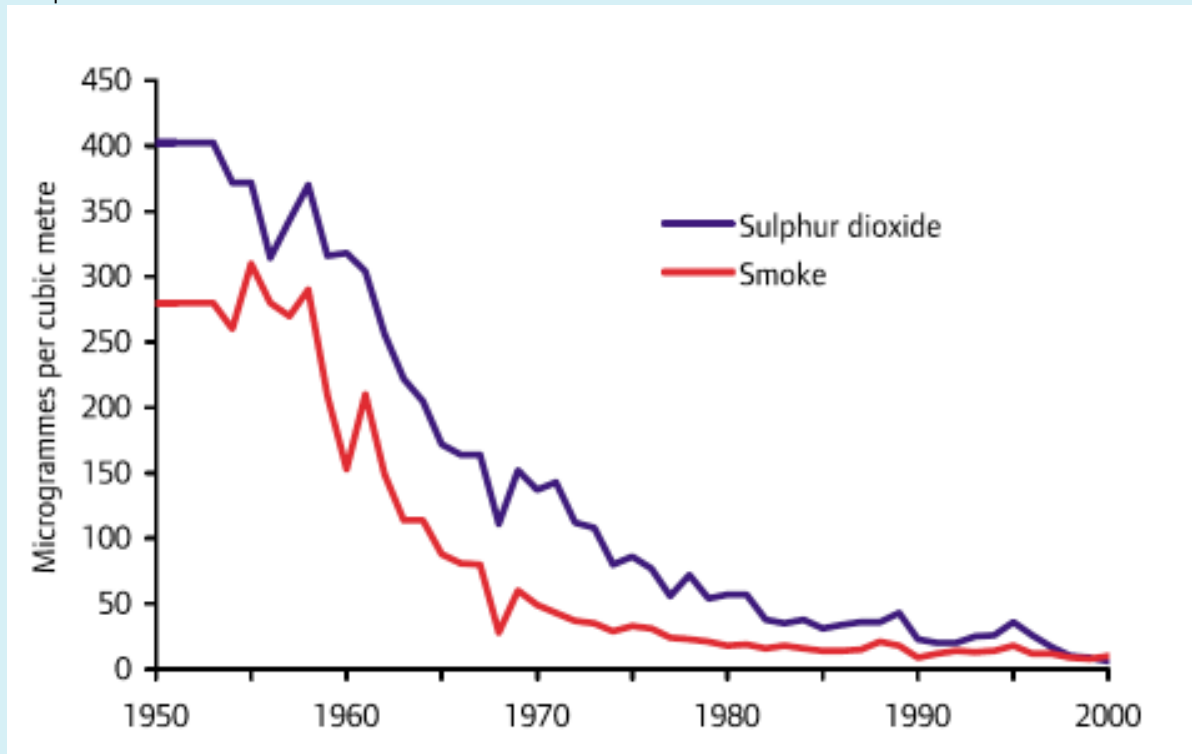
Post war





Rapid improvements from 1960's

AEAT plc and GLA



So everything was sorted...or was it?





Air Pollution - Present





1950s – 2000 Air Pollution Changed

'New' sources and 'new' pollutants

Then

Solid fuel

*Sulphur dioxide
'Smoke'*

Now

*Transport and industrial emissions
Secondary pollutants and photochemistry*

*Particulate PM10
Ground level ozone
Nitrogen dioxide
Carbon monoxide
Sulphur dioxide
Volatile organics*





Measuring air pollution





Monitoring techniques changed too





Monitoring techniques changed too





The London Air Quality Network

Partnership between King's and local authorities.

Also TfL, Defra, GLA, Environment Agency and BAA

Managed by King's from our operations centre at Waterloo.

Created in 1993 with less than 10 monitoring sites

Now Europe's largest city-wide monitoring network

almost 100 continuous monitoring sites

focus on 'regulated' pollutants

increasing research – orientated measurements

modelling and health research





The London Air Quality Network

www.londonair.org.uk

The screenshot shows the website interface for the London Air Quality Network. At the top, there is a navigation bar with links for home, contacts, help, accessibility, and site map. Below this is the main header with the King's College London logo and the title 'The London Air Quality Network'. A secondary navigation bar includes links for Home, Bulletins, Monitoring Sites, Statistics, Episodes, Local Authorities, Pollution Guide, Stats Tools, Graph Tools, Reports, Download Data, News, and RSS. The main content area features a map titled 'LAQN Pollution Levels' showing air pollution levels recorded on Wednesday 12 December 2007. The map uses colored dots to represent different pollution levels: Low (1-3), Moderate (4-6), High (7-10), Very High (10), No Data, and Closed. A legend below the map explains these symbols. To the right of the map, there is a text box explaining that the map shows daily maximum index values and provides instructions on how to find more information about each location, including links for 'Site Details', 'Statistics', and 'Pollution Episodes'. There is also a 'Show latest hourly bulletin' button and a date selector for the bulletin date (12/12/2007).



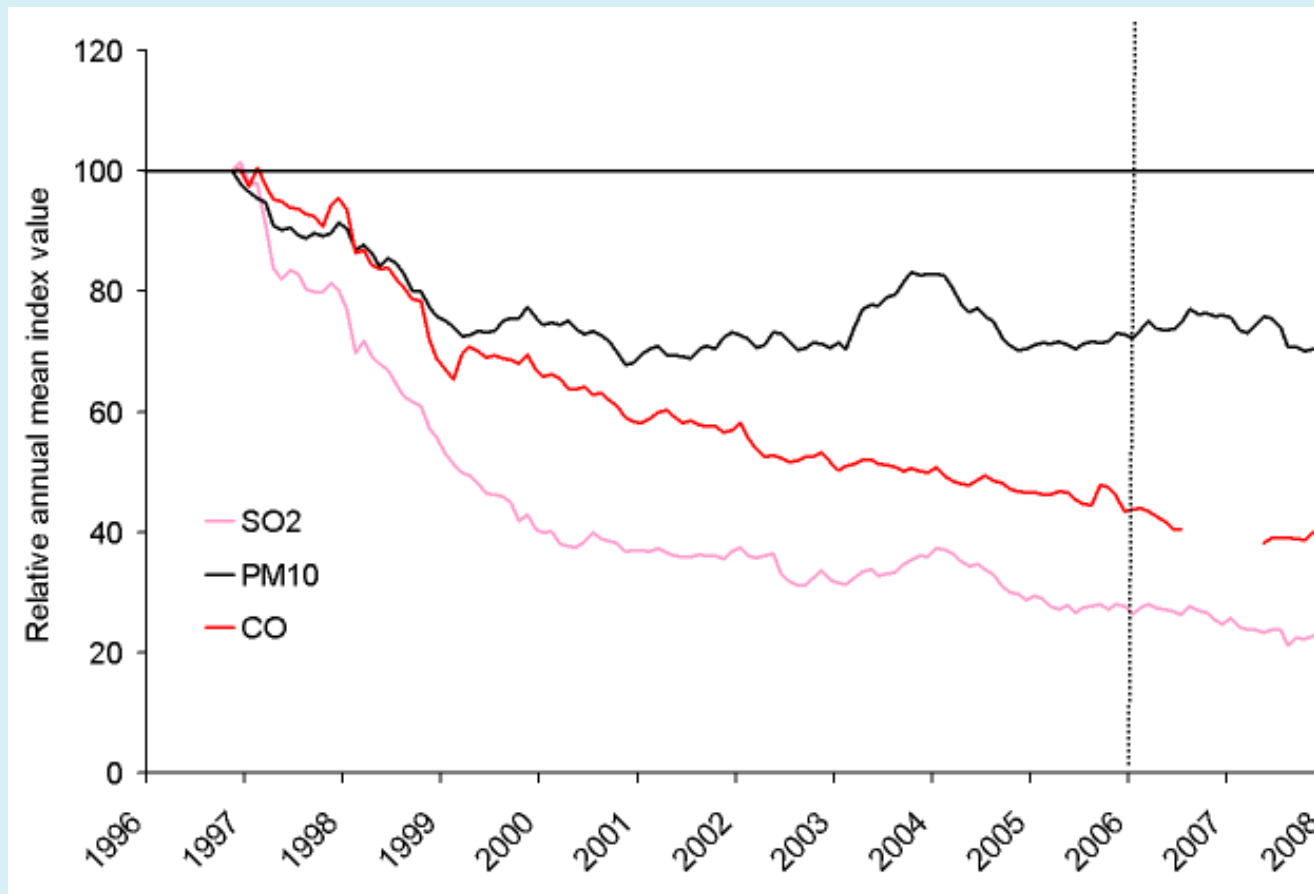


What do measurements tell us?



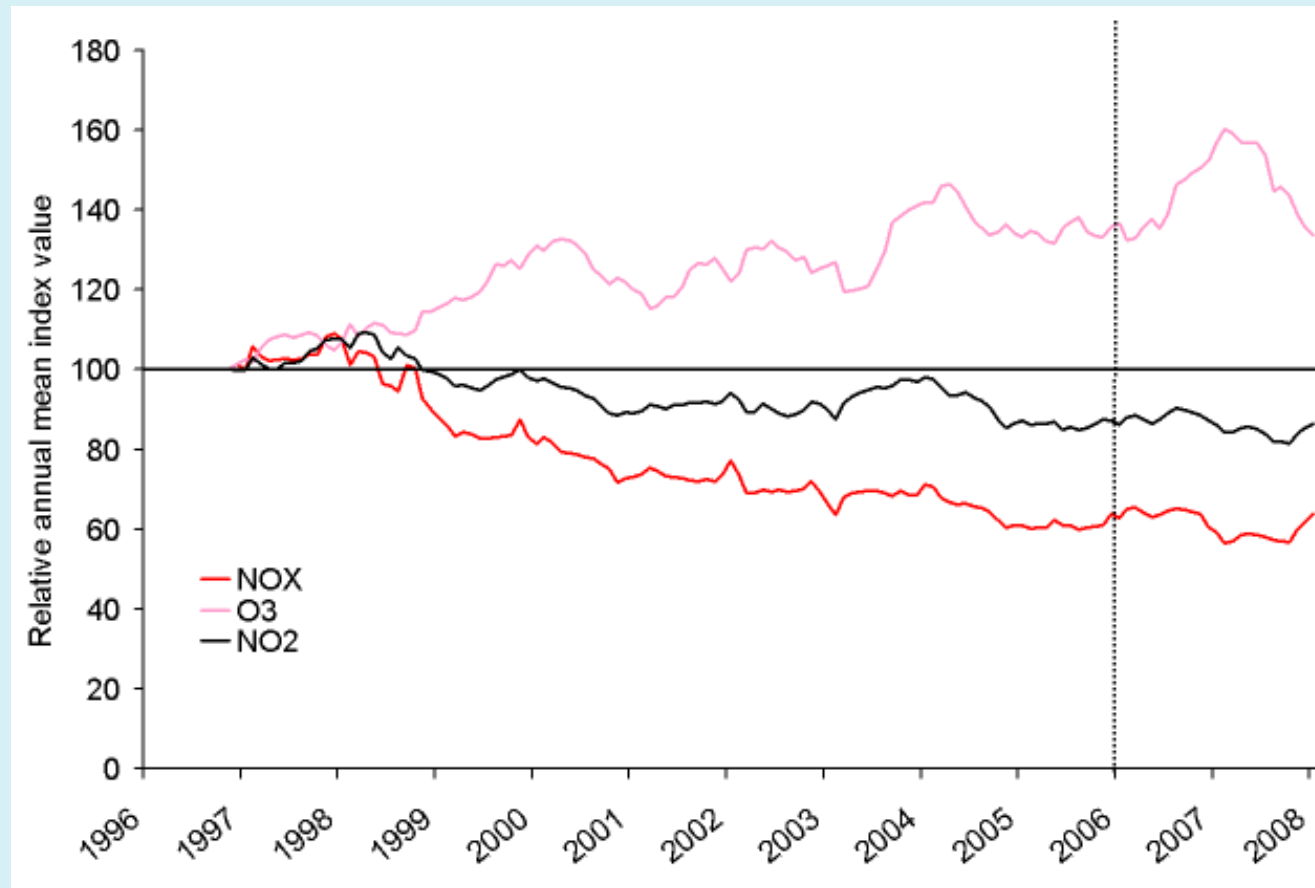


Recent trends - the LAQN index





Recent trends - the LAQN index





Progress towards UK and EU Limit Values

LAQN index hides a great deal of complexity

- Progress towards legislated objectives
- Changes at different site types
- effects of pollution episodes

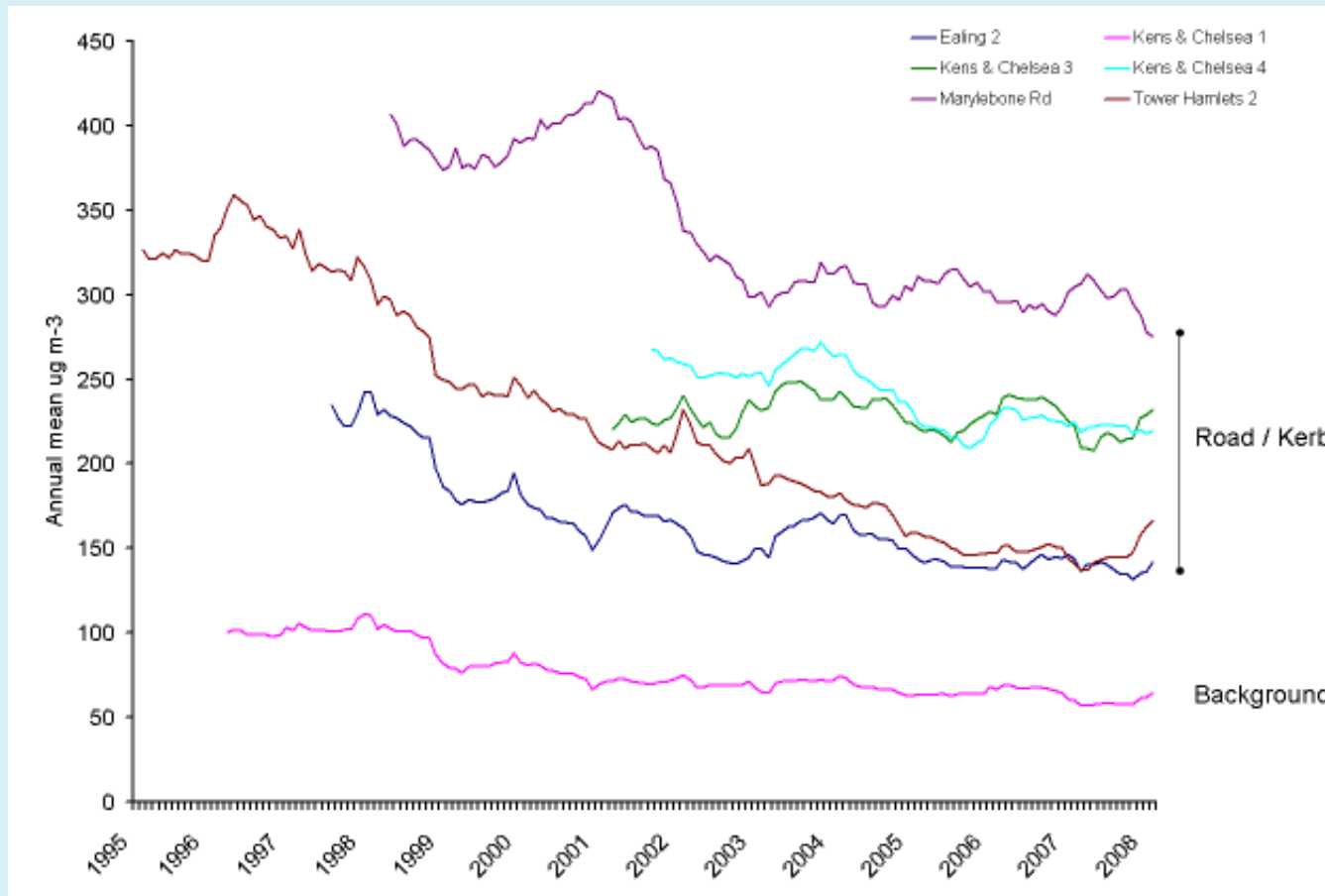
A more detailed look at two pollutants

- PM₁₀ particulate
- NO_x / NO₂



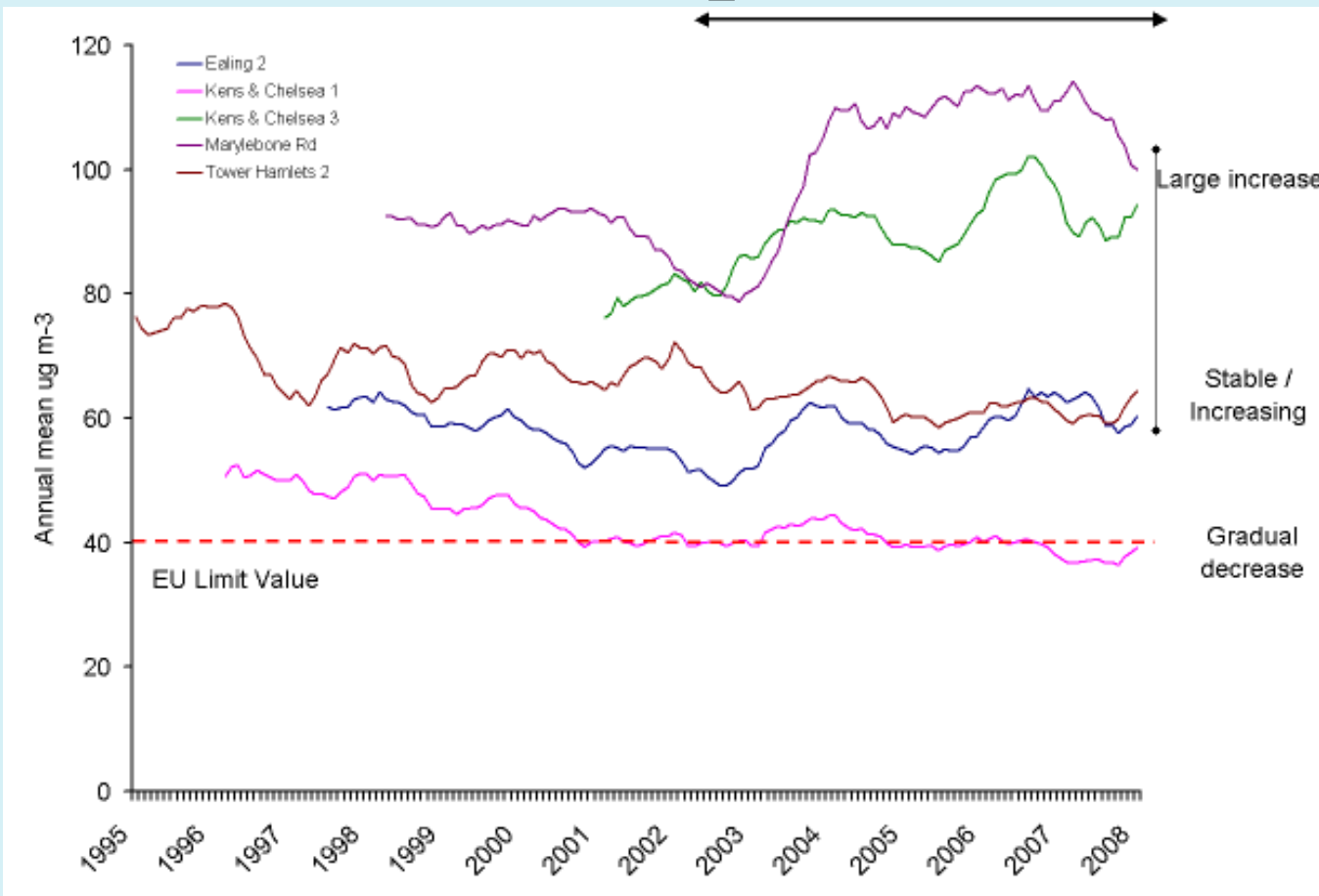


Annual mean NO_x concentrations



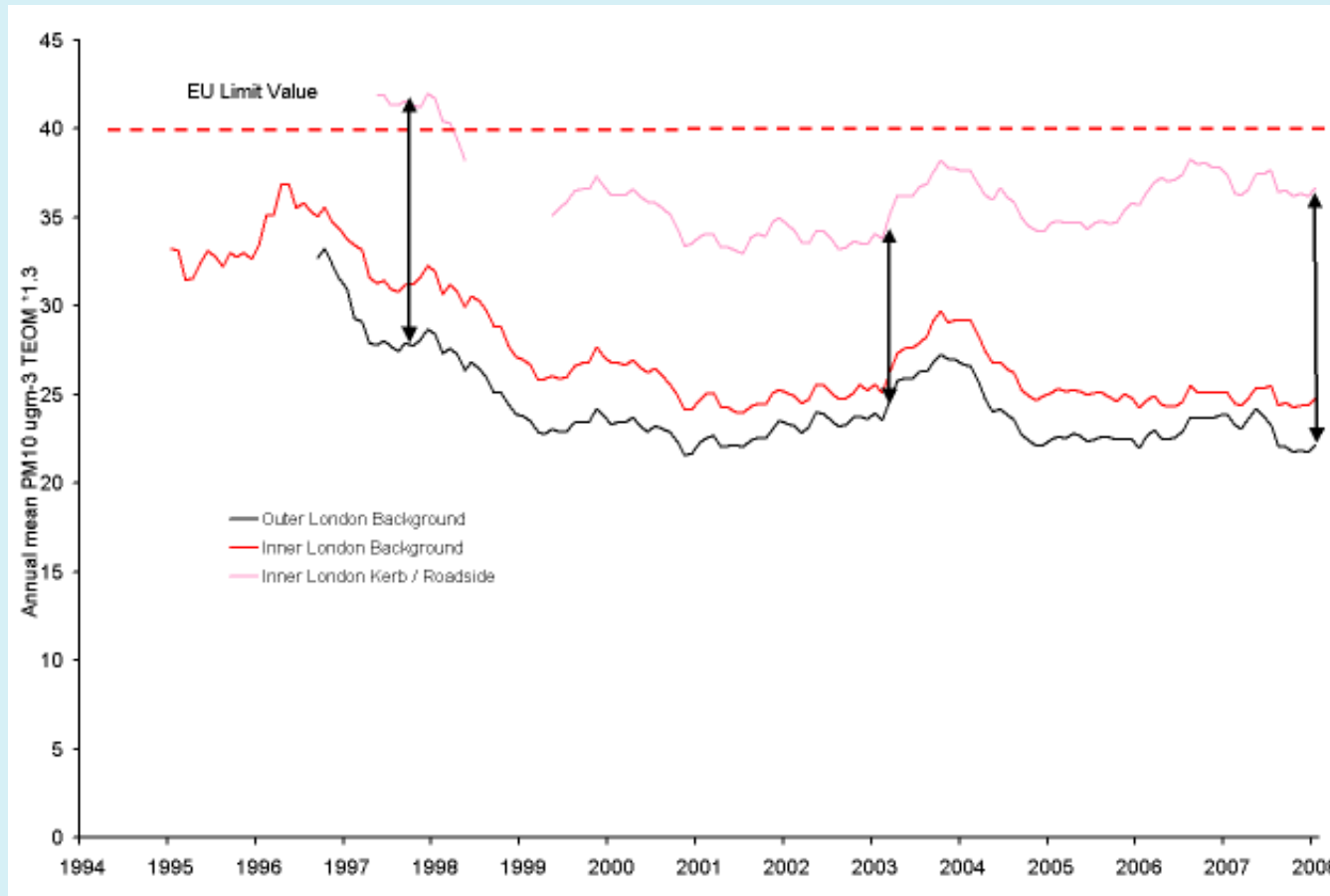


Annual mean NO₂ concentrations



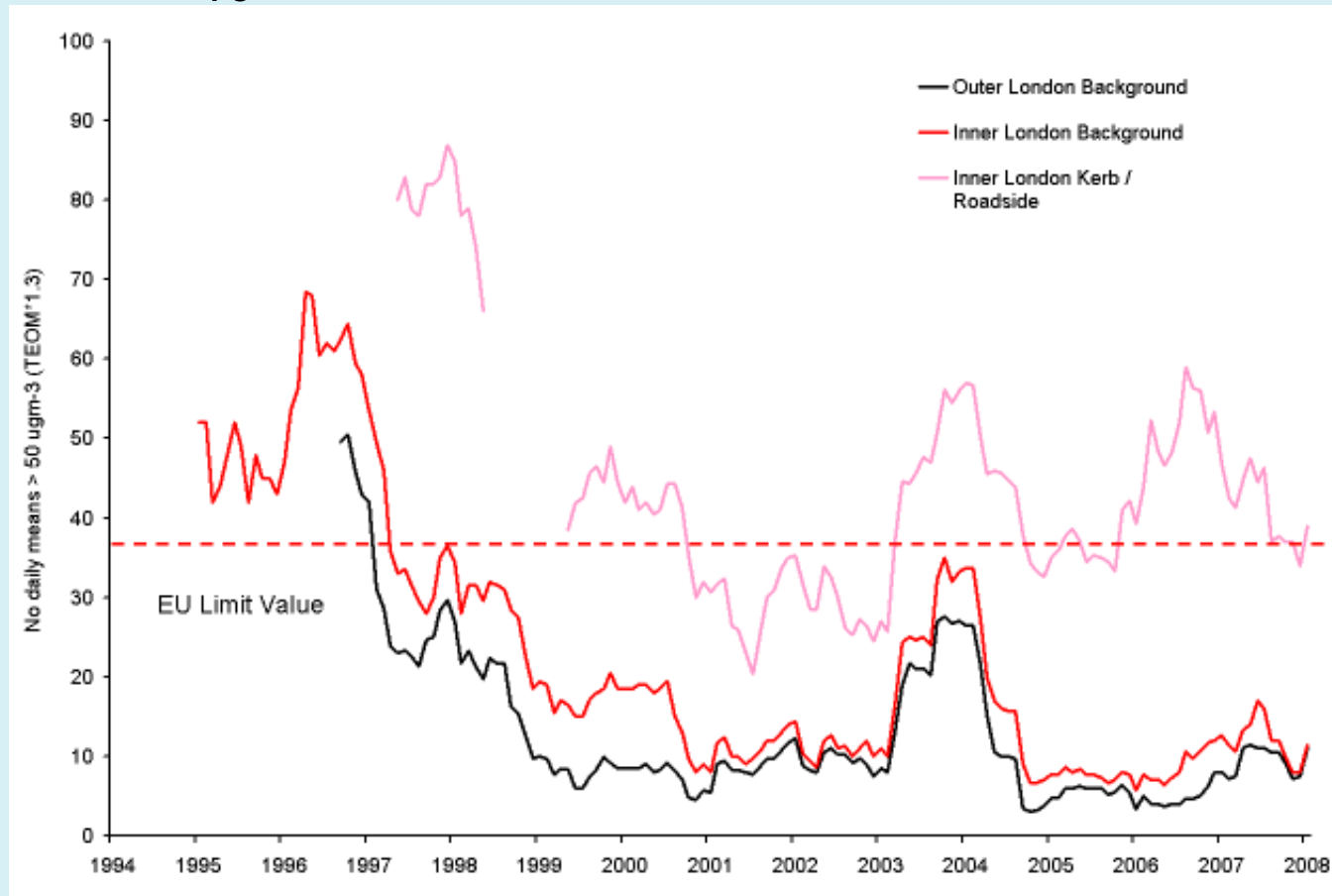


Annual mean PM₁₀ concentrations





Days with PM_{10} concentration $< 50 \mu g m^{-3}$ TEOM *1.3





Summary

Air pollution is a consequence of our 'non sustainable' development

Since the 1950's air pollution in London has improved and changed linked to changes in fuel use

Recent improvements due to policy interventions and abatement technologies

But widespread breaches of EU Limit Values remain in London

Robust extensive measurement network is essential to determine the effectiveness of policy interventions





Measurements highlight new challenges

NO₂ concentrations not responding to reductions in NO_x

- Direct emissions of NO₂ from increasing 'dieselisation', new diesel technologies and from diesel particle filters (Carslaw and Beevers 2004, Carslaw et al 2007, AQEG 2007).

PM₁₀ concentrations should be decreasing but are stable / increasing since 2000. (Harrison et al 2008)

- Increasing PM₁₀ from London's roads (Fuller and Green 2007)

Recent increases in roadside concentrations of NO₂ and PM₁₀

- **Implies increased emissions from road transport in London**

Increasing O₃ in London (see AQEG's forthcoming report)





Acknowledgements

London Boroughs, TfL, local authorities outside London and Defra who fund the LAQN measurements

