

What needs to be done to meet urban air quality targets and what are the consequences if the targets are not met?

Date and Location:	26th April, 2017 at The Royal Society
Chair:	The Earl of Selborne GBE FRS Chair, The Foundation for Science and Technology
Speakers:	Elliot Treharne Air Quality Manager, Greater London Authority Dr Stephen Bryce Vice President, Fuels Technology, Shell Projects & Technology Professor Frank Kelly FKC FRSE Professor of Environmental Health, King's College London
Panellist	Dr Christa Hasenkopf Chief Executive Officer and Co-Founder, OpenAQ
Audio Files:	www.foundation.org.uk
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On 5th May the government published a number of consultation documents on air quality - see:
www.gov.uk/government/consultations/improving-air-quality-reducing-nitrogen-dioxide-in-our-towns-and-cities
<https://consult.defra.gov.uk/airquality/air-quality-plan-for-tackling-nitrogen-dioxide/>

ELLIOT TREHARNE began by illustrating the significant progress made since 1952 in curbing air pollution in London (focussed in the main on reducing levels of sulphur dioxide and carbon dioxide) but then pointed to the Europe-wide challenge of ensuring compliance with the EU legal limits for nitrogen oxides. London was not the only city in Europe with large areas in breach of those legal limits. Half of London's nitrogen oxide emissions came from road transport with diesel cars and heavy goods vehicles as the major contributors.

The situation had been exacerbated by past ill-conceived regulatory decisions promoting greater use of diesel power as an important way of reducing carbon dioxide emissions. The Mayor of London aimed to bring nitrogen dioxide levels within virtually the whole of London down to or well below the current legal limits. A major priority would be the elimination from the roads of dirty diesel power. By 2020 the entire London bus fleet should meet EU emission standards and no new diesel-powered buses would be bought. Cleaner vehicles would replace the existing London taxi fleet. An emissions surcharge would be imposed on older polluting vehicles

entering London during Congestion Charge hours from 2017. Ultra Low Emission Zones would be progressively introduced across London over the next five years. Greater use of bicycles would be facilitated. New initiatives for improving the efficiency of freight movements would be explored. The public would be given more information about air quality. In the longer term the Mayor intended to take a range of non-transport measures to improve air quality and deal with other environmental problems such as noise in order to make London a city where people could live contented and healthy lives. The Mayor's focus on these issues stemmed from concern not only about the adverse effects of air pollution on health but also about the disproportionate impact of these on the poorest and less advantaged sections of London's population.

If this programme was to deliver its full potential for London and the UK as a whole, it needed to be supported by complementary action by Government at the national level, such as fiscal measures to reverse dieselisation and promote cleaner vehicles, a diesel scrappage scheme to help people meet new emission standards and a new Clean Air Act to enshrine the right to clean air and to equip local authorities with the powers they needed to tackle emissions from non-transport sources.

DR STEPHEN BRYCE outlined the wider context in which measures to meet urban air quality targets had to be considered – increase in global population (from 7.4 billion to 10 billion by 2050, with two thirds living in cities), rising global energy demand (60 per cent higher in 2060 with more than double the present number of vehicles on the road), despite a possible tripling of renewable energy by 2050, a continuing need for large amounts of gas and oil to meet energy requirements, and the need to tackle global climate change.

It was important to remember that currently global energy demand consisted of 31 per cent oil, 27 per cent coal, 21 per cent gas, 10 per cent biomass, 5 per cent nuclear and 4 per cent renewables. 30 per cent of domestic and commercial demand was met by traditional biomass energy. 96 per cent of transport depended on liquid fuels. 27 per cent of industry runs on gas. Studies showed that the lower the level of urban population density, the higher the level of transport-related energy consumption.

Having also outlined the complexity of the various challenges for future mobility (all of which had an impact on air quality) and the rich mosaic of potential solutions, he emphasised that there was no “silver bullet” answer to the problem of air pollution. Local circumstances, such as geography and the accessibility and affordability of energy, would determine the appropriate mix of policy choices. And it was essential for policy decisions to be reached through active partnerships between the relevant players, especially between governments, industry and society.

PROFESSOR FRANK KELLY said that current air pollution targets resulted from guidance provided by the World Health Organisation (WHO) in its reviews of health literature, begun in 1987 and regularly updated in subsequent years. He noted that the targets set in European legislation were less demanding than WHO guidelines, largely because of concerns about the impact on Eastern Europe following German reunification.

He drew attention to the 2010 Report by the Committee on the Medical Effects of Air Pollutants which showed that across the UK in 2008 poor air quality (measured as PM_{2.5}) was associated with a loss of total population life years of 340,000 life years, equivalent to 29,000 premature deaths per year due to breathing tiny particles (compared with the 2,500 deaths per year due to road accidents). He added that the adverse impact of air pollution on health extended beyond actual deaths to a range of effects on different levels of the NHS and on individuals. There was clear evidence, both mechanistic and epidemiological, that episodes of high pollution (and there had already been several of such episodes in 2017) were associated with adverse health impacts. Those adverse impacts varied from individual to individual and were not confined to those with pulmonary and asthmatic conditions.

A particular concern was the adverse effect on lung growth in children, given that lung growth normally ceased at the age of 18 and, after the age of 30, lung capacity started to diminish. As we all in our daily lives contributed to air pollution, an essential component of any solution had to be improved public awareness of the damage to others for which we were each in part responsible. The transformation of social attitudes towards smoking showed what could be

achieved.

The 1956 Clean Air Act succeeded in solving the problem of sulphur dioxide pollution. We now needed to achieve similar results with the problem of air pollution caused by carbon dioxide and nitrogen oxides. We also needed to deal with air pollution emanating from activities other than road vehicles as well as from non-exhaust sources in road vehicles (such as brakes and tyres).

The pre-dinner discussion period was launched by a contribution from DR CHRISTA HASENKOPF in which she outlined the work of her organisation – the creation of a world-wide open-source platform for bringing together real-time government station-level air quality data. The platform had more than 54 million physical data points from 47 countries, gathered by members across 4 continents. Community members were using the data in a variety of ways aimed at achieving much needed improvements in air quality. It was important to remember that one in eight people in the world suffered from air pollution.

In the discussion periods before and after the dinner interval, many contributors spoke of the important and difficult task of widening public awareness of the scale of the air pollution problem, of the nature of its adverse impacts, of the part which everybody played in creating the problem and of the part which everybody could play in solving it, especially if they were equipped with better information and forecasts of air pollution. Politicians needed to be persuaded that action to deal with air quality needed to be given higher priority. For that to happen there needed to be much greater popular pressure (stimulated by professional public relations activity and by the media) as well as firm political leadership of the kind being shown by the Mayor of London.

Several contributions looked beyond London and the UK and referred to the different regulatory

policies and practices of other countries (e.g. Japan which, unlike the UK, had not incentivised the use of diesel power, car-sharing in Hamburg, Los Angeles and Madrid, the Netherlands which had many similarities to the UK but a better air quality record). It was also suggested that we should do more to help the Third World avoid in cities like Calcutta and Kathmandu) the mistakes which we had made elsewhere. Two contributors from China spoke of the focus on building and construction being given in that country to those major sources of air pollution.

Other points made in discussion were:

1. One cause of increased traffic in London and other urban centres could be the growth of journeys delivering on-line purchases. Possible solutions to this could be consolidation of drop-off points or the use of new technology to optimise delivery systems;
2. Some progress had been made with the development of nationally available forecasts of air quality but more needed to be done. The situation was certainly better than in the past when data from the UK's (then) six monitoring stations was subject to the Official Secrets Act;
3. Was it possible that advances in genetic engineering might lead to ways of mopping up emitted nitrogen oxides? Probably not; at present the focus had to be on reducing the sources of pollution;
4. Was enough attention being given to reducing sources of pollution outside large urban areas where the lack of public transport meant greater use of private transport and where pressure on money precluded measures to increase the use of bicycles?
5. Every new taxi in London would in the future have to be electric and taxi-drivers, heavily exposed to air pollution, were well aware of the need to clean up London's air. It was therefore regrettable that the minicab lobby had succeeded in persuading the authorities to allow continued use of diesel powered vehicles until 2023.

Sir John Caines KCB

USEFUL REPORTS AND URLS

Arup Environmental Consulting

www.arup.com/services/environmental_consulting

ARCC - Better homes, better air, better health

www.arcc-network.org.uk/wp-content/pdfs/IAQ-action-group-report-Apr2017.pdf

Research and Technology Organisations (AIRTO)

www.airto.co.uk

Cambridge Environmental Research Consultants

www.cerc.co.uk

City of London Air Quality Strategy 2015-2020

www.cityoflondon.gov.uk/business/environmental-health/environmental-protection/air-quality/Documents/city-of-london-air-quality-strategy-2015.pdf

Clearing the Air: The Mayor's Air Quality Strategy

www.london.gov.uk/sites/default/files/air_quality_strategy_v3.pdf

Department for Business, Energy and Industrial Strategy

www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy

Department for Communities and Local Government

www.gov.uk/government/organisations/department-for-communities-and-local-government

Department of Environment, Food and Rural Affairs – Air Quality

<https://uk-air.defra.gov.uk/>

EPA Air Quality Monitoring Programme

www.airnow.gov/index.cfm?action=airnow.global_summary

ERM – Air Quality

www.erm.com/en/service/all-services/air-quality/

Export Opportunities in Approving Air Quality

www.trade.gov/topmarkets/pdf/Environmental_Technologies_Top_Markets_Report.pdf

Earth day: Imperial event brings together experts to tackle air pollution

www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/newssummary/news_21-4-2017-16-8-42?hootPostID=5bb1ff834074d88ca812d6dea7f23430

Hansard Report on Urgent Question on Air Quality Strategy

<https://hansard.parliament.uk/commons/2017-04-24/debates/4E0AFC5E-6B08-4A88-AE5E-AACC3F1C47D9/AirQualityStrategy>

IARC: Outdoor air pollution a leading environmental cause of cancer deaths

www.iarc.fr/en/media-centre/iarcnews/pdf/pr221_E.pdf

King's College London: Professor Frank Kelly

www.kcl.ac.uk/lsm/research/divisions/aes/about/people/Kelly/index.aspx

London Assembly - Pollution and Air Quality

www.london.gov.uk/what-we-do/environment/pollution-and-air-quality

Monitoring the implementation of London Plan energy policies in 2015

www.london.gov.uk/sites/default/files/2015_monitoring_report_-_final_nov_2016.pdf

OpenAQ
www.openaq.org

Royal College of Physicians: Every breath we take: the lifelong impact of air pollution
www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution

Studies on the Impacts of Air Pollution on Human Health, the Environment, and Global Economies
www.niehs.nih.gov/health/topics/agents/air-pollution
US Environmental Protection Agency Air Quality Awareness Week 1-5 May 2017
www3.epa.gov/airnow/airaware

US Department of State Global Air Quality Partnership
www.state.gov/m/pri/gdi/airquality/index.htm

World Bank Report The Cost of Air Pollution: Strengthening the Economic Case for Action
www.openknowledge.worldbank.org/handle/10986/25013

RESEARCH COUNCILS, ACADEMIES AND FUNDING BODIES:

Research Councils UK
www.rcuk.ac.uk

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www.bbsrc.ac.uk

Engineering and Physical Sciences Research Council
www.epsrc.ac.uk

Economic and Social Research Council
www.esrc.ac.uk

Medical Research Council
www.mrc.ac.uk

Natural Environment Research Council
www.nerc.ac.uk

Science and Technology Facilities Council
www.stfc.ac.uk

Research Organisations and Academies:
Academy of Medical Sciences
www.acmedsci.ac.uk

British Academy
www.britac.ac.uk

Catapult Programme
www.catapult.org.uk

Francis Crick Institute
www.crick.ac.uk

Government Office for Science
www.gov.uk/government/organisations/government-office-for-science

Higher Education Division, Department for Education, Northern Ireland Government
www.economy-ni.gov.uk/articles/higher-education-division

Higher Education Funding Council for England
www.hefce.ac.uk

Higher Education Funding Council for Wales
www.hefcw.ac.uk

Innovate UK
www.gov.uk/government/organisations/innovate-uk

Knowledge Transfer Network
www.ktn-uk.co.uk

Learned Society of Wales
www.learnedsociety.wales

The Royal Society
www.royalsociety.org

Royal Academy of Engineering
www.raeng.org.uk

Royal Society of Edinburgh
www.rse.org.uk

Russell Group
www.russellgroup.ac.uk

Scottish Funding Council
www.sfc.ac.uk

University Alliance
www.unialliance.ac.uk

Wellcome Trust
www.wellcome.ac.uk

Universities:

UniversitiesUK
www.universitiesuk.ac.uk