Addressing Urban Air Pollution in the UK

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NO_2, $PM_{2.5}$, and setting targets

CLEAN AIR STRATEGY, UK

Led by Defra

Following slides are from the Joint Air Quality Unit (JAQU)
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Addresses major sectors:

- Transport
- Domestic
- Agriculture
- Industry

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

AIR POLLUTION IS A PUBLIC HEALTH RISK

Air pollution is the **largest environmental health risk** in the UK. Long-term exposure reduces life expectancy and conditions including asthma, chronic heart disease, and chronic bronchitis are exacerbated by air pollution.

Air pollution most severely affects vulnerable groups, for example **the elderly, children and people already suffering from pre-existing health conditions.**.

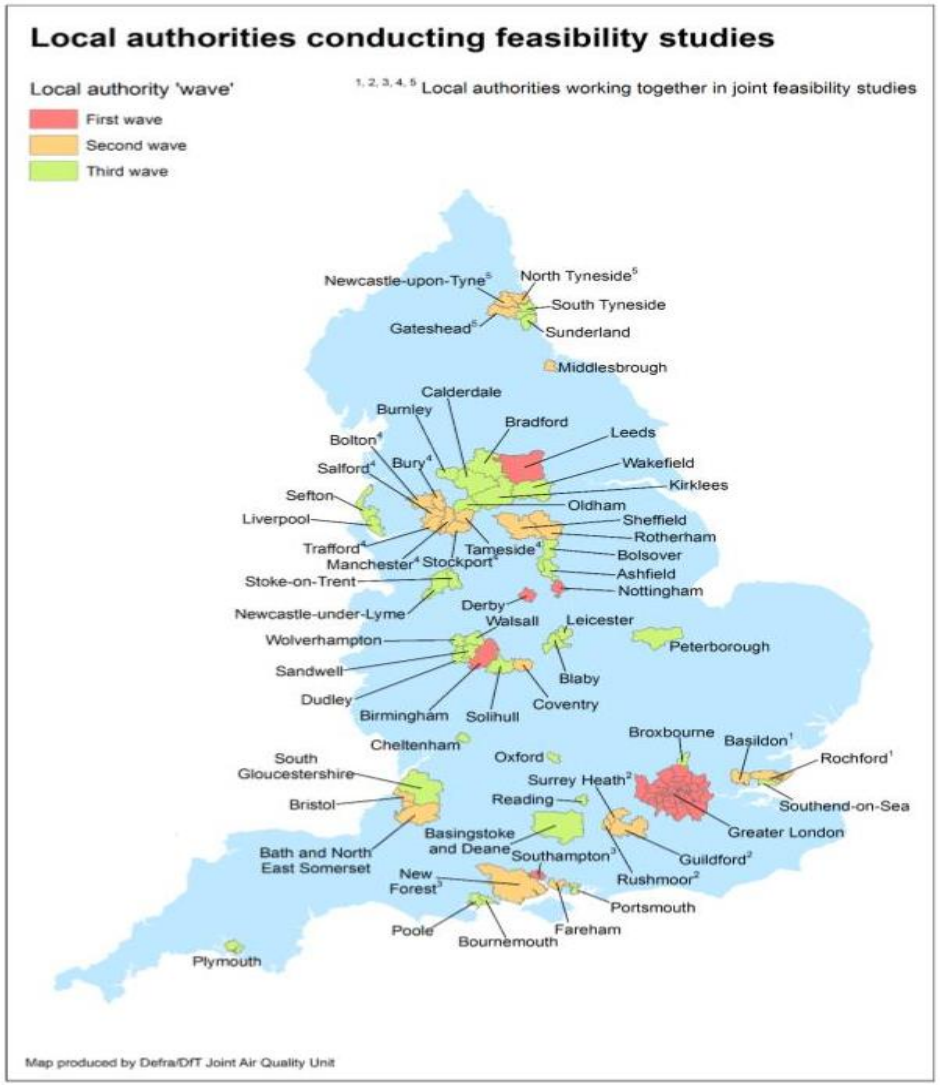
Tackling air pollution is a government priority

The **Clean Air Strategy** was published in Jan 2019 and sets out how we will meet international commitments to **reduce emissions of five damaging air pollutants by 2020 and 2030**

The **Road to Zero Strategy** was published in May 2018, setting out how government will support the **transition to zero emission road transport** and reduce emissions from conventional vehicles during the transition.

Alongside these sits a targeted delivery programme on the UK's most immediate air quality challenge: **tackling roadside NO_x/NO_2 concentrations** - the only statutory air quality limit that the UK currently fails to meet.

TACKLING ROADSIDE CONCENTRATIONS



The risk from NO_2 is highly localised, so interventions are targeted to the problem areas.

5 'First wave' LAs, plus London: identified 2015

23 'Second Wave' LAs: identified 2017

33 'Third Wave' LAs: projected to become compliant in 2019, 2020 or 2021 and directed to undertake feasibility studies in 2018
Subsequently,

- **10 of these LAs** shown to be already compliant by detailed local models.
- **10 of these LAs** directed to implement measures.
- **8 of these LAs** directed to develop detailed plans.

NO2 LOCAL PLANS

Local plans must set out steps that will be taken to achieve compliance with legal limits **as quickly as possible.** They must consider a charging Clean Air Zone but other measures are preferred if they will deliver the air quality benefits as quickly. £572m has been made available to support local authorities

Range of measures being implemented

- Charging CAZ
- Reduced speed limits
- Lane closures/high-occupancy lanes (may be active at peak times)
- Other traffic management
- Taxi licensing, bus reforms, HGV restrictions
- Public transport route improvements and encouragement
- Encourage alternative and active travel

<u>Local plans must also set out how the local authority will monitor the impact of their plan.</u>

Evaluation questions

1. What impact have NO2 Local Plans had on = **NO_2 concentrations, NOx emissions and health**

2. How have NO2 Local Plans **affected behaviours** of businesses, private vehicle users, transport users, public transport providers and public bodies

3. How has the impact of NO2 Local Plans **varied for different local groups**, including more vulnerable residents or transport users and SMEs?

4. How have **external factors** influenced the effectiveness of the NO2 Local Plans?

5. How does the **approach to implementing NO2 Local Plans** affect the scale and pace of impacts?

Key interest in impact of Local Plans on five user groups: the **public, businesses, transport users, public transport providers & public bodies**.

Gathering both **LA-specific learning** & **cross-area learning** e.g. for specific types of measure

KEY STRANDS OF CENTRAL EVALUATION ACTIVITY

Explore national & local trends, making best use of existing data and supplementing with new data

Analysis of air quality & traffic data gathered by Local Authorities & by evaluation team

Data to include existing AQ and traffic monitoring, additional Continuous Analysers and Diffusion Tubes, and the National Diffusion Tube Network.

Air quality and traffic data submitted to central evaluation by Local Authorities on a quarterly basis.

Deep-dive case-studies (~ 8)

In-depth look at impacts of Local Plan & influence of other factors

Over 1 – 2 years

Quantitative & qualitative evidence gathering

Secondary data analysis

Rapid Assessments (~10)

Detailed look at specific element of a Local Plan(s) e.g. a specific measure, targeted group

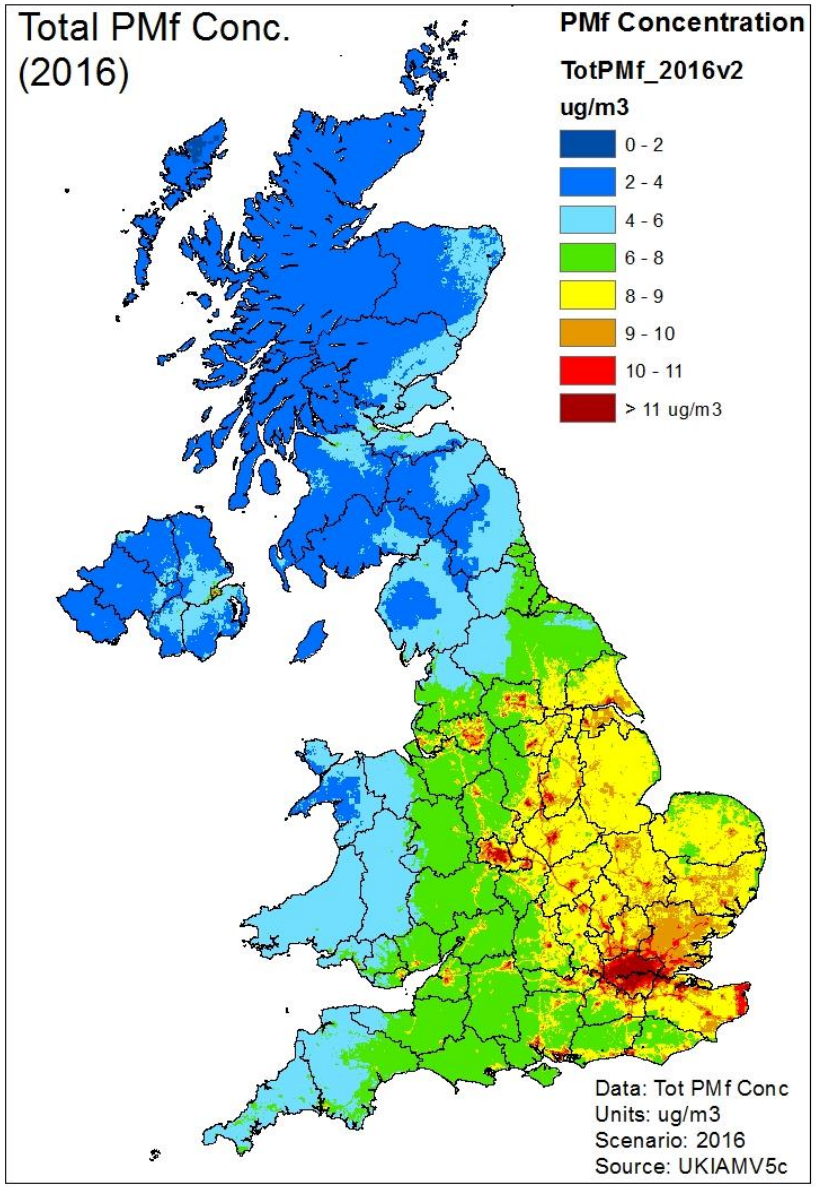
Up to 4 months

Triggered by trend data, JAQU query, LA request or external interest

Analysis of other existing data e.g. on travel behaviour, health

Reviewing relevant **national data** e.g. National Travel Survey

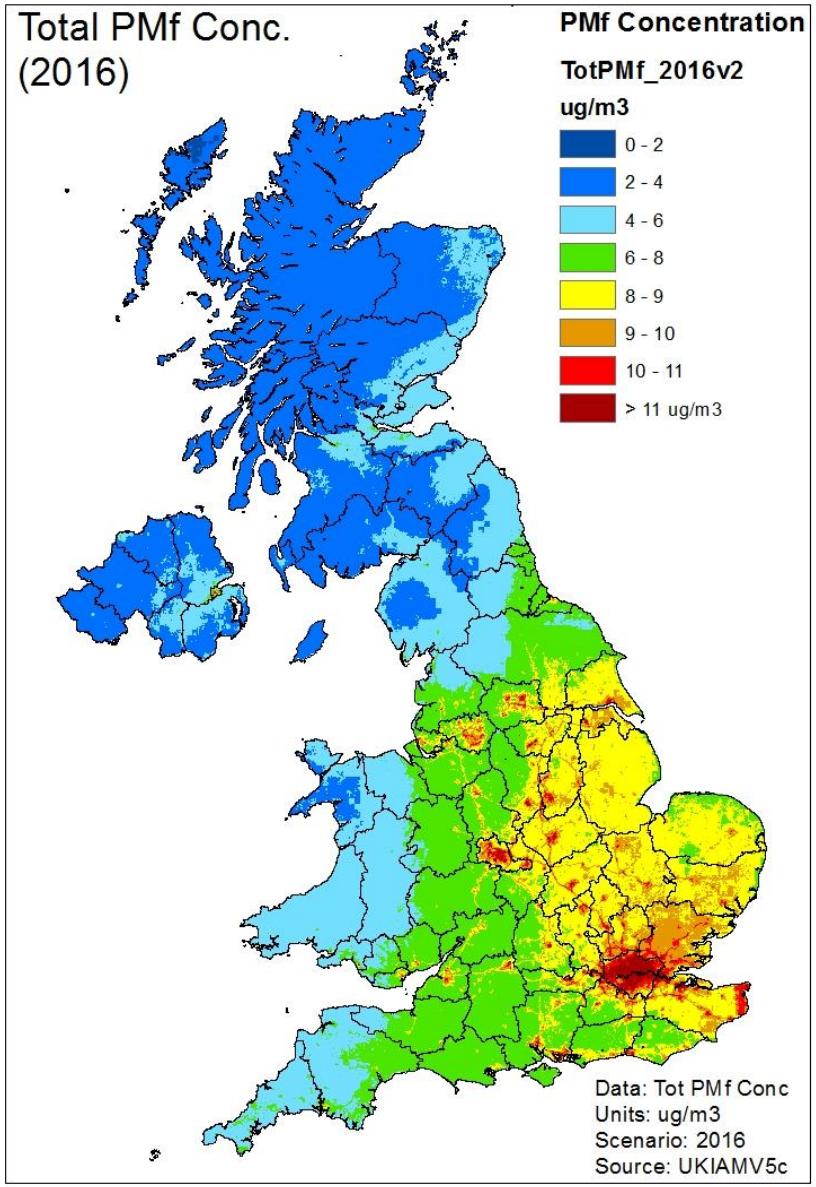
And analysing **relevant data gathered at local level**



2016

Modelling using the UKIAM and related models

Helen ApSimon and colleagues, Imperial College



2016

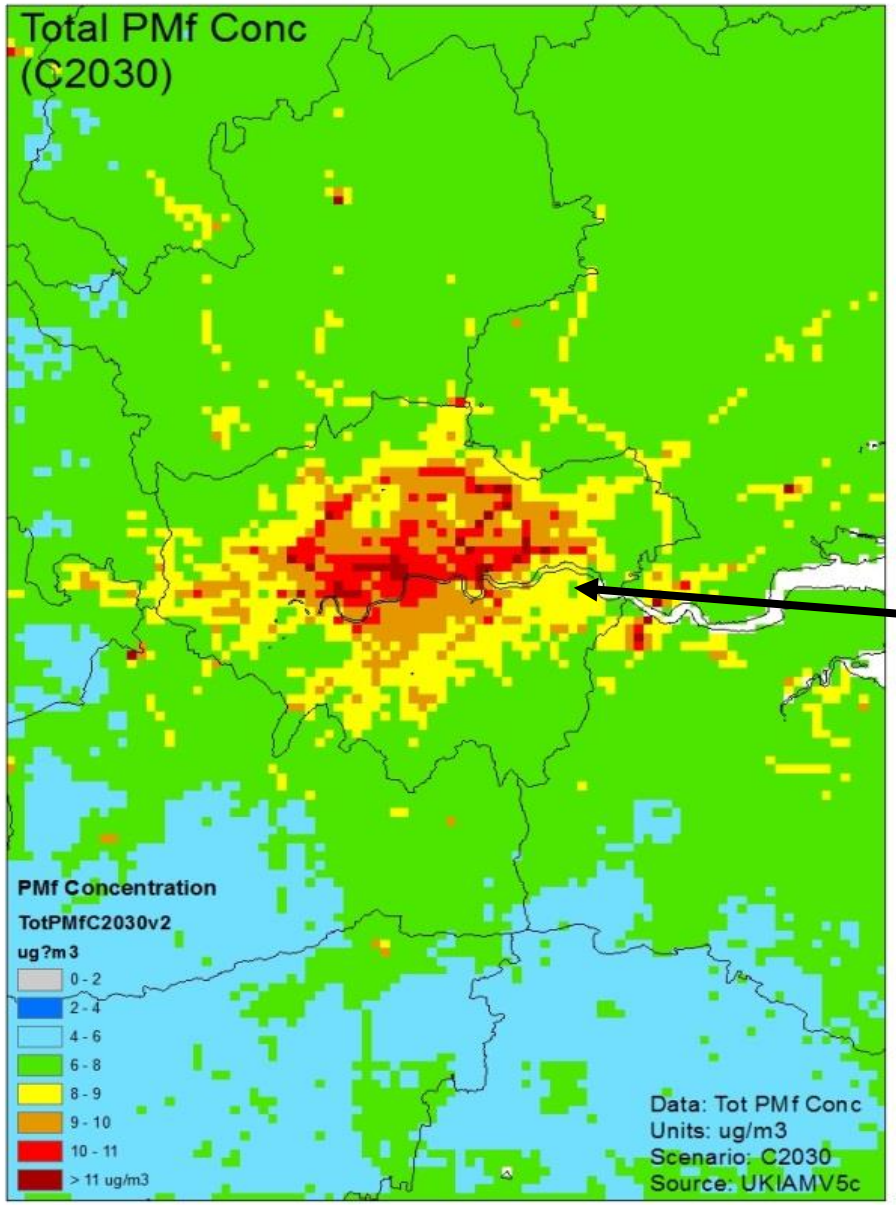
PM2.5 UK Commitment to halve population exceeding WHO guideline of 10ug/m3 by 2025.

Report based on modelling studies with UKIAM published in July assessing progress towards WHO guideline "PM2.5 exposure and reduction towards achievement of WHO standards"

www.gov.uk/government/publications/air-quality-assessing-progress-towards-who-guideline-levels-of-pm25-in-the-uk

Exceedance of WHO guideline coincides with urban areas of enhanced concentration, especially across London

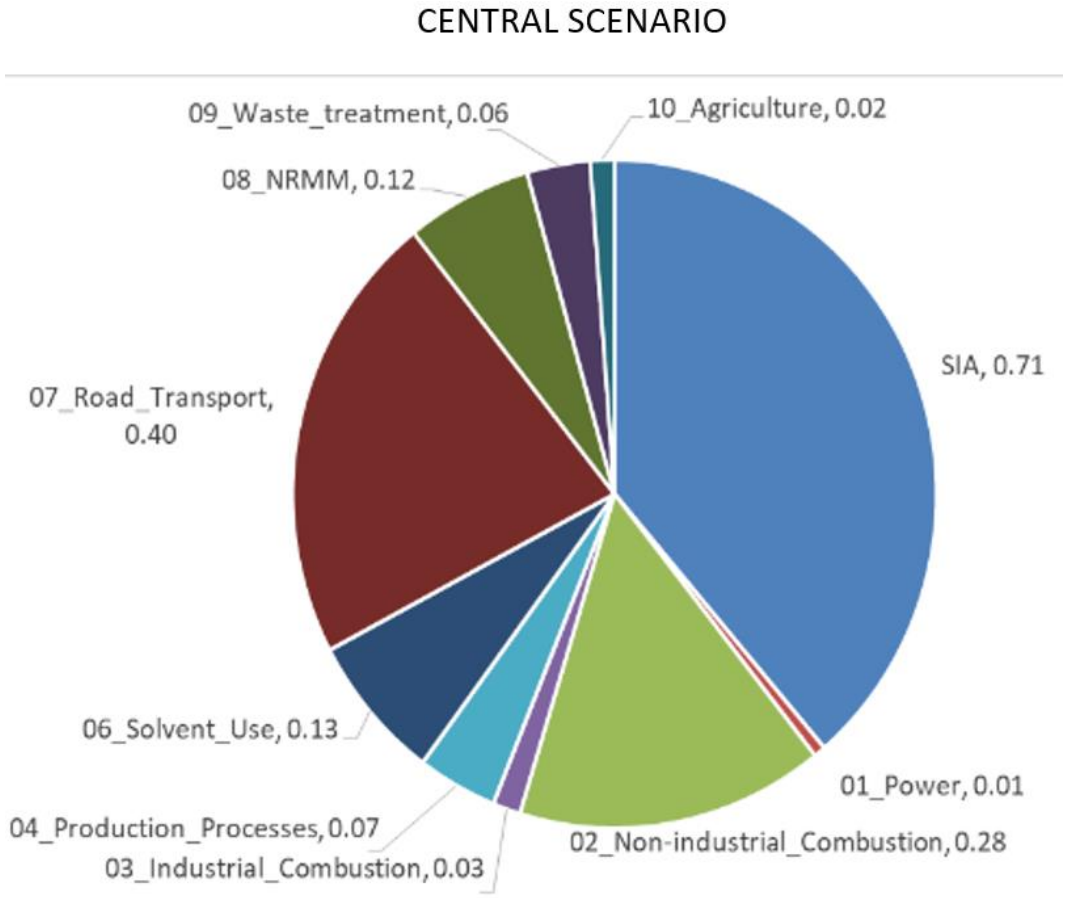
-> emphasis on reducing primary PM emissions with local impacts as well as longer range background



Big improvement by 2030 due to measures to achieve NECD in the UK and reduction in imported contribution from other countries (but international shipping a growing problem with NOx control new ships insufficient; also NB ports)

Still exceedance of 10 ug/m3 in London and other urban hot-spots
-> emphasis on further reduction of more local contributions from urban primary PM2.5 emissions

-> large uncertainties



Source apportionment of population weighted mean concentration of PM2.5 in UK for Central 2030 scenario (ug/m3).
In urban areas primary PM2.5 from transport, wood burning & NRMM even more dominant

Wood- burning- important contribution, especially in winter. Uncertainty in amount of wood burned, its quality, and stoves/way used.

NRMM Urban construction/machinery. London already introduced zone with tighter emission regulations. Other control measures?

? Missing sources e.g. cooking (high density of restaurants in cities)

Road transport- will be dominated by non-exhaust emissions-> big uncertainties and not solved by electric vehicles ?

AQEG report on Non-exhaust emissions
https://uk-air.defra.gov.uk/library/reports?report_id=992

Lack of real-world data to estimate emissions and effectiveness of control measures (reducing traffic, ecodriving, regenerative braking etc).

UNECE working on measurement methods towards emission standards
https://www.unece.org/fileadmin/DAM/trans/doc/2016/wp29grpe/GRPE-73-14.pdf

any work on road surfaces?

How to set targets ?

NO_2 : limit values -> focus on remaining hot-spots rather than reducing overall exposure

$PM_{2.5}$: a) number of population exceeding 10ug/m3 -> easy to understand, but very sensitive to model predictions and population close to threshold. May show slow improvement in big cities.

b) population exposure -> can be related to health impacts and used in CBA. No direct relationship with WHO guideline.

c) accumulated exceedance above 10ug/m3 summed over population