Creating a world
fit for the future

Implications of the WHO's new air quality guidelines for the UK

IAPSC 2021; 1/12/21; David Birchby

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Update WHO guidelines vs current UK ambition

Pollutant	Avg.time	IT1	IT2	IT3	IT4	AQG level	UK standard
$PM_{2.5}$ (µg/m³)	Annual	35	25	15	10	**5**	**25**
"	24-hour	75	50	37.5	25	**15**	N/A
PM_{10} (µg/m³)	Annual	70	50	30	20	**15**	**40**
"	24-hour	150	100	75	50	**45**	**50**
NO_2 (µg/m³)	Annual	40	30	20	-	**10**	**40**
"	24-hour	120	50	-	-	**25**	N/A
"	1-hour	-	-	-	-	[200]	**200**
O_3 (µg/m³)	Peak Season	100	70	-	-	**60**	N/A
"	8-hour	160	120	-	-	**100**	**120**
SO_2 (µg/m³)	24-hour	125	50	-	-	**40**	**125**
"	1-hour	-	-	-	-	-	**350**
	15-min	-	-	-	-	-	266
"	10-min	-	-	-	-	[500]	N/A
CO (mg/m³)	24-hour	7	-	-	-	**4**	N/A
"	8-hour	-	-	-	-	[10]	**10**
"	1-hour	-	-	-	-	[100]	N/A

Considerations for UK policy

Environment Act 1995
(+ subsequent supporting legislation)

Brexit and the withdrawal agreement (2019/20)

Clean air strategy (2019)

- *"ambitious, legally binding international targets to reduce emissions of five of the most damaging air pollutants"*
- *"tough new goals to cut public exposure to particulate matter pollution, as recommended by the World Health Organization"*

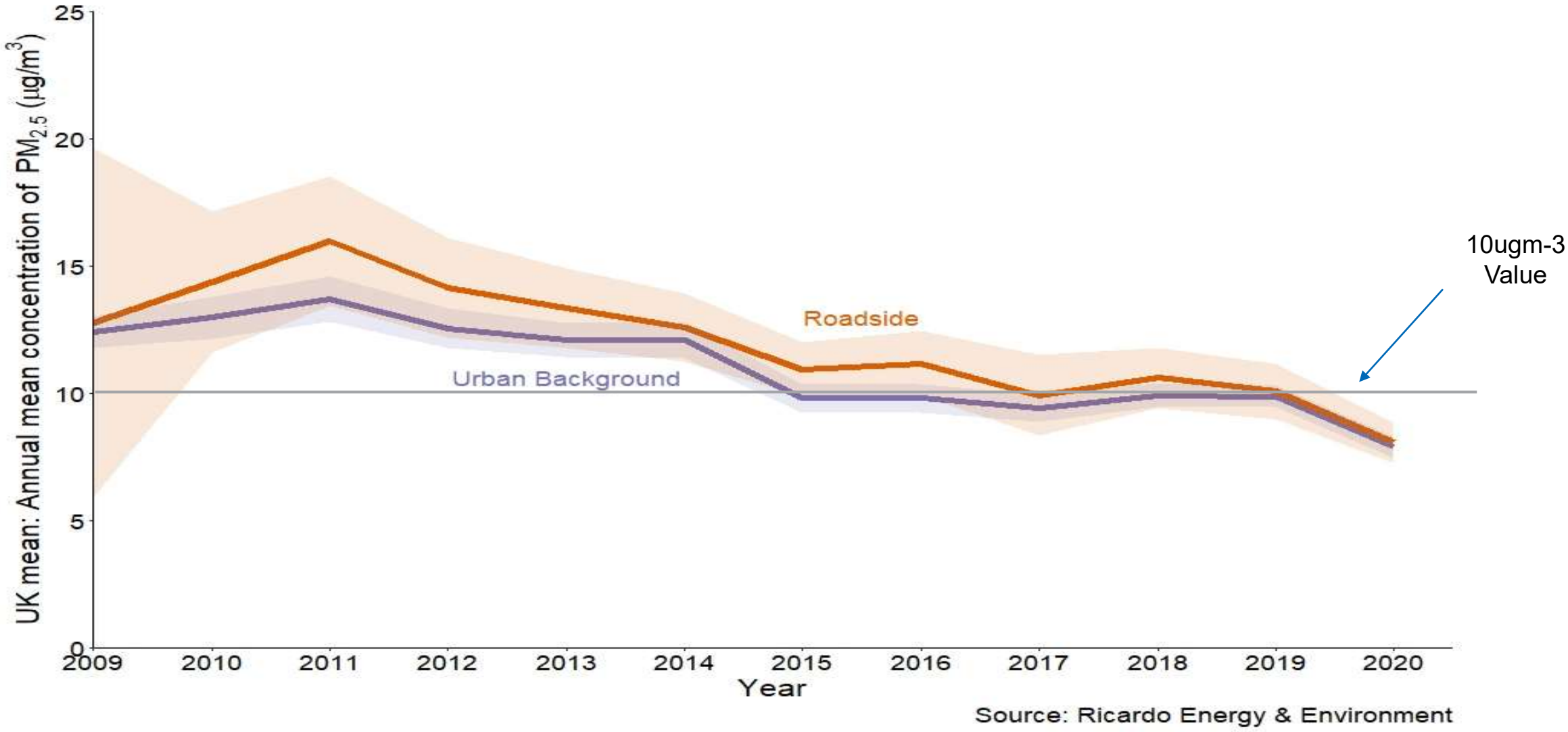
Environmental ~~Bill~~ Act

- Four key areas for long term targets: air quality, water, biodiversity, waste
- Plus – a specific target on PM2.5
  - *"Secretary of State to set a target by regulation for an annual mean concentration level of fine particulate matter (PM2.5) in ambient air"*
- Targets:
  - Are long-term;
  - Must set the standard to be achieved;
  - Have a date when this standard must be achieved;
  - The Secretary of State has a duty to meet the standard.

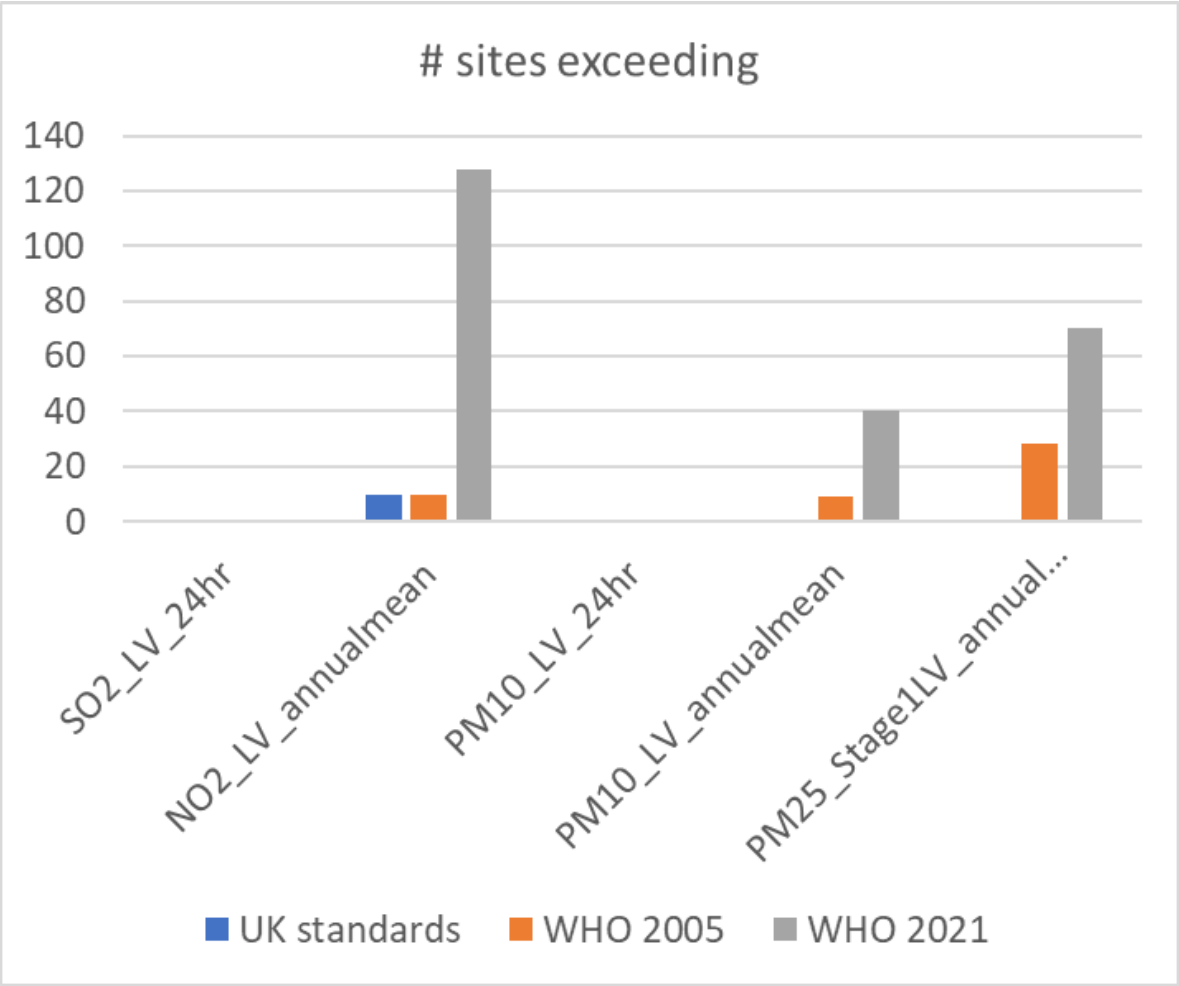
LAQM

- New AQ standards (and plans??)
- Implications for monitoring networks and modelling to allow assessment

Trends in average PM2.5



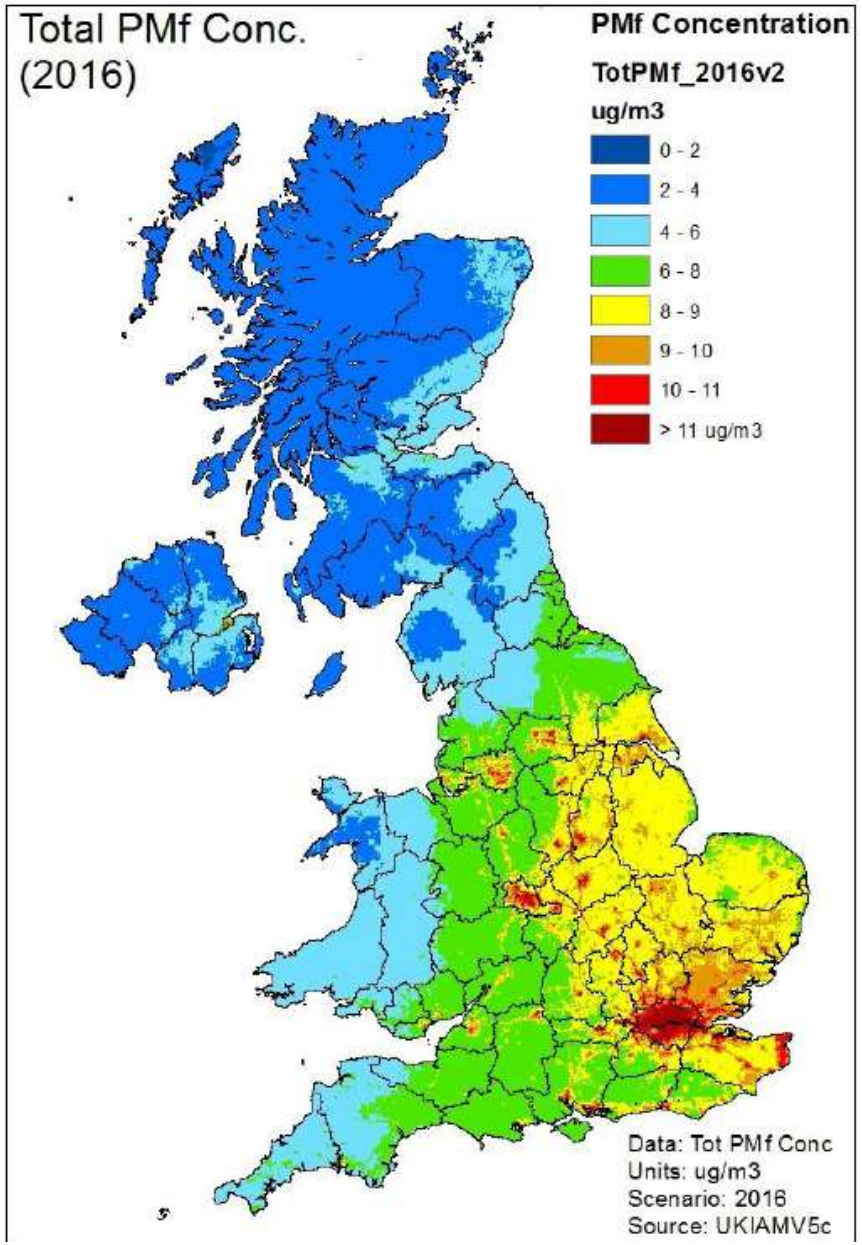
Comparison of guidelines to 2019 UK concentrations



Population living in exceedance areas

- **2016…**
  - 15m live in areas > 10 µg/m3
    - Of these 6 m +1 µg/m3 of the standard
  - 12.4m are in 9-10 µg/m3.
  - A further 13.5m are in 8-9 µg/m3 (between 1-2 below the standard).

- **2030 projections**
  - Likely compliance except London, Birmingham and major cities under current projections
  - Population > 10 µg/m3 reduced from 15m to 4.4m by 2030
  - But…high modelling uncertainty relative to the predicted impacts
  - So action will be needed to reduce PM2.5



Modelling courtesy of Imperial College

Health impacts – mortality risk

WHO – Air Quality guidelines and interim targets for PM (annual mean)

Annual mean level	$PM_{2.5}$ (µg/m3)	Mortality
Interim target 1	35	+ 24 % above guideline level
Interim target 2	25	+ 16 % above guideline level
Interim target 3	15	+ 8 % above guideline level
Interim target 4	10	+ 4 % above guideline level
AQ guideline level	5	mortality at guideline level

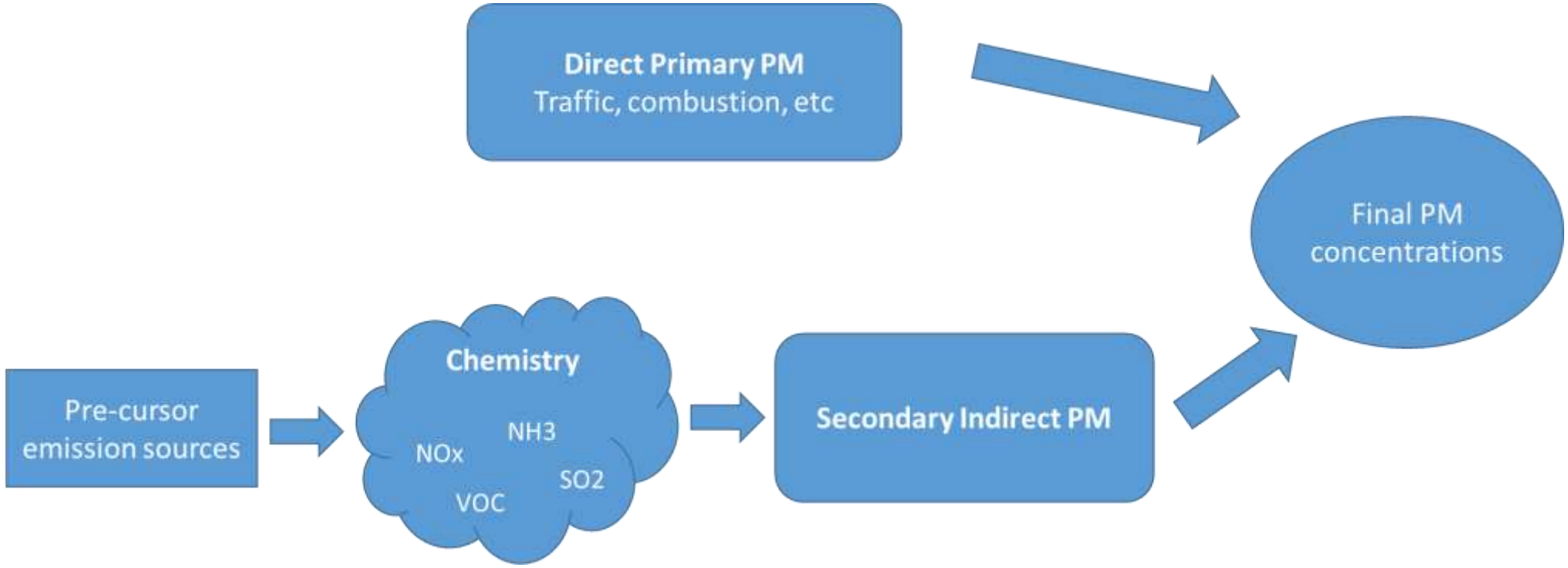
- Long-term exposure to man-made air pollution in the UK has an annual effect equivalent to 28,000 to 36,000 deaths (PHE)

- *(Based on comparison to average 2019 concentrations at LSOA level)…..*
- Achieving 2005 WHO target of 10 µg/m3 could:
  - Reduce deaths by 820 per annum (3% attributable fraction)
  - Equivalent health impact value of £2.5bn pa

- Achieving 2021 WHO target of 5 µg/m3 could:
  - Reduce deaths by 12,600 per annum (43% attributable fraction)
  - Equivalent health impact value of £40bn pa

- *Before use of new relative risk……*

Other considerations



- **Other considerations**
  - Costs will increase with greater ambition
  - (Positive + negative?) distributional effects
  - Technical feasibility (monitoring)
  - Technical feasibility (abatement….)
  - ….. Timing is key

DELETE

1. Recap of what the WHO's latest update covered (and what it didn't)
2. Initial analysis on UK compliance levels with new targets
3. Some initial analysis on what this means in terms of health impacts
4. Possibly something around wider considerations – feasibility, costs, distributional effects…….
5. Any initial noises from UK government in response / UK policy context post Brexit
    a. And if/how this might lead to new requirements on UK Las….