Reflections on the Report: Air Quality Science and Policy

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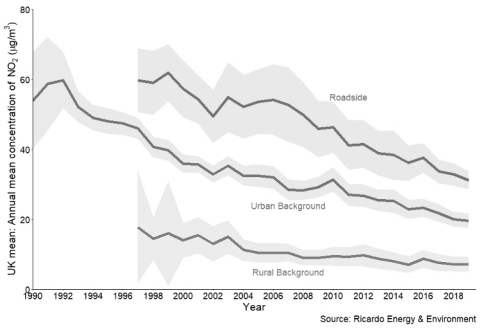
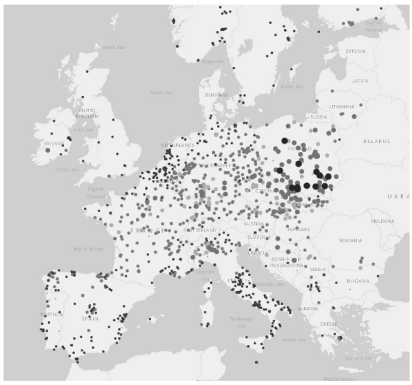
Air Quality Standards are frequently imperfect, but can be very effective at catalyzing action and change



Trends in NO_2 concentrations in the UK 1990 to 2020



$PM_{2.5}$ across Europe today

2

The existence of an AQS requires a supporting ecosystem of monitoring and verification

WMO GAW Global Station, Mace Head Ireland

National monitoring network station

Local Authority monitoring station

- Who polices the standards?
- Where is it measured?
- Can it be modelled (cheaper, everywhere…)?
- Is data equivalent across nations?
- *What is regulated and measured?*

Modelled estimate of NO_2 concentrations

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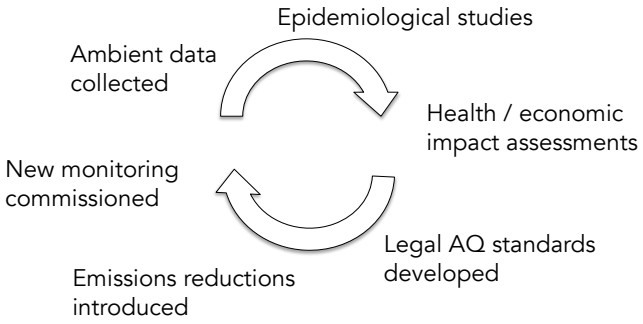
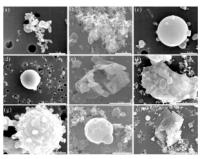
What to regulate and control?

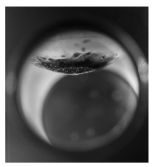
A chicken and egg problem





Particulate matter – $PM_{2.5}$ – particles smaller than 2.5 microns diameter

Nitrogen Dioxide – a brown toxic gas from high temperature combustion



Ozone – a blue-ish highly unstable gas

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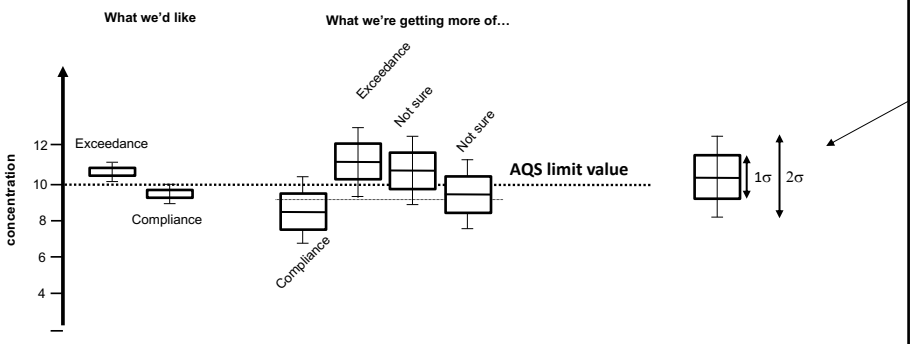
Pass or Fail?

Legal standards appear clear cut, typically pass or fail.



- "Certainty" in the pass or fail depends on the pollutant
- Uncertainty increases at lower concentrations
- $PM_{2.5}$ uncertainty at 5 micrograms / m^3 is >70%

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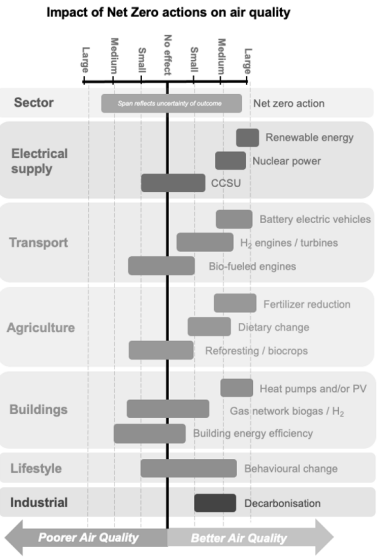
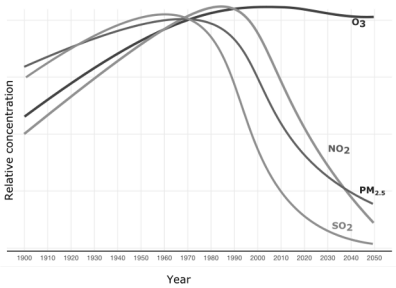
The once in a lifetime clean air opportunity



- Decarbonization and Net Zero can be overwhelmingly positive for air quality
- Public expectation of cleaner air should be higher and the co-benefits of climate mitigation made explicit
- Robust Air Quality Standards are central to locking in these benefits



Taken from forthcoming Royal Society report on "*Effects of climate change and net zero policies on air quality*" Chapter 3, A Lewis *et al.*, and Chapter 4 D. Carslaw *et al.*, 2021.

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