# PARTICULATE MATTER IN THE UK
## PROGRESS AND DATA IMPLICATIONS

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# Outline

- Impacts – why do we care?
- Primary PM and the emissions inventory
- What next? Implications for data communication and national targets

# Health impacts

- No safe level of exposure in terms of acute and long-term exposure according to WHO and COMEAP

> *"neither the concentration limits set by government, nor the World Health Organization's air quality guidelines, define levels of exposure that are entirely safe for the whole population"*

  - Royal College of Physicians

# Environmental impacts

Secondary PM, formed through reactions of precursor gases with ammonia, is the major concern for ecosystem damage.

- Ammonium nitrates and sulphates deposit on plant leaves
  - reduce the drought-tolerance of trees
  - impact on exposure to sunlight.
- Deposited within ecosystems
  - Acidification and eutrophication
  - Over 50% of natural ecosystem area in the UK estimated to exceed critical loads for acidity

❖ Should there be a greater focus on promoting the environmental impacts?

# Quantifying impacts

- RCP: Air quality imposes a cost to public health of £20 billion
- A similar figure regarding the economic cost to the UKs natural environment is not as readily available

❖ This could be an important element when assessing cost-benefit of AQ actions (and projections)

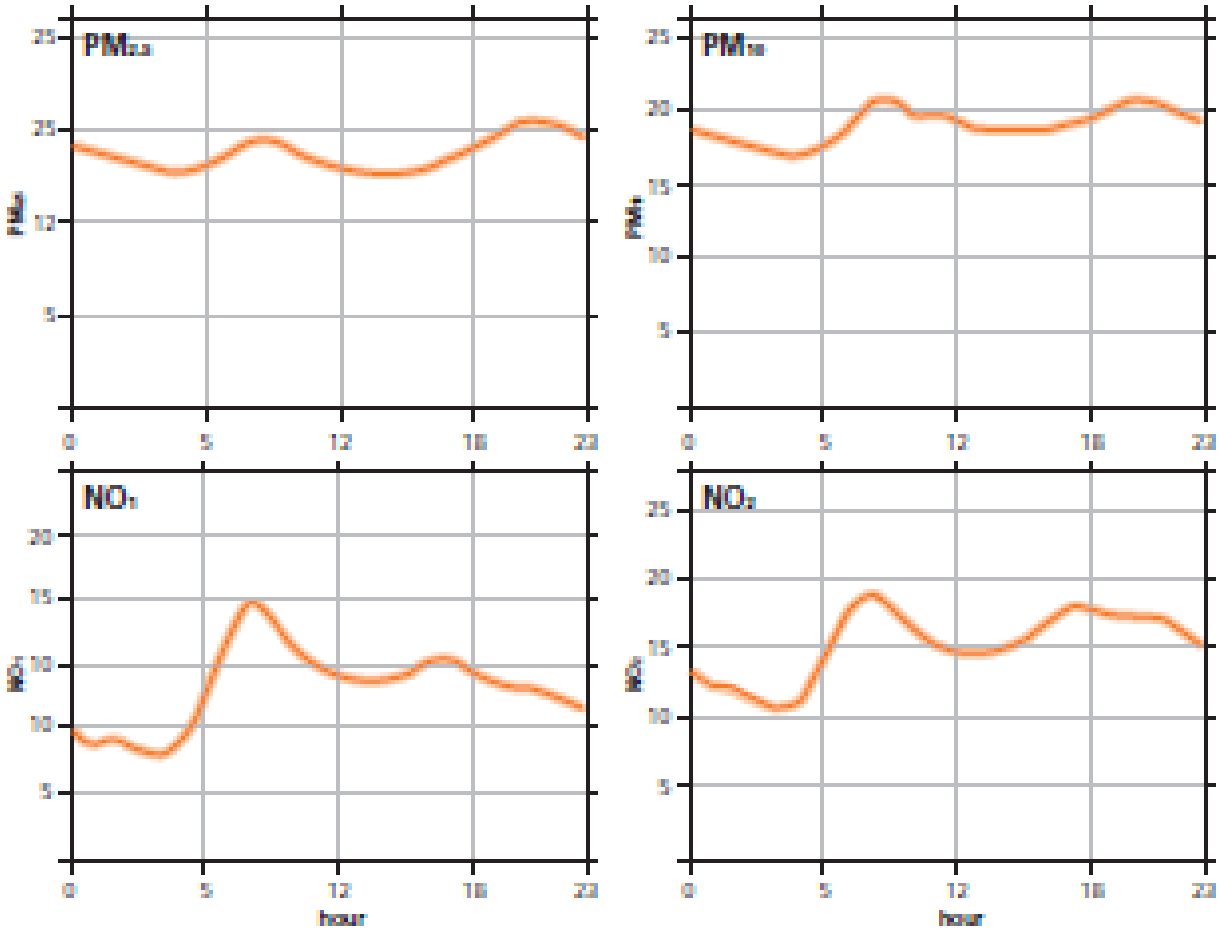
# What is PM?

- Primary: Direct emissions
- Secondary: Formed in the atmosphere through reactions and transformation of *precursor gases*

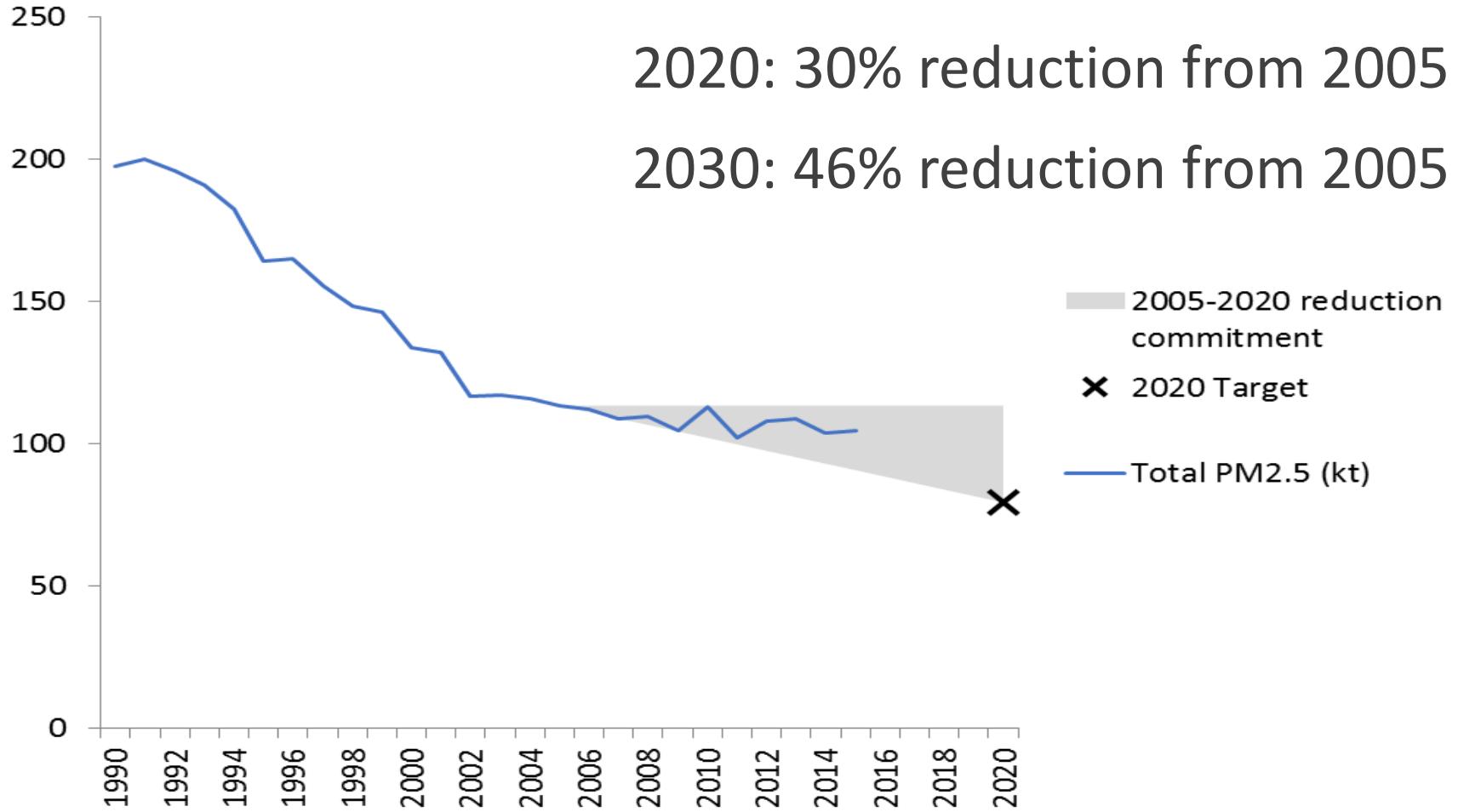
❖ *The inventory is for primary PM… What are the implications for data communication?*

# Understanding concentrations
## Where does our PM come from?

Diurnal profile:



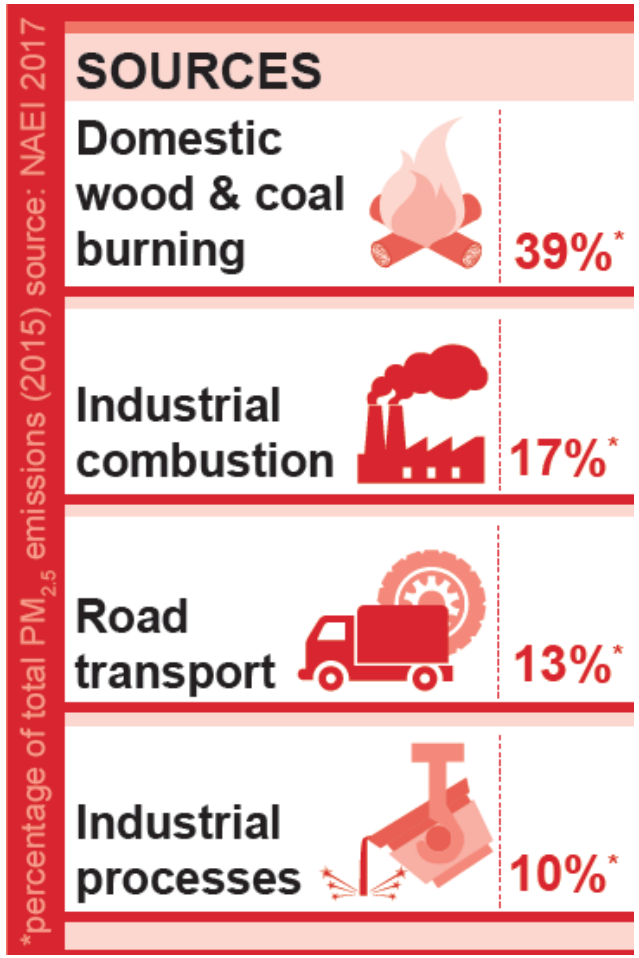
# Emissions inventory




2020: 30% reduction from 2005

2030: 46% reduction from 2005

# Emissions inventory

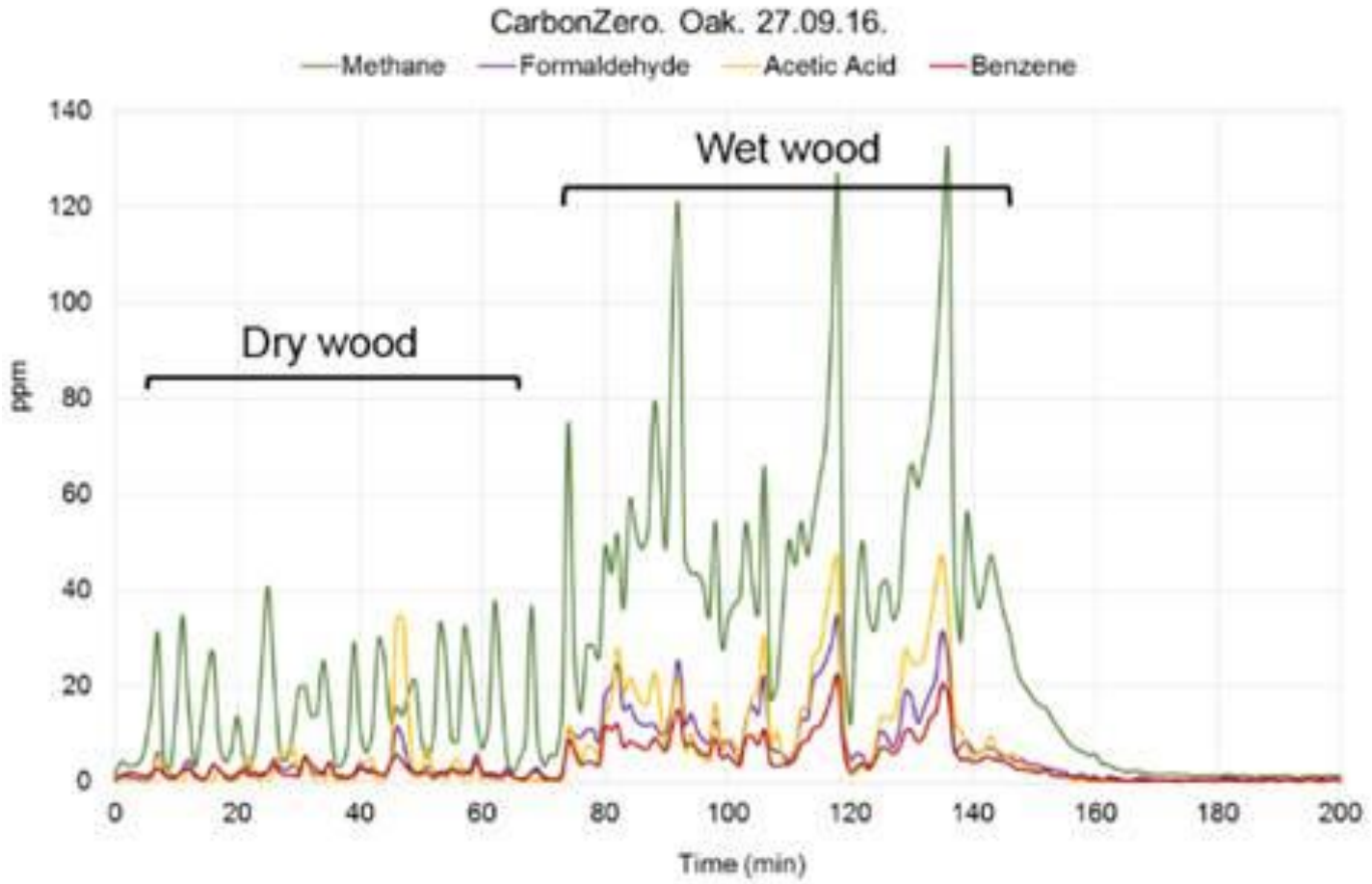



- Domestic wood burning most significant source
- but the estimates for PM are highly uncertain…

# Emissions inventory
## Uncertainties

| Activity data | X | Emission factor |
| --- | --- | --- |
| • How much is burnt?<br>• What type of wood?<br>• Equipment / technology?<br>• Seasoning (Wet / dry?)<br>• Maintenance and operation<br>• Etc. | | • How much PM is emitted for the mass of fuel burnt? |

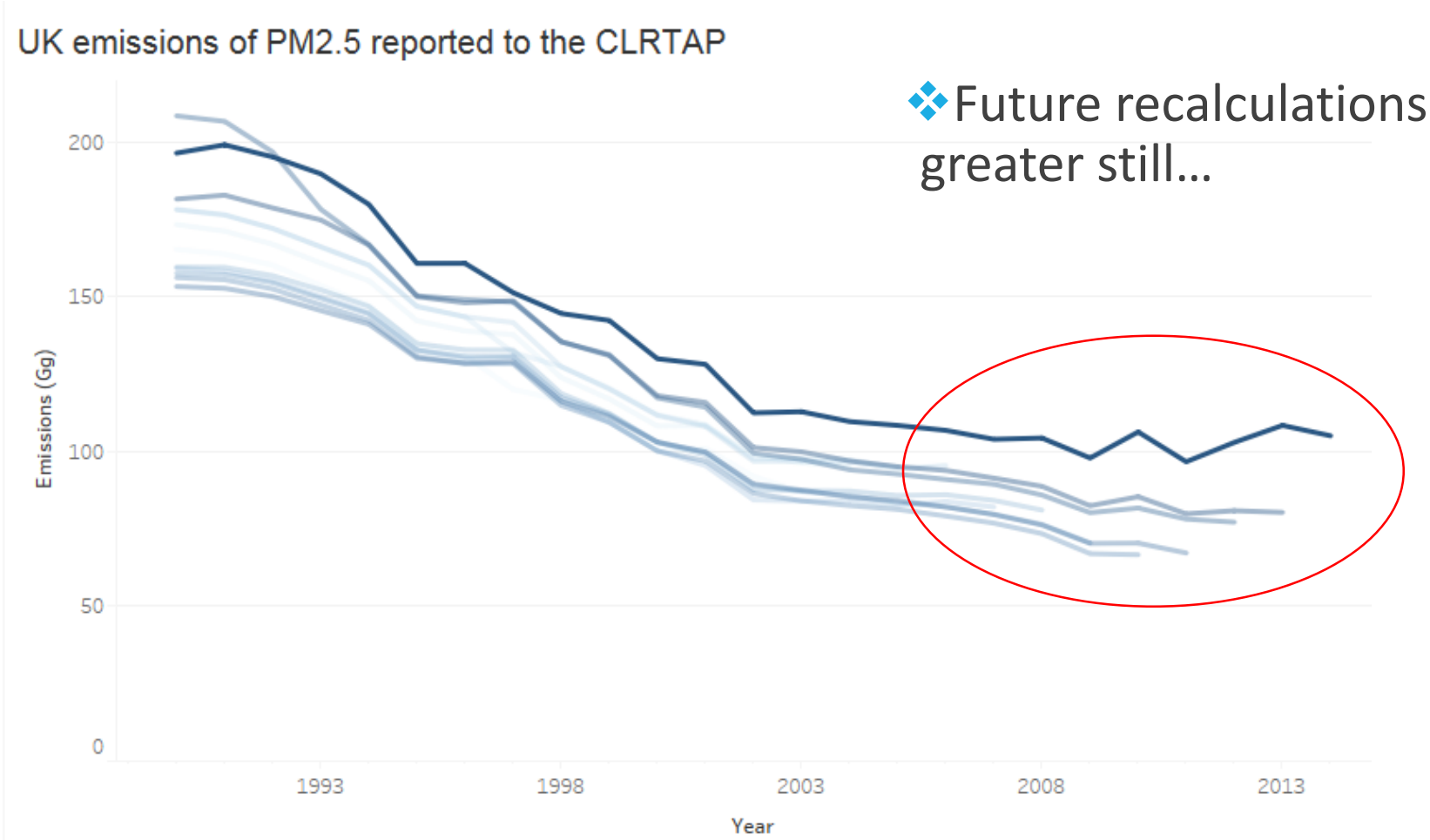
# Emissions inventory
## Uncertainties




- PM and emissions from wood burning are complex…

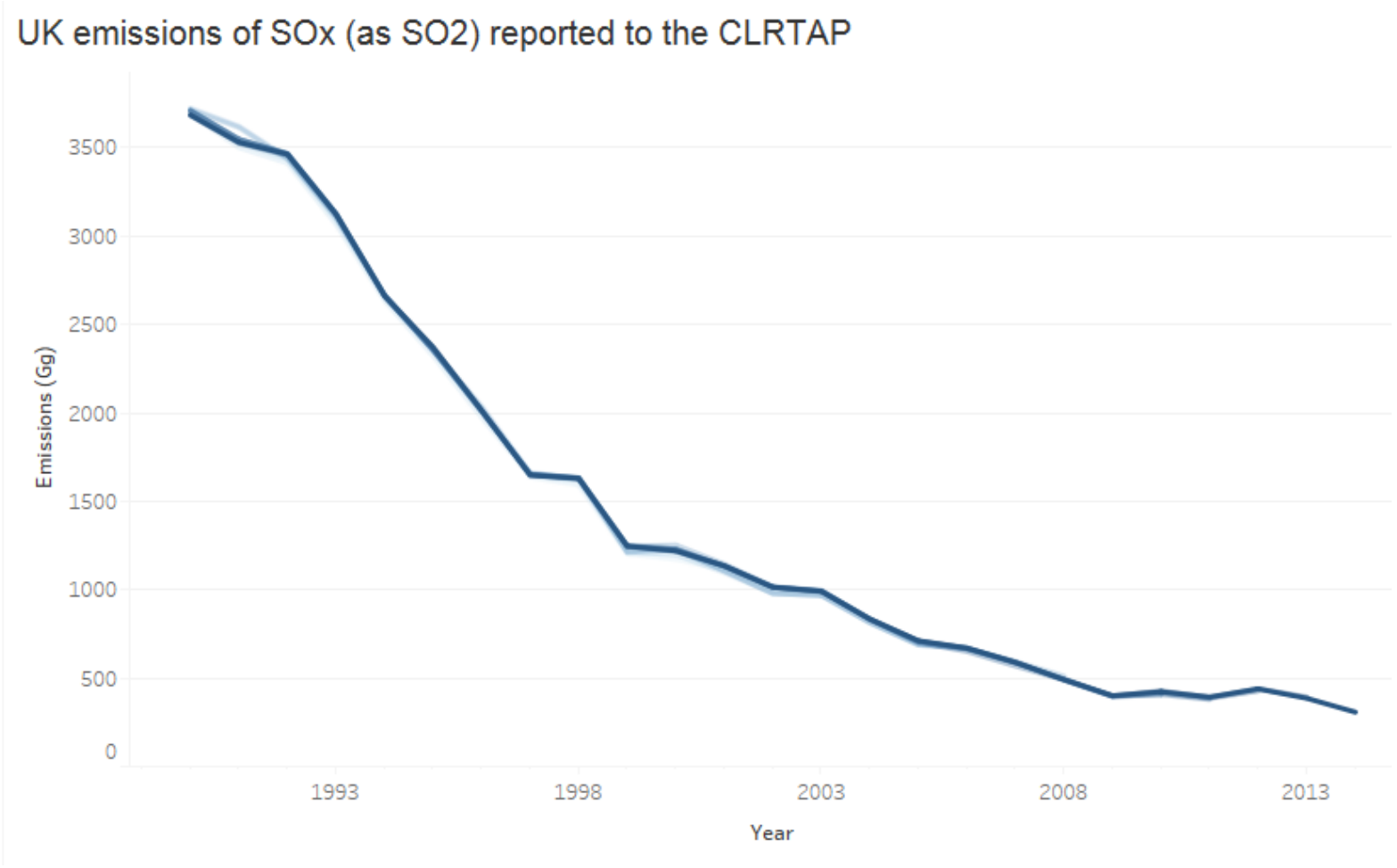
Fuel reload, set up and maintenance are hugely important

# Emissions inventory
## Recalculations




- Future recalculations could be greater still…
- Improved data can affect the trend
- But how correct is this and are we confident in the trend??

# Emissions inventory
## Recalculations



# Conclusions – data communication

- Use specific numbers with caution e.g. “36% from wood”
- Remember the importance of secondary (regional and transboundary) PM
  - A 30% reduction in primary PM is estimated to lead to a proportional reduction in annual mean $PM_{2.5}$ of only 0.8µg m-3 in the UK
  - This is almost equivalent to the impact of removing all domestic wood burning

# Conclusions – Gothenburg and NECD

- Recalculations can be made any year if better data is available…
  - How does this change the emissions trend?
  - How to we verify this and add confidence in the data?
  - How does this impact our 2020 & 2030 targets?
  - Implications for assessing compliance and likelihood of adjustments due to updated guidance?

Thank you

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