

Environmental targets consultation 2021 – Royal Society of Chemistry response

About us

With about 50,000 members in over 100 countries and a knowledge business that spans the globe, the Royal Society of Chemistry is the UK's professional body for chemical scientists, supporting and representing our members and bringing together chemical scientists from all over the world.

We are responding to this consultation on environmental target proposals in the areas of 'air quality'¹ and 'resource efficiency and waste reduction'².

The Royal Society of Chemistry would be happy to discuss any of the issues raised in our submission in more detail. Any questions should be directed to policy@rsc.org.

Air quality target proposals

Chemical scientists have an important role to play in reducing outdoor and indoor air pollution as well as helping to understand and monitor it. Scientists and engineers worldwide are tackling this issue, and we aim to support chemistry's vital role in understanding and measuring air pollution, its impact on human health, and developing solutions to improve air quality. We look forward to providing support and advice to Defra as they develop the interim PM_{2.5} targets, the policy choices to achieve the maximum benefit in air quality and the review of the Clean Air Strategy in the Autumn of 2022.

Evidence from the scientific community suggests that an annual average mean concentration target (AMCT) of 10 µg/m³ is technically feasible in the UK by 2040 and will support the aim of benefitting human health by reducing the maximum exposure to PM_{2.5}.

The RSC believes ambitious action should be taken at all levels of society to reduce PM_{2.5} and the associated health burden quickly. This will be supported by reducing both the maximum PM_{2.5} levels in urban environments and the PM_{2.5} exposures experienced by everyone in the UK irrespective of the PM_{2.5} level. Multiple modelling studies, including those commissioned by Defra for the purpose of setting these targets³, and accompanying commentary from the Air Quality Expert Group⁴ (AQEG) suggest that an AMCT of 10 µg/m³ is achievable in large areas of England by 2030 under a 'business as usual' scenario. Public Health England estimated in 2018 that "a 1µg/m³ reduction in PM_{2.5} in England in a single year can prevent around 50,000 cases of coronary heart disease, 16,500 strokes, 9,000 cases of asthma and 4,000 lung cancers over the following 18 years"⁵. **Therefore, the interim targets set by Defra should encourage a front-loading of mitigation action to realise the health and economic benefits of improved air quality as early as possible in the target period.**

We agree that achieving a concentration of 10 µg/m³ by the earlier target of 2030 at all monitoring sites would be challenging in certain urban areas, in particular London, as stated in AQEG's commentary. **We recommend exploring options for achieving targets as quickly as possible in different regions**, working with local authorities to develop mitigation action suitable for the local environment. Action should not be unnecessarily delayed in areas outside of London and other urban centres due to challenges in these settings. This should be combined with targeted effort and support for urban centres which face the biggest challenge to meet the targets.

¹ P32 Defra consultation (as above)

² P27 Defra consultation: https://consult.defra.gov.uk/natural-environment-policy/consultation-on-environmental-targets/supporting_documents/Environment%20Targets%20Public%20Consultation.pdf

³ https://consult.defra.gov.uk/natural-environment-policy/consultation-on-environmental-targets/supporting_documents/Environment%20Targets%20Public%20Consultation.pdf

⁴ https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2107150951_Modelling_PM25_workshop_summary_15_03_21.pdf

⁵ <https://www.gov.uk/government/publications/health-profile-for-england-2018/chapter-7-current-and-emerging-health-protection-issues#fn:10>

The dual targets of the AMCT with a population-based metric (the population exposure reduction target (PERT)) are necessary to achieve maximum benefit to public health and reduce PM_{2.5} across England, not just in areas above the concentration target of 10 µg/m³. There is no evidence of a minimum threshold below which PM_{2.5} does not cause harm to health. This was reflected in the updated WHO guidance on air quality published in August 2021⁶, in which WHO reduced its advised standard to 5 µg/m³. In the longer term, the RSC believes that the UK should continue to seek to reduce PM_{2.5} where understanding and technology develop to support this.

Monitoring PM_{2.5} at levels of 10 µg/m³ and less to track progress towards compliance with both targets will require development of more accurate and reliable measurement technologies for particulate matter. At present, uncertainties in the most common monitoring technologies make it difficult to accurately measure low levels of PM_{2.5}. Through its research programmes, Government should encourage and support research and development to improve measurement of PM_{2.5} at low levels. UKRI should also be aware of this need as the UK seeks to reduce its PM_{2.5} towards the targets.

In addition, **research and development are needed into measurement technologies that increase our understanding of the health impacts of different components of PM_{2.5} and which could therefore inform targeted policy actions to maximise benefit to public health.** Examples include measurement of numbers and sizes of particles in addition to the particulate matter mass and measurement of the different chemical components of PM_{2.5} (in both urban and rural locations). At present, this can be done via off-site analysis of filter samples or in real-time with more sophisticated and expensive equipment. More affordable methods to determine particle composition are needed to study PM_{2.5} more widely to provide insights into PM_{2.5} sources especially as these change with the implementation of net-zero and other policies. These would also provide data for epidemiological studies and help validate model simulations. The RSC recommends that wherever possible the different particle measurements be co-located at the same sites, and that these should focus on urban background locations that represent large populations. Measurements should be taken all year round as the sources of PM_{2.5} can change at different times of year. These sites can also act as test-beds where emerging measurement and sensing technologies can be evaluated against existing reference instruments.

The drive towards net-zero will significantly impact air quality and needs to be considered when developing policy options in both areas. This is an active area of research and was summarised recently in the 2021 Royal Society report 'Effects of net-zero policies and climate change on air quality'⁷. Often, measures to reduce carbon emissions are expected to have a positive impact on air quality, but for some net-zero policies mitigation may be needed to avoid worsening air quality. For example, the exact impact on air quality of the widespread use of hydrogen for energy and heating is unclear⁸, and there remains some uncertainty about the impact of electrification of the vehicle fleet on PM_{2.5} emissions from tyre-wear. Tree-planting over large areas could increase emissions of biogenic volatile organic compounds leading to an increase in ozone and organic PM_{2.5} formation and ozone but have other impacts on air quality as well. These and other **links between net-zero and air quality policies need to be considered in determining policy actions.**

Finally, achieving the air quality targets set by Government will require behaviour change on the part of individuals and businesses. Government should be open about the underlying assumptions and scenarios considered in the target development to achieve buy-in from public and other stakeholders.

⁶ <https://apps.who.int/iris/handle/10665/345329>

⁷ <https://royalsociety.org/topics-policy/projects/air-quality-climate-change/>

⁸ RSC submission to BEIS consultation 'Hydrogen for heat: facilitating a grid conversion trial', September 2021

Resource efficiency and waste reduction target proposals

We are supportive of Defra's continuing commitment to reduce waste, whether that is through the lens of plastics policy, or broader resource efficiency. The RSC has longstanding interest in highlighting the evidence from the chemical sciences to support resource efficiency and waste reduction policy, including in our contributions to the House of Commons Environment, Food and Rural Affairs Committee's inquiry on plastic waste⁹.

There is a focus within the proposed headline target on the end of life rather than tackling excessive production of unrecyclable materials. **This target should be complemented with a suite of other policies further up the resource hierarchy**, i.e. ones specifically focused on reduction and designing out waste. This ambition is referenced elsewhere in the consultation documents: "Reducing residual waste could be achieved [by]... Preventing waste from occurring in the first place, with strong links to reduced or more efficient material consumption".

Any plans to divert waste away from landfill and towards more beneficial treatment options **need to be tied to long-term investment in recycling infrastructure** (including sorting) to ensure that waste collected for recycling is brought back into circulation in as closed loop as possible to retain value.

As referenced in the consultation documents in the context of data reporting, **any new data must be linked up with the proposed new electronic waste tracking system**. This could provide a considerable data source for gaining a greater understanding of the quantity and destination of waste, and, with that, important insights into the flow and availability of resources in the wider economy.

Finally, if **local authorities are legally obliged to report against this target, they will need to be adequately resourced to complete the requirements to a high quality**.

We are happy to be involved in the development of interim targets and policies aimed at driving progress towards the resource efficiency and waste reduction targets and look forward to receiving further information on these.

⁹ <https://committees.parliament.uk/work/1391/plastic-waste/>