Written evidence submitted by CIBSE (IAQ0115)

Note – for clarity, the inquiry questions are in non-italic black, and CIBSE response in italic green.

Introduction

The Environment Food and Rural Affairs, Environmental Audit, Health, and Transport Committees have re-launched their joint inquiry into improving air quality.

In July 2017, after UK courts twice ruled that the Government’s plans to cut air pollution were inadequate, the Government released a new air quality plan. The cross-party inquiry will examine whether this new plan goes far enough, fast enough to both meet legal limits and to deliver the maximum environmental and health benefits.

The respondent is The Chartered Institution of Building Services Engineers (CIBSE). CIBSE is one of the leading global professional organisations for building performance related knowledge. The Institution and its members are the primary source of professional guidance for the building services sector on the design, installation and maintenance of energy efficient building services systems to deliver healthy, comfortable and effective building performance. Our focus is on adopting a co-ordinated approach at all stages of the life cycle of buildings, including conception, briefing, design, procurement, construction, operation, maintenance and ultimate disposal.

Important note - Air quality is impacted by both outdoor and indoor sources. We understand this inquiry focuses on outdoor sources and (e.g. combustion for transport and heating) and this is therefore the focus of our response. We would however stress that indoor sources such as those from building materials and consumer products also have impacts on health, some of them well-evidenced and others still subject to research, but raising concern. We recommend this should be considered as part of a wider comprehensive policy framework.

The Committees invite written submissions on the following key questions:

Q1 - How effectively do Government policies take into account the health and environmental impacts of poor air quality?

RESPONSE

Comments on the recent plan to tackle roadside NOx emissions: see response to Question 2

More broadly, it is our opinion that the impact of air quality on health is not addressed in a comprehensive, consistent, and sufficient manner. The following paragraphs highlight key examples to support this statement, considering the different ways in which air quality and its impact on health and the environment are addressed in national objectives, the planning system, and building regulations.

National outdoor air objectives

The Government’s response focuses on whether the UK meets its legal obligations. However, we would stress that these air quality objectives do not entirely follow EU objectives and, more importantly, they are not aligned with recommendations from the World Health Organization (WHO). The following table highlights key such occurrences.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>WHO guidelines¹</th>
<th>UK Air Quality Objective²</th>
<th>Comments</th>
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² https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf
We would recommend the implementation of revised objectives aligned with those of the WHO. This was also recommended by NICE in recent guidelines, at least within clean air zones. EU Directives on ambient air quality have provided long-term objectives and a clear framework for policy and investment decisions. We would welcome assurances that such a stable and long-term approach will be retained post April 2019.

**Lack of consistency**

See response to Question 2 for an example of an incentive (STOR) which may jeopardise the achievement of these objectives.

**Planning framework**

We believe the planning process offers more opportunities to incorporate air quality considerations. In the current planning application process, much of the evaluations of air quality focus on an impact assessment, which results in the following:

- The impact is often assessed to be insignificant or minor compared to the existing situation, rather than in relation to health-based objectives, and
- The assessment focuses on the impact of the scheme on local air quality; how outdoor air quality may impact the future users of the building is often not assessed nor considered.

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1 WHO Regional Office for Europe, *WHO guidelines for indoor air quality: selected pollutants*, 2010
2 [https://www.nice.org.uk/guidance/ng70/chapter/Recommendations](https://www.nice.org.uk/guidance/ng70/chapter/Recommendations), paragraph 1.3.1
Please also see response to Question 5 for information on where we see opportunities for a more effective consideration of air quality and public health preventive approaches in the planning process. In particular, we do not think the current planning framework sufficiently supports the adoption of built environment and infrastructure measures with the best long-term environmental and health outcomes, such as green and blue infrastructure.

**Indoor air quality**

People spend the large majority of their time indoors (typically, over 90% in the US and Western Europe). Both indoor and outdoor air quality therefore need to be considered when reviewing the impacts of outdoor air quality on human health. Indoor air quality is directly influenced by outside air quality, and this must be addressed when considering outside air quality issues.

As noted in the introduction to this submission, indoor air quality is also related to other factors, including indoor pollution sources, which are not addressed here. The following paragraphs focus on how outdoor air pollution is considered in its impact to indoor air quality.

There is currently **no comprehensive framework of policies and associated guidance on indoor air quality**. We understand NICE are currently carrying out a review of evidence with the view to publish guidelines for indoor air quality in homes by 2019⁵. We would welcome plans from Government to engage with early findings and start considering options to incorporate the future guidelines. Beyond homes, all building types should be considered.

In the meantime, we would highlight the way air quality is considered in Building Regulations. Building Regulations Schedule 1, Part F states that “there shall be adequate means of ventilation provided for people in the building”. However:

- In the absence of widely adopted guidelines for indoor air quality, “adequate” ventilation is not necessarily interpreted in relation to air pollutant concentrations; in practice it is often related to ventilation rates which address the removal of odours and indoor pollutants, but not the impact of outdoor pollutants on the indoor environment;
- Approved Document F (section 4.6) states that “Ventilation is simply the removal of ‘stale’ indoor air from a building and its replacement with ‘fresh’ outside air. It is assumed within the Approved Document that the outside air is of reasonable quality” (the underlining is ours, not in the original text). This would imply that the impact of outdoor air quality in large areas of the country, including Air Quality Management Areas, is not currently taken into account in Building Regulations Approved Document F. We note that Appendix D of Approved Document F offers guidance on limiting the ingress of external pollution in urban areas. However, this is advisory only and not linked to performance requirements; the Appendix is not even referenced in the main document, and there is therefore no prompt to readers as to when it should be read and followed. We are aware from industry feedback that its guidance is often not applied.
- We also note that Approved Document F offers performance criteria for ozone and NO2 levels (Appendix A, for projects following a performance-based ventilation route), however they are intended to address pollution from indoor sources and it is clear from industry feedback that these performance criteria are rarely applied and enforced in practice.

We would therefore strongly recommend a **more comprehensive approach to air quality in Building Regulations**, with definitions of indoor air quality (e.g. performance requirements) and enforcement mechanisms.

**Lack of coordination and whole systems thinking**

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⁵ [https://www.nice.org.uk/guidance/indevelopment/gid-ng10022](https://www.nice.org.uk/guidance/indevelopment/gid-ng10022)
Air quality depends on a number of factors, including emissions from the transport, built environment, and industrial sectors. We therefore very much welcome the multi-disciplinary cross-committee approach taken in this inquiry.

Air quality is closely linked with environmental issues and with other health and wellbeing considerations than those directly linked to air pollution. In particular, the choice of transport modes has associated implications in terms of carbon emissions and physical activity levels. The complexity of the challenges and the inter-relation between transport, built environment, electricity and heat infrastructure make a whole system approach crucial. This also represents an opportunity for the UK to demonstrate leadership in multi-disciplinary long-term approaches:

- While measures are required to reduce emissions from individual vehicles, and we welcome them, we would strongly recommend a broader and comprehensive strategy to reduce vehicle transport, especially single vehicle trips. This should include better and more attractive walking and cycling infrastructure, starting with how we plan our built environment, how safe and attractive our streets are to cycling and walking, and where new development is located in relation to cycling, walking, and public transport infrastructure. We would draw attention to the fact that a very large proportion of trips in the UK are short and could be displaced by walking and cycling – (“in 2014, 56% of car driver trips were under 5 miles” [1]). In addition to carbon and air pollution benefits, this could reduce congestion and noise and improve physical activity levels, with a wide range of associated health and wellbeing benefits.
- Links between the development of electric vehicles with autonomous vehicles and with the shared economy should be explored: car pool models could bring benefits by reducing the number of vehicles (i.e. more space recovered from un-required parking, less use of natural resources in manufacture); they could also, as a managed fleet, offer better control over the location and timing of charging. We would encourage research and pilots into these models, including technological development as well non-technical barriers such as consumer attitudes and behaviour change.
- Options should be reviewed as part of the whole energy system, including options for heat decarbonisation. Our understanding of the consensus at this stage is that a single solution is unlikely to meet the challenges of air quality, carbon emissions, energy affordability, and reliability, and a combination of approaches will be required.

Q2 - Do these plans set out effective and proportionate measures to achieve necessary emissions reductions as quickly as possible?

RESPONSE

It is our opinion that further, more effective and comprehensive measures should be considered. See response to Question 1, in particular in relation to the need for a whole system approach.

Our specific comments to the recent Government’s plan are as follows:

- The plan is focused almost entirely on emissions from vehicles, despite Figure 3 in the report stating that ‘Regional Background’ and ‘Homes Industry and Commerce’ make up 17% of the total roadside NOx emissions nationally. The plan contains the statement “Emissions from commercial...and domestic buildings represent a small proportion of overall UK NOx emissions”. However, the National Atmospheric Emissions Inventory highlights substantial contributions from the energy industries (including CHP/Biomass etc) and buildings: for example, in 2016 in England, these represent over 1/3rd of total NOx emissions [2].
- The very limited references to buildings touch on domestic boilers and general energy efficiency. We recommend this is further explored as there are significant potential beneficial synergies from energy efficiency to deliver health and comfort improvements, fuel poverty reduction and carbon emissions

reductions. There is little obvious co-ordination between current consideration of the challenges of decarbonising heat in buildings and the need to reduce emissions of pollutants from heating systems.

- The references to the built environment do not consider the increase of distributed small scale generation, including Combined Heat and Power (CHP) and diesel generators in the UK’s cities (especially London) and their impact on NOx emissions. These CHP generators are almost all less than 1MW and as such, not covered by the Medium Combustion Plant Directive mentioned in the plan. See also more details below on diesel generators in the context of STOR.

- The focus on roadside emissions seems to be because of the network of sensors on which the models are based being roadside, rather than the emissions themselves being confined to the roadside. As such, pollution sources not near a roadside (such as large-scale CHP, generators, commercial boilers or diesel-powered locomotives) are being ignored almost entirely in the plan.

- The worst-case road in London is predicted NOT to be compliant until 2028, which would be a breach of national objectives. The plan focusing entirely on traffic will not bring quicker reductions to achieve compliance.

- The impact of the individual “additional actions” being taken across the UK is not quantified in terms of reduction in first year and cumulative. As a result, their impact is not clear. The Government’s plans leave much flexibility to Local Authorities about whether Low Emissions Zones should be put in place; these were however identified by NICE as the measure potentially leading to the most significant benefits\(^7\); the NICE appraisal noted some uncertainties on long-term cost effectiveness; furthermore, it did not take into account the potential impacts on air quality outside the Low Emission Zone, nor did it account for potential associated health benefits, such as more cycling and walking encouraged by the creation of low emission zones. We would recommend this is considered in more detail to inform policy decisions.

Short Term Operating Reserve (STOR)

STOR is a financial incentive which rewards decentralized generators that make themselves available to the National Grid in order to meet local electricity demand at times when the local grid cannot meet demand\(^8\). Diesel generators have high polluting emissions levels and, when intended only for intermittent operation as is the case for back-up generators made available under STOR, are typically much less regulated than the equivalent plant that would be intended to run more regularly. This can have impacts on local air quality, as highlighted in DEFRA’s impact assessment in December 2016, which states: “domestic energy market incentives are leading to an increase in high NOx (oxides of nitrogen) emission generators, which (...) have the potential to exceed the Gothenburg 2020 NOx emission ceiling and hourly NO2 (nitrogen dioxide) limits set in the EU Ambient Air Quality Directive”.

Beyond air quality issues, we would also note as an aside to this inquiry that diesel generators are a high-carbon way to generate electricity, and their operation therefore also contradicts the government’s plans for carbon emissions reduction.

Government recently consulted on the implementation of the Medium Combustion Plant (MCP) Directive, which must be transposed by December 2017 to avoid infraction and associated fines. Defra’s assessment is that transposing the MCP alone will “not adequately address the risks these generators pose to air quality and to our compliance” with NOx level objectives, and therefore that “additional regulation is needed and quick action required to avoid further rapid increases in NOx emissions from generators.” Defra therefore recommend the introduction of additional emission controls to address the growth in emissions from high-NOx emitting generators\(^6\). They state this “will deliver significant benefits to public health and the environment and (...) avoid potential breach of EU and international air quality limits and standards”.

We recommend that, in light of the government’s own impact assessment, emissions control measures are put in place to prevent the rise in NOx emissions from diesel generators, often located in urban centres in Air Quality Management Areas.

\(^7\) https://www.nice.org.uk/guidance/ng70/evidence/economic-report-pdf-4595574493
\(^8\) http://www2.nationalgrid.com/uk/services/balancing-services/reserve-services/short-term-operating-reserve/
Emission control options, including technological abatement, have been assessed by Defra\(^9\). For new plant, measures should not be based solely on limits to operating hours, as these can be difficult to monitor and enforce in practice, as also highlighted in the recent position statement by the Institute for Air Quality Management\(^10\). In addition, it is currently unclear whether additional emissions controls are expected to be implemented to existing diesel generators, and we would welcome a clarification on this.

Q3 - Are other nations or cities taking more effective action that the UK can learn from?

We are aware of large efforts in Europe in this area, both in terms of policy at the national and local level and in public and private R&D.

Below are some examples of approaches taken by other countries / cities. We have not reviewed their effectiveness but would encourage they are evaluated to gather lessons learnt, both in terms of effectiveness and acceptance by the population. We would also recommend continued engagement and collaboration with European partners after April 2019.

- Banning old cars from city centres altogether or reducing traffic volume by alternating which days cars can use city centres (Beijing/Paris/Madrid)
- Pedestrianizing entire areas/roads (Madrid/Paris)
- Smart city solutions to reduce car use (Helsinki)
- Focus on urban form and planning (Helsinki/Beijing) – enabling wind to penetrate city to effectively disperse pollutants.

In the UK, we would highlight the efforts of some Local Authorities to set best practice objectives, policies, and collaborative approaches, for example the draft London Environment Strategy\(^11\), the London Low Emission Construction Partnership\(^12\) and a comprehensive set of initiatives in the City of London\(^13\) including policy, collaboration with the private sector, pilot projects, and community engagement and awareness campaigns.

Q4 - Is there enough cross-government collaboration to set in place the right fiscal and policy incentives? In particular, the Committees are interested in the role of Local Authorities and the need for effective collaboration across government departments?

RESPONSE

We do not think there is enough cross-department collaboration and whole system thinking - See response to Question 1.

We think the planning framework does not sufficiently support Local Authorities to take air quality into consideration in planning applications – see response to Question 1. See also response to Question 5 for potential ways to incentivize good long-term decisions during the planning process.

We would also highlight STOR as indicating a lack of consistency and collaboration between departments, resulting in financial incentives which jeopardise air quality objectives – see response to Question 2.

Q5 - How can those charged with delivering national plans at local level be best supported and challenged?

RESPONSE

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\(^10\) http://www.iqm.co.uk/text/position_statements/aq_impacts_of_STOR_facilities_interim.pdf

\(^11\) https://www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/draft-london-environment-strategy-have-your-say

\(^12\) http://www llecp.org.uk/

\(^13\) https://www.cityoflondon.gov.uk/business/environmental-health/environmental-protection/air-quality/Pages/default.aspx
We think there are opportunities at the local level to better support decisions for positive public health outcomes. The following paragraphs set-out examples.

**Health and Social Care Act and local health and wellbeing boards**

It is our understanding that the health and wellbeing boards set-up as a result of the Health and Social Care Act 2012 are intended to better support long-term healthcare and public health decisions.

We have not carried out a systematic review, however evidence indicates that the current typical set-up of health and wellbeing boards does not maximise opportunities; from anecdotal feedback and from a high-level and randomized review of the composition of these boards, it is apparent they typically do not include representatives from the planning and transport departments. Their composition implies a focus on healthcare provision, with limited attention to preventative approaches to public health, including how built environment and transport decisions can best support healthy lifestyles and environmental improvements.

We would recommend this is reviewed more systematically, and options considered to maximise the opportunities created by these health and wellbeing boards to encourage collaboration and inform decisions at a local level. This could facilitate decisions that impact air quality and associated health and environmental issues, for example decisions on low-impact transport modes and the introduction of green and blue infrastructure.

**Health Impact Assessments**

The impact of decisions on air quality, and subsequently on the environment and on public health, lends itself to long-term impact assessments such as Health Impact Assessments (HIAs). Feedback from members indicates that the adoption of HIAs is limited, and that Local Authorities would greatly benefit from additional resources (e.g. staff, training, guidance) on the application of HIAs.

In the future, as knowledge and evidence build on the long-term impact of decisions in the planning process, options could be examined to better reward and incentivize the decisions which support better outcomes, for example through the use of S106 contributions.

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