DEFRA CLEAN AIR STRATEGY

CONSULTATION

CIBSE Response

Submitted 14th August 2018

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

Introduction

The respondent is **The Chartered Institution of Building Services Engineers (CIBSE).**

The Chartered Institution of Building Services Engineers is the professional body that exists to:

> 'support the Science, Art and Practice of building services engineering, by providing our members and the public with first class information'

CIBSE members are the engineers who design, install, operate, maintain and refurbish the energy-using systems installed in buildings, including heating and hot water, lighting, ventilation and cooling and small power distribution. Many CIBSE members work in all sectors.

CIBSE has over 20,000 members, of whom around 75% operate in the UK and many of the remainder in the Gulf, Hong Kong and Australasia. Many are actively involved in the energy management of commercial buildings for larger businesses, and so this consultation is highly relevant to us and to our members.

CIBSE is the sixth largest professional engineering Institution, and along with the Institution of Structural Engineers is the largest dedicated to engineering in the built environment. Our members design, install, manufacture, maintain, manage, operate and replace all the energy using systems in buildings as well as public health systems.

As an Institution CIBSE publishes Guidance and Codes which provide best practice advice and are internationally recognised as authoritative. The CIBSE Knowledge Portal, makes our Guidance available online to all CIBSE members and is the leading systematic engineering resource for the building services sector. Over the last twenty-one months it has been accessed over 200,000 times, and is used regularly by our members to access the latest guidance material for the profession. Currently we have users in over 170 countries, demonstrating the world leading position of UK engineering expertise in this field.

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EXECUTIVE SUMMARY

We welcome this consultation and the government's intent to protect the nation's health and show leadership on air quality.

There are a number of measures which we support in the proposals, and we have commented accordingly in our response to individual questions. However, we have strong concerns about the overall targets, commitments, and package of measures:

- There should be a firm commitment to **align ambient air quality objectives with World Health Organisation** guidelines, with clear mechanisms to review and report on progress. It is difficult to reconcile ambitions for world leadership when the UK's ambient air quality objectives do not align with the WHO, or indeed even with EU objectives.

- There needs to be strong **monitoring and enforcement** mechanisms, including powers from the upcoming environment body over central departments and all public authorities, and adequate **resources to local authorities**.
- There is currently **no comprehensive regulatory framework on indoor air quality**, and poor implementation of the few guidelines related to pollutant levels in Building Regulations Approved Document F. We strongly recommend this should be reviewed, including a review of Building Regulations Part F to incorporate indoor air quality requirements. This would also align with amendments of the Energy Performance of Buildings Directive, which the UK has committed to implement despite exiting the EU.
- A more comprehensive set of solutions is needed, with a focus on solutions that address pollution at source and those that offer multiple health, wellbeing and environmental benefits; in particular this should include **built environment planning to promote cycling and walking and reduce transport needs**, and the incorporation of **green infrastructure** from the local to the regional levels. Government support to modelling, monitoring, research and innovation should be aligned with these priorities, including: assessing the impact of transport policies on pollution levels and transport patterns, understanding what can drive behaviour change in consumers, and assessing the influence of urban form and trees on air pollution levels; this in turn should inform guidelines to policy-makers and professionals.

We understand a number of our recommendations align with the WHO and with the views of other professionals from the built environment, research, and public health sectors.

CONSULTATION QUESTIONS

CHAPTER 1 – UNDERSTANDING THE PROBLEM

Air pollution comes from many sources. Pollutants can travel long distances and combine with each other to create different pollutants. Emissions from distant and local sources can build up into high local concentrations of pollution. The UK has set stringent targets to cut emissions by 2020 and 2030. The goal is to reduce the harm to human health from air pollution by half. A robust evidence base, backed by the most up to date science is essential to help us achieve this.

Proposed actions

- *We are investing £10m in improving our modelling, data and analytical tools to give a more precise picture of current air quality and the impact of policies on it in future.*
- *We will increase transparency by bringing local and national monitoring data together into a single accessible portal for information on air quality monitoring and modelling, catalysing public engagement through citizen science.*

Q1 - What do you think about the actions put forward in this chapter? Please provide evidence in support of your answer if possible.

CIBSE response

Given the limited size of this fund, priorities will be needed; while there is value in better understanding current pollution levels, we would in that case recommend a focus on **solutions**; themes that we would see of value in supporting as part of this £10m investment include:

- Modelling and analysis to relate monitored pollutant level data, typically taken at high level as part of local authority objectives, with **exposure** i.e. at pedestrian and building opening level; this could help reduce investment in monitoring; the scope of this should be informed by the WHO's recommended needs on exposure assessment and monitoring[1]

[1] WHO Europe, *Review of evidence on health aspects of air pollution – REVIHAAP Project*, Technical Report, 2016. See in particular responses to Questions A7 & C9 on exposure assessment and monitoring, to Question D2 on assessing the impact of measures such as traffic-related initiatives, and to Question D1 on the need to revise guidelines and policy objectives, making them more stringent http://www.euro.who.int/__data/assets/pdf_file/0004/193108/REVIHAAP-Final-technical-report-final-version.pdf?ua=1

- Modelling, monitoring and analysis of the impact of solutions in urban environments on air pollutant levels, including the **impact of urban patterns and built** form (e.g. highways, building massing etc) and the contribution from trees and green infrastructure, as also recommended by NICE[2]: while cities are generally more polluted than rural areas, there are also significant variations at the micro-level, for example in street canyons where air flow is reduced and pollutants can accumulate. Initial steps have been taken to summarise the current understanding and guidance, for example the recent publication *First Steps to Urban Air Quality*[3], but there is a need for a better understanding of solutions for mitigation and pollutant dispersion. This should in turn inform guidance on all aspects of urban planning and delivery. Examples of leadership in this area include Stuttgart[4] and Hong-Kong[5], where planning is informed by an understanding of micro-climates, including air flows.
- Monitoring and analysis of the impact of the **effectiveness of policies to reduce transport needs** and congestion, as recommended by NICE[2] and the WHO[1]; this should include an analysis of existing schemes (including examples abroad), and would inform the guidance to Local Authorities on possible solutions; this could be jointly funded by the Department of Transport rather than fully out of this £10m pot;
- Support to the development of **standards and quality assurance schemes for monitoring** equipment and procedures, particularly in the low-to-medium cost range, where high accuracy may not be the priority but where data would be useful to monitor trends, assess the impact of solutions, and engage the public (for example, applications in the built environment).

Q2. How can we improve the accessibility of evidence on air quality, so that it meets the wide-ranging needs of the public, the science community, and other interested parties?

CIBSE response

In terms of meeting the needs of the research community and policy-makers, see our response to the previous question, including our advice to align data gathering and accessibility efforts with recommendations from the WHO[1].

There should be sharing of data and coordination across government departments, since air quality results from the actions of several departments (e.g. BEIS, Transport) and impacts a number of others (e.g. MHCLG, Health). Defra can play in a leading role in this coordination and in disseminating research among policy-makers.

A general and obvious principle is that data that was generated using public funding should be publically available. This means it should not only be possible to access it on request, but as easily as possible e.g. publically accessible databases. This can then facilitate other initiatives and innovations turning "data" into "useful information", and finally into action. For example, see the Future Cities Catapult programmes in the fields of air quality, citizen participation and planning (https://futurecities.catapult.org.uk/projects/).

For more comments on awareness raising with the general public, see our response to Question 4.

CHAPTER 2. PROTECTING THE NATION'S HEALTH

Air quality is the largest environmental health risk in the UK. It shortens lives and contributes to chronic illness. Health can be affected both by short-term, high-pollution episodes and by long-term exposure to lower levels of pollution. There are small things we can all do that will make a big difference to emissions locally and

[2] https://www.nice.org.uk/guidance/ng70/chapter/Recommendations
[3] *First Steps in Urban Air Quality* – guidance from the Trees and Design Action Group (TDAG) UK by Ferranti, E.J.S., MacKenzie, A.R., Ashworth K., and Hewitt C.N. 2017, http://epapers.bham.ac.uk/3069/
[4] Directorate for Urban Development and Environmental Protection, Office for Environmental Protection, *Scripts by the Office for Environmental Protection - No. 1/2009, Environmental aspects in spatial planning in Stuttgart, April 2009* http://www.stadtklima-stuttgart.de/stadtklima_filestorage/download/AfU-Script-01-2009_E.pdf
[5] Hong Kong Planning Standards and Guidelines - Chapter 11 : Urban Design Guidelines, 2005, last revision 2015 http://www.pland.gov.hk/pland_en/tech_doc/hkpsg/full/ch11/pdf/ch11.pdf

nationally. Effective communication of health messages about air pollution can save lives and improve quality of life for many.

Proposed actions

- *We will progressively cut public exposure to particulate matter pollution as suggested by the World Health Organisation. We will halve the population living in areas with concentrations of fine particulate matter above WHO guideline levels (10 µg/m^3) by 2025.*
- *We will provide a personal air quality messaging system to inform the public, particularly those who are vulnerable to air pollution, about the air quality forecast, providing clearer information on air pollution episodes and accessible health advice.*
- *We will work with media outlets to improve public access to the air quality forecast.*
- *We will work to improve air quality by helping individuals and organisations understand how they could reduce their contribution to air pollution, showing how this can help them protect their families, colleagues and neighbours.*
- *We will publish updated appraisal tools and accompanying guidance this summer to enable the health impacts of air pollution to be considered in every relevant policy decision that is made.*

Q3. What do you think of the package of actions put forward in this chapter? Please provide evidence in support of your answer if possible.

CIBSE response

We welcome the government's intent to "be bold in (their) ambition". We also welcome the move not to focus solely on whether the UK meets its existing legal obligations, which as we noted previously fall short of EU objectives and, more importantly, of WHO guidelines[6].

However, the only commitments in the current draft Clean Air Strategy regarding targets for outdoor air pollution levels seem to be:

- "We will reduce PM2.5 levels in order to halve the number of people living in locations where concentrations of particulate matter are above 10 µg/m^3 by 2025";
- "We will set detailed interim objectives and report publically on our progress. We will review our progress in 2022, and we will consider if we should have more challenging milestones towards WHO goals".

For our comments on these objectives, see below; for our comments on measures to meet them, see our response to individual questions to the individual chapters.

For clarity, the following table summarises WHO guidelines, current UK objectives, and our understanding of the proposals in this consultation. **This shows significant gaps**.

Pollutant	WHO guidelines[7]		Comments	UK Air Quality Objective[8]	Proposal in this consultation
NO2	annual average	40µg/m^3	Note also the WHO state there is "no evidence for an exposure threshold"[9]; it is therefore recommended to reduce exposure levels as much as possible, rather	40µg/m^3 by end 2005	None i.e. no target to progressively reduce levels
	1-hour average	200µg/m^3		200µg/m^3 not to be exceeded more than 18 times a year, by end 2005 i.e. marginally less onerous than WHO recommendation	

[6] CIBSE submission to Joint Committees inquiry on air quality, November 2017 http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environment-food-and-rural-affairs-committee/joint-inquiry-into-improving-air-quality/written/73321.pdf

[7] WHO, *Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide, Global update 2005, Summary of risk assessment*, 2006

[8] https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

[9] WHO Regional Office for Europe, *WHO guidelines for indoor air quality: selected pollutants, 2010*

Pollutant	WHO guidelines[7]		Comments	UK Air Quality Objective[8]	Proposal in this consultation
			than the guideline levels being seen as "safe"		
PM10	annual average	20 µg/m^3	Note also the WHO have not identified thresholds, and instead the guidelines are produced for the purpose of standard-setting on the basis of risk assessments and public health priorities, but authorities are encouraged to adopt increasingly stringent limits[7]. This was also reinforced by their latest technical report[1].	- UK: 40 µg/m^3 by end 2004 i.e. **the UK objective is 2 times the WHO recommendation** - Scotland: 18 µg/m^3 by end 2010	None i.e. **no actual target and timeline to meet WHO objective**
	24-hour average	50 µg/m^3		- UK: 50 µg/m^3 not to be exceeded more than 35 times a year, by end 2004 - Scotland: 50 µg/m^3 not to be exceeded more than 7 times a year by end 2010 i.e. marginally less onerous than WHO recommendation	
PM2.5	annual average	10 µg/m^3		- England, Wales, and Northern Ireland: 25 µg/m^3 by 2020 i.e. **the objective is 2.5 times the WHO recommendation** - Scotland: 10 µg/m^3 by end 2020 - UK urban areas: 15% reduction in concentrations at urban background between 2010 and 2010	"reduce PM2.5 levels in order to halve the number of people living in locations where concentrations of particulate matter are above 10 µg/m^3 by 2025" i.e. **no actual target and timeline to meet WHO objective**
	24-hour average	25 µg/m^3		None i.e. **the WHO recommendation is not addressed**	None i.e. **no actual target and timeline to meet WHO objective**

It is difficult to reconcile the proposals in this consultation with the government's stated ambitions. **There should be a firm commitment to align air quality objectives with WHO guidelines.** This was also recommended by NICE in recent guidelines, at least within clean air zones[Error! Bookmark not defined.]. **Targets should be in primary legislation and accompanied by interim objectives, a timeline and a progress review mechanism** (this should be more precise than a "periodic" review e.g. every 3 years).

There should also be a commitment to review targets when evidence emerges, in particular:

- reviewing whether there is a need to introduce a statutory limit for **ammonia** levels in line with WHO guidelines (or better), since the consultation notes the increase in ammonia emissions from agriculture and consumer products;
- reviewing the need to introduce a target on **ultra-fine particles** (diameter below 0.1 micron), as WHO guidelines may emerge on this in the future.

As noted in the consultation, implementation and progress on these objectives may then be monitored and enforced by the **new environment body**. We would note that air quality is a key area that illustrates the need for the body to have real **enforcement powers**, as recommended by CIBSE[10], and as illustrated by the series of court cases between the UK government and the Supreme Court and European Court of Justice.

Moreover, in order to reduce human exposure and as people typically spend about 90% of their time indoors, attention needs to be put on indoor quality. We welcome the government's attention on this but think the

[10] CIBSE submission to DEFRA consultation on Environmental Principles and Governance After EU Exit, August 2018

actions should be much more comprehensive, including the **consideration of internal air quality in the regulatory framework** – see our response to Questions 15 and 29.

We welcome the plans to produce updated appraisal **tools and guidance** this summer, including working with Public Health England, NICE and the Local Government Association. The guidance provided to local authorities must include:

- The need to establish a steady process towards WHO guideline values, as summarised in our above table
- Solutions, especially those that offer multiple health, wellbeing and environmental benefits, such as green infrastructure
- How to take account of the long-term impact of built environment decisions on communities. Heath Impact Assessments may be one option which could help better reward and incentivise the decisions which support better outcomes (for example through the use of S106 contributions). HIAs are however still a relatively new area, with knowledge and supporting evidence still being built upon. We understand that their adoption has so far been limited, and that Local Authorities would greatly benefit from additional resources (e.g. staff, training, guidance) on the application of HIAs, particularly a "light" version which would not require extensive resources from project teams and local authorities but which could inform early strategic decisions.

We have highlighted other areas throughout our responses where more guidance could be provided to local authorities, for example in Question 29 in the context of planning applications.

UK-wide collaboration

We welcome the commitment that the UK government "will engage with the devolved administrations to explore the potential to develop a shared UK- wide goal, recognising the work that the London Mayor and Scottish Government have already begun in this area". As the natural environment does not follow national borders, cross-border collaboration is important to allow efficient regulation, effective use of resources (e.g. shared data), and avoid loopholes and "gaming the system" should regulations differ from one nation to another. We have expanded on this point in our recent response to the Defra consultation on environmental principles and governance.

Health inequalities

We welcome recognition that "deprived communities are more likely to experience adverse health effects from poor air quality because they are more exposed to air pollution" ; this is an important reason why we advocate for **better regulations of the outdoor and indoor environment, in order to help create a more level playing field – see our response to Questions 15 and 29;** this should become increasingly important if public awareness of air pollution increases, creating market demand for less polluted areas, i.e. increasing their sale or renting value, and therefore potentially increasing the risk that more deprived communities would only have access to more polluted areas.

Research

We welcome the desire to work with the research community, and strongly encourage government to keep supporting the work of Public Health England and adopting their recommendations. We would also like to highlight a research project currently appealing for funding, led by the Royal College of Physicians and Royal College of Paediatrics and Child Health: https://www.rcpch.ac.uk/effects-indoor-air-quality-children-young-peoples-health-research-project . This research follows on from their previous influential report[11] and focuses on the impact of air pollution on children.

Q4. How can we improve the way we communicate with the public about poor air quality and what people can do?

CIBSE response

A solution to communicate information on air quality could be to include it with the weather forecast, as is already done for pollen count. There are already examples which unfortunately do not extend to the whole

[11] RCP and RCPCH, "*Every breath we take – the lifelong impact of air pollution*", 2016

country (e.g. Evening Standard). Another complementary option are dedicated websites and apps, such as London Air, though they would tend to capture audiences that are already engaged rather than reach the wider public. Forecasts could include sources from local authorities or other parties, as well as EU data sources which provide predictions for key pollutants (e.g. http://macc-raq.copernicus-atmosphere.eu/index.php?category=forecasts).

We fully support the importance of raising public awareness. We are however mindful of some important points:

- While information on air quality levels is useful, the public should also be informed about the **actions they can take** in their daily lives to improve air quality and to reduce their exposure.re should be an emphasis on
- Access to information alone is often not sufficient to encourage actual **change in actions and behaviour**; for example, there are a number of websites and apps that include information on air quality levels, however it is unclear how effective they are at encouraging actual changes in transport patterns (i.e. in taking less exposed routes) and driving less ; lessons should be learnt from the successful ones on what are effective messages, user interfaces, desirable functions etc .
- The message needs to be **carefully balanced** in order not to cause undue concern and stress, and to avoid unintended consequences; in particular, we understand that except on peak pollution days and for particularly sensitive people, the benefits of physical activity outweigh the risks from increased exposure[12]. It is important to ensure that public awareness does not lead to more sedentary lifestyles, or more people driving (where they contribute to pollution and are exposed to higher levels).

Messaging about outdoor air quality to the general public should then focus on reducing exposure when outdoors (e.g. by avoiding the most polluted roads), and avoiding further contributing to outdoor pollution (e.g. by walking or cycling where possible). There are clear **synergies with other policy areas** where government is already seeking to encourage behaviour change i.e. transport (to encourage more walking and cycling) and building energy retrofit (since consuming less energy will reduce air polluting emissions as well as carbon emissions). Efforts could therefore be spent in collaboration with other departments to ensure the public sees simple consistent messages with clear links to multiple benefits, rather than a variety of messages that may be seen to change regularly (e.g. as happened, for example, with incentives for diesel vehicles or biomass heating for carbon emissions reasons, only to find out now about the detrimental air quality impacts).

We think this is an area where more research is needed:

- A better understanding of what can encourage **behaviour change**, including how information is communicated to the public
- effective and balanced messages of what can be complex information
- a better understanding of the balance between the benefits and risks of outdoor exposure vs physical activity, for the general population and for more vulnerable individuals. Although the study referenced above seems comprehensive, we are aware it is but one study that could probably benefit from more attention to the UK context in terms of air pollution levels, physical activity levels, and transport patterns.

CHAPTER 3 – PROTECTING THE ENVIRONMENT

This strategy is a key part of delivering our 25 Year Environment Plan. Air pollution has direct impacts on the natural environment, contributing to climate change, altering biodiversity, reducing crop yields and polluting oceans. Cleaner air will directly benefit plants, animals and habitats as well as creating a better environment for everyone to live, work and thrive in.

Proposed actions

- *We will monitor the impacts of air pollution on natural habitats and report annually so that we can chart progress as we reduce the harm air pollution does to the environment.*

[12] Tainio M. et al, *Can air pollution negate the health benefits of cycling and walking?*, Preventive Medicine 87 (2016) 233–236

- *Later this year we will provide guidance for local authorities explaining how cumulative impacts of nitrogen deposition on natural habitats should be mitigated and assessed through the planning system.*

CIBSE response

The resilience of the natural environment is generally enhanced if it is in a good state, and part of a wider "green" network, hence the importance of achieving the other objectives of the 25 Year Environment Plan. This requires coordination at all levels, including with MHCLG - we would refer to our response to the NPPF consultation on this[13].

Q5. What do you think of the actions put forward in this chapter? Please provide evidence in support of your answer if possible.

Q6. What further action do you think can be taken to reduce the impact of air pollution on the natural environment? Where possible, please include evidence of the potential effectiveness of suggestions.

CHAPTER 4. SECURING CLEAN GROWTH AND DRIVING INNOVATION

This strategy contributes to the government's action on clean growth. Action to clean up the air will boost productivity and economic growth. We will make the UK a world leader in the development, use and export of goods and services focused on tackling air pollution.

Proposed actions

- *In partnership with UK Research and Innovation, we will seek ways to support further investment in Clean Air innovation to enable the development of novel technologies and solutions that tackle emissions from industry, vehicles, products, combustion and agriculture and support both improvements in air quality and decarbonisation.*
- *We will make the UK a world leader in goods and services focused on tackling air pollution.*
- *Future energy, heat and industrial policies will together improve air quality and tackle climate change. Phasing out coal-fired power stations, improving energy efficiency, and shifting to cleaner power sources will reduce emissions of air pollution as well as carbon. As we phase out oil and coal heating, we will ensure this transition improves air quality wherever possible and cost effective to do so. In addition, the government will conduct a cross-departmental review into the role of biomass in future policy for low carbon electricity and heat, focusing on the air quality impacts. The proposed way forward will be set out in the final Clean Air Strategy.*
- *We will minimise the air quality impacts of the Renewable Heat Incentive Scheme, for example by tackling non-compliance and consulting on excluding biomass from the RHI if installed in urban areas which are on the gas grid. We will work across central and local government to put a plan in place. In addition, we will consult on making coal to biomass conversions ineligible for future allocation rounds of the contracts for difference scheme.*
- *We are seeking evidence on the uses of non-road diesel, mainly in urban areas, considering the air quality impacts and the potential for market distortion. The Treasury has also announced it will review how alternative fuel rates line up with rates of petrol and diesel ahead of Budget 2018.*
- *We will cut emissions from non-road mobile machinery and give local authorities tough new powers to control the use of such machinery where it is causing an air pollution problem.*
- *Green Great Britain Week, starting in autumn 2018, will engage the public on air quality, alongside climate change, and highlight the economic opportunities it offers for the UK.*

[13] CIBSE response to NPPF consultation, May 2018 https://www.cibse.org/getmedia/a62a117f-8f16-42ad-93df-c554a6e1eca0/NPPF-Consultation-CIBSE-response.pdf.aspx

Q7. What do you think of the package of actions put forward in this chapter? Please provide evidence in support of your answer if possible.

CIBSE response

We welcome the proposals which are in line with our previous recommendations, including better consideration of air quality in the RHI and in the heat decarbonisation strategy, and general cross-departmental collaboration on the issues, recognizing that carbon emissions and air quality need to be considered together as part of the whole energy system.

We note buildings are not specifically mentioned within the first action point on supporting further investment in Clean Air innovation: **buildings must be part of the solution**. Significant improvements are required to the energy efficiency of our building stock in order to meet the UK's carbon emission targets, and they would also help reduce air pollution emissions through reduced fuel consumption. This must be done in a holistic manner, with solutions that address together **energy efficiency, comfort, and indoor air quality**; see also our response to Question 15 on the need for a regulatory framework on indoor air quality.

We look forward to the consultation on **RHI for biomass heating in urban areas**, and to the outcome of the cross-departmental review on the **role of biomass** in future policy; we would like the opportunity to inform it if possible, before it is set in final form in the final Clean Air Strategy. We would also point to our recent comments as part of the BEIS consultation on the future framework for heat[14].

We also welcome the intention for the UK to be a world leader in goods and services on tackling air pollution. Given growing awareness of the issue around the world, and increasing industrialization and urbanization, this should provide ample opportunities for the UK to export products and expertise in the future, particularly if it is considered alongside low-carbon solutions, responding to two important and linked world challenges.

We would be happy to support Defra on Green Great Britain Week.

We very much welcome the commitment to review fuel duties, including the current non-road diesel tax rebate. We would expand on this to recommend a **general review of subsidies to energy consumption** (including from transport, machinery and equipment, but also buildings) with the view to better align them with low-carbon and low-pollution policies. A first step of incentivizing low-carbon, low-pollution solutions must be to reduce incentives for those that high-carbon, high-pollution. We believe this would also be in line with the UK government's G7 commitment to end fossil fuel subsidies and with previous recommendations of the Environmental Audit Committee[15]. We have expanded on this in our recent response to the BEIS consultation on a future heat framework[14].

Non-road mobile machinery

We welcome the attention to this source of emissions. Non-road vehicles and equipment can significantly contribute to noise and air pollution in urban areas, and a switch to electric or hybrid models could therefore bring significant benefits; they are typically un-used at night, therefore being able to be charged at night during periods of lower demand. Electric construction vehicles, machinery and equipment should be more strongly encouraged, with the overall objective to eradicate diesel use. This is already the case on some construction sites, thanks to early discussions between developers, contractors and utilities to ensure a grid connection throughout construction. This would have significant benefits in reducing air pollution and noise exposure both for site workers and neighbouring populations. Local authorities could be provided with guidance on this.

[14] CIBSE submission to BEIS, Heat Framework consultation , June 2018
[15] Environmental Audit Committee, Energy subsidies, Ninth Report of Session 2013–14

Best practice case studies could be gathered; we would point to the London Low Emission Construction Partnership[16] and some London boroughs such as the City of London as useful references.

Non-road diesel (e.g. generators) in urban areas

We do not have evidence as such and merely refer to the work of Defra themselves, from December 2017, which highlighted: "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"[17].

Beyond air quality issues, they are also a high-carbon way to generate electricity, and their operation therefore also potentially jeopardises carbon emissions reduction targets.

New regulations implementing the Medium Combustion Plant Directive (MCPD)[18] are welcome. We would highlight that limits such as emission standards, retrofitted measures and, especially, operating hours, can be difficult to enforce; monitoring compliance is crucial, as highlighted by the Institute for Air Quality Management[19], so this should be given appropriate **local authority resources** and be carried out in liaison with Defra's permitting department.

It should also be noted that, until 2025, the new regulatory restrictions only apply to new plant, and only captures plant above 1MW. Defra's own assessment had concluded that transposing **the MCPD alone would "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 themselves therefore recommended the introduction of additional emission controls to address the growth in emissions from high-NOx emitting generators[20]. We therefore strongly recommend considering additional measures, with guidance to local authorities, including how to treat existing generator plant to improve emissions and/or limit operating hours (e.g. referring to emission control options, including technological abatement, assessed by Defra[20]).

See also our response to Question 24.

Q8. In what areas of the air quality industry is there potential for UK leadership?

- *Science, research and understanding of air pollution and its impacts*
- *Monitoring and modelling of air pollution*
- *Mitigation technology*
- *Low or zero emissions technology*
- *Other - If so, please specify*

CIBSE response

All areas offer opportunities for leadership, although in some areas such as air quality monitoring equipment it may be through standard-setting, analysis and services rather than the equipment itself, where other markets (e.g. China) are already developing a strong lead.

We would recommend supporting expertise and technologies at the building and wider built environment scale that offer **multiple benefits**, including green infrastructure and trees, particularly in urban areas. This is

[16] www.llecp.org.uk/
[17] https://consult.defra.gov.uk/airquality/medium-combustion-plant-and-controls-on-generators/supporting_documents/Generator%20EA%20air%20dispersion%20modelling%20report.pdf
[18] Environmental Permitting (England and Wales) (Amendment) Regulations 2018 https://www.legislation.gov.uk/ukdsi/2018/9780111163023/pdfs/ukdsiem_9780111163023_en.pdf, and accompanying Explanatory Memorandum, 2018 https://www.legislation.gov.uk/ukdsi/2018/9780111163023/pdfs/ukdsiem_9780111163023_en.pdf
[19] http://www.iaqm.co.uk/text/position_statements/aq_impacts_of_STOR_facilities_interim.pdf
[20] https://consult.defra.gov.uk/airquality/medium-combustion-plant-and-controls-on-generators/supporting_documents/Generator%20EA%20air%20dispersion%20modelling%20report.pdf

also recommended by NICE[21]. See also our response to Question 1, and for example the work of the University of Birmingham with the TDAG group[3].

See also our response to Question 7 on the need to support retrofit programmes that address together **energy efficiency and indoor air quality and comfort**. In addition to UK benefits, this offers significant opportunities for leadership abroad; in particular, the recent amendments to the Energy Performance of Buildings Directive[22] are placing increasing onus on Member States to put in place comprehensive retrofit programmes; they also emphasise the need for indoor air quality and comfort to be considered as part of energy efficiency regulations. Developing knowledge and solutions could therefore open significant export and leadership opportunities to UK actors in the future.

Q9. In your view, what are the barriers to the take-up of existing technologies which can help tackle air pollution?

- *Upfront costs*
- *Operational costs*
- *Lack of knowledge of the technologies available*
- *Lack of information on the technologies available*
- *Lack of reliable advice on the technologies available*
- *Lack of track record for the technologies available*
- *Familiarity with existing technology*
- *Fit of older technology with other infrastructure and organisational processes*
- *Lack of a strong reason to use a new technology*
- *Other - If so, please specify*

How can these barriers be overcome?

CIBSE response

We broadly agree that there are a variety of barriers depending on the solution being considered, but would highlight in particular:

- Lack of incentives in the regulatory framework: this a really important reason, first because of the lack of a comprehensive regulatory framework on indoor air quality – see our response to Question 15; and because regulations and policies that are in place (e.g. emissions limits from plant) are often poorly enforced. Conversely, we would also highlight the need to remove incentives for high-pollution systems - see also our response to Question 7.
- Upfront costs of some solutions e.g. NOx filters
- Lack of reliable information on the effectiveness of some systems; this may be due to a still limited track record, or to the lack of established standards (as, for example, for monitoring equipment).

We would also point out that solutions to tackle air pollution are not only "technologies", as the wording of this question would imply. There are significant opportunities to reduce emissions through changes in transport modes and through improved building energy efficiency, as highlighted elsewhere in our response.

Q10. In your view, are the priorities identified for innovation funding the right ones?

Innovation funding priorities

- *Particulate matter emissions from industrial combustion; tyre, brake and road wear; industrial processes; and domestic burning*

[21] Air pollution: outdoor air quality and health, NICE guideline, June 2017

[22] Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 *amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency* https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0844&from=EN

- *Zero or ultra-low emission heavy goods vehicles*
- *Volatile organic compounds from industrial processes and product formulation*
- *Low and zero-emission options for non-road mobile machinery*
- *Ammonia emissions from agriculture*

CIBSE response

- ~~Yes~~
- ~~No~~
- Partly
- ~~Don't know~~

Please briefly explain your answer

While the proposed areas are useful, we would strongly recommend that funding is made available to other areas of innovation which would offer multiple benefits beyond air quality alone, including:

- **Solutions that offer multiple benefits**, in particular the incorporation of **trees and green infrastructure** into urban environments – as recommended by NICE, and detailed in our response to question 8.
- Solutions that encourage **behaviour change** to reduce transport needs in the first place – see also our response to Question 4.

CHAPTER 5. ACTION TO REDUCE EMISSIONS FROM TRANSPORT

Transport is a significant source of emissions of air pollution. The immediate air quality challenge is to reduce emissions of nitrogen oxides in the areas where concentrations of these harmful gases currently exceed legal limits. The government has already committed £3.5bn to tackle poor air quality through cleaner road transport and is working closely with local authorities and Local Economic Partnerships to make progress. Alongside this, the government is committed to cutting air pollution from all forms of transport.

We will shortly publish Road to Zero, our strategy for reducing exhaust emissions form road vehicles. This, together with the UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations, sets out our approach to addressing exhaust emissions from road transport. These are not part of this consultation.

Proposed actions

- *In 2018 we will set out our ambitious plans to drive down emissions from shipping and aviation.*
- *We will end the sale of new conventional petrol and diesel cars and vans by 2040. We will position the UK as the best place in the world to develop, manufacture and use zero exhaust emissions vehicles and, during the transition, we will ensure that the cleanest conventional vehicles are driven on our roads.*
- *We will work with international partners to research and develop new standards for tyres and brakes to enable us to address toxic non-exhaust emissions of microplastics from vehicles which can pollute air and water.*
- *New legislation will enable the Transport Secretary to compel manufacturers to recall vehicles and machinery for any failures in their emissions control system, and environmental nonconformity or failure, and make tampering with an emissions control system a legal offence.*
- *We will reduce emissions from rail and reduce passenger and worker exposure to air pollution. By the autumn, the rail industry will produce plans to phase out diesel-only trains by 2040.*
- *All major English ports should produce air quality strategies setting out their plans to reduce emissions. These plans will be reviewed periodically to establish if the measures are effective or whether government action is required.*
- *We will review policy on aviation-related air quality to improve air quality.*

Q11. What do you think of the package of actions put forward in this chapter? Please provide evidence in support of your answer if possible

CIBSE response:

We welcome the commitment to phase out the sale of diesel and petrol cars. However, with the average lifespan of a car, the current target date of 2040 means there could be diesel cars in circulation by the end 2040s/ early 2050s. It is not clear this is consistent with the government's ambition to be world leading. We would very much welcome evidence that government have **analysed the impact of this 2040 timeline on emissions and resulting levels**, on the likelihood to meet the ambient air quality objectives, and to **progress towards WHO guidelines.** Furthermore, with 2040 a target so far away (outside the control of this government), how is it proposed to be enshrined in law, to ensure future governments are held to account? we would strongly recommend a more ambitious timeline with progressive implementation and phase-out, as has been used in other environmental areas (e.g. the phase out of ozone-depleting materials), giving certainty to the industry to develop alternative technologies and providing an incentive to vehicle owners to adopt clean technology at the first replacement opportunity. As much as possible, the **limits should be technology-agnostic** (i.e. they should be based on performance parameters related to energy, CO2 and air pollutants, rather than "diesel vs petrol vs electric"), leaving industry to develop the most appropriate technological response.

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"[23]. 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. This would also reduce the pressure on finding solutions for emissions from tyres and brakes, which while welcome may still take some time and have unintended consequences if untested materials are used, or known materials in untested applications.

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 managed fleet, offer better control over the location and timing of charging, and therefore help with grid demand management, a crucial issue to resolve for the energy system of the future, both centrally and at the local network level. We would encourage research and pilots into these models, including technological development as well non-technical barriers such as consumer attitudes and behaviour change.

Aviation

We understand the strategic importance for the UK of some infrastructure decisions, however we would stress the need for a thorough analysis of costs and benefits, including health and environmental impacts. We would refer to the advice of the Committee on Climate Change[24]:

> *"It is essential that aviation's place in the overall strategy for UK emissions reduction is considered and planned fully by your Department. (…) Our analysis has illustrated how an 80% economy-wide reduction in emissions could be achieved with aviation emission at 2005 in 2050. (…) Aviation emissions at 2005 levels in 2050 means other sectors must reduce emissions by more than 80%, and in many cases will likely need to reach zero. (…) Higher levels of aviation emissions in 2050 must not be planned for, since this would place an unreasonably large burden on other sectors."*

While we recognise this is under the leadership of DfT, we strongly recommend Defra to collaborate and develop a **joint strategy to reduce carbon and air pollution from aviation**. Any planned increase in aviation must be accounted for in air quality plans, and limited as much as possible by technology development, both at the UK level and at the local level to limit health effects on residents, which are typically compounded by noise and can be significant as evidenced by substantial research[25].

[23] https://www.licencebureau.co.uk/wp-content/uploads/road-use-statistics.pdf
[24] CCC letter to Secretary of State for Transport, June 2018 https://www.theccc.org.uk/wp-content/uploads/2018/06/CCC-letter-to-DfT-on-Airports-National-Policy-Statement.pdf
[25] see in particular the ESCAPE study, 2017: *Long-term exposure to ambient air pollution and traffic noise and incident hypertension in seven cohorts of the European study of cohorts for air pollution effects (ESCAPE),* European Heart Journal, Volume 38, Issue 13, 1 April

Q12. Do you feel that the approaches proposed for reducing emissions from non-road mobile machinery are appropriate or not?

CIBSE response:

- ~~Yes~~
- ~~No~~
- Neither yes/no
- Don't know

Please briefly explain why.

See our response to Question 7.

CHAPTER 6. ACTION TO REDUCE EMISSIONS AT HOME

Many people are unaware that emissions in the home increase personal exposure to pollutants and contribute significantly to our overall national emissions. Burning solid fuel in open fires and stoves makes up 38% of the UK's primary emissions of fine particulate matter ($PM_{2.5}$). Harmful sulphur dioxide (SO_2) is emitted by coal burned in open fires. Non-methane volatile organic compounds (NMVOCs) from a wide variety of chemicals that are found in carpets, upholstery, paint, cleaning, fragrance, and personal care products are another significant source of pollution.

Proposed actions

- *We will legislate to prohibit the sale of the most polluting fuels.*
- *We will ensure only the cleanest stoves are available for sale by 2022.*
- *We will update outmoded legislation on 'dark smoke' from chimneys and underused provisions on Smoke Control Areas to bring these into the 21st century with more flexible, proportionate enforcement powers for local government*
- *The government will work with industry, retailers, health experts and consumer groups to reduce NMVOCs from consumer products, develop options to promote product innovation and encourage the use of low emissions alternatives.*

Q13. What do you think of the package of actions put forward to reduce the impact of domestic combustion? Please provide evidence in support of your answer if possible.

We welcome the adoption of some of our previous recommendations, including updating and making better use of provisions in Smoke Control areas.

We cannot comment on the proposals for "more flexible, proportionate enforcement powers for local government" without detail; we would welcome the opportunity to comment on this before the proposals are finalized.
As noted elsewhere in our response, any increased responsibility given to local authorities should be accompanied by guidance, training, and resources, as **local authority resources** are already significantly strained, and new requirements are otherwise unlikely to be implemented (or other policy areas will suffer as a result).

We note the proposed measure address some sources through individual products and technologies. They do not address all potential sources (e.g. cooking equipment). They also are no guarantee of overall indoor air quality, for which a more comprehensive approach is required, including all sources and including ventilation. We would stress the **need for a comprehensive attention to indoor air quality**, including attention to overall

2017, Pages 983–990, https://doi.org/10.1093/eurheartj/ehw413

performance outcomes (i.e. indoor pollutant levels), not just individual measures; we recommend this should be part of the **regulatory framework** – see our response to Q15.

Q14. Which of the following measures to provide information on a product's non-methane volatile organic compound (NMVOC) content would you find most helpful for informing your choice of household and personal care products?

Information on "ABC" labelling

"A B C" labelling would provide a categorised product rating for relevant domestic products, similar to other labels such as food traffic light labels:

	Not helpful	Quite helpful	Very helpful	Not sure
"A B C" label on product packaging			X	
Information on manufacturer website		X		
Leaflet at the point of sale		X		
Inclusion in advertising campaigns		X		

Please briefly explain your choices

CIBSE response

We think that all options would be useful, and none on its own would be sufficient. Although information on websites and leaflets would be useful, we think they will have less influence on actual consumer decisions at the point of purchase and the point of use, and less reach than labels on the actual products. Labelling should be simple and on the product itself (not the associated information leaflet); it should be **health-based**, i.e. relate to **emissions** levels (rather than **content**), and to **exposure**; it should also include information about how A / B/ C rating relates to typical application (e.g. small areas, short exposure times). We would note there already a large number of labels and the new ones should not add to consumer confusion, so they should be simple and robust; in particular, they should make sure of established standards (BS, EN and ISO) on emissions levels, and use lessons from existing labels such as the EU Ecolabel

We would also recommend pilot testing to inform the proposals, and lessons could be learnt on consumer education in other areas trying to convey complex information, for example healthy food labelling.

Advertising campaigns could have information as small print, similar to that, for example, on pharmaceuticals.

While we do welcome attention to VOCs, we would point out that not all are harmful; this should be taken into account in the labelling, with reference to the work of specialist including the WHO and Public Health England.

Is there any other way of providing NMVOC information we should consider? Please briefly explain what and why.

CIBSE response

No comment; we would point to the responses submitted by the UK-IEG and by Derrick Crump, an authority on this topic.

Q15. What further actions do you think can be taken to reduce human exposure from indoor air pollution?

Regulatory framework for 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 2019[26]. We would welcome plans from Government to engage with early findings and start considering options to incorporate the future guidelines in the regulatory framework, including building regulations and planning. Beyond homes, **all building types** should be considered.

In the meantime, we would highlight the way air quality is considered in **Building Regulations, which we think needs to be reviewed**. 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 only 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), which is guidance only (i.e. not regulation itself) 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). This implies 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; 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 very 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 these 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. Furthermore, requirements do not address indoor pollutants in a comprehensive manner; for example, they do not specifically address formaldehyde, a known harmful pollutant from building materials and products; the existing guideline refers to "total VOCs"; many VOCs are not harmful, while formaldehyde is a known carcinogen.
- There is generally poor enforcement of the guidance in Approved Document F, for example ventilation rates are often below recommended levels[27].

We would therefore strongly recommend a **more comprehensive approach to air quality in Building Regulations**, with clear requirements (i.e. indoor pollutant limits) and enforcement mechanisms, backed-up by resources to Building Control authorities. This would also respond to the requirements of the revised Energy Performance of Buildings Directive[22], which emphasise the need for indoor air quality and comfort to be considered as part of energy efficiency regulations and which the UK have committed to implement despite leaving the EU. Indoor air quality should also be considered as part of the planning process – see our response to Question 29.

We would note that professionals from a range of professionals have made similar recommendations, from built environment and public health backgrounds, and whether practitioners, academics, or in policy. We would refer in particular to the response of the UK-IEG group to this consultation.

Support to research and innovation

[26] https://www.nice.org.uk/guidance/indevelopment/gid-ng10022

[27] There is extensive evidence on this; see for example Sharpe T., McGill G., Gupta R., Mawditt I. (2016) *Characteristics and Performance of MVHR Systems: A meta study of MVHR systems used in the Innovate UK Building Performance Evaluation Programme*, Report for Innovate UK

We would recommend support to the following R&D areas in relation to indoor air quality; these are also largely in line with the recommendations of public health authorities, such as the WHO[1] and NICE[Error! Bookmark not defined.] previously referenced:

- Building retrofit: this is essential as part of Clean Growth and to achieve carbon targets, as raised in our response to Question 7; needs more attention to avoid unintended consequence in the future e.g. high levels of pollutant from indoor sources, mould growth
- Research into effects of exposure to "cocktails" of pollutants
- Research into long-term effects of low level exposure
- Research into potential solutions, and support to the development of standards and labels, potentially a better control of various claims e.g. monitoring equipment; "VOC-absorbing materials".

CHAPTER 7. ACTION TO REDUCE EMISSIONS FROM FARMING

The agriculture sector accounts for 88% of UK emissions of ammonia, which is emitted during storage and spreading of manures and slurries, and from application of inorganic fertilisers. Ammonia damages sensitive natural habitats and contributes to smog in urban areas. Action by farmers can make a big difference to ammonia emissions. The government is already acting to help farmers by funding the necessary equipment.

Proposed actions

- *We will provide a national code of good agricultural practice to control ammonia emissions.*
- *We will require and support farmers to make investments in the farm infrastructure and equipment that will reduce emissions.*
- *A future environmental land management system will fund targeted action to protect habitats impacted by ammonia.*
- *We will continue to work with the agriculture sector to ensure the ammonia inventory reflects existing farming practice and the latest evidence on emissions.*
- *We will regulate to reduce ammonia emissions from farming and are seeking views on 3 possible approaches to regulation.*

Q16. What do you think of the package of actions put forward in this chapter (see the drop-down menu above for a summary)? Please provide evidence in support of your answer if possible.

Q17. What are your preferences in relation to the 3 regulatory approaches outlined and the timeframe for their implementation: (1) introduction of nitrogen (or fertiliser) limits; (2) extension of permitting to large dairy farms; (3) rules on specific emissions-reducing practices? Please provide evidence in support of your views if possible.

Q18. Should future anaerobic digestion (AD) supported by government schemes be required to use best practice low emissions spreading techniques through certification?

If not, what other short-term strategies to reduce ammonia emissions from AD should be implemented? Please provide any evidence you have to support your suggestions.

CIBSE response

Farming is not our area of expertise. We would only refer to our response to question 3 recommending attention to ammonia levels in relation to WHO guidelines.

CHAPTER 8. ACTION TO REDUCE EMISSIONS FROM INDUSTRY

Industrial processes, including energy generation to power our businesses and homes, and the manufacture of goods and food, can all create pollution. For many decades, the UK has been at the forefront of reducing

industrial pollution, and significant progress has already been made. We will continue to build on that progress by increasing standards to reflect international best practice.

Proposed actions

- *We will maintain our longstanding policy of continuous improvement in relation to industrial emissions, building on existing good practice to deliver a stable and predictable regulatory environment for business as part of a world-leading clean green economy.*
- *We will work with industrial sectors to review improvements to date, and to explore opportunities to go further through a series of sector roadmaps that set ambitious standards – moving beyond a focus on minimum standards to make UK industry world leaders in clean technology and secure further emissions reductions between.*
- *We will close the regulatory gap between the current Ecodesign and medium combustion plant regulations to tackle emissions from plants in the 500kW to 1MW thermal input range. As legislation on medium combustion plants and generators comes into force, we will consider the case for tighter emissions standards on this source of emissions. We will exempt generators used for research and development purposes from emission controls.*

Q19. What do you think of the package of actions put forward in this chapter? Please provide evidence in support of your answer if possible.

CIBSE response

We have received anecdotal feedback that there is a lack of awareness about the Medium Combustion Plant regulations in its application to **district energy schemes**, particularly how this may affect existing plant (including Combined Heat and Power). This would seem to be an area for government to improve guidance. CIBSE are already making efforts with our members on this issue; we would be happy to collaborate with Defra on this.

Q20. We have committed to applying Best Available Techniques to drive continuous improvement in reducing emissions from industrial sites. What other actions would be effective in promoting industrial emission reductions?

CIBSE response

We welcome the commitment to apply Best Available Techniques. We would stress these will only bring benefits if they are associated with clear targets, monitoring, and enforcement (with fines if required), in particular through local authorities resources and the future environment body, as also raised elsewhere in our responses.

Q21. Is there scope to strengthen the current regulatory framework in a proportionate manner for smaller industrial sites to further reduce emissions? If so, how?

CIBSE response

We welcome the intention to continue to increase "standards to reflect international best practice": as a very minimum, continued alignment with EU standards would be very useful to facilitate trade between the UK and the EU; many UK actors who trade with the EU will have to anyway, so regulatory requirements that reflect that alignment would help put all UK actors on a minimum level playing field in the domestic market. See also our response to Question 7 on generators below 1MW.

We understand there may be important opportunities for improvements in smaller industrial sites, combined with measures to reduce energy use: anecdotal feedback is that large energy users have achieved significant energy consumption reductions in recent years, but this is not the case with small / medium users, indicating opportunities for fuel savings.

Q22. What further action, if any, should government take to tackle emissions from medium combustion plants and generators? Please provide evidence in support of your suggestions where possible.

CIBSE response

See our response to Question 7; anecdotal feedback is that generators remain a problem, particularly as there are still strong financial incentives for them to operate.

Q23. How should we tackle emissions from combustion plants in the 500kW-1MW thermal input range? Please provide evidence you might have to support your proposals if possible.

CIBSE response

See our response to Question 7

Q24. Do you agree or disagree with the proposal to exempt generators used for research and development from emission controls? Please provide evidence where possible.

CIBSE response

- ~~Yes~~
- ~~No~~
- Neither yes/no
- ~~Don't know~~

We agree with the value of exemptions for special cases. However, we are also mindful of creating loopholes which would reduce the effectiveness of regulation, and also of the enforcement burden if too many schemes are able to apply for exemption (i.e. who would check their request for exemption, and later on check that it was warranted i.e. that the generators are indeed used for R&D?). if exemptions are proposed, they should be within very clearly defined limits. This should come with an analysis of the proportion of installations expected to be exempt. Policy should aim to capture the large majority of installations, in order to be effective and worthwhile. See also our response to Question 7.

CHAPTER 9. LEADERSHIP AT ALL LEVELS

Emissions from abroad, across the UK and local sources all contribute to the pollution that people and the environment are exposed to. Effective action is needed at all levels to clean up our air. This strategy sets out our commitment to cut our national emissions to reduce population exposure. As part of this we will make it easier to take action at local level. Alongside this, the UK will continue to play an active, leading role in international action to improve air quality.

Our international air quality commitments have been agreed at a UK level. However, air quality is a substantially devolved policy area. Scotland and Northern Ireland have both already produced their own Air Quality Strategies and Wales is currently in the process of producing one (further details of these are set out in Chapter 9).

Proposed actions

- *We are consulting on a new, independent statutory body to hold government to account on environmental commitments following EU exit. Ensuring that there is transparency and accountability in how we achieve our clean air ambitions will be a priority in this work.*
- *We will bring forward new clean air legislation at the earliest opportunity. This will bring long-standing frameworks for local and national action on air pollution into the 21st century with stronger powers and clearer accountability.*

- *To ensure that local action to reduce air pollution remains robust and relevant, we will transform existing structures to increase transparency and back this up with stronger statutory powers to tackle local air pollution.*
- *The UK government will work in partnership with the governments of Scotland, Wales and Northern Ireland to develop a detailed National Air Pollution Control Programme as required under the National Emissions Ceilings Directive for publication in 2019.*

Q25. What do you think of the package of actions put forward in this chapter? Please provide evidence in support of your answer if possible.

CIBSE response

We have detailed our comments about the legislative proposals in response to individual questions. The key points are:

- The need for the future strong **environment body to have strong enforcement powers on all government departments and public authorities**; we have detailed our recommendations on this in our response to the recent DEFRA consultation on this issue[10];
- The need for continued **cooperation with neighbouring countries**, and for a **UK-wide approach** to air quality; the latter is also a point we have detailed in our response to the recent DEFRA consultation on this issue[10];
- The need for better implementation and enforcement at the local level; this requires more **resources to local authorities**, as these are already significantly strained ;
- The need for regulatory framework on indoor quality, including building regulations and planning – see Question 15;
- The need for firm air quality targets which would be health-based and in line with WHO recommendations, with a clear timeline and reporting mechanisms – see Question 3.

Q26. What are your views on the England-wide legislative package set out in section 9.2.2 of the draft strategy? Please explain, with evidence where possible.

Legislative framework

New clean air legislation will enable the Transport Secretary to compel manufacturers to recall vehicles and machinery for any failures in their emissions control system, and make tampering with an emissions control system a legal offence.

It will also replace the existing patchwork with single coherent legislative framework for local authorities to tackle air quality and bring the law up to date with the evolution of structures at sub-national level so that accountability for air quality sits in the right place.

It will update outmoded legislation on 'dark smoke' from chimneys and underused provisions on Smoke Control Areas to bring them into the 21st century with more flexible, proportionate enforcement powers.

Finally, it will create a new statutory framework for Clean Air Zones (CAZ) to simplify current overlapping frameworks of CAZ, AQMA and Smoke Control Areas to create a single approach covering all sources of air pollution.

In addition we will legislate to ensure that major sources of air pollution are subject to proportionate controls that reflect the risk they pose to public health and the environment. This will strengthen powers at both national and local level.

We will take England-wide action to:

- *prohibit the sale of polluting fuels and inefficient stoves for domestic use -limit emissions of ammonia from farming*

- *consider the case for setting tighter emission controls for biomass installations to reduce PM pollution from energy generation*
- *close regulatory gap to apply limits to medium combustion plants between 500kw - 1MW and consider the case for increasing stringency of limits for plants above 1MW*
- *drive up emissions standards for diesel-powered non-road mobile machinery before and after sale*

Q27. Are there gaps in the powers available to local government for tackling local air problems?

- ~~Yes~~
- No
- ~~Don't know~~

If yes, what are they?

CIBSE response

As highlighted in many of other questions, we think **lack of local authorities resources** is a much more significant issue than gaps in powers. There is consistent feedback that local authorities increasingly lack the resources (staff, skills, guidance) to implement regulations and policies. This is a significant problem in many areas, not only air quality.

Q28. What are the benefits and risks of making changes to the balance of responsibility for clean local air between lower and upper tier authorities?

What are the benefits?

What are the risks?

CIBSE response

- The main risk, particularly with strained local authority resources, would be that air quality would be likely to fall relatively low down the list of funding priorities, resulting in insufficient action and poor implementation.
- The main benefit would be that much of the causes and solutions to air pollution related to traffic, i.e. a local problem. Solutions can then emerge through local action, particularly if it is coordinated between local departments, including planning.

A balance may be needed between central funding, requirements and guidance to local authorities, with local powers, resources and implementation, all monitored and ultimately enforced by the future environment body ("watchdog").

Q29. What improvements should be made to the Local Air Quality Management [LAQM] system? How can we minimise the bureaucracy and reporting burdens associated with LAQM?

Suggestions to minimise bureaucracy and reporting

CIBSE response

Better use of air quality assessments, which potentially could be simplified – see below

Suggestions for other improvements

CIBSE response

An important consequence of AQM areas is the requirement for Air Quality Assessments to be produced as part of the planning application process. Unfortunately, these often focus on assessing the impact on external

air quality; their value could be improved if they were used to **inform design proposals**, with more attention given to mitigation measures for reducing exposure and reducing emissions, in collaboration with other disciplines.

More guidance to local authorities should be provided on what is a useful AQA e.g. they should take account of the local urban form, including local wind patterns and massing, particularly in high rise areas. CFD modelling and methods such as those used in Singapore and Hong Kong to look at increasing airflow in urban canyons could be applied to help disperse pollution (these also being investigated in other cities such as Helsinki or Beijing).

Furthermore, we would encourage AQAs to consider not only the impact on the surrounding ambient air quality, but also **exposure of the future building occupants** – see also our response to Question 15.

The current policy wording does not set in place any method by which to ensure **compliance with the recommendations of the Air Quality Assessment.** This should be addressed, including **post-completion verification** of measures such as emissions from major emission sources and verification of indoor air quality limits (see further comments on indoor air quality and post-completion below). What gets measured and verified against tangible, measurable targets is more likely to be delivered.

Furthermore, they are often required only above a certain **size of development.** This is debatable. First of all, small-scale sources can result in a significant cumulative impact, as illustrated by the fact that, according to Defra, "domestic burning of house coal, smokeless solid fuels and wood is the single largest source of harmful particulate matter emissions in the UK, at around 40% of the total in 2015"[28]; the importance of wood burning on polluting emissions specifically in London and UK cities has also been shown by recent studies[29]. For smaller developments, we think the requirement for an AQA could also be triggered by risk factors such as average ambient pollution in the local area, or risk profile of the future building occupiers (e.g. housing, care homes, schools). A risk-based trigger would be more appropriate than a size-based trigger. Proximity to major roads or other sources of pollution such as local generators should be considered as material risks as a minimum.

A suggestion for major developments is that, instead of air quality being covered simply as part of the EIA, it should be addressed in an '**Air Quality Strategy'** document, with similar profile and status as Energy Strategies already required by most local authorities. This should be a broader multi-disciplinary document with architect, Mechanical & Electrical engineer and Air Quality Specialist input, which would lead to significantly improved coordination between these key disciplines. It should contain at least the following information:

- **Targets** for air quality for the site, based on WHO limits and any site specific situations; these should include indoor air quality targets, and targets of polluting emissions.
- **Strategy** for meeting those targets, including specification of plant such as boilers, CHP etc, location of flues, opening requirements, filtration specification, provision of user guides, etc. Consideration should also be given to long-term ventilation plans so that, for example, if a development is currently proposed to be mechanically ventilated to allow high-level air inlets and filtration of the outdoor air, it may still have the capacity to be naturally ventilated in the future as London starts meetings its air quality objectives.
- Requirements for **maintenance and operation** to ensure that the system actually delivers what it is intended to
- Proposals for **post construction monitoring.**

The key benefit of this document would be enabling local authorities to produce guidance similar to energy strategy documents, and have a number of key metrics they could view to ensure compliance with policy.

CHAPTER 10. PROGRESS AGAINST OUR CLEAN AIR GOALS

[28] Defra, *Call for evidence on the domestic burning of wood and coal*, February 2018 https://consult.defra.gov.uk/airquality/domestic-burning-of-wood-and-coal/

[29] https://uk-air.defra.gov.uk/assets/documents/reports/cat05/1801301017_KCL_WoodBurningReport_2017_FINAL.pdf

Analysis shows that the actions set out in this draft strategy can meet our ambitious emissions reduction targets, if they are implemented with the necessary pace and determination.

This draft strategy developed by the UK government, on which we are consulting, sets out how we will work towards meeting these ambitious reductions in England. The consultation period for this strategy runs until 14 August 2018. We look forward to input from a wide range of partners on the measures set out here and what more is possible.

Q30. What do you think of the package of actions in the strategy as a whole?

CIBSE response

We have detailed our comments in individual responses. Overall we welcome some of the actions, however we have significant concerns in a number of areas, including:

- The overall impact on pollutant levels: the actions focus on individual technologies, but it is unclear what analysis has been undertaken to ensure they can meet current objectives and, importantly, go beyond to progress towards WHO recommendations
- Whether actions will be implemented, given strained local authority resources; for example, this could jeopardise much of the efforts in limiting emissions from generators in urban areas
- Lack of attention to reducing transport needs, green infrastructure, and retrofitting buildings; this applies to research, support to innovation, regulations, and the planning framework
- The timeline related to phasing out diesel and petrol cars: see Question 11.

These are comments on how the proposed actions may meet the objectives. Our comments about the need to revise objectives and set health-based targets in line with WHO recommendations are detailed in Question 3.

Q31. Do you have any specific suggestions for additional or alternative actions that you think should be considered to achieve our objectives? Please outline briefly, providing evidence of potential effectiveness where possible.

CIBSE response

See our response to question 30 and throughout our responses to individual questions.

Q32. If you have any further comments not covered elsewhere, please provide them here.

CIBSE response

No comment

END

Response collated and submitted by:
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Please do not hesitate to contact us for more information on these responses.