CIBSE response to the Environmental Audit Committee Call for Evidence into Air Quality in England inquiry

About CIBSE

CIBSE is the leading global body for building services professionals, championing sustainability, innovation and building performance across the built environment. We empower and equip professionals with the expertise, guidance and standards needed to deliver safe, efficient and future-ready buildings. Through our leadership in decarbonisation, building performance and continuous professional development, we support a community dedicated to creating better places for people and the planet.

CIBSE Air Quality Group

Our response to this Call for Evidence has been led by the CIBSE Air Quality Group. This group was formed to help CIBSE be an advocate for: improvements in indoor and outdoor air quality; to raise awareness of air quality in the built environment; and to build links to other organisations with similar goals. Our aim is to improve the standard of air in buildings, and the Group's mission Statement is: *"To use engineering skill to support the pursuit of healthy air in the built environment."*

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Executive summary of CIBSE response

1. **Indoor air quality is a major and under-addressed public health risk**. People spend up to 90% of their time indoors, making IAQ a critical determinant of exposure to pollutants such as VOCs, NO_2 and particulate matter (PM2.5). Evidence from the UK Chief Medical Officer and the Royal College of Physicians shows air pollution contributes to asthma, cardiovascular disease, impaired lung development and tens of thousands of premature deaths annually. Impacts are disproportionately felt by deprived communities and certain ethnic groups, reinforcing environmental health inequalities.

2. **Current building and retrofit practices risk worsening IAQ without proper ventilation and oversight**. Energy-efficiency measures that increase airtightness can elevate indoor pollutant concentrations if not paired with effective ventilation. While retrofit presents an opportunity to improve mould control, filtration and air exchange, weak compliance regimes under Part F of the Building Regulations, lack of performance verification, and the absence of mandatory IAQ standards create systemic performance gaps, particularly significant given that 80% of today's buildings will still be in use by 2050.

3. **Regulatory reform is required to integrate IAQ into national air quality strategy**. England lacks enforceable IAQ standards, routine compliance testing, and clear pollutant concentration thresholds for new and existing buildings. CIBSE recommends introducing health-based IAQ standards aligned with WHO guidelines, mandating independent ventilation commissioning and verification, and embedding IAQ within the National Clean Air Strategy to address both indoor and outdoor sources holistically.

Responses to Call for Evidence questions

Q1&2: Causes of air pollution, inequality and health impacts (and associated supporting evidence)

1. Good air quality is vitally important for health and wellbeing. The most recent Chief Medical Officer (CMO)[1] report on air pollution provides a detailed discussion on health, and there is evidence that air pollution has short- and long-term health effects.
2. As people spend up to 90% of their time indoors[2,3] the indoor environment plays an important part in a person's daily exposure to air pollutants. This number can be even higher for those that are most vulnerable. Indoor air quality (IAQ) is therefore a critical but often overlooked part of the national air pollution challenge.
3. Air pollutant sources can be indoors and outdoors; typical indoor pollutants include Volatile Organic Compounds (VOCs) from sources such as materials, adhesives and cleaning products, nitrogen dioxide (NO_2) from combustion appliances such as hobs and boilers, CO_2 from exhalation, and fine particulate matter (PM_{10} and $PM_{2.5}$) from wood burning and other combustion processes.
4. Typical outdoor pollutants include NO_2, PM_{10} and $PM_{2.5}$, from sources such as vehicle exhausts and electricity generation.
5. In buildings, a balance must be made between removing indoor pollutants and reducing ingress of those from the outside environment, and there is evidence ventilation (that includes purpose provided ventilation and infiltration/exfiltration) can play a significant role in the relationship between indoor and outdoor air pollutants [4, 5, 6].
6. IAQ and inadequate ventilation in buildings can significantly contribute to indoor pollutant concentrations, and therefore add to health risks, including asthma, cardiovascular disease, and impacts on vulnerable groups such as children and the elderly[7].
7. The Inquiry's own summary notes that air pollution contributes to asthma, impaired lung development in children, and cardiovascular diseases[8]. The latest report from the Royal College of Physicians[5] outlines that air pollution contributes to tens of

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[1] Chief Medical Officer's Annual Report 2022: Air pollution. Available online: https://www.gov.uk/government/publications/chief-medical-officers-annual-report-2022-air-pollution

[2] Klepeis et al, 2001. *The National Human Activity Pattern Survey (NHAPS): a resource for assessing exposure to environmental pollutants*. Journal of Exposure Science & Environmental Epidemiology.

[3] Dimitroulopoulou et al, 2017. *Use of population exposure frequency distributions to simulate effects of policy interventions on NO2 exposure.* Available at: https://doi.org/10.1016/j.atmosenv.2016.11.028

[4] Stranger et al, 2008. Characterization of indoor air quality in primary schools in Antwerp, Belgium. Indoor Air. Volume: 18.

[5] Majd et al, 2019. Indoor air quality in inner-city schools and its associations with building characteristics and environmental factors. Environmental Research. Volume: 170.

[6] Langer and Bekö, 2013. Indoor air quality in the Swedish housing stock and its dependence on building characteristics. Building and Environment 69 (2013) 44-54

[7] Royal College of Physicians, 2025. A breath of fresh air. Available online: https://www.rcp.ac.uk/media/5r2kmmi4/rcp-full-report-a-breath-of-fresh-air-responding-to-the-health-challenges-of-modern-air-pollution.pdf

[8] UK Parliament, 2026. Air Pollution in England Inquiry. Available online: https://committees.parliament.uk/work/9561/air-pollution-in-england/

thousands of premature deaths annually in the UK, it affects nearly every organ in the body, there are health impacts even at low concentrations, and that indoor pollution sources are key risks due to the amount of time people spend indoors.

8. Moreover, the impacts of poor IAQ have been shown to be unequally distributed. This includes from a study looking at 321 homes in Bradford, where higher $PM_{2.5}$ concentrations are associated with higher deprivation levels, rented versus owned homes, terraced vs semi-detached housing, smoking vs non-smoking households, and in South Asian households[9].
9. Data from the English Housing Survey has also shown that higher damp and mould is both associated with higher deprivation levels and also impacts Black households more than other ethnic groups[10]. This evidence underscores the urgency of integrating IAQ into national air quality policy, and the importance of tackling environmental inequities[11,12].
10. Measures that are focused on making buildings more airtight to improve energy efficiency (such as with many current net-zero policies), may lead to a worsening of IAQ, if there is inadequate ventilation.
11. This has been shown in a number of studies, including Collignan et al[13], where thermal retrofitted buildings and those without ventilation showed higher indoor radon concentrations; Broderick et al[14], where indoor pollutants levels of CO_2, VOCs, and $PM_{2.5}$ significantly increased following an energy upgrade (and reduced air exchange) of 15 dwellings; and Shrubsole et al[15], where tightening the building envelope showed increased indoor $PM_{2.5}$ exposure following housing retrofit.
12. Inversely, as many existing homes are not provided with sufficient ventilation[1617] and/or suffer from poor air quality due to mould levels, retrofits are an opportunity

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[9] Cheung et al, 2025. *Inequalities and indoor air pollution: a prospective observational study of particulate matter (PM2.5) levels in 309 UK homes from the Born in Bradford cohort study.* BMC Public Health. Avsilable at: https://link.springer.com/article/10.1186/s12889-025-25182-x

[10] Air Quality Expert Group (AQEG), 2024. *Differentials in air pollutant exposure across communities and regions in the UK*. Available at: https://uk-air.defra.gov.uk/assets/documents/reports/cat05/2503251005_AQEG_Differentials_clean_280824.pdf

[11] Booker et al, 2025. *Ten questions concerning the future of residential indoor air quality and its environmental justice implications.* Building and Environment, Volume 278.

[12] Chief Medical Officer's Annual Report 2017: Air pollution. Available online: https://eprints.whiterose.ac.uk/id/eprint/133618/1/CMO_Annual_Report_2017_Health_Impacts_of_All_Pollution_what_do_we_know.pdf

[13] Collignan et al, 2016. Relationships between indoor radon concentrations, thermal retrofit and dwelling Characteristics. Journal of Environmental Radioactivity. 165, 124-130.

[14] Broderick et al, 2017. A pre and post evaluation of indoor air quality, ventilation, and thermal comfort in retrofitted co-operative social housing. Building and Environment. 122:126-33.

[15] Shrubsole et al, 2016. Impacts of energy efficiency retrofitting measures on indoor PM2.5 concentrations across different income groups in England: a modelling study. Advances in Building Energy Research. 10, 69-83; 2016.

[16] Ventilation provision and use in homes in Great Britain: A national survey, Cairan Van Rooyen and Tim Sharpe, Volume 257, 2024,111528,ISSN 0360-1323, https://doi.org/10.1016/j.buildenv.2024.111528. (https://www.sciencedirect.com/science/article/pii/S0360132324003706)

[17] Ventilation and indoor air quality in new homes, AECOM for MHCLG, 2019 https://assets.publishing.service.gov.uk/media/5d91be8040f0b65e62c6cfb0/Research_-_ventilation_and_indoor_air_quality.pdf)

to improve air quality by reducing the incidence of mould (e.g. repairing fabric, improving insulation and avoiding thermal bridging), and by providing adequate ventilation.

13. Retrofit Revisit, a recent study co-led by CIBSE of ten long-term housing retrofit case studies[18], includes air quality and energy monitoring results, and demonstrates the long-term benefits which can be delivered on air quality as well as thermal comfort and energy use.
14. Any strategy to improve air quality in England must therefore address IAQ holistically alongside outdoor emissions, and other national policies.

Q4&10: National targets and regulatory framework for air quality

15. Overall, there is a lack of mandatory standards for IAQ in England, and many developers lack clarity on best practice without mandatory thresholds.
16. Clear legislation is needed to establish compliance with appropriate benchmarks and drive the adoption of best-practice ventilation technologies.
17. Examples from other countries, include German housing law, where tenants are legally required to maintain apartments at appropriate temperatures and regularly open windows for brief periods a day for purge ventilation, with the main drive to prevent structural damage from moisture and mould[19].
18. Although Part F of the Building Regulations[20] sets ventilation requirements and guideline values, in practice compliance is rarely verified. For example, there is no consistent national regime for on-site testing or commissioning checks for mechanical ventilation systems.
19. Many buildings are signed-off without confirmation that the installed systems deliver the designed flow rates or achieve appropriate pollutant-dilution, and poor filter maintenance and inadequate commissioning can undermine energy performance and IAQ, increasing occupant exposure and energy consumption.
20. CIBSE has previously highlighted that *performance gaps* arise when design intent is not matched by actual operation, and this is a systemic issue which requires regulatory reform[2122]
21. It would be useful to have clear recommendations for indoor pollutants concentrations and compliance testing, to reduce inconsistencies across new and existing buildings.

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[18] https://www.cibse.org/knowledge-research/knowledge-portal/retrofit-revisit-2024

[19] *Tenancy law: The landlord may only demand daily shock ventilation to prevent mould to a certain extent*. Available at: https://www.mth-partner.de/en/tenancy-law-the-landlord-may-only-demand-daily-airing-to-prevent-mould-to-a-certain-extent/

[20] Ministry of Housing, Communities and Local Government, Ministry of Housing, Communities & Local Government (2018 to 2021) and Department for Levelling Up, Housing and Communities, 2022. *Ventilation: Approved Document F.* Available online: https://www.gov.uk/government/publications/ventilation-approved-document-f

[21] Van Rooyen and Sharpe, 2024. *Ventilation provision and use in homes in Great Britain: A national survey.* Building and Environment, Volume 257.

[22] BPN: Joint Position on Measured Operational Building Performance https://building-performance.network/advocacy/building-performance-joint-position-statement

22. In addition, with 80% of today's buildings expected still to be in use in 2050[23], the absence of IAQ standards for existing buildings is a major gap.
23. Without standards or incentives, and improvements in ventilation, filtration and moisture control, real changes in air quality and health will be slow and uneven, especially in low-income homes and for those that are most vulnerable.

CIBSE policy recommendations

24. As part of the EAC's inquiry, and in response to the questions in the call for evidence, we would like to propose the following policy recommendations:

    a. **Introduce IAQ standards**: Adopt enforceable health-based standards for indoor air pollutant concentrations and minimum ventilation-effectiveness criteria for all public buildings in England. These could stand alongside the Government's own Air Quality Objectives and Guidelines[24][25], and be based on the WHO guideline values[26].
    b. **Strength compliance and commissioning requirements:** Require independent verification of ventilation system performance before a building is signed-off. Introduce routine IAQ assessments, especially in public buildings. We recommend these requirements are aligned with CIBSE standards such as CIBSE Guide B and TM40: Health and Wellbeing in Building Services.
    c. **Include IAQ in the National Clean Air Strategy:** Current policy heavily focuses on outdoor air quality and emissions and does not adequately address indoor pollutant sources (such as emissions from cooking, heating, cleaning products and materials). It should consider building-fabric issues such as damp and mould, and airtightness without adequate ventilation. Plus, it should include ventilation and filtration measures, such as those recommended by academic experts and government advisory groups (such as the Air Quality Expert Group (AQEG))[27].

25. For further information on CIBSE's work in this area, please see the air quality pages on our website which includes a policy position statement - CIBSE Air Quality Position Statement.

[23] UK Parliament POST on Net Zero and the UK's historic building stock Net zero and the UK's historic building stock - POST
[24] Defra, 2026. *UK Air Quality Limits*. Available online: https://uk-air.defra.gov.uk/air-pollution/uk-limits.php
[25] Air quality: UK guidelines for volatile organic compounds in indoor spaces - GOV.UK
[26] World Health Organisation (WHO), 2021. *WHO global air quality guidelines*. Available online: https://www.who.int/publications/i/item/9789240034228
[27] Air Quality Expert Group (AQEG), 2022. *Indoor Air Quality*. Available online: https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2211011000_15062022_Indoor_Air_Quality_Report_Final.pdf