



# BETTER VENTILATION BETTER HOMES BETTER HEALTH

Sustainable, safe and efficient ventilation  
for a healthier nation

# ABOUT BEAMA

BEAMA is the UK's leading trade association representing manufacturers of electrical infrastructure products and systems from transmission through distribution to environmental systems and services in the built environment.

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# 1

## EXECUTIVE SUMMARY

The proposals in this paper set out what BEAMA believe needs to be done to deliver better ventilation, better homes and better health. The proposals outline the steps that should be taken to ensure that the ventilation industry works as effectively as it should, as well as ensuring that the public have the education, information and tools that they need in order to make the best decisions for their health, in their home.

Poor indoor air quality (IAQ), or indoor air pollution, is a growing public health concern. It is responsible for thousands of deaths per year, healthcare costs in the millions and wider economic costs that are even greater.

As homes become more air tight, through retrofitted energy efficiency measures and the building of more airtight energy efficiency homes, the need for effective ventilation becomes ever more important. Numerous studies have shown the critical role that ventilation plays in removing indoor pollutants from the home – reducing exposure levels, improving cognitive performance and minimising the health symptoms suffered by occupants.

If the ventilation industry is to play its part in delivering good indoor air quality then two big issues must be tackled: energy efficiency and

ventilation improvements must be joined up and poor-quality installations of ventilation systems need to be rooted out.

To meet these challenges, BEAMA recommend that the Government:

**1) Improve the focus on Indoor Air Quality in the Building Regulations.** The Government should consider ventilation installation as important to health as gas and electricity installations. Existing Building Regulations should be rewritten and refocused to ensure the in-use performance is aligned to the end users' needs.

**2) Improve compliance with the current Building Regulations.** It should be compulsory that all ventilation installations are undertaken by an installer who is a member of a MHCLG recognised and registered competent persons scheme.

**3) Avoid problems of poor air quality following refurbishment.** There should be a requirement for compulsory checks or assessments on ventilation provision following the installation of energy efficiency measures, particularly under Government schemes.

**4) Make IAQ a Government priority.** The Government should consider and accept the findings of relevant scientific studies and endorse industry best practice on improving IAQ as well as publish its own 2015 study into the effectiveness of Part F (of the Building Regulations). The Government should also encourage the installation of ventilation systems in existing homes through financial incentivisation and undertake public health education campaigns to alert the public to the risks of poor indoor air quality and the simple steps that can be taken to improve it.

## 2 INTRODUCTION

“Poor indoor air quality, or indoor air pollution, is an issue that has, and is, becoming ever more prominent in all of our lives.



While very positive steps have been made to improve the energy efficiency of our homes, whether they be newly built homes or retrofitted existing homes, the same cannot be said for improvements in ventilation. Unfortunately, without this partnership of ‘insulating tight and ventilating right’, we are at serious risk of creating a major public health burden in the years to come by sealing pollutants in our homes.

As the industry body representing the UK’s leading ventilation providers, we are determined that we will do all we can to ensure that the ventilation market works properly and share our decades worth of experience in order to come up with solutions to the problems that face both the industry, and the country at large.

In this paper we set out the case for delivering better ventilation, for better homes, for better health. We are proactively calling for change – across both Government and the industry. We know that as an industry we need to step up and take responsibility for the quality and effectiveness of ventilation products, which is why we are asking for Government to give us the tools and support to make ventilation in UK homes the best it can be.

We know that leadership for making ventilation the effective solution to indoor air quality needs to come from us, and we are ready for that challenge.”

### **DR HOWARD PORTER**

Chief Executive Officer  
BEAMA

# 3

## A WORD FROM ACADEMIA

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“Current legislation in the UK recognises the importance of lethal indoor air pollutants, such as carbon monoxide, and mandates specific actions accordingly. The need to address fuel poverty and energy reduction is also well recognised, which has resulted in concerted action through domestic energy efficiency initiatives and policies. In comparison, indoor air quality is poorly considered and has not received the same level of attention. As such, indoor air quality actions are significantly lacking.

Given the current focus on energy efficiency policies and the governmental target to build one million new homes by 2020, along with the need to refurbish existing homes there is a significant need to raise the agenda of indoor air quality to ensure the delivery of homes that protect building occupants and do not create or exacerbate health problems.”

### **PROF TIM SHARPE**

Director, Mackintosh Environmental Architecture Research Unit  
at the Glasgow School of Art  
Chair, Health Effects of Modern Airtight Construction Network

## 4

### A WORD FROM PATIENTS

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“Poor ventilation, humidity and inefficient air exchange are major contributors to mould and house dust mite, both of which can have a significant negative impact on the health of adults and children in their own homes. We are seeing an increase in the number of calls to our telephone helpline from people whose allergic symptoms suggest that these two factors are the cause.

While energy efficiency remains a priority for the building industry, the issue of indoor air quality and its impact on human health needs to be more widely recognised and addressed.”

**CARLA JONES**

Chief Executive Officer, Allergy UK

# 5 INDOOR AIR QUALITY AND HEALTH

Poor indoor air quality (IAQ), or indoor air pollution, is linked to a range of health conditions and is responsible for a significant loss of healthy life years, loss of life and disease burden and the knock-on costs to the NHS, and the wider economy, are considerable.

UK citizens spend around 90% of their time indoors<sup>2</sup> and around 16 hours a day<sup>3</sup> on average at home. This means that their potential risk of exposure is many times that of pollution outdoors, especially considering that indoor air can be many times more polluted than outdoor air<sup>4</sup>.

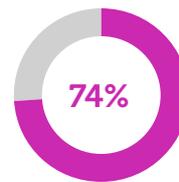
Poor IAQ has been linked to allergy and asthma, lung cancer, chronic obstructive pulmonary disease, cardiovascular disease and more recently even investigated for its links to dementia<sup>5</sup>. Ongoing research is looking at the impact of low ventilation rates on disease transmission<sup>6</sup> and new research is being undertaken to look at the impact of poor IAQ on mental health, following research from schools that cognitive function is impaired where air quality is poor<sup>7</sup>.

In 2015, Hazim B. Awbi, Professor of Building Environmental Science at the University of Reading, predicted that by 2050, without action to tackle indoor air pollution, there could be an 80% rise in those suffering asthma symptoms and total volatile organic compound concentrations could rise to 60% above WHO 24-hour limit levels<sup>8</sup>.

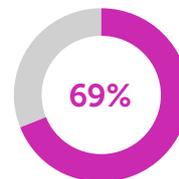
### The Human Cost

Poor IAQ is reported to have an annual cost to the UK of over 204,000 healthy life years, with 45% of those lost to cardiovascular diseases, 23% to asthma and allergy, and 15% to lung cancer<sup>9</sup>. In 2012 The World Health Organisation reported that indoor air pollutants were responsible for around 99,000 European deaths a year<sup>10</sup>. Whilst in 2016, the Royal College of Physicians warned that indoor air pollutants cause, at a minimum, thousands of deaths per year in the UK and are associated with healthcare costs in the order of "tens of millions of pounds"<sup>11</sup>.

### PUBLIC OPINION<sup>1</sup>



74% OF THE BRITISH PUBLIC ARE AWARE THAT POOR INDOOR AIR QUALITY COULD NEGATIVELY AFFECT THEIR HEALTH



69% OF THE BRITISH PUBLIC BELIEVE INDOOR AIR POLLUTION TO BE AS IMPORTANT AS OUTDOOR AIR POLLUTION AND 12% SAY IT IS MORE IMPORTANT

## 6 VENTILATION AND GOOD INDOOR AIR QUALITY

### PUBLIC OPINION<sup>1</sup>

65.2% OF THE BRITISH PUBLIC WOULD BE WILLING TO PAY A SMALL PREMIUM FOR A HOUSE THAT HAD EFFECTIVE VENTILATION WHICH MAINTAINED GOOD INDOOR AIR QUALITY

The recent drive to increase air tightness and energy efficiency, largely through building fabric measures, has led to a deterioration in air quality and the exacerbation of pollutants inside UK homes and buildings. The most cost-effective procedure to rectify these problems is the standardised fitting of an effective and continuous mechanical ventilation system.

In a 2002 BRE study<sup>12</sup> of houses built after 1995, substantial evidence was found to link low ventilation rates with deteriorating indoor air quality, with further deterioration expected for newly built dwellings. And, according to Professor Hazim Awbi<sup>8</sup>, by 2050, total volatile organic compounds (TVOCs) levels are expected to exceed WHO daily limits in all future dwellings if mechanical ventilation is not installed in a substantial number of homes and buildings.

Many studies have shown improvements in indoor air quality and positive human impacts after the installation of effective ventilation systems, including:

- The UK Chief Medical Officer's annual report<sup>13</sup> 2017 – 'Health Impacts Of All Pollution' – references new indoor air ventilation and filtration models, developed by the EU-funded HEALTHVENT, which have shown the potential for significant health risk reduction. Well-maintained ventilation is therefore vital for safeguarding human health by managing and reducing the level of VOCs in the home, minimising cases of lung cancer, asthma, cardiovascular disease and COPD.
- A 2015 study<sup>7</sup> – 'Ventilation rates in schools and pupils' performance' – cites that poor ventilation negatively impacts both children's health and performance. Once ventilation systems were put in place, higher levels of focus and attention among students were observed.
- A 2012 Allergy UK study<sup>14</sup> – 'Work Fever' – reports that headaches, lethargy and a dry throat can be caused by poor ventilation and that only 9% of those who experienced breathing difficulties at work, worked in an office that they considered to be well ventilated.
- A 2008 study<sup>15</sup> – 'The effect of domestic mechanical heat recovery ventilation on asthma control of patients allergic to the house dust mite' – shows that visual analogue scores for sneezing, nasal discharge and nasal blockage significantly improved in the group who had the benefit of mechanical ventilation compared to a control group.

# 7

## THE CHALLENGE FOR VENTILATION

While outdoor air quality has received high levels of publicity and share of voice in recent years, indoor air quality has lagged behind. However, it is beginning to rise up the political and public interest agenda and the National Institute for Health and Care Excellence (NICE) is now developing guidelines on indoor air pollution and, in June 2018, Clean Air Day jointly focused on outdoor and indoor air.

Delivering good indoor air quality in UK homes faces two major challenges: a lack of emphasis and knowledge as to the causes and impacts of poor ventilation rates in existing homes and poor-quality installations, which are plaguing their effectiveness.

As successive UK Governments have worked hard to improve energy efficiency in UK homes, it has had the unintended consequence of sealing up homes and trapping in pollutants, as ventilation provision has not been concurrently improved. This has resulted in findings such as those from Exeter University<sup>16</sup> which studied 944 social houses in Cornwall and found a link between energy efficiency of dwellings (evaluated in terms of the Standard Assessment Procedure – SAP rating) and the prevalence of asthma – each increase in SAP rating was associated with a 2% increased risk of asthma symptoms.

For the ventilation industry, the quality of installation has become the number one issue. As it stands, competency of installers is not enforced by Building Regulations which results in installations that do not meet the standards expected.

A number of studies have been made of ventilation system installations, the most recent of which was published in 2016 by the Zero Carbon Hub<sup>17</sup>. The study concludes:

“...The Hub team found things going wrong at multiple stages of the construction process at every site. The cumulative effect of these issues ultimately outweighed any good practice, as the systems we tested showed significant under-performance. At 5 of the 6 sites, fans were operating at only half the required duty or lower, i.e. flow rates were far too low. The end result was that nearly all of the 13 occupants interviewed by the team across the sites

### PUBLIC OPINION<sup>1</sup>

64.9% OF THE BRITISH PUBLIC HAVE EXPERIENCED THE TELL-TALE SIGNS OF POOR INDOOR AIR QUALITY (SUCH AS MOULD GROWTH AND CONDENSATION) IN THEIR HOMES

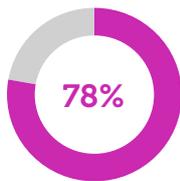
had turned off their ventilation systems, finding them too noisy, especially at night. If systems are turned off, they are not doing their job. The air quality in the property will be compromised, with potentially serious consequences for the health of occupants. It is essential that ventilation systems are designed, installed, commissioned and handed over to occupants in accordance with Building Regulations. Our findings show that despite the availability of good practice guidance and training minimum ventilation rates in the units reviewed were not achieved in practice.”

If ventilation is to be the effective intervention that it should be, then it must be:

- included at the same time as any energy efficiency improvements
- designed, installed and commissioned to the highest standards

## 8 POLICY SOLUTIONS

### PUBLIC OPINION<sup>1</sup>



78% OF THE BRITISH PUBLIC THINK THAT A VENTILATION SYSTEM'S INSTALLATION AND MAINTENANCE SHOULD BE REGULATED IN THE SAME WAY THAT ELECTRIC AND GAS INSTALLATIONS ARE

BEAMA recognise that leadership for change must come from industry and where possible, industry should look to solve issues with ventilation.

The policy solutions proposed below reflect the expert opinion of those who deliver ventilation to the UK public and are supported by leading academics and key opinion leaders. These recommendations for action are based on years of experience and are designed to help correct some of the key issues facing both the ventilation market and public behaviour and understanding, in relation to managing indoor air quality.

### STEP 1

#### Improve the focus on Indoor Air Quality within the Building Regulations

- The Government should consider that ventilation is critical to health and that it should be treated similarly to gas and electricity in terms of efficiency, effectiveness, safety and installation.
- Building Regulations concerning ventilation should be rewritten and refocused to ensure the in-use performance of ventilation not only maximises the quality of indoor air but is aligned to the end users' needs. Currently, too much emphasis is placed on achieving performance in theory rather than ensuring it is achieving performance in practice.

### STEP 2

#### Improve compliance with the current Building Regulations

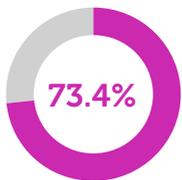
It should be compulsory that all ventilation installations are undertaken by an installer who is a member of a MHCLG recognised and registered competent persons scheme. This will shift the onus of ensuring compliance from Building Control bodies to industry, who can audit and publish details of installers who fail to comply with the Building Regulations. However, until it becomes compulsory, there should be improved training and resources for Building Control organisations to ensure better enforcement of existing regulations.

### STEP 3

#### Avoid problems of poor air quality following refurbishment

Currently there is no requirement to address refurbishment or retro-fit works that cause poor ventilation in UK properties. Where energy efficiency measures will lead to increased air tightness, particularly under Government schemes, there should be a requirement for compulsory checks or assessments on ventilation provision and utilisation of retrofit standards where these drive effective provision of ventilation. This would also identify additional ventilation installation requirements, following refurbishment or retro-fit, to ensure better indoor air quality, where otherwise it would be likely to deteriorate.

#### PUBLIC OPINION<sup>1</sup>



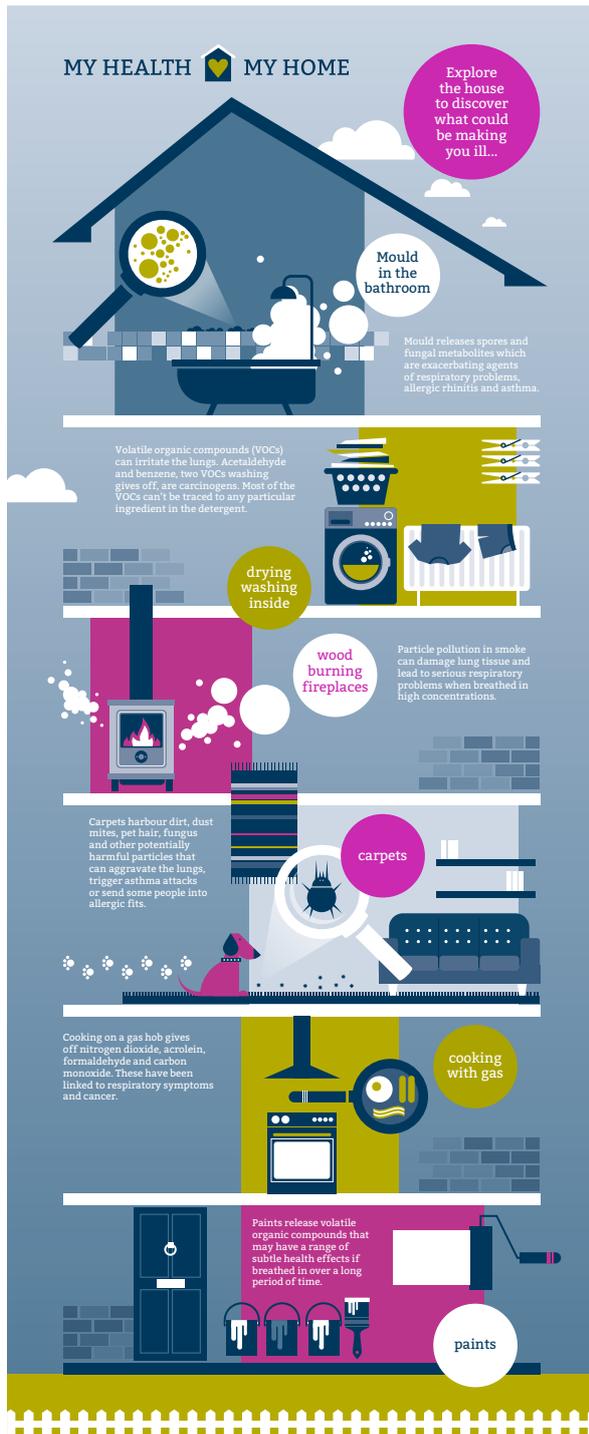
73.4% OF THE BRITISH PUBLIC THINK THAT POOR INDOOR AIR QUALITY SHOULD BECOME A GOVERNMENT HEALTH PRIORITY

### STEP 4

#### Make IAQ a Government priority

- The Government should consider and accept relevant findings of eminent, peer-reviewed UK academia, scientific study and endorse industry produced best practice guidance on improving IAQ.
- The Government should publish its 2015 study into the effectiveness of Part F in delivering ventilation rates in real homes, together with an action plan on how it will address any findings that show ventilation rates are not being achieved in practice.
- As suggested by Dame Sally Davies in her 2017 Annual Report<sup>15</sup>, the Government should consider introducing requirements for air quality sensors (like those for carbon monoxide) to indicate when IAQ falls below a minimum standard. These sensors could then alert the occupant or, where a ventilation system is installed, automate the ventilation system as required.
- Much like energy efficiency, the Government should consider supporting financial incentives to encourage the installation of ventilation systems in existing homes, which would be balanced by NHS cost savings in the long term. This could in practice either mean grants, interest free loans, a VAT reduction, stamp duty or council tax rebates.
- While action plans exist to tackle ambient pollution, no such Governmental plan or strategy exists to tackle indoor air pollution. The Government should consider poor indoor air quality as a potential serious public health risk and undertake public education campaigns, through Public Health England, on the risks of poor IAQ and importantly, what steps can be taken to manage it.

## 9 MY HEALTH MY HOME



For the past four years, BEAMA has run a public awareness campaign entitled *My Health My Home*.

The campaign aims to raise householder, and house builder, awareness of the potential impacts of poor indoor air quality on human health and the importance of effective ventilation in managing indoor air quality. It also draws attention to the impact that certain behaviours, household products, furnishings and building materials can have in relation to levels of pollution inside homes.

*My Health My Home* has been widely featured in the media, including the Guardian, the Observer, the Daily Express, the Daily Mail, the Mail on Sunday, the Daily Mirror as well as on This Morning and the ITV News.

The campaign has a range of useful publications, including guides, research and interactive tools. These include:

- Consumer guide to ventilation
- Indoor Air Quality factsheet
- Infographics
- Public information video
- Research
- Healthy Homes barometer

To find out more about the campaign, visit the *My Health My Home* websites, or follow us on Twitter:

**@MyHealthMyHome**

Consumer advice site:  
**myhealthmyhome.com**

Expert and stakeholder site:  
**indoorairpollution.co.uk**

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## GLOSSARY OF TERMS

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**BEIS** Department for Business, Energy and Industrial Strategy

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**DoH** Department of Health and Social Care

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**EEM** Energy Efficiency Measures

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**IAQ** Indoor Air Quality

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**MHCLG** Ministry of Housing, Communities and Local Government

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**MVHR** Mechanical Ventilation with Heat Recovery

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**NHS** National Health Service

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**TVOCs** Total Volatile Organic Compounds

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**VOCs** Volatile Organic Compounds

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**WHO** World Health Organisation

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# 11

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