

# OVERHEATING AND VENTILATION IN HOMES

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New projects by the  
Zero Carbon Hub



# Overheating in homes

This leaflet includes a summary of the work the Zero Carbon Hub is taking forward to help address the issue of overheating in homes.



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# Introduction

There appears to be growing evidence of overheating in homes, including in homes built or retrofitted to satisfy more demanding standards of energy efficiency.

Overheating of homes over prolonged periods can have serious consequences for the health of occupants and in extreme cases there can be a risk to life. With average temperatures set to increase, and more hot spells anticipated, overheating could become more commonplace in the future.

Those most vulnerable, such as the elderly or sick, are more likely to be occupying their homes during daytime, when the heat is most intense. For this reason in particular, homes are a focus for concern on overheating.

The challenge for both the new build and retrofit sectors going forward is to consistently provide energy efficient homes which are warm and cosy in the winter, but also cool and comfortable in the summer. The Zero Carbon Hub will work with industry and government in the near future to support this goal.

## THE ZERO CARBON'S HUB'S OVERHEATING PROJECT

The Zero Carbon Hub is about to begin a two-year project on the subject of overheating in homes. We will investigate how overheating risk may change over time, and what additional action may be needed to address the issue. More information on the project can be found in this leaflet.

If you would like to be involved, or have evidence or information that may be relevant please email **[info@zerocarbonhub.org](mailto:info@zerocarbonhub.org)**

To keep updated on the project's progress sign up to our newsletter through our website – **[www.zerocarbonhub.org](http://www.zerocarbonhub.org)**

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# The causes and effects of overheating

## Heat and health

In 2003 the summer heat wave across Europe is estimated to have caused the deaths of more than 35,000 people, including 2000, in the UK. During that heat wave, Londoners experienced 12 consecutive days with temperatures peaking between 26 and 37°C and, significantly, night temperatures staying above 19°C for 7 continuous nights. Excessive heat like this has known effects on health, particularly when combined with high levels of humidity.

## Heat, health and homes

After a few days of very hot weather, average internal temperatures in some homes can start to exceed average external temperatures and may cease to provide protection from the heat. With no safe haven from ongoing, extreme heat during the day and elevated temperatures at night, even healthy people will experience discomfort and heat-related effects on their health.

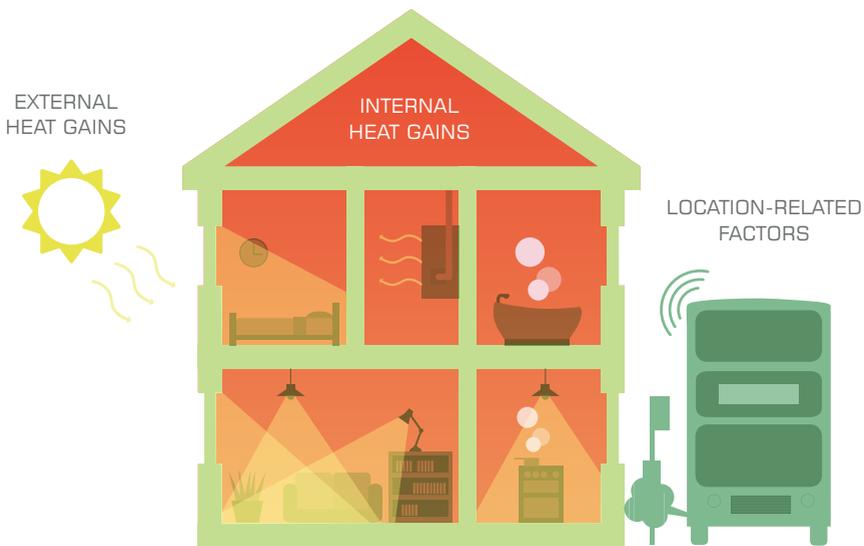
For more vulnerable occupants, such as infants, the elderly or sick, the risk of severe heat stress, including potentially fatal heat stroke, is greater. This is because they have less resilience to heat and may be unable to follow recommended precautions. In addition they will often be at home for most of the day and be exposed to peak day temperatures, unlike those who go out to work or to study.

## External heat gains

Sun shining through the windows will heat interior surfaces. Modern houses (and some upgraded homes) with double glazed windows and good standards of insulation will tend to retain this heat indoors, allowing it to build up. The amount of heat gain will depend on the area of window, the home's orientation, and whether any blinds, shades or shutters are used. In some circumstances unwanted heat can also be gained when warm external air is drawn into the home.

## Internal heat gains

Internal gains can vary depending on the type or age of the home. For recent homes, which are more airtight and better insulated, heat gains from internal sources may have a significant effect. It may arise from occupants themselves, building services such as hot water systems, inadequate ventilation and lighting and appliances.



There are a number of reasons why overheating occurs in homes, and often it arises when a number of causes or processes act together. The location, construction type and layout of the home can also be a factor. The causes of overheating are set out in more detail in the NHBC Foundation’s Guide ‘Understanding Overheating – where to start (NF44)’.

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## Tackling overheating

Overheating is caused by a variety of effects. Tackling it requires an approach that can be implemented on a large scale, neighbourhood scale and at the scale of the individual home, including advice to owners. For new urban or suburban developments, overheating should be a key consideration at the planning application stage.



### Planning considerations

such as the urban heat island effect, the use of green spaces and water to provide cooling.



### Design considerations

such as the use of thermal mass, shading and shutters, and cooling and ventilation strategies.



### The owner’s perspective

such as knowing how occupant behaviour affects conditions in the property.

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# The Hub's overheating project

The focus of the Hub's new project will be on what strategic action might be needed to tackle overheating in homes, as well as to support the industry more generally by sharing information and best practice.

## **The project objectives are:**

### **1. Baseline – by spring 2015**

Provide analysis which helps industry and government understand the scale, patterns and impacts of overheating in new and existing homes and whether these are likely to worsen over time. Specifically, what impact these changes could have on people's well-being, health, businesses and the economy, and which combinations of people and buildings are most vulnerable.

### **2. Options appraisal – by end of 2015**

Describe in detail a range of possible strategic responses for both sectors (including doing nothing more) which could be adopted to tackle the issue, and assess as far as possible the costs, benefits, effectiveness and feasibility of each.

### **3. Dissemination – ongoing**

Motivate and support organisations in the house building and retrofit sector, as well as consumer organisations and public health professionals, in developing their own responses and strategies by sharing key messages, factsheets, best practice evidence and other useful information on overheating.

## **The definition of overheating**

In common with other research projects, one difficulty is to define what overheating actually is. The issue arises because it is difficult to define what 'too hot' actually is – it will differ from person to person, and depends on other factors such as temperature, humidity, duration and an individual's susceptibility. The relationship between external and internal temperatures is also highly variable.

The project will gather together the work already done on 'definitions and thresholds', for example, recent work by Chartered Institution of Building Services Engineers (CIBSE), and examine whether there is evidence that particular indoor temperatures are 'safe' and 'comfortable'.

# The Hub's new project on ventilation strategies



As time has passed and the up-take of low and zero carbon homes has improved, there has been an increased focus on minimising energy losses from buildings. With this in mind it is clear that strategies for adequate ventilation need to take into account more airtight construction, and to make sure that indoor air quality is not being compromised.

The NHBC Foundation's and Zero Carbon Hub's Ventilation and Indoor Air Quality Group, chaired by Lynne Sullivan OBE, produced a report in July 2013 focused on making recommendations on Mechanical Ventilation Heat Recovery systems. This work ultimately fed into a new NHBC Standard.

In the run up to 2016, the Hub intends to continue working with the sector to help to define and showcase what good ventilation strategies, and processes to implement them, look like. This work should provide useful context for future government policy.

If you would like to be involved in the project, or have evidence or information that may be relevant please email [info@zerocarbonhub.org](mailto:info@zerocarbonhub.org)

For updates on the project sign up to our newsletter at [www.zerocarbonhub.org](http://www.zerocarbonhub.org)



The Zero Carbon Hub was established in 2008, as a non-profit organisation, to take day-to-day operational responsibility for achieving the government's target of delivering zero carbon homes in England from 2016. The Hub reports directly to the 2016 Taskforce.

Get in touch to find out how we can assist you

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