

TACKLING OVERHEATING IN HOMES

Evidence Gathering



Baseline Evidence Review

Includes

Extent

Current Impacts

Definition And Thresholds

Causes

Current Processes And
Practice

Future Drivers

Projected Impacts

Technical Solutions

People/Behavioural
Solutions

Policy Solutions

Case Studies And Best
Practice

Supply Chain

Cross-cutting



Baseline Evidence Review

Extent

To what extent are homes already overheating?

How frequently is overheating occurring?

At what times of year?

Causes

Are new technologies or processes contributing to overheating risk?

Case Studies And Best Practice

Examples of best practice in managing overheating in the UK and the associated costs and benefits

Examples of public/user education, e.g. CLISP in Islington

Baseline Evidence Review

Includes thematic evidence reviews

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Thematic Evidence Reviews

Autumn 2014 (final drafts)



Thematic Evidence Reviews

Current Processes, Practices and Regulatory Landscape

- Building Regulations and other requirements
- Guidance and Standards
- Current practice

Definition And Thresholds

- Thermal Comfort
- Excess Heat

Impacts

- Current and Projected
- Adaptive action
- Risk mapping

Future Drivers

- Climate Change
- Demographic
- Building Practices
- Planning/Policy

Modelling Capacity

- Potential for risk assessment
- Costs versus benefits
- Practical implementation

Solutions

- Technical Solutions
- Supply Chain
- Behavioural Solutions

Thematic Evidence Reviews

Each review:

30-page stand-alone report

Final drafts October 2014

Publication March 2015 or Dec 2014

- In-depth
- Neutral
- Practical observations

To inform development of policies/strategies under Project Objective 2



Current Processes, Practices and Regulatory Landscape *author tbc*

What is the current state-of-play within the housing sector?

1. How are professionals required to consider overheating by regulation and policy?
2. What happens in practice?

Current Processes, Practices and Regulatory Landscape

What is the current state-of-play within the housing sector?

1. How are professionals required to consider overheating by regulation and policy?

- Building Regulations
- Local Planning Requirements
- CIBSE Guidance
- Aspirational Standards, e.g. BREEAM, Code for Sustainable Homes, PHPP



Current Processes, Practices and Regulatory Landscape

2. What happens in practice? Stakeholder Interviews

- How are regulations and requirements applied in practice?
- What problems and issues do users experience?
- Are there contractual obligations or soft incentives for housebuilders to consider overheating?
- What is the reporting process if occupants experience overheating?
- Are there incentives for considering overheating when retrofitting?
- Best Practice, e.g. overheating assessment using dynamic thermal simulation and future weather files
- Worst Practice, e.g. opening windows and closing curtains in SAP

Definitions and Thresholds

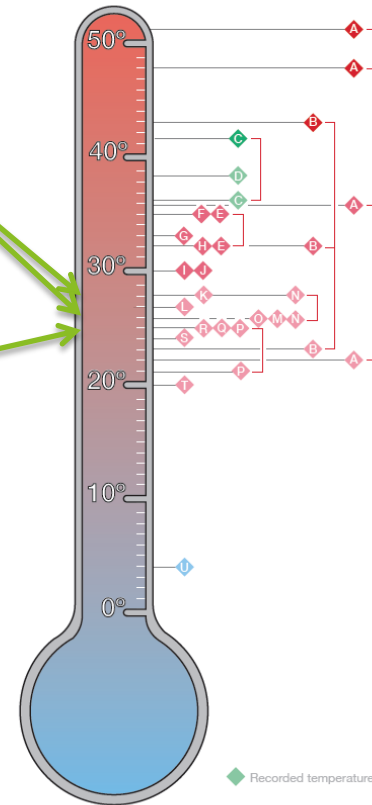
CIBSE/UCL

What is overheating?

CIBSE Guide A
overheating thresholds

Increased morbidity,
mortality and hospital
admissions in London

CIBSE TM52 – adaptive
comfort



LCCP/EA
Heat Thresholds Project

Definitions and Thresholds

CIBSE/UCL

What is overheating?

Survey of different definitions and thresholds – evidence base and practical implementation

Thermal Comfort and Construction Industry Standards

- CIBSE Guide A, absolute thresholds
- Adaptive Comfort, CIBSE TM52

Heat-related Impacts on Health and Wellbeing

- Heat wave definitions
- Lack of sleep and reduced productivity
- Health impacts, mortality and morbidity

What is an appropriate, practical working definition?



Impacts

AECOM

What are the impacts of overheating?

How might changing incentives create certain outcomes?

Current Impacts

Future and Potential Impacts

Adaptive Action

Risk Mapping



Impacts

AECOM

What are the impacts of overheating?

How might changing incentives create certain outcomes?

Current, Future and Potential Impacts

- People – health and wellbeing, e.g. excess deaths
- Building types and design, which are most vulnerable?
- Business and the economy, e.g. legal cases
- Public Policy, e.g. NHS costs

Existing housing and New Build



Impacts

AECOM

What are the impacts of overheating?

How might changing incentives create certain outcomes?

Adaptive Action – present and future

Actions taken by individuals, e.g. buying Air Conditioning

Risk Mapping literature review

- Heat
- Building type
- Occupants



Future Drivers

AECOM

Which driving factors are likely to alter the current extent and patterns of overheating and how?

Environmental – Climate Change

Socio-economic – Demographic Changes,

Building Practices, Planning/Policy

Identify the most important drivers: Which drivers have the greatest effect on overheating and should be addressed by strategic policy responses?



Future Drivers

AECOM

Which driving factors are likely to alter the current extent and patterns of overheating and how?

Climate Change

- Rising temperatures – will new areas of England and Wales be at risk?
- Urban Heat Island – will it intensify?
- Trigger events

Demographic Changes

- Ageing population
- Changing urban population
- Home working

Building Practices

- Energy-efficient, airtight, highly insulated homes
- Heating practices – underfloor, communal heating

Planning/Policy

- Urban Density
- Green Infrastructure



Future Drivers

AECOM

Which driving factors are likely to alter the current extent and patterns of overheating and how?

Climate Change

Building Practices

Demographic Changes

Planning/Policy

Short to Medium Term (next 5 – 20 years)

Longer Term (2050s)

Cumulative Effects and Interaction of Drivers

Geographical Variation

Which drivers have the greatest effect on overheating and should be addressed by strategic policy responses?



Modelling Capacity

Inkling/CIBSE

How can designers assess the overheating risk in homes?

Current Tools/Methodologies for Assessing Overheating Risk

- SAP
- Dynamic Thermal Simulation
- Research Models

Input data

- Weather data
- Occupancy and gains profiles

Output data

- Calculation of overheating metric



Modelling Capacity

Inkling/CIBSE

How can designers assess the overheating risk in homes?

Use of models in practice

Technical Barriers

- User competence
- Lack of clear methodology and guidance

Costs/Financial Barriers

- Software licences
- Training
- Additional project time

Observations on current overheating prediction methodology, practical implementation and possible improvements



Technical and Behavioural Solutions

BRE

What can we do to reduce the risk of overheating in the UK?

Technical Solutions

Behavioural Solutions

Consumer Issues

Supply Chain

Combined Solutions

Individual dwelling

Building/development

Neighbourhood/masterplan

City

New build

Existing housing



Technical and Behavioural Solutions

BRE

What can we do to reduce the risk of overheating in the UK?

Technical Solutions

- Form, shading, ventilation
- Innovative solutions
- Solutions from abroad

Behavioural Solutions

- Window opening/closing

Consumer Issues

- Installation and capital cost
- Ease of use

- Payback period

Supply Chain Issues

- Product availability in UK
- Cost and scale of production

Combined Solutions

- Passive or mixed-mode

Best Practice Exemplars



Wider Evidence Gathering



Evidence Gathering

Types of Evidence

- Thematic evidence reviews
- Existing literature - academic journal articles, grey literature, technical project reports, case studies, presentations etc
- “Confidential’ information
- Studies and projects currently underway, due to report in the project period or shortly afterwards
- Existing tools and guidance, e.g. models, risk assessment tools
- Consultations with experts
- Stakeholder consultations/interviews
- Monitoring data
- Site visits
- Further new evidence and analysis commissioned as part of this project

We're too hot to sleep. Is it worth buying a portable air con unit?

We need to know that they really work before spending more than £300 on one for our top-floor flat

The Guardian, Saturday 26 July 2014

[Jump to comments \(24\)](#)



Fans don't help in the heat ... and the running costs of a portable air con unit look high. Photograph: Dan Chung

Every week a Guardian Money reader submits a question, and it's up to you to help him or her out – a selection of the best answers will appear in next Saturday's paper.

This week's question

In recent days our inner-city, top-floor flat has been unbearably hot at night and sleep has been almost impossible. We have tried fans to no avail, and in our desperation are considering buying a portable air con unit. At more than £300 they aren't cheap, and running costs look high, but do they work? Anyone got a better idea for someone already putting their pillows in the freezer?

What do you think?

Do you have a problem readers could solve? Email your suggestions to money@theguardian.com or write to us at Money, The Guardian, Kings Place, 90 York Way, London N1 9GU

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Article history

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Series

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on

Money

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Progress Update

Thematic Evidence Reviews commissioned

Technical Group Brainstorming 4 June 2014

Expert Consultation

Literature Review

- 300+ articles identified
- Managing in Zotero

Issues Log



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Causes of Overheating

What factors contribute to overheating?

- Solar gain through glazing and/or fabric
- Lightweight, airtight properties with limited ventilation
- Heavyweight properties with limited ventilation
- Window opening limitations, e.g. safety restrictors, security, noise, air pollution, patio doors
- MVHR issues, e.g. poor installation, low airflow rates, no summer bypass, noise
- Communal heating, corridor gains
- Microclimate, e.g. hard standing
- Urban Heat Island

Any others?



Extent of Overheating

How widespread is overheating?

Estimate

- ASC extrapolation from English Housing Survey
- Dynamic thermal modelling

Building Performance Temperature Monitoring

- Shortage of data
- Some samples very small

Reports of perceived overheating

- Anecdotal evidence
- Surveys
- Self-selecting sample

Extent of Overheating

Estimate	Monitoring	Reported
0.5%	20%	48%
ASC based on English Housing Survey	Beizae, Lomas, and Firth 2013 – 207 homes in England Lomas and Kane 2013 – 268 homes in Leicester	Respondents to GHA Survey - self-selecting sample, 185 instances (Taylor, Melissa 2014)
		20%
	◀ ◻	DECC Energy Follow Up Survey 2013

Key Questions



Key Questions

What is the extent of overheating?

- Looking for evidence and instances of overheating
- Case Studies

How does overheating affect sleep and productivity?

- Military research on sleep deprivation and performance
- Less evidence on relationship between domestic thermal comfort, sleep and productivity

Questions for Stakeholders

- Current practice – how does overheating policy affect them?

Lead Author for Processes and Practices Review?

Key Questions

What is the relationship of outdoor and indoor temperature?

- In the absence of evidence, what assumptions can we make if any?

How many heat-related excess deaths are due to domestic overheating?

- Where do heat-related deaths occur? (information not recorded)
- What is the relationship between heat-related health impacts and overheating in the built environment?

Other Questions for Evidence Review?

Other Questions for Stakeholders?



Evidence Gathering

Baseline Evidence Review

To be published Spring 2015

Thematic Evidence Reviews

Final drafts October 2014

To be published Dec 2014 or Spring 2015

