TACKLING OVERHEATING IN HOMES

Evidence Gathering
Baseline Evidence Review

Includes

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<th>Extent</th>
<th>Projected Impacts</th>
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<td>Current Impacts</td>
<td>Technical Solutions</td>
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<td>Definition And Thresholds</td>
<td>People/Behavioural Solutions</td>
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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

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
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
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

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

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

*AECONT*

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

### Supply Chain Issues
- Payback period
- 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
Progress Update

Thematic Evidence Reviews commissioned
Technical Group Brainstorming 4 June 2014
Expert Consultation
Literature Review
• 300+ articles identified
• Managing in Zotero
Issues Log
Baseline Evidence Review

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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

<table>
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<tr>
<th>Estimate</th>
<th>Monitoring</th>
<th>Reported</th>
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<tbody>
<tr>
<td>0.5%</td>
<td>20%</td>
<td>48%</td>
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<tr>
<td><strong>ASC based on English Housing Survey</strong></td>
<td>Beizaee, Lomas, and Firth 2013 – 207 homes in England</td>
<td>Respondents to GHA Survey - self-selecting sample, 185 instances</td>
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<td>Lomas and Kane 2013 – 268 homes in Leicester</td>
<td>(Taylor, Melissa 2014)</td>
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<td></td>
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<td>20%</td>
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<td>DECC Energy Follow Up Survey 2013</td>
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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