

Building Regulation Part O Event

Occupant and design perspectives.

IMOGEN CHRISTODOULOU

A CONVERSATION WITH CIBSE HVAC SYSTEMS GROUP





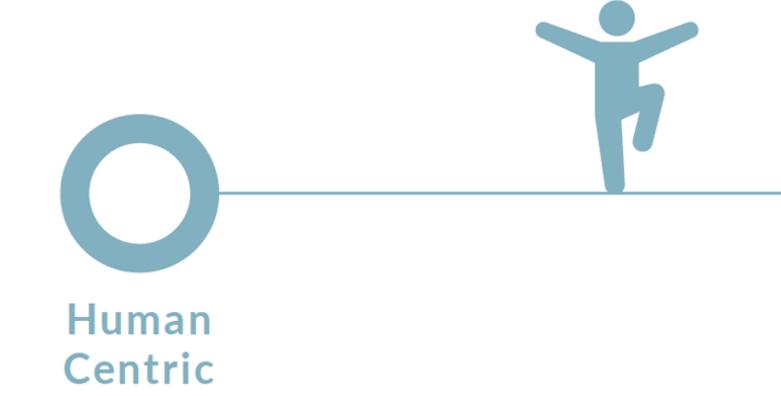
Presentation Outline.

- Occupant perspectives on overheating risk
- Early planning
- Sources of overheating
- Ventilation & window design
- Shading options
- Summary





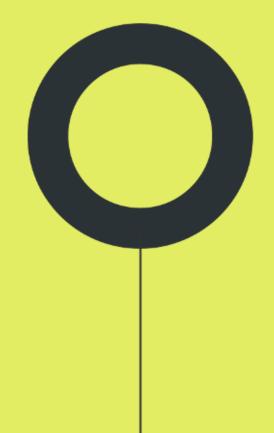
The challenge.







Occupants health and wellbeing must come first.





Overheating can kill!

The number of heat-related deaths is likely to increase to:

7,000 /year by 2050

Equivalent to:

4x road traffic fatalities / year





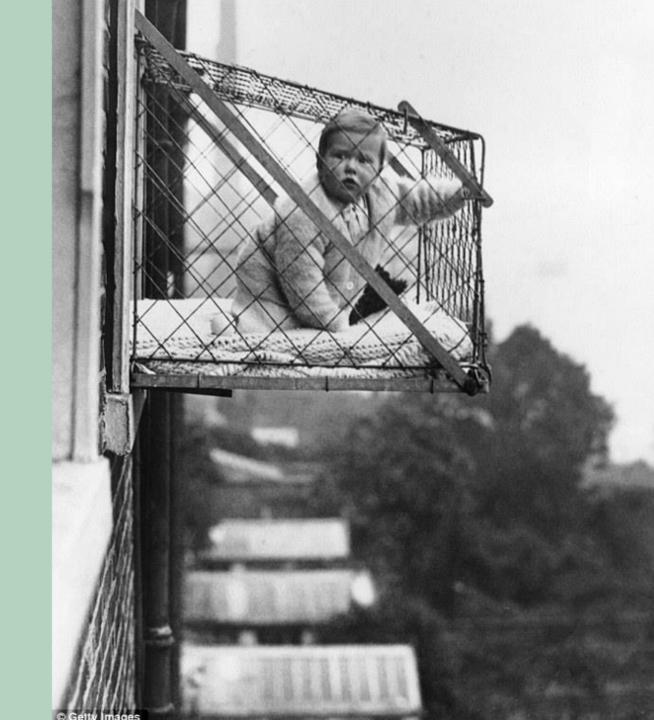


Overheating will have a detrimental impact on sleep.

- Hotter nights will affect our sleeping patterns.
- By 2050 climate change could reduce our sleep, on average, by:

30 minutes/ night

(Source: Night time temperature and human sleep loss in a changing climate, Obradovich, 2017)





Who are we designing for? And what do they want?



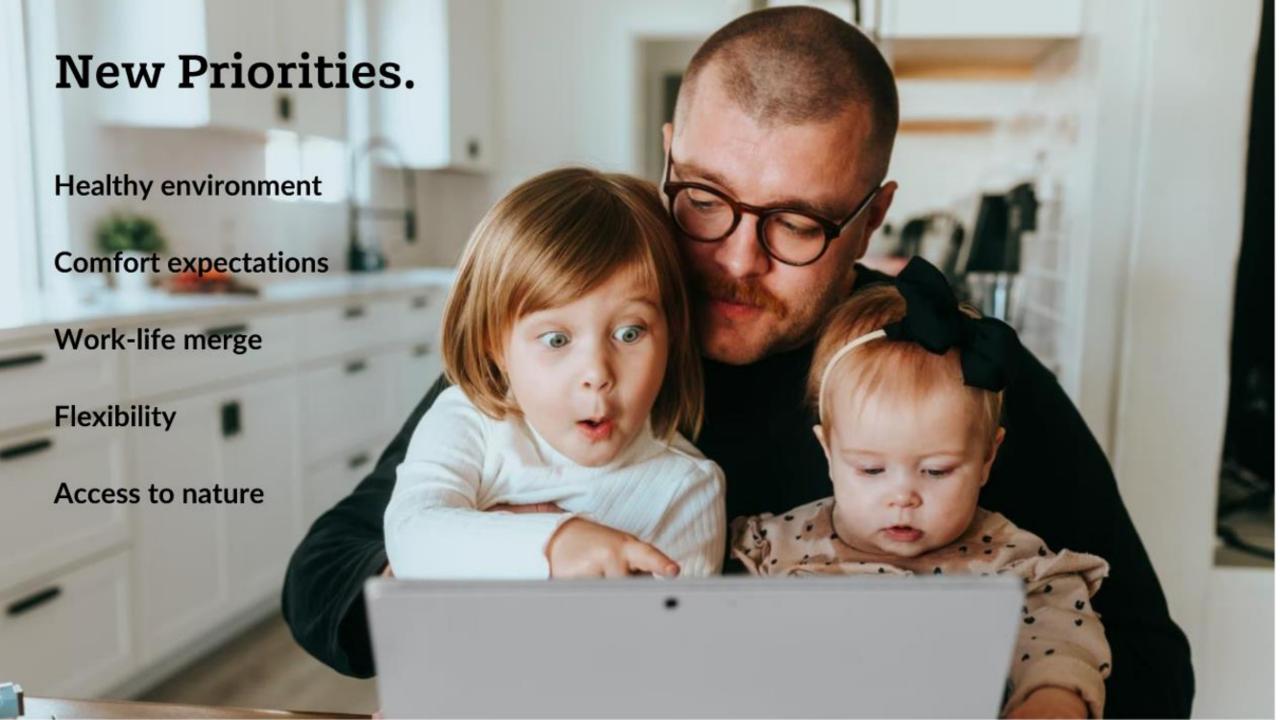








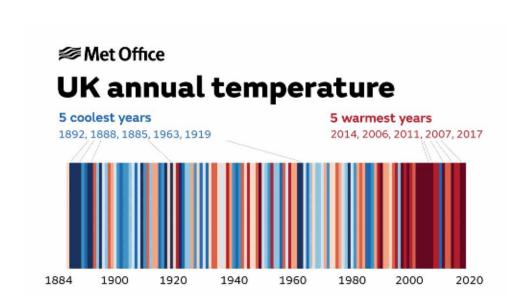






Key Challenges

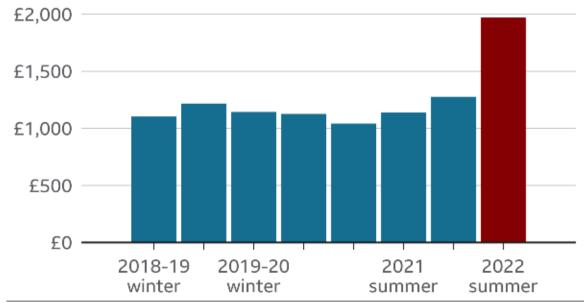
- Rising temperatures
- Rising energy prices
- Increased home working





The energy price cap has risen by nearly £700

Annual bill for a typical household on a price capped dual-fuel tariff paying by direct debit



Source: Ofgem B B C

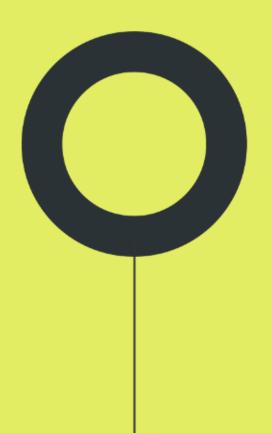
MVHR without summer by-pass or specified Causes of overheating air flow rate not achieved Heat emission from Solar gains through glazing (no shading) corridor heating distribution Heat transmission through fabric External noise becomes a nuisance for occupants when opening windows Internal heat gains Single aspect apartment inhibits Window opening restrictors reduce

free area for natural ventilation

cross-flow ventilation



How might people currently manage overheating?



HOARE LEA (H.)



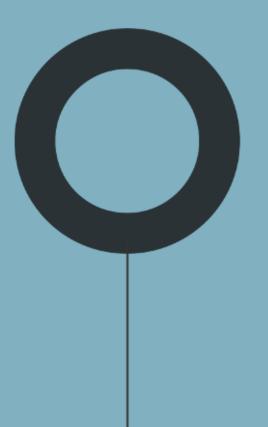








Early planning is key.



Evidence based design.

Health and wellbeing in homes.

UK GREEN BUILDING COUNCIL

hor

3

÷Ö:

and well-designed ventilation systems that promote good indoor air quality

MATERIALS

SOUND INSULATION

and good double glazing to promote quiet and tranquil home environments

LIGHT

is optimised with generous access to daylight and sunlight and well-designed supplementary electric lighting

RESILIENCE

designed in, with homes able to adapt and respond to changing occupant requirements and future climate change

COMFORT

ensured, using passive design to prevent both overheating and excessive heating costs

SENSORS

that monitor indoor conditions and increase resident awareness

BEDROOMS

that promote healthy sleep, relaxation and respond to circadian rhythms

COLOURS

that promote balance, wellbeing and relieve stress and anxiety



are energy efficient and low-emission heating, cooling and ventilation systems with simple and user-friendly controls

SYSTEMS

SECURITY

is built in: home environments are safe and secure

STORAGE

and space provision to promote stress-free functional living

- fabric/envelope
- internal layouts/ interior design
- systems
- interface with neighbourhood
- strategy overall concept

CONNECTED

to local amenities, public transport, and pedestrian routes to the wider community

LIVING SPACE

that provides stimulating environments for social engagement and play

WINDOWS

and layouts that maximise views out and natural ventilation opportunities

QUIET SPACE

provides settings for focused work, privacy, thinking, relaxation and reflection

KITCHENS

that promote positive family interaction and encourage healthy eating

LAUNDRY

provision to avoid moisture, mould growth and pollutant build-up within the home

FLOURISHING

is enabled: homes not only allow people to be physically and mentally healthy, but also provide opportunities to restore, uplift the spirit, and make people happy!



Wellbeing in mixed-use developments. Environmental design tensions.

Daylight

Thermal comfort

Air quality

Noise













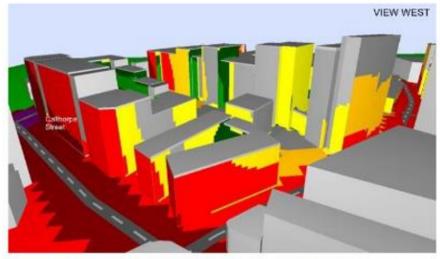


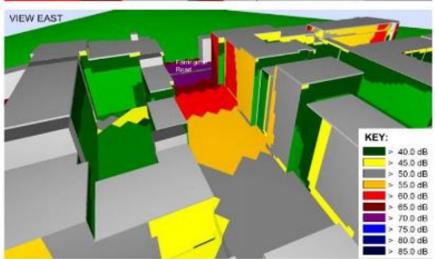
Early analysis should be used to optimise facade design.

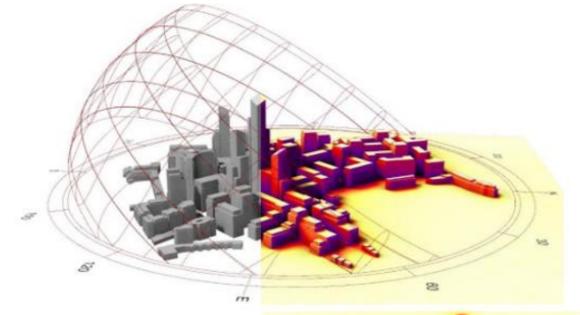




Site context







NOISE ASSESSMENTS

AIR QUALITY ASSESSMENTS

SOLAR ANALYSIS



kWh/m2 1050 1000

600

200



Optimising design.

Early analysis:

- Building form and location.
- Daylight, window and shading strategy.
- Acoustics review.
- Air quality analysis and ventilation strategy.
- External landscaping.





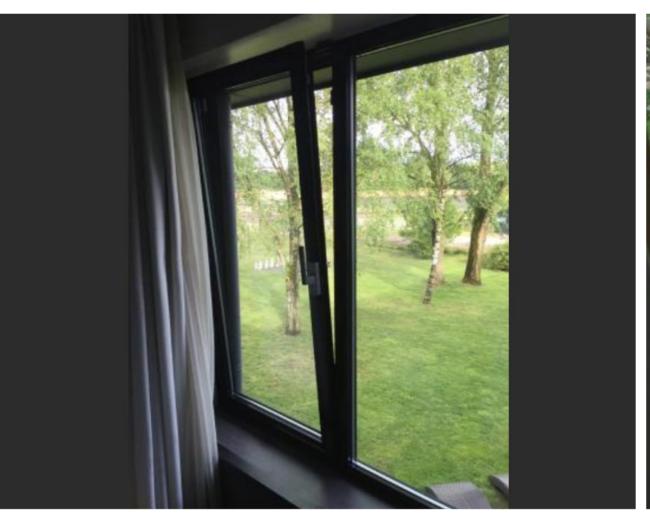


OPTIMISE BUILDING FORM AND FABRIC





Window design needs to consider in-use.







Shading Devices.

External Shading



Example of vertical window awnings







Safety and security.

- Ground floor bedrooms.
 - Fixed or lockable louvred shutters.
 - Fixed or lockable window grilles or railings.
 - Accessibility?
- Safety
 - Top level windows?







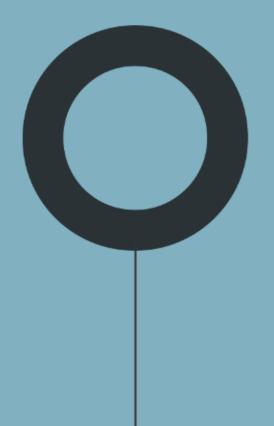
Summary.

- Occupants health and wellbeing is key
- Energy prices are continuing to rise
- Early planning is crucial
- Change to design
- Linked up thinking
- What do occupants want vs what do occupants need



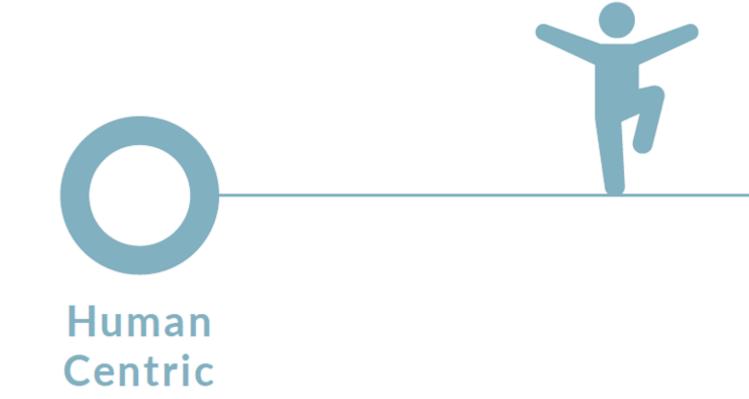


What do occupants want vs what do occupants need.



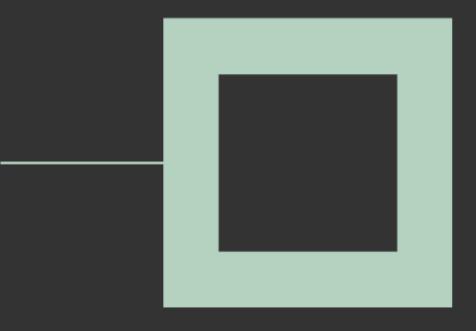


The challenge.









Thank you. hoarelea.com

imogenchristodoulou@hoarelea.com