

## What can we do to reduce high indoor temperatures in converted lofts now and in the future?

# IN BRIEF

### Researchers on the CUSSH project investigated ways to reduce overheating in converted lofts under current and future climate scenarios

As house prices increase, more people in the UK are converting lofts into additional rooms. However, overheating is a serious issue. This research asked three important questions:

1. Are converted lofts more likely to overheat than other rooms in a house?
2. What are the best adaptations for reducing loft overheating without using air conditioning?
3. How do these adaptations compare in terms of cost-effectiveness?

Using building physics, researchers simulated indoor temperatures in a semi-detached London dwelling under current and future climate scenarios.

### Methods

Three approaches were explored:

- **Reducing sunlight entry through roof windows:** including external shutters, internal roller blinds, internal curtains, changing the colours of the roof and walls, and solar control glass film
- **Increasing ventilation:** including night ventilation, cross ventilation, and different window types
- **Insulation:** including external wall insulation, internal wall insulation, and ground floor insulation

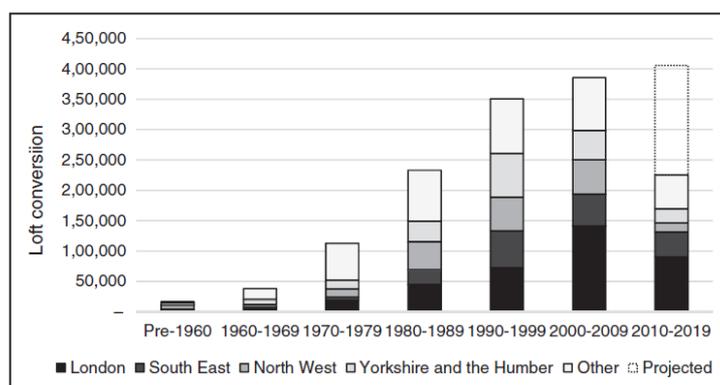


Figure 1. The number of loft conversions by date range conversion occurred, by English regions.



## Several low-cost options can significantly reduce the risk of overheating in converted lofts, but active cooling systems may be needed in the future

# IMPLICATIONS

### Results from the research and recommendations

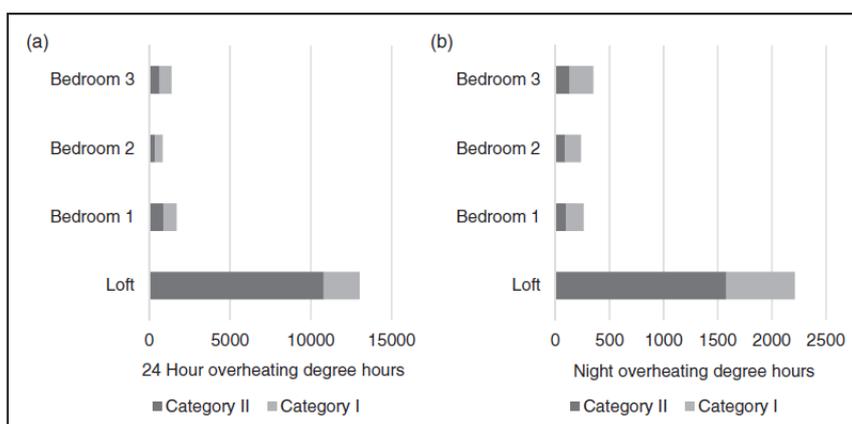
- Overheating risk is greater in converted lofts than in other rooms and future climates will increase the risk even further
- People most vulnerable to heat, such as the elderly or sick, should not occupy lofts during hot weather episodes
- External shutters are the single most effective intervention for heat reduction
- The best strategy in terms of both cost and heat reduction is night ventilation from roof windows on opposite sides of the loft combined with internal curtains closed during hot days
- However, under future climates air conditioning systems may be necessary to maintain comfortable temperatures

### National Government:

The current review of the Building Regulation on overheating suggests that consideration be given to the risks of loft overheating and the relevant passive cooling interventions

### Planners and Designers:

Consider the most efficient and effective combination of mitigating overheating when converting lofts, as well as cost-effectiveness



Li X, Taylor J and Symonds P (2019) Indoor overheating and mitigation of converted lofts in London, UK Building Services Engineering Research & Technology 40 (4) 409 – 425  
<https://journals.sagepub.com/doi/10.1177/0143624419842044>

Figure 3. Overheating degree-hours for the full day (a) and during night-time (b) for converted lofts compared to conventional bedrooms under current climate conditions.