CIBSE Weather Data & TM59 Update

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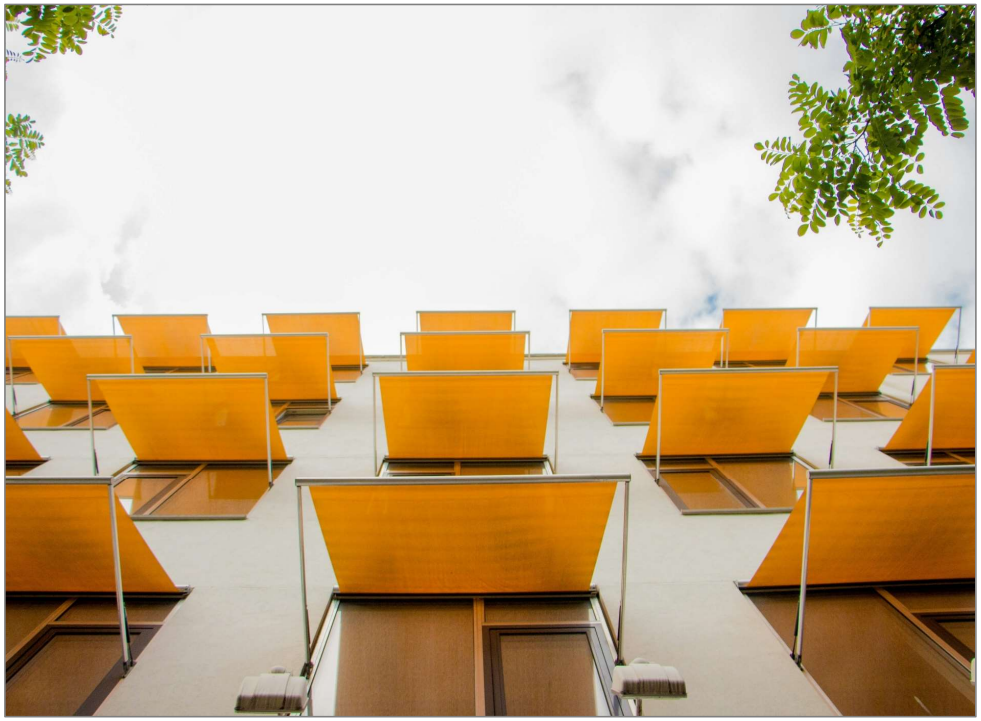
Who is CIBSE?

- Global professional institution with almost 22,000 members (30.5% are based internationally).
- Leading authority and standard setter on building services engineering.
- Leading on global practice in the profession.
- We advance the careers of building services engineers through accreditation, training and technical guidance.
- We work closely with government, providing expert advice which informs policy making.

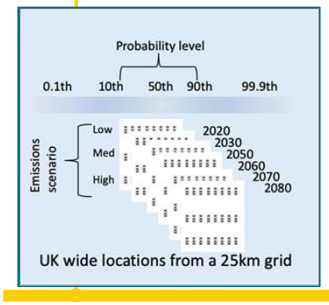


CIBSE Timeline on Weather Data and Overheating

CIBSE

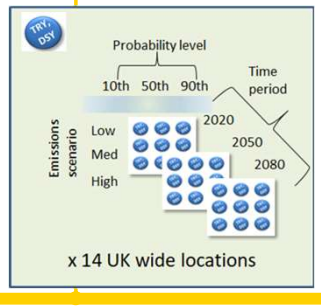
POLICY

2007, CIBSE Future weather files



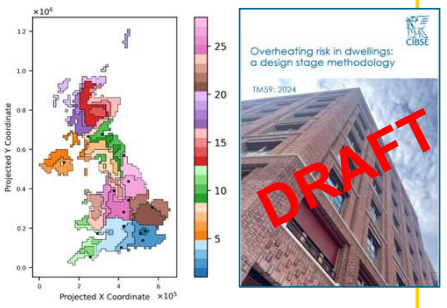
2013 CIBSE TM52, the limits of thermal comfort, 2013

2016, CIBSE Future weather files update



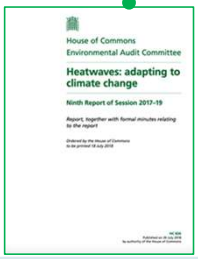
2017, CIBSE TM59
Requires use of CIBSE Weather Files

2025 NEW CIBSE Weather Data (UKCP18) + Revised TM59 Methodology

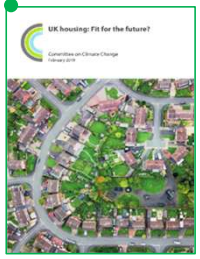


No regulatory or planning requirement to use CIBSE Weather Files

Growing anecdotal evidence of overheating in housing *e.g. via expert witnesses. Industry alert regulators, but evidence base is limited e.g. out-of-court settlements, residents' fear of devaluation.*

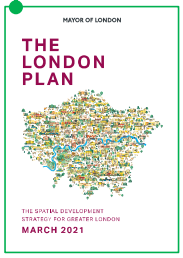


Environmental Audit Committee report on Heatwaves & adaptation, 2018



Climate Change Committee report, Housing – Fit for the Future?, 2019

London Plan, 2021
TM59
+ Good Homes Alliance at pre-app



Required by Building Regulations Part O + Part L via NCM, 2022

CIBSE Weather Data 2025 (UKCP18)

Stage 1: Development

CIBSE

University of Exeter

2.5 Yr Knowledge Transfer Partnership (KTP) resulted in 5,488 data files

Stage 2: Testing

Loughborough University

ARUP

INKLING

Check, Test + Advise

Stage 3: Launch

June 2025

Industry, Academic, Policy Collaboration

CIBSE

What's NEW!

Better Data!

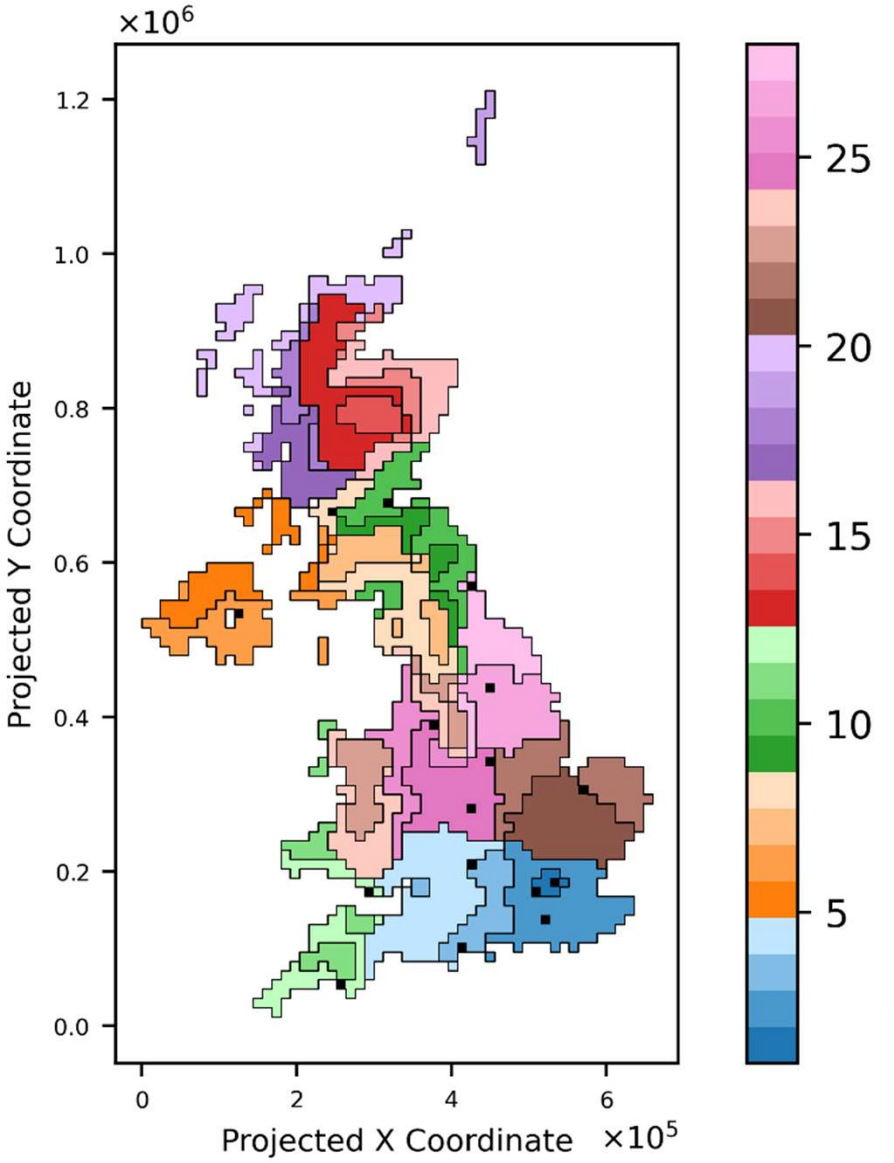
- Incorporates more recent observation data (1994 to 2023).
- Applies UKCP18 Met Office Climate Projections
- Improved solar radiation data from CAMS

More Accurate!

- Moved from 14 /16 locations to 28 Zones - making the selection of files easier, and representative of the actual climate. See **Xie et al** for more details.

Easier to access!

- “New weather data shop” to streamline the ordering process for members.



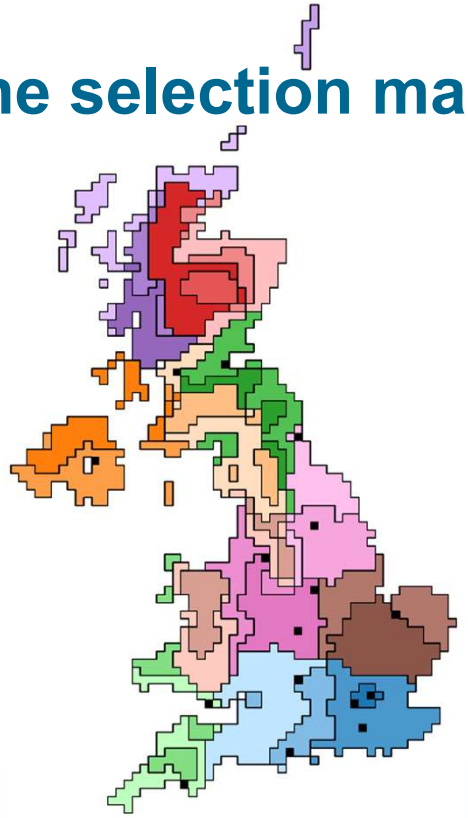
Slide Citation:
Xie, H. et al (2024). *Creating granular climate zones for future-proof building design in the UK*. Applied Energy, 357, 122549.
https://doi.org/10.1016/j.apenergy.2023.122549

Testing

- 5,000 + files produced for:
  - 5 timelines (Observation, 2020s, 2030s, 2050s, 2080s),
  - 4 emission scenarios,
  - 3 probability percentiles (10^{th}, 50^{th}, 90^{th}).
- Checking for accuracy, errors, anomalies.
- Assessing impact on 3 building typologies + variations:
  - Apartment
  - Semi Detached House
  - Office
- Evaluating performance by heating and cooling demand & TM59 criteria (2017 and 2025) amongst other metrics (HDD, CDD, No. of hours above X etc.)

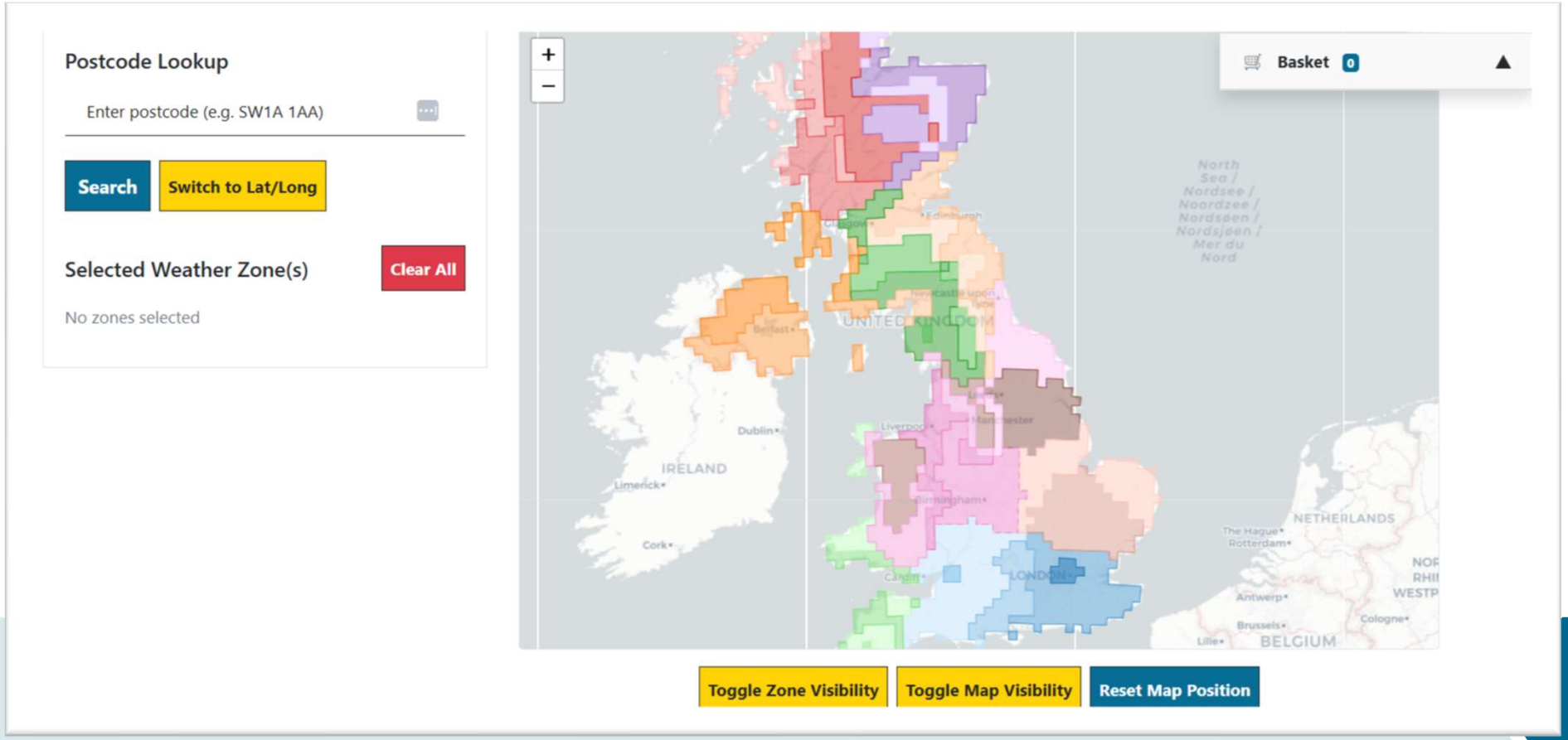
Easier to access: NEW Weather Data Shop

Online selection map

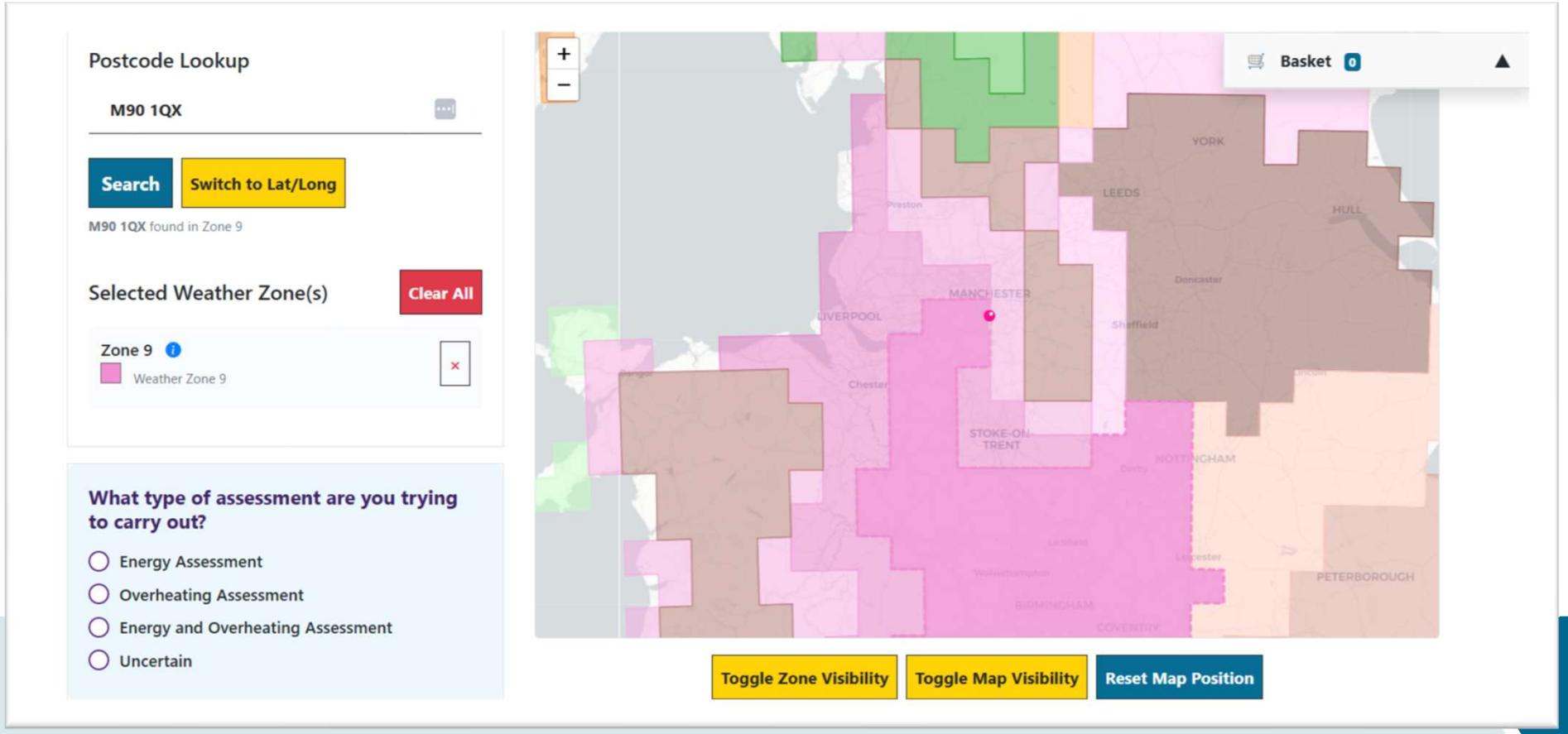


Short Q&A

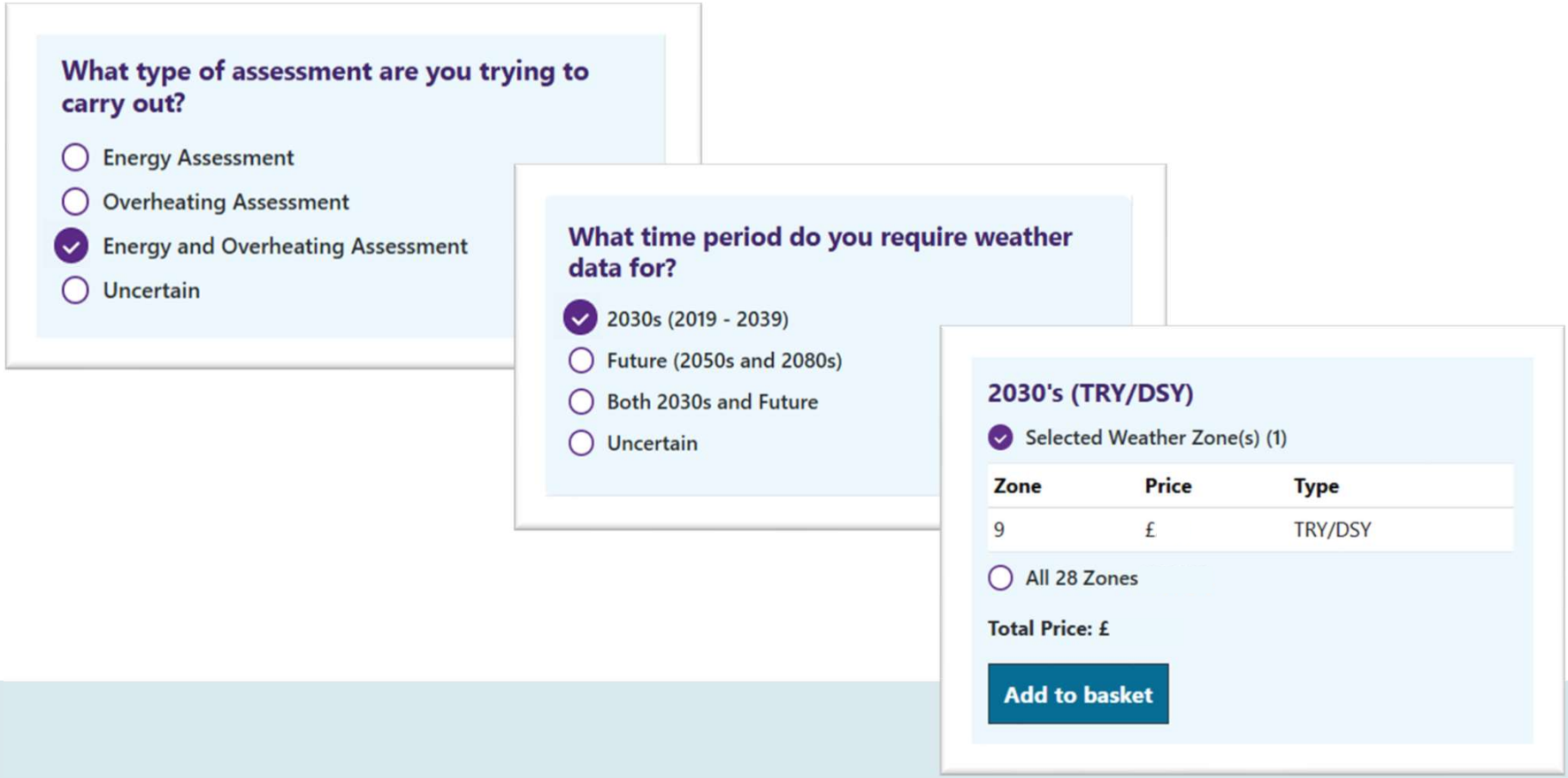
Step 1: Add Site Details



Step 2 : Select your required Zone



Step 3 : Q&A to determine Weather Data Package



Additional Features

Explore your CIBSE Weather File Zones

In Zone 22: East England 2 [Coastal] the No of Hours above 26°C* is:

Current	2030's	2050's	2080's
			
45 hrs	58 hrs	129 hrs	242 hrs

*Results are based on UKCP18 CIBSE Weather Files - DSY1, High Emission, 50th Percentile

Register Your Interest

Go to www.CIBSE.org

Knowledge & Research

Knowledge Toolbox

www.bit.ly/4kq3EzF

TM59 (2017)

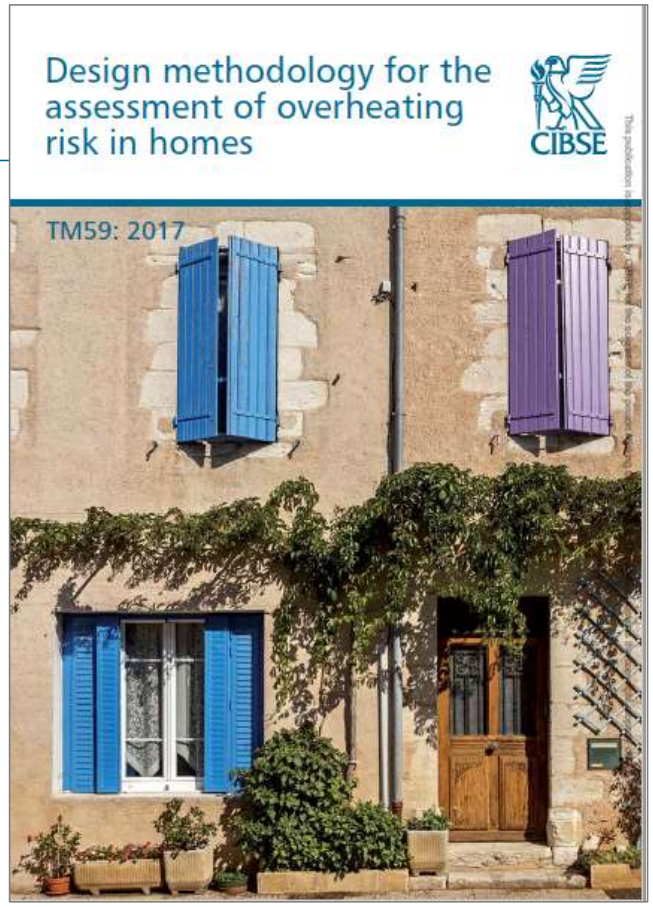
- Adopted into Building Regulations Part O 2021
- 2 criteria required to pass:

  Criterion a) all occupied rooms

  3% of the annual occupied hours should not exceed 26°C in operative temperature.

  Criterion b) bedrooms

  night-time operative temperatures should not exceed 26°C threshold ***for more than 1% of annual hours*** *(i.e. 33 hours or more).*



New Criterion B

- Loughborough University research suggested night-time bedroom criterion was too onerous in 2023.
- Re-analysed temperature data from 591 UK bedrooms (EFUS) and reviewed literature on heat and sleep to inform a new overheating threshold.
- Proposed change to Criterion b. based on the number of summer nights instead of annual hours.

Slide Citation:
Lomas KJ, Li M. An overheating criterion for bedrooms in temperate climates: Derivation and application. Building Services Engineering Research & Technology. 2023;44(5):485-517.
doi:10.1177/01436244231183113

New Criterion B

Criterion b. *For bedrooms only: the number of nights for which the mean operative temperature between 10pm and 7am exceeds Tn, between 1st May to 30th September, shall not be more than 7 nights.*

= ***For bedrooms****: the night-time mean operative temperature should not exceed* ***Tn*** *in summer for more than* ***7 nights****.*

Tn = 26°C for CAT I *(i.e. dwellings designed for sensitive or fragile persons)*
or
27°C for CAT II *(i.e. all other dwelling types)*

Other Updates

Ceiling Fans

- Include if: Installed in base build, can be operated by occupants and can be quiet.
- Threshold uplift: +1.2°C (naturally ventilated), +2.0°C (mechanically ventilated).
  Max 0.6m/s air speed generation and when internal resultant temperatures exceed 25°C.
- Applies to daytime only (insufficient evidence of improvement to sleep comfort).

Other:

- CIBSE UKCP18 Weather Data recommendation
- Criterion to be used when mechanical ventilation and cooling is unavoidable is clarified.
- Criterion and internal gains profile to be used for the assessment of home offices has been added.

Supporting Documents: TM59 and Part O

TM59 and Part O Checklist

- Highlight differences between AD-O and TM59
- TM59 (2025) moving towards modelling protocols in Part O *(e.g., window opening profile, definition of day and night-time)* (TBC).
- However, TM59 will still differ on the treatment of blinds/curtains and other aspects.
- Dialogue open with HSE

Weather Data Specification

- Separate document that specifies weather data required to make updates to the file selected easier.

Next steps

Peer and Technical Review Complete

Engaging with Software Providers

Testing with UKCP18 Weather Data

Publish v2 (2025)

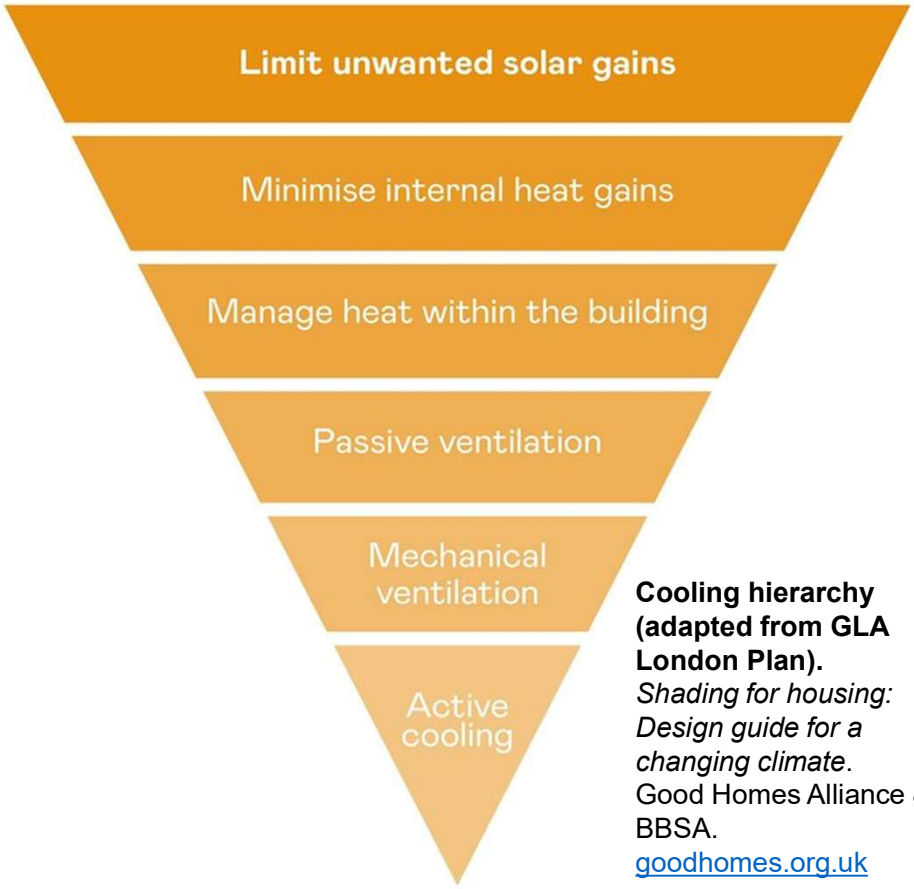
Get it adopted into Part O

New CIBSE ‘Sustainable Cooling’ Working Group

Co – Chairs: Graeme Maidment, DESNZ
Jesus Lizana, Oxford University

To bring professionals together to identify:

- Gaps in knowledge (CIBSE Knowledge, Policy, Research etc).
- Challenges and opportunities are for new areas of research.
- Activities taking place that can advance the art and science of sustainable cooling.
- Dissemination and advocacy of the challenges, opportunities and activities.



Cooling hierarchy (adapted from GLA London Plan). *Shading for housing: Design guide for a changing climate*. Good Homes Alliance & BBSA. goodhomes.org.uk

Thank you

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