TECHNICAL BRIEFING

CIBSE WEATHER DATA [2025 Release] V1.1

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1. Release Log and Updates

Table 1. Version History of Weather Data [2025 Release]

Version	Date of Release	Summary of Changes
V1.0	14th July 2025	First release of 2025 Weather Files
V1.1	21st May 2026	V1.1 improved the calculation of horizontal infrared radiation intensity, which was identified as being abnormally high in the v1.0 dataset. This update involved all v1.0 weather files, including TRYs and DSYs, across all locations.

Who is affected by the update?

This update is most relevant to users of DesignBuilder and EnergyPlus, as DesignBuilder and EnergyPlus defaults to using the horizontal infrared radiation intensity values in the weather file. Users of IES and EDSL TAS are generally not affected, since these platforms default to software calculated horizontal infrared radiation intensity values.

What should I do next?

We advise all those who have purchased the v1.0 files to download and replace with the v1.1 files. Particularly for DesignBuilder and EnergyPlus users, we recommend rerunning simulations using the v1.1 files.

How do I obtain the updated files?

If you previously purchased v1.0 Weather Data, you will have received one or more emails at the address associated with your CIBSE account. The emails will contain links to the v1.1 Weather Data, which you should click on to download the data locally.

If you have not previously purchased v1.0 Weather Data and would like to purchase the v1.1 Weather Data, please use the Weather Data Selection Tool.

Who can I contact for more information?

Please feel free to email weatherdata@cibse.org for any questions.

2. What Weather Data do CIBSE provide and what can they be used for?

CIBSE provide Test Reference Years (TRYs) and Design Summer Years (DSYs).

TRYs represent a typical weather year and should be used to conduct annual energy assessments.

DSYs are years with various hot weather events and should be used to conduct overheating risk assessments. There are three types of DSY files available (DSY1, 2 and 3) representing different hot weather events:

- DSY1: a moderate year containing heat events with a return period of 7 years.
- DSY2: the year containing the most intense heat events.
- DSY3: the year containing the longest heat events.

3. What locations are the weather data available for?

The new weather data are available for 28 UK Zones that are representative of the climate conditions across England, Wales, Scotland and Northern Ireland. The Zones can be navigated using the *CIBSE Weather Data Selection Tool*. Here you can enter the site location of your project (by post code or longitude d latitude) to identify the appropriate Zone.

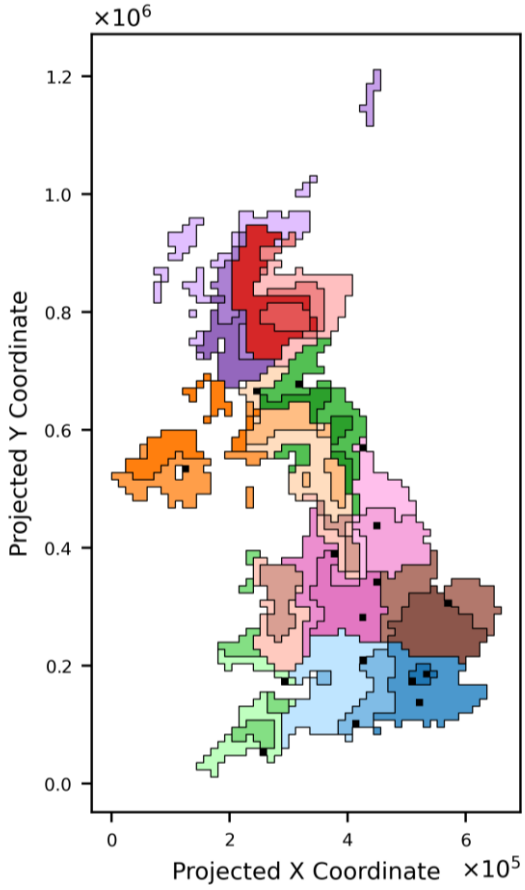


Figure 1. UK Weather Data Zone Map [2025 Release]
(Black squares identify the locations of CIBSE 21016 Weather Data)

4. What other scenarios of the weather data are there?

Weather data is available for three future time periods: the 2030s (2019–2039), 2050s (2039–2059), and 2080s (2069–2089). Each time period includes different emission scenarios: High scenario (RCP 8.5) for the 2030s, Medium (RCP 4.5) and High for the 2050s, and Low (RCP 2.6), Medium, and High for the 2080s. Each time period also includes different probability percentiles: the 50th percentile for the 2030s and the 10th, 50th, and 90th percentiles for the 2050s and 2080s. Table 2. displays what scenarios CIBSE provides.

Table 2. Weather Data available in 2025 CIBSE Weather Data Release.

File Type	Time Period	Emission Scenario			Probability Percentiles		
		Low (RCP 2.6)	Medium (RCP 4.5)	High (RCP 8.5)	10th	50th	90th
TRY	2030s *(2019 - 2039)*			✓		✓	
	2050s *(2039 - 2059)*		✓	✓	✓	✓	✓
	2080s *(2069 - 2089)*	✓	✓	✓	✓	✓	✓
DSYs (1 - 3)	2030s *(2019 - 2039)*			✓		✓	
	2050s *(2039 - 2059)*		✓	✓	✓	✓	✓
	2080s *(2069 - 2089)*	✓	✓	✓	✓	✓	✓

Please note that after extensive consultation with industry the Current 2016 Weather Data based on weather station data collected between 1984 – 2013 has been replaced by the new 2030s time period which is representative of 2019–2039. This data better reflects the weather experienced now and in the near future.

5. What format are they available in and what do they contain?

All weather data are provided in epw. format which is compatible with most building simulation software.

Hourly data over a year are included in each file for the following weather variables:

- Dry Bulb Temperature (°C)
- Dew Point Temperature (°C)
- Relative Humidity (%)
- Atmospheric Station Pressure (Pa)
- Extraterrestrial Horizontal radiation (W/m^2)
- Extraterrestrial Direct Normal Radiation (W/m^2)
- Infrared Radiation intensity (W/m^2)
- Global horizontal radiation (W/m^2)
- Direct normal radiation (W/m^2)
- Diffuse horizontal radiation (W/m^2)
- Global Horizontal Illuminance (lx)
- Direct Normal Illuminance (lx)
- Diffuse Horizontal Illuminance (lx)

- Zenith Luminance (Cd/m^2)
- Wind Direction (°)
- Wind Speed (m/s)
- Cloud Cover (10ths)

The file also contains information to describe the file type, version number, copyright and source data licensing information, the latitude and longitude and relevant time zone.

Each file is labelled in the following way:

Z1_DSY1_2020s_HIGH10_CIBSE_v1.1.epw

Zone#_FileType_TimePeriod_EmissionScenarioProbabilityPercentile_Provider_Version#.epw

6. How were the UK Weather Data for the 2025 Release created?

Test Reference Years

A baseline file that is constructed of months that best represent long-term climate trends is created for each Zone from data recorded by the Met Office between 1994 - 2023. Statistical methods are used to select the most 'average' month, interpolate missing values and smooth the data between the months of the years. Climate change factors are then applied to the baseline file to create future files for different time period, emission and probability scenarios. For a more detailed description please see Eames *et al.*[1,2]

Design Summer Years

DSYs are selected based on the return periods of their hot events. The methods used are more comprehensively explained within *Eames et al* [1,2] and *Xie et al*[3]

Three DSYs are provided which capture different types of hot events between April and September. DSY1 includes a hot weather event with a one-in-seven-year likelihood. DSY2 represents the year with the most intense heat. DSY3 captures the year with the longest-lasting heat event.

[1] Eames ME, Xie H, Mylona A, Shilston R, Hacker J. A revised morphing algorithm for creating future weather for building performance evaluation. *Building Services Engineering Research & Technology*. 2023;45(1):5-20. doi:10.1177/01436244231218861
[2] Eames ME, Xie H, Mylona A, De Grussa Z, Challenor P. (in press). Comparative Analysis of Old and New Test Reference Years: City-Based vs. Climate Zone-Based Approaches. *Building Services Engineering Research & Technology*
[3] Xie, H., Eames, M., Mylona, A., Davies, H., & Challenor, P. (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

7. What has been updated between the 2025 and 2016 release of Weather Data?

A. More up to date baseline

The historical 30-year observation data used for the creation of the weather files has been updated from 1984 – 2013 to 1994 – 2023, using primarily Met Office observations.

B. UK Climate Projections 2018 (UKCP18)

The baseline files have been morphed to UKCP18 climate projections to create the 2030s, 2050s and 2080s weather files[1,2]. UKCP18 is the latest set of climate projections released by the UK Met Office to help policymakers, engineers, and researchers understand how the climate is changing and what future conditions might look like. For more information see: UKCP science - Met Office. The 2016 release of weather data were based on UKCP09 climate projections.

C. Improved solar radiation data

Solar radiation observations are often incomplete but essential for energy and overheating assessments. Missing data from Met Office stations has been supplemented with data modified from Copernicus Atmosphere Monitoring Service (CAMS) data. Specifically, ERA5 hourly data on single levels from 1940 to present[4].

D. Improved UK climate representation by creating distinct climate zones.

We have expanded the number of locations that weather data are available for. The 2025 release of weather data now provide data for 28 climatic zones across the UK that are more representative of the local climate. For further information on how these zones were created see *Xie et al[3].*

8. Why have we moved to Zones?

To better reflect differences in local weather. This improves the robustness of energy and overheating performance analysis, ensuring that weather profiles are more representative of each location. For more information on how the 28 climatic zones were defined see *Xie et al[3].*

9. How have they been tested?

Loughborough University, Arup and Inkling LLP supported CIBSE and University of Exeter in testing the 2025 release of CISBE Weather Data.

The purpose of the testing was to:

a. ensure the 2025 Weather Data represents a logical and consistent variation of key weather metrics, both spatially across the UK and temporarily though the forthcoming decades and,

[4] Hersbach, H., Bell, B., Berrisford, P., Biavati, G., Horányi, A., Muñoz Sabater, J., Nicolas, J., Peubey, C., Radu, R., Rozum, I., Schepers, D., Simmons, A., Soci, C., Dee, D., Thépaut, J-N. (2023): ERA5 hourly data on single levels from 1940 to present. *Copernicus Climate Change Service (C3S) Climate Data Store (CDS)*, DOI: 10.24381/cds.adbb2d47

b. compare the differences in energy use and overheating risk between the 2025 and 2016 Weather Data releases.

The methods and results of this testing are currently being prepared to be published and this document will be updated with links to the results.

10. How does the 2025 Release compare to the 2016 Release?

The TRY (Test Reference Year) data was analysed to understand how the temperature characteristics between the 2016 CIBSE Weather Data and the new 2025 CIBSE Weather Data release differ and how changes in external conditions subsequently impact the heating energy demand in a typical semi-detached house. The DSY1 (Design Summer Year) data were assessed to determine changes in overheating hours, using *CIBSE TM59 Design methodology for the assessment of overheating risk in homes (2017)*[5] Criteria a and b as thresholds. These building models and results were generated as part of the testing project led by Loughborough University. The modelled case studies presented provide indicative examples of how the new weather data will impact building design outputs.

Figure 2 shows the annual mean temperatures of 2016 TRY Current and 2025 TRY 2030s, High (RCP 8.5), 50th percentile for comparative locations and Zones. Figure 3 shows the heating degree days for the two sets, with a base temperature of 15°C and Figure 4 shows the cooling degree days with a base temperature of 21°C.

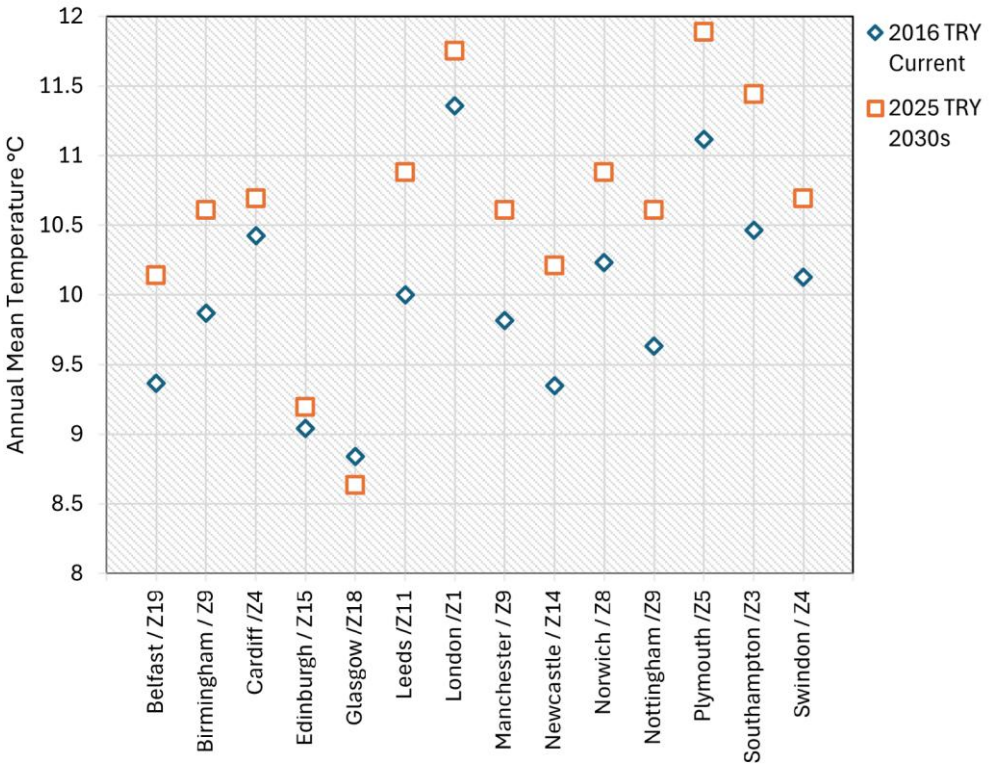


Figure 2. Annual Mean Temperatures.

[5] CIBSE (2017). TM59: Design methodology for the assessment of overheating risk in homes. *Chartered Institution of Building Services Engineers*. ISBN: 9781912034185. Available at: CIBSE Knowledge Portal

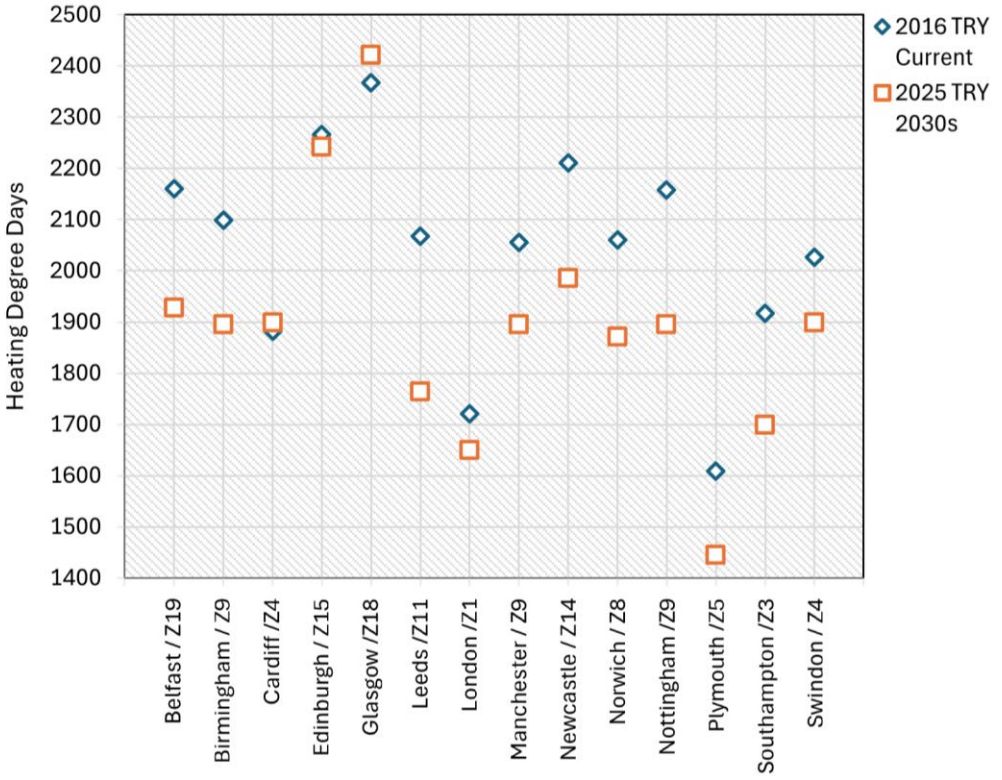


Figure 3. Heating Degree Days with a base temperature of 15°C

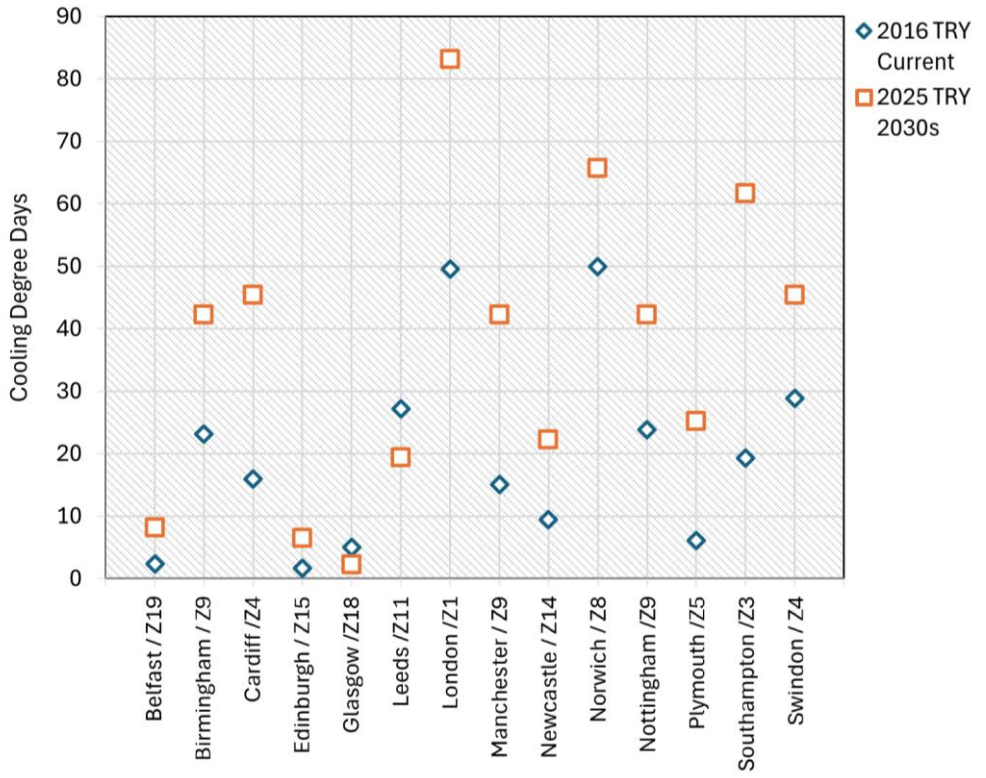


Figure 4. Cooling Degree Days with a base temperature of 21°C

The overarching trend observed across all locations indicates an increase in annual mean temperatures (Figure 2) and cooling degree days (Figure 4), accompanied by a corresponding reduction in heating degree days (Figure 3) when comparing the 2016 and 2025 TRY Weather Data. This shift is expected, as the baseline period has been updated to include more recent data (1994–2023 instead of 1984–2023) and incorporates more recent warm years, including 2022 - the UK's hottest year on record, according to the Met Office. Additionally, the 2025 TRY Weather Data are representative of the 2019–2039 period, offering a more accurate reflection of current weather conditions and represents the near-term future more reliably than previous datasets.

DSY1s

The one-bedroom, single-aspect apartment is constructed using heavyweight materials with external insulation. It has an internal floor area of 46.4 m², a floor-to-ceiling height of 2.48 m, a form factor of 4.0, and a total glazing area of 4.32 m². The dwelling is situated on an open site, with no external shading from adjacent buildings.

Thermal properties:

- Wall U-value: 0.18 W/m²·K
- Window U-value: 1.09 W/m²·K
- Solar heat gain coefficient (g-value): 0.52

The apartment is naturally ventilated through operable windows, which respond to indoor temperature. Windows begin to open at 22°C and are fully open above 26°C, remaining closed when the temperature falls below 22°C. There are no constraints on window operation related to noise, security, or occupant behaviour. The background infiltration rate is set at 0.25 air changes per hour. Occupancy schedules and internal heat gains are consistent with those specified in TM59 (2017).

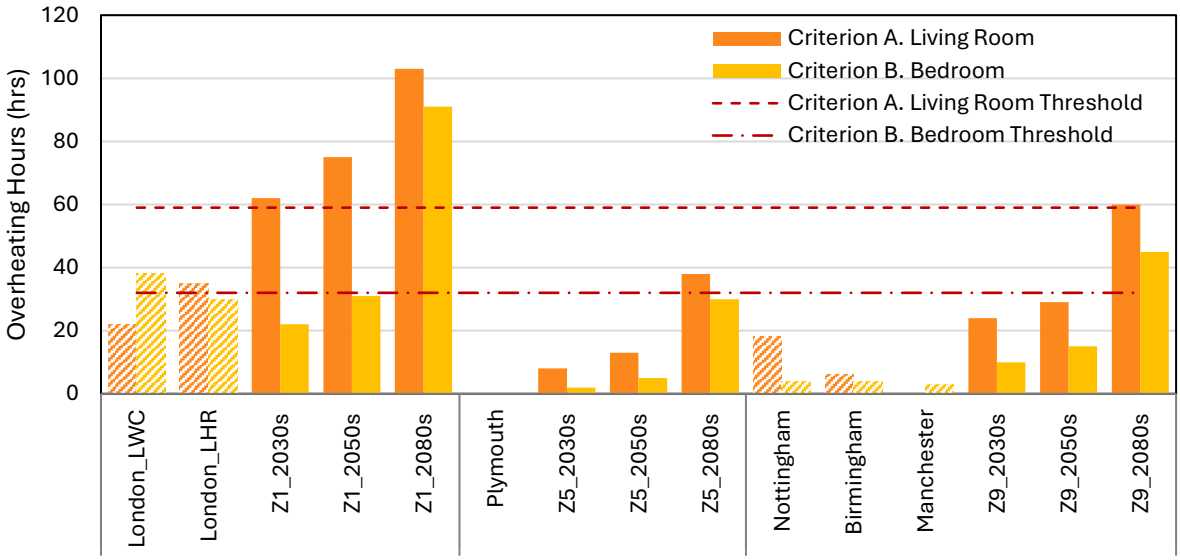


Figure 5. Comparison of Overheating hours comparing CIBSE 2016 Weather Data for DSY1, 2020s, high emissions, 50th percentile (diagonal stripes) and CIBSE 2025 Weather Data for 2030s, 50s and 80s, high emissions (RCP 8.5), 50th percentile (solid colour).

Figure 5 demonstrates that for the locations investigated the 2025 Weather Data makes it more challenging to meet TM59 (2017), particularly Criterion A in living rooms and in London/Zone1. Whilst Zones 5 and 9 experience an increase in overheating hours compared to the 2016 weather dataset, the TM59 (2017) criteria can still be met up until the 2080s (representative of 2069 -2089). This increase in overheating hours is expected given that the baseline used to create the future files has been updated and now spans 1994–2023 (replacing 1984–2023), incorporating more recent warm years. Additionally, the new datasets use future weather files that reflect the 2030s (2019–2039), in contrast to the 2016 datasets, which were based on the 2020s (2011–2040) and incorporate more recent climate projections (UKCP18). This shift results in weather data that more accurately capture current climatic trends and the increasing frequency of extreme heat events, such as those seen in 2022.

Whilst the 2025 Weather Data is observed to be more challenging, it should be highlighted that the building modelled is absent of mitigation features (such as shading, and optimal openable window areas). The modelled case study presented provides an indicative example of how the new weather files will impact building design outputs.

TRYs

The semi-detached house is designed using heavyweight construction materials and is based on a dwelling model from the *Research into Overheating in New Homes – Phase 1* report by AECOM for the Ministry of Housing, Communities and Local Government[6]. The design has been updated to comply with current Building Regulations, specifically Part L (Conservation of Fuel and Power) and Part F (Ventilation)[7,8]. The house comprises three floors, with the roof space converted into a bedroom with an en-suite bathroom. It has an internal floor area of 111.5 m² (of which 103.1 m² is conditioned), and ceiling heights vary by floor: 2.36 m on the ground floor, 2.56 m on the first floor, and an average of 1.29 m on the second floor. The total glazing area is 9.57 m². The dwelling is situated on an open site with no external shading from surrounding buildings. Ventilation is provided at a continuous rate of 37 L/s and infiltration is set at 0.25 air changes per hour. The heating system operates year-round between 07:00 and 22:00. In the living room, the heating setpoint is 21°C with a setback temperature of 15°C. For all other rooms, the setpoint is 18°C, also with a setback of 15°C.

Figure 6. demonstrates that overall, the 2025 Weather Data result in consistently lower heating demand across the UK. The greatest reduction is observed between Cardiff and the new Zone 5 - covering the south coast of Wales and the Southwest of England- with a decrease of 1,335 kWh, equivalent to a 53% reduction. The smallest reduction is seen between Edinburgh and the new Zone 15, with a 628 kWh decrease, or 20%. Apart from Cardiff, all other location-to-zone comparisons show reductions in heating demand ranging from 20% to 38% (628 - 1,093 kWh). As noted regarding the observed decrease in heating degree days (Figure 3), this reduction is expected and reflects the updated baseline period (1994 - 2023), which captures the warming trend driven by climate change.

[6] MHCLG (2019). Research into overheating in new homes - Phase 1 report. *AECOM for Ministry of Housing, Communities and Local Government*, London. (http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/)
[7] HMG (2023) The Building Regulations 2010, Approved Document L Conservation of Fuel and Power, Volume 1: Dwelling., 2021 edition incorporating 2023 amendments.
[8] HMG (2021). Approved Document F: Ventilation – Volume 1: Dwellings. Retrieved from https://assets.publishing.service.gov.uk/media/61deba42d3bf7f054fcc243d/ADF1.pdf

The 2025 TRY Weather Data also better represent current and near-future conditions (2019 - 2039) than the previous 2016 TRY current weather data (1984 - 2013).

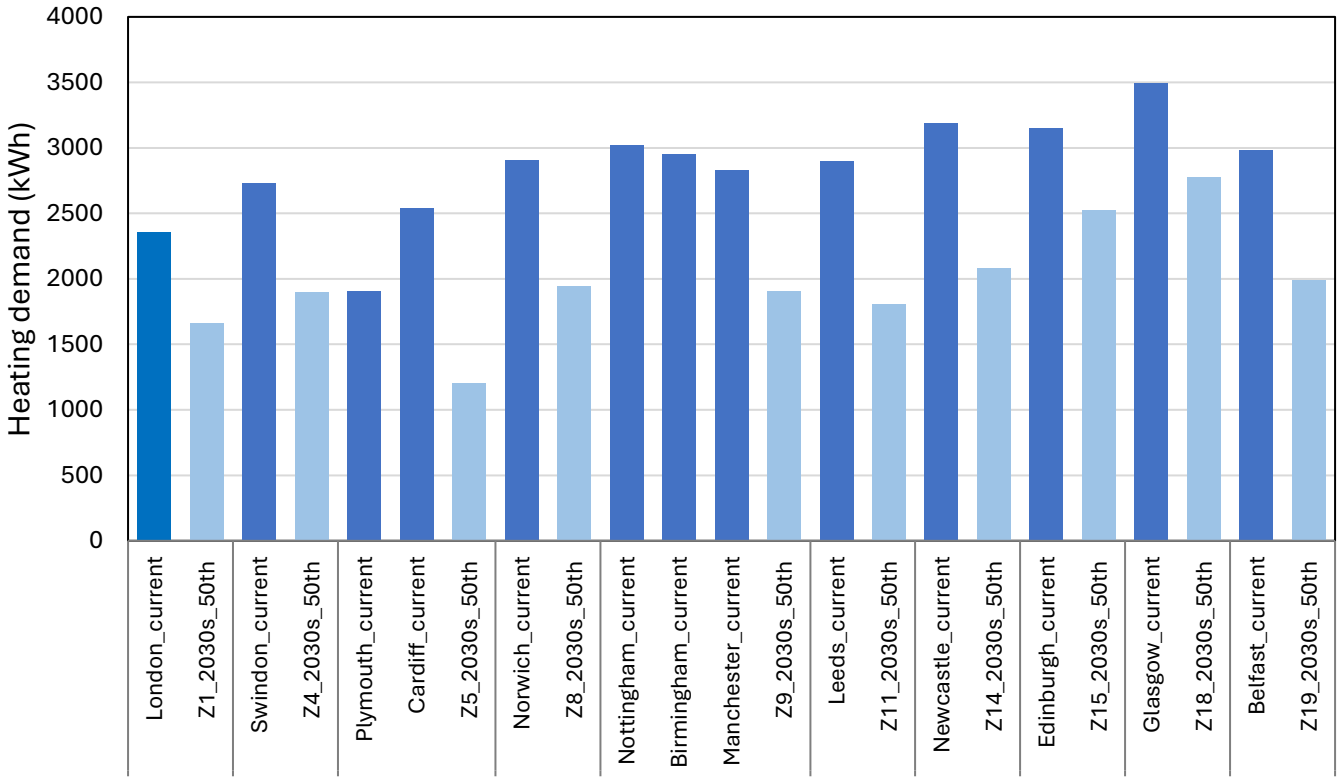


Figure 6. Comparison of heating energy demand (kWh) which compares CIBSE 2016 Weather Data for the current TRYs (dark blue) and CIBSE 2025 Weather Data for 2030s, high emissions (RCP 8.5), 50th percentile (light blue).

11. Emission Scenarios

Four emissions scenarios were made available as part of the UKCP18 climate projections: RCP 2.6, RCP 4.5, RCP 6.0 and RCP 8.5[9]. These scenarios are depicted in Figure 2. and plotted against the global warming level relative to pre-industrial levels in degree Celsius (°C).

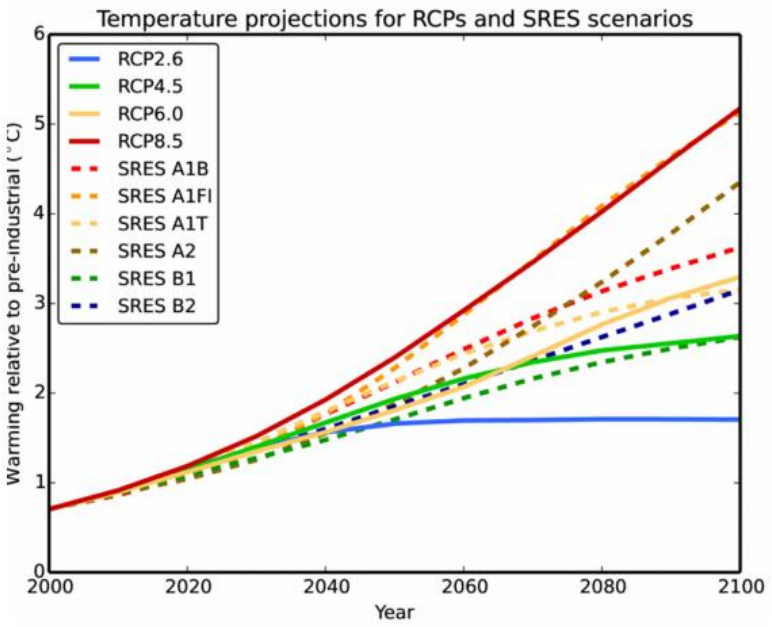


Figure 7. Global mean temperature projections relative to a pre-industrial average (1850 – 1900) for RCP 2.6 (blue), RCP 4.5 (green), RCP 6.0 (yellow) and RCP8.5 (red) and the older SRES scenarios (dashed coloured lines). Image taken from UKCP18 Guidance: Representative Concentration Pathways [9].

Initially, CIBSE generated weather datasets for all four UKCP18 emission scenarios: RCP 2.6, RCP 4.5, RCP 6.0, and RCP 8.5 and aimed to release only those that were distinctly different from one another. When compared it was observed that there was very little difference in the four emissions up to the 2050s. As a result of this only one emission scenario has been released for the 2030s – RCP 8.5.

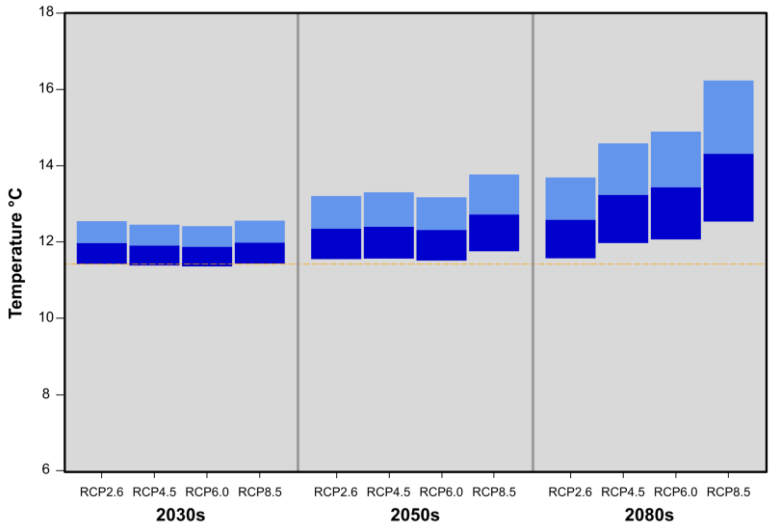
For the 2050s, RCP 2.6, RCP 4.5, and RCP 6.0 remained quite similar. Therefore, CIBSE chose to release data for RCP 8.5 and RCP 4.5. By the 2080s, the differences between scenarios becomes more noticeable. However, RCP 4.5 and RCP 6.0 remain similar. Therefore, the data for the 2080s was reduced to RCP 2.6, RCP 4.5 and RCP 8.5 as RCP 6.0 would provide little additional insight.

Resulting in CIBSE providing a Low (RCP 2.6), Medium (RCP 4.5), High (RCP 8.5) emission scenarios.

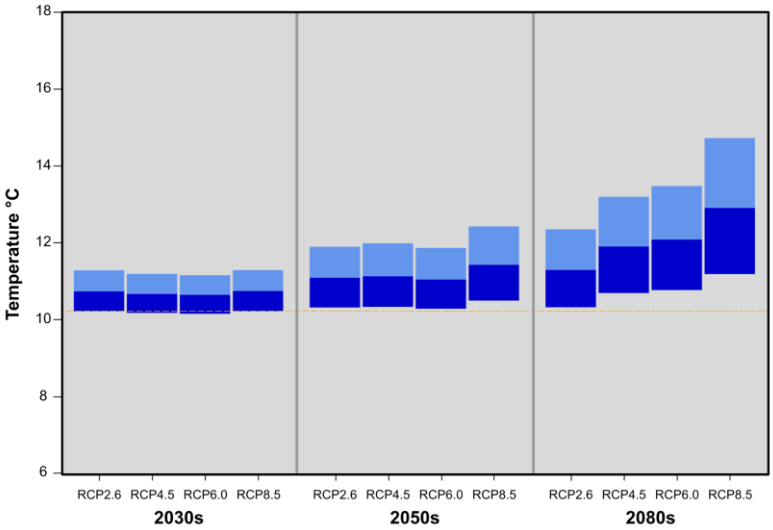
Figures 3 and 4 compare the annual and summer mean temperature for Zones 1, 9 and 18 across all time periods, emission and probability scenarios assessed. In each of the box plots the median represents the 50th percentile weather data scenario, the first quartile represents the 10th percentile, and the third quartile represents the 90th percentile. The yellow dashed line represents the annual mean temperature of the 30-year baseline 1994 – 2023.

[9] Met Office. (2018). UKCP18 Guidance: Representative Concentration Pathways. *UK Government*. https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-guidance---representative-concentration-pathways.pdf

a) TRY Zone 1 – inc. Greater London



b) TRY Zone 9 – inc. Birmingham, Manchester and Nottingham



c) TRY Zone 18 – inc. Glasgow Weather Station

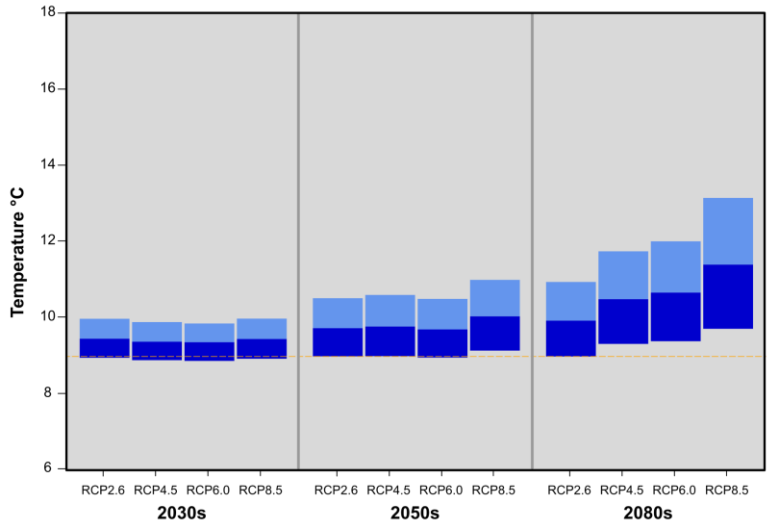
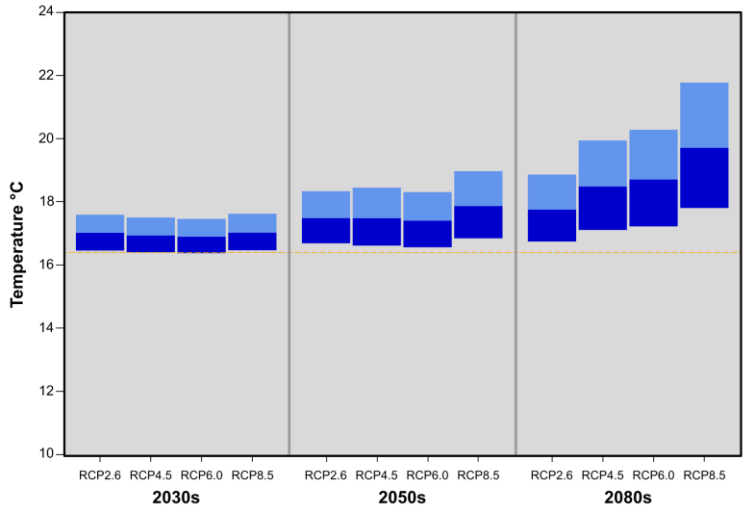
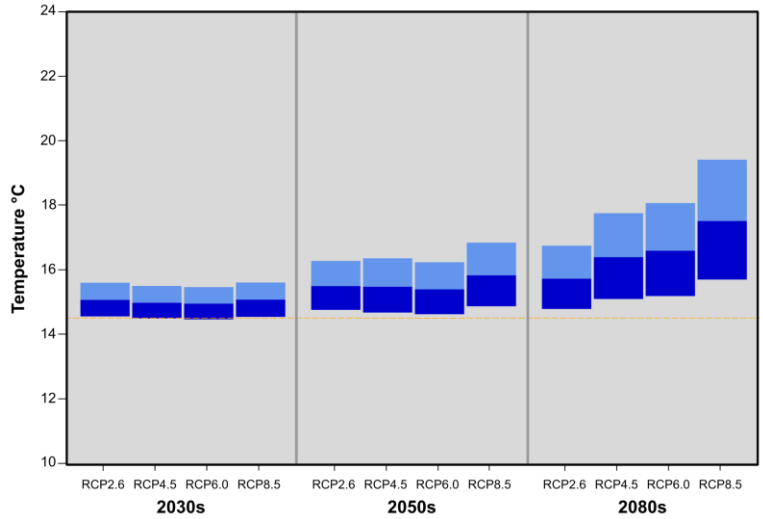


Figure 8. Annual Mean Temperature of the 2030s, 50s and 80s Weather Data for all emission scenarios for TRY Weather Data for a) Zone 1, b) Zone 9, c) Zone 18.

a) DSY1 Zone 1 – inc. Greater London



b) DSY1 Zone 9 – inc. Birmingham, Manchester and Nottingham



c) DSY1 Zone 18 – inc. Glasgow Weather Station

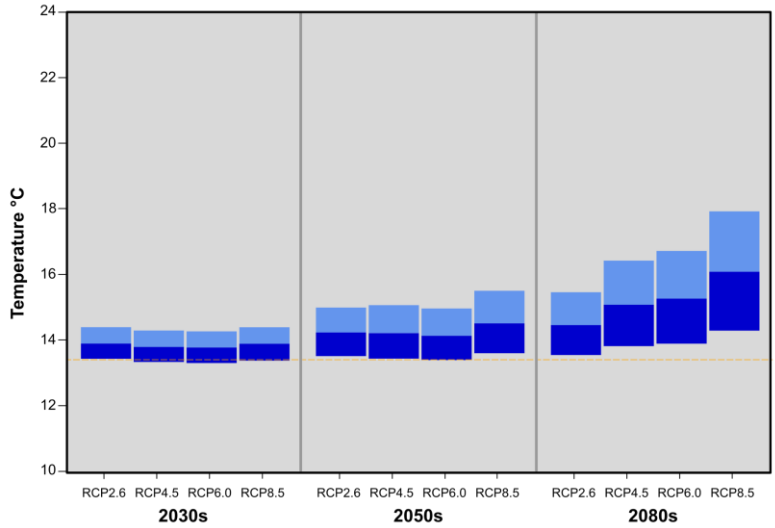


Figure 9. Summer (May – September) Mean Temperature of the 2030s, 2050s and 2080s Weather Data for all emission scenarios for DSY1 Weather Data for a) Zone 1, b) Zone 9, c) Zone 18.

For more details on the emission scenarios please see:

- Met Office: UKCP18 Guidance Representative Concentration Pathways[9]
- UK Climate Risk Independent Assessment (CCRA3) Technical Report[10]
- IPCC, 2000: IPCC Special Report on Emissions Scenarios[11]

12. Probability Percentiles

Three probability percentiles are available: 10th, 50th, 90th.

These percentiles do not represent the probability of a specific outcome occurring. Instead, they reflect the range of weather data outputs under a given emissions scenario.

With the:

- **90th percentile** representing a plausible upper bound - only 10% of climate models project more extreme conditions (e.g., higher temperatures or solar gains). This is particularly useful for stress-testing buildings under worst-case overheating scenarios.
- **50th percentile** representing the median, offering a balanced view of expected conditions - often used for typical performance assessments.
- **10th percentile** representing a lower bound, useful for understanding cooler or less demanding conditions, which might affect heating loads or passive design strategies.

13. How to refer to CIBSE Weather Data [2025 Release]?

Weather Data files should be referred to in the following way when reporting the building modelling simulation parameters used:

Z1_DSY1_2030s_HIGH_50th_CIBSE_2025_V1.1

[10] Betts, R. A., Haward, A. B., & Pearson, K. V. (Eds.). (2021). The Third Climate Change Risk Assessment: Technical Report (CCRA3-IA). *UK Climate Risk*. https://www.ukclimaterisk.org/wp-content/uploads/2021/06/Technical-Report-The-Third-Climate-Change-Risk-Assessment.pdf

[11] IPCC, 2000: IPCC Special Report on Emissions Scenarios. Prepared by Working Group III of the Intergovernmental Panel on Climate Change. *Cambridge University Press*, Cambridge, United Kingdom, and New York, NY, USA. https://www.ipcc.ch/report/emissions-scenarios/