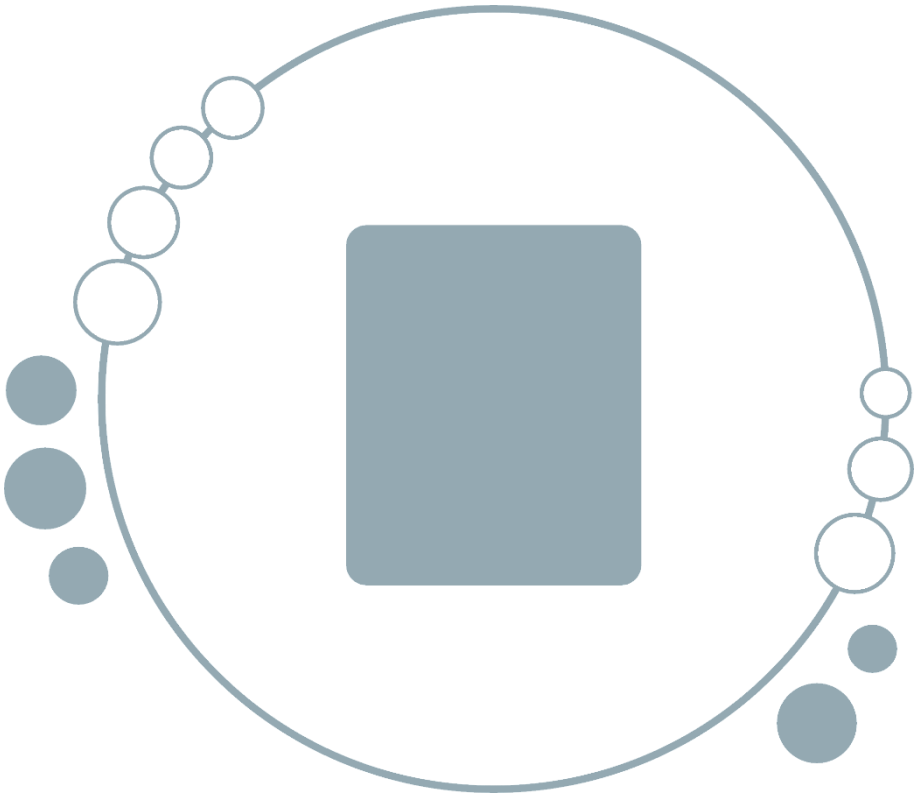

# Modelling Curtains and Blinds within the Home Energy Model: FHS assessment

## A technical explanation of the methodology

March 2026

**Acknowledgements**

This methodology has been developed for the Department for Energy Security & Net Zero by a number of organisations and individuals, including Sustenic, Quidos, Scene Connect, City Science, Hoare Lea, Oxford Brookes University, University of Bath, 10-x, Building Research Establishment (BRE), AECOM, Kiwa Ltd., Loughborough University Enterprises Limited, Chris Martin and John Tebbit.

Quality assurance has been undertaken by a consortium led by Etude, including Levitt Bernstein, People Powered Retrofit, University of Strathclyde's Energy Systems Research Unit, Julie Godefroy Sustainability, and UCL.

**Document reference:** HEMFHS-TP-08

**Document version:** v1.0

**Issue date:** March 2026

**Home Energy Model version:** HEM v1.0

**Home Energy Model: FHS assessment version:** HEM: FHS v1.0



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# Contents

# Background to the Home Energy Model

## What is the Home Energy Model: Future Homes Standard assessment?

The Home Energy Model: Future Homes Standard assessment is a calculation methodology designed to assess compliance with the Future Homes Standard (FHS). It builds on the government's Home Energy Model, which will replace the government's Standard Assessment Procedure (SAP).

## Where can I find more information?

This document is part of a wider package of material relating to the Home Energy Model:

**Home Energy Model: FHS assessment technical documentation (e.g. this document)**

**What:** This document is one of a suite of technical documents, which explain the approach to developing the standard assumptions and methodology used in the wrapper.

**Audience:** The technical documentation will be of interest to those who want to understand the justifications and evidence base behind the assumptions used in the model.

**The Home Energy Model: Future Homes Standard assessment consultation and government response**

**What:** The Home Energy Model: Future Homes Standard (FHS) assessment consultation sought views on the proposed methodology for demonstrating compliance with the FHS.

**Audience:** The consultation and response will be of interest to those who want to understand the proposed standardised assumptions around occupancy, energy demand etc. to be used when assessing compliance with the FHS, as well as the methodology for the calculation of the FHS compliance metrics.

**The Home Energy Model reference code**

**What:** The full Python source code for the Home Energy Model FHS wrapper has been published as a Git repository. Note the reference code for the HEM core engine is published as a separate repository.

**Audience:** The reference code will be of interest to those who want to understand how the model has been implemented in code, and those wishing to fully clarify their

understanding of the new methodology. It will also be of interest to any potential contributors to the Home Energy Model or those wishing to use it within their own projects.

**Future Homes and Buildings Standards Government Response**

**What:** The FHS consultation and response sets out the feedback received to the 2023 consultation on proposed Part L standards, and details the new regulations being introduced.

**Audience:** The consultation and response will be of interest to those wishing to understand the incoming standards for Building Regulations Part L.

# Related content

To see how curtains and blinds are interpreted by the Home Energy Model core, see.

*HEM-TP-05 Fabric heat loss*

*HEM-TP-08 Solar gains and shading*

The FHS wrapper determines when curtains and blinds are opened via controls which are dependent on the external conditions of the building, to understand how controls and external conditions are interpreted by the Home Energy Model core, see.

*HEM-TP-17 Controls*

*HEM-TP-03 External Conditions*

To understand how this methodology has been implemented in computer code, please see:

*hem-fhs-wrapper/src/future_homes_standard/future_homes_standard.py*

# Methodology

The FHS wrapper defines controls for opening and closing window treatments in accordance with *HEM-TP-05 Fabric heat loss* Annex B and BS EN ISO 52016-1:2017[1] tables B.23 and B.24. The FHS wrapper does not make any inferences about the thermal resistivity or transmission reduction of window treatments, nor does it set any limits or default values for these properties.

## 1. Controls

Window treatments as defined in *HEM-TP-05 Fabric heat loss* Annex B may accept controls either as a direct schedule of opening and closing or controls that respond to the intensity of solar radiation incident on the window. In the FHS wrapper, these control types are assigned to curtains and blinds, respectively. The user must specify whether the treatment is a curtain or blind and whether the controls are automatic or manual.

Following section G.2.2.1.2 of BS EN ISO 52016-1:2017, the FHS wrapper makes a distinction between window treatments primarily intended for thermal insulation and privacy ("curtains")[2] and treatments intended to shade windows and prevent overheating ("blinds"). Curtains are thus open during daylight hours, whereas blinds are closed when the sun is strong. In either case, the treatment may be on either side of the window.

### 1.1 Curtains (thermal insulation and privacy)

For curtains, the FHS wrapper creates a direct schedule of opening and closing in accordance with BS EN ISO 52016-1:2017 table B.23 (applicable to "shutters"), reproduced as Table 1 below.

The FHS wrapper defines sunset and sunrise as the hours at which the Sun crosses a flat plane tangential to the ground at the latitude and longitude defined in the external conditions (see *HEM-TP-03 External Conditions*) and does not account for shading.

The FHS wrapper defines occupant sleeping hours as 23:00-07:00, in accordance with Approved Document O1[3] section 3.2. These same sleeping hours are used to determine when windows may be opened if a noise nuisance is present, see *HEMFHS-TP-07*.

[1] BS EN ISO 52016-1:2017 - Energy performance of buildings. Energy needs for heating and cooling, internal temperatures and sensible and latent heat loads. Calculation procedures
[2] The ISO standard refers to (external) "shutters" rather than "curtains" and so counts security as a motivation for the schedule. Since only the opening schedule is being adopted, this makes no practical difference.
[3] Approved Document O1 Overheating Mitigation, MHCLG 2021, Overheating: Approved Document O - GOV.UK

| Control | Rules |
|---|---|
| 0 Manual | Closed: after sunset if occupied<br><br>Open: after sunrise if occupied, but not during sleeping hours |
| 1 Motorized with manual control | Same as 0 Manual |
| 2 Motorized with automatic control | Closed: after sunset<br><br>Open: after sunrise |
| 3 Combined light/blind/HVAC control | Same as 2 Motorized with automatic control |

***Table 1: operation of curtains, derived from table B.23 in ISO 52016-1:2017***

## 1.2 Blinds (solar protection to avoid overheating and glare)

For blinds, the FHS wrapper creates rules for opening and closing in accordance with BS EN ISO 52016-1:2017 table B.24 (applicable to “solar shading devices”), reproduced as Table 2 below.

The HEM core methodology allows for the solar irradiance thresholds to be varied throughout the simulation, however the constant values shown in Table 2 are used throughout. Occupant sleeping hours are the same as those for curtains defined in section 1.1 above.

| Control | Rules |
|---|---|
| 0 Manual | Closed: if solar irradiance > 300W/m^2 but not during sleeping hours<br><br>Open: if solar irradiance < 200W/m^2 |
| 1 Motorized with manual control | Same as 0 manual |
| 2 Motorized with automatic control | Closed: if solar irradiance > 200 W/m^2<br><br>Open: if solar irradiance < 200 W/m^2 and >= 2 hours passed since closing |
| 3 Combined light/blind/HVAC control | Same as 2 Motorized with automatic control |

***Table 2: operation of blinds, derived from table B.24 in ISO 52016-1:2017***

# Future development

Future development may include the following:

- Determination of sunrise and sunset times depending on shading from terrain and neighbouring buildings.

- If the HEM core calculation were able to accept partially open/closed blinds and curtains, controls could be developed for this.

- Determine how the closure of blinds/curtains should affect ventilation properties of corresponding windows, and how this affects occupant behaviour toward controlling them.

This publication is available from: https://www.gov.uk/government/publications/home-energy-model-future-homes-standard-assessment-technical-documentation