Home Energy Model Consultation

Online questionnaire

April 2024

About us

Solar Energy Scotland is the trusted industry trade body for solar energy in Scotland. Alongside Solar Energy UK, we represent a thriving member-led community of businesses and associates, ranging from ambitious and innovative SMEs to global brands.

Together with our members, Solar Energy Scotland works to shape policy to realise the potential of solar and energy storage in Scotland, and to work with Government and all stakeholders to deliver on climate change obligations and net zero greenhouse gas emissions by 2045.

Consultation questions Chapter 2: The need to replace SAP

1. What are your views on the choice of name for the new model? Please provide your reasoning and any supporting evidence.
No comment

2. What are your views on the choice of name for the version of the model which is to be used to demonstrate compliance with the Future Homes Standard? Please provide your reasoning and any supporting evidence.
No comment

3. What are your views on the potential implications of this proposed name change? Please provide your reasoning and any supporting evidence.
No comment

Chapter 3: Occupancy and energy demand

4. What are your views on using the open-source code as the approved methodology for regulatory uses of the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

5. What forms of collaboration would you be interested in for future development of the Home Energy Model codebase? Please provide further details. Changes to the delivery model and provision of software
Solar Energy UK would support extensive engagement with DLUHC on any changes to the delivery model and provision of software. We enjoyed great collaboration with the department during the consultation period and correctly pointed out a bug in the HEM model. We hope that this engagement continues during the development of the HEM software.

6. What are your views on our assessment of issues with the current SAP delivery model? Please provide your reasoning and any supporting evidence.
We agree with the issues identified by the Department.

The shortcomings of SAP intensified by the 2022 implementation of the Future Homes Interim Standard; housebuilders struggled to build homes that complied with the new building regulations which were already in force. This was made worse by the extensive delays to the software. SAP also struggled to accurately assess low carbon technologies such as solar PV, battery storage, smart controls etc. SAP relied on monthly time resolution, meaning new technologies had to be demonstrated in real life studies and an average performance across multiple households derived before a simplified month by month impact could be added to the model.

The move to the HEM system is then positive for solar as it provides a more accurate and timely account of the real-world performance of solar. It is however vital that the software is accurate and well tested before it goes into the market.

7. What are your views on the concept of a centralised, cloud-based version of the Home Energy Model, to be used for regulatory purposes? Please provide your reasoning and any supporting evidence. A revised database of product characteristics

Solar Energy UK is supportive of the transition to a cloud- based software, as this modernises the system. The separation of a core engine, based on best available building physics modelling, from the 'wrappers' which clearly surface the assumptions and inputs into the model for specific applications such as building regulations or EPCs makes it much easier to interrogate how the 'black box' is working.

8. What are your views on revising the database of product characteristics (currently the "PCDB") for the Home Energy Model? Please provide your reasoning and any supporting evidence.

No comment

9. What changes would you recommend to the PCDB data collection procedures? Please provide your reasoning and any supporting evidence.

No comment

10. What changes would you recommend to the PCDB data requirements for particular technologies? Please provide your reasoning and any supporting evidence. Recognising new technologies in the Home Energy Model The Home Energy Model 74

No comment

11. What are your views on our assessment of issues with the way SAP currently recognises new technologies (currently the "Appendix Q process")? Please provide your reasoning and any supporting evidence.

Please see our response to Question 6

12. What are your views on the principles for how the Home Energy Model will recognise new technologies once it is in use? Please provide your reasoning and any supporting evidence.

No comment

13. What are your suggestions for how to integrate new innovative products into the Home Energy Model? Please provide your reasoning and any supporting evidence. Using "wrappers" to distinguish different use cases

No comment

14. What are your suggestions for other wrappers that could be developed for the Home Energy Model in future? Please provide your reasoning and any supporting evidence.
No comment

Chapter 4: The new Home Energy Model – an overhaul

15. What are your views on the increased time resolution offered by the Home Energy Model? Please provide your reasoning and any supporting evidence.
We are very supportive of the transition to a 30-minute time resolution, this allows the model to more accurately assess low carbon technologies such as solar, battery storage and time of use tariffs.

16. What are your views on the choice of BS EN ISO 52016-1:2017 (in its half-hourly form) as the basis for the Home Energy Model? Please provide your reasoning and any supporting evidence.
Whilst we are supportive of the transition to a half hourly model, SEUK draws attention to research by Viridian Solar and Cambridge University Department of Engineering (published scientific paper is attached to this submission, summary document can be accessed on the below link):
https://www.viridiansolar.co.uk/assets/files/briefings/08_In-roof_Performance_of_PV.pdf

This work found a 3% difference in annual generation between on-roof (moderately ventilated in HEM) and in-roof (unventilated in HEM) systems and we request that the HEM is adjusted to reflect the evidence.

17. What are your views on the ability of the Home Energy Model to model energy flexibility and smart technologies? Please provide your reasoning and any supporting evidence.
No comment

Chapter 5: What is inside the Home Energy Model? Space heating and cooling demand

18a. What are your views on the methodological approach for calculating space heating and cooling demand? Please provide your reasoning and any supporting evidence.
No comment

18b. What are your views on the methodological approach for calculating fabric heat loss? Please provide your reasoning and any supporting evidence.
No comment

18c. What are your views on the methodological approach for calculating thermal bridges? Please provide your reasoning and any supporting evidence.
No comment

18d. What are your comments on the methodological approach for calculating infiltration and/or controlled ventilation? Please provide your reasoning and any supporting evidence.
No comment

18e. What are your views on the methodological approach for calculating thermal mass? Please provide your reasoning and any supporting evidence.
No comment

18f. What are your views on the methodological approach for calculating solar gains and solar absorption? Please provide your reasoning and any supporting evidence.
No comment

18g. What are your views on the methodological approach for calculating shading? Please provide your reasoning and any supporting evidence
Despite our overall support there was one glaring error within the model which we fed back to the software modelling team directly. The concern centred around how the model deals with PV generation as the orientation shifts away from south facing, the HEM drastically underrepresented the solar generation of the other directions. Whilst the team at DLUHC confirmed that there was a bug in the consultation version of the HEM and successfully addressed the issue, this remains a serious error and one which will need to be closely assessed by DLUHC.

19a. What are your views on the methodological approach for calculating Domestic Hot Water demand? Please provide your reasoning and any supporting evidence.
No comment

19b. What are your views on the methodological approach for calculating heat losses from Domestic Hot Water pipework? Please provide your reasoning and any supporting evidence.
No comment

19c. What are your views on the methodological approach for calculating heat losses from hot water cylinders? Please provide your reasoning and any supporting evidence.
No comment

19d. What are your views on the methodological approach for calculating incidental gains from domestic hot water? Please provide your reasoning and any supporting evidence. Heating and cooling systems
No comment

20a. What are your views on the modelling of heat pumps in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

20b. What are your views on the modelling of electric resistive heaters in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

20c. What are your views on the modelling of electric storage heaters in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

20d. What are your views on the modelling of heat networks in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

20e. What are your views on the modelling of boilers in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

20f. What are your views on the modelling of heat batteries in the Home Energy Model? Please provide your reasoning and any supporting evidence
No comment

20g. What are your views on the modelling of air conditioning in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

20h. What are your views on the modelling of other Domestic Hot Water heating (e.g. immersion heaters, point-of-use, solar thermal) in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

20i. What are your views on the modelling of heat emitters in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

20j. What are your views on the methodological approach for calculating pumps' and fans' energy consumption in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

20k. What are your views on the modelling of controls for heating and/or hot water in the Home Energy Model? Please provide your reasoning and any supporting evidence. Electricity generation, self-consumption, and storage
No comment

21a. What are your views on the current priority order for allocating electricity supply and demand in the Home Energy Model? Please provide your reasoning and any supporting evidence.
No comment

21b What are your views on the modelling of solar PV in the Home Energy Model? Please provide your reasoning and any supporting evidence.
The Home Energy Model is broadly a positive change for solar. The move to a half hourly resolution is a welcome development as this is more aligned with enabling technologies that solar PV feeds into e.g time of use tariffs, smart meters, battery storage and hot water from PV fed immersion heaters. We support the adoption of the HEM. As previously stated, the issue around the bug remains a live issue. Whilst the department took measures to address the issue, some respondent may not submit an amended response based on their new modelling. The department should also take this into consideration when assessing consultation responses from housebuilders, who will have been taking the results from the HEM at face value. Going forward the department should work with industry to ensure that the roll out of the HEM is successful.

21c. What are your views on the modelling of electric batteries in the Home Energy Model? Please provide your reasoning and any supporting evidence
No comment

21d. What are your views on the modelling of PV diverters in the Home Energy Model? Please provide your reasoning and any supporting evidence. Future features development
No comment

22. What are your views on future features development for the Home Energy Model? Please make suggestions, explaining your reasoning.
No comment

23. What data or evidence do you have which could support the future development of features within the Home Energy Model? Please provide further details. Chapter 6: Validating the Home Energy Model
Solar Energy UK would like to reiterate the importance of relying on the MCS Yield Data sheet to calculate the solar generation based on orientation. We have already provided DLUHCC with this but would be happy to do so again.

24. What are your views on the inter-model validation work that has been carried out (i.e. comparison against SAP 10.2 and validation against PHPP, and ESP-r)? Please provide your reasoning and any supporting evidence.
No comment

25. What are your views on the validation work that has been carried out against real world case studies (i.e. IEA Annex 58, Camden Passivhaus, and Marmalade Lane)? Please provide your reasoning and any supporting evidence.
No comment

26. What are your views on the lab testing validation work that has been carried out (i.e. on boiler cycling and heat pumps providing DHW)? Please provide your reasoning and any supporting evidence.
No comment

27. What examples of real-world case studies do you suggest be used to further validate the Home Energy Model? Please provide further information.
No comment

28. What suggestions do you have for further validation exercises that could be undertaken to refine the Home Energy Model? Please make suggestions, explaining your reasoning, and providing any supporting evidence. Public Sector Equality Duty
No comment

29. What are your views on the impact of proposed changes to the modelling ecosystem on those with protected characteristics? Please provide your reasoning and any supporting evidence. Environmental Principles Policy Statement
No comment

30. What are your views on the possible environmental impacts of the Home Energy Model core engine itself? Please provide your reasoning and any supporting evidence.
No comment