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Consultation Response

Home Energy Model: Future Homes Standard assessment

Prepared for: DESNZ

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1. Introduction

Elmhurst Energy are pleased that DESNZ are seeking a Consultation on 'Home Energy Model: Future Homes Standard' and as such we are delighted to respond to each question in turn.

The Consultation asked 31 questions and we have answered them all below. We hope you find the responses considered and useful for taking 'Home Energy Model: Future Homes Standard' forward in a progressive manner.

2. Questions and Answers

Chapter 2: The Future Homes Standard assessment: a wrapper for the Home Energy Model

1. What are your views on the choice of inputs that have been standardised vs left open as user inputs (as in the consultation tool)? Please explain your reasoning and provide any supporting evidence.

Elmhurst has spoken to a wide range of SAP assessors and other industry professionals since the consultation tool was launched. Many are concerned by the vast increase in data inputs required by the HEM: FHS consultation tool and the time the tool takes to return results. After conducting some sensitivity analysis we do not believe the additional time/effort required to gather the relevant information needed for some of these fields compared to the relative impact on the compliance results justifies them being left as user inputs. For example changing input values in the following fields have a very minor or even no impact on the results from the HEM: FHS consultation tool;

- AD O Window Equivalent Area (minimal impact)
- AD F number of wet rooms (minimal impact)
- Solar absorption coefficient for walls and roofs (minimal impact)
- Pitch for floors (no impact)
- U-values for internal walls, ceilings, floors (no impact)
- Cold water source (minimal impact)
- Photovoltaic panel height and width (no impact)
- Primary pipework length, insulation thickness and conductivity (minimal impact)

Elmhurst believes these fields could be standardised by the FHS wrapper based on average or common building practice data. Alternatively conservative estimates could be used where this data is not available to the assessor, but the assessor will also have the option of entering the specific data if it is obtainable. This is particularly relevant where calculations are being completed before construction commences where many of these fields will simply be not known.

In regards to the half hourly time resolution we understand this is the primary reason for results not being returned from the HEM: FHS consultation tool for at least five minutes. Whilst we appreciate the need to improve the time resolution over the SAP 10 methodology, if this is the level of performance delivered from the proposed central engine this will cause significant issues for assessors and their clients that are used to, and have built business processes around, generating results instantly. Elmhurst strongly suggests the time resolution is reviewed to arrive at a suitable improvement over SAP 10 but also that meets the needs of an industry that is time sensitive.

Finally the amount of data entry into HEM: FHS consultation tool currently takes around 3-4 times longer than entering a corresponding assessment into SAP 10. Whilst we appreciate with each change to methodology there is some degree of extra time taken, the current level of data entry shown in the consultation tool risks a situation where many assessors leave the industry and the delivery of Building Regulation compliance reports slows down the delivery of new homes. There needs to be a balance between the level of detail a compliance tool requires, and the need for a scalable solution to meet the demands of the construction industry.

2. What are your views on the ease of populating or sourcing data for those user inputs? Please explain your reasoning and provide any supporting evidence.

From speaking to members and other industry professionals there is concern about the sourcing of data in the areas of shading, space heating and domestic hot water pipework.

In regards to shading detailed site plans showing all surrounding obstacles are not always available. This means it may not be possible to accurately measure the shading of objects as assessors do not conduct site visits to ascertain this information.

The data required for heat emitters is a significant change from the SAP methodology. There is concern that this data will simply not be available for assessments completed before construction commences as the heating design will not have been completed at this stage.

Finally the data needed for DHW pipework again may cause issues particularly at design stage. As with space heating this data may not be available as the M + E design may not have been completed at this point.

Two further fields of concern are the AD F Required ACH and AD O Window Equivalent Area. The inputs for these fields are reliant on provision of information from individuals who may not have been engaged by the builder at the point of completing the HEM: FHS assessment.

Chapter 3: Occupancy and energy demand

Occupancy assumptions

3. What are your views on the proposed standard occupancy assumption? Please explain your reasoning and provide any supporting evidence.

Elmhurst agrees that the standard occupancy should be based on the latest research to ensure the values assumed are as accurate as possible.

4. What are your views on the assumptions for metabolic gains? Please explain your reasoning and provide any supporting evidence.

Elmhurst agrees that the assumptions for metabolic gains should be based on the latest research to ensure the values assumed are as accurate as possible.

Space heating and cooling assumptions

5. Do you think the FHS assessment wrapper should keep two thermal zones for all dwellings? Y/N. Please provide your reasoning and any supporting evidence.

Elmhurst supports the use of two thermal zones as this is a sensible level of complexity for the calculation of compliance results using HEM. This is similar to SAP where the living area was assigned different temperature levels to the remainder of the dwelling so the industry is reasonably familiar with this approach.

However we also agree that for smaller dwellings or ones with single heating controls that one zone should be used. This would make assessment of these dwellings more efficient for users whilst still accurately representing the dwellings heating conditions.

6. If the FHS assessment wrapper keeps two thermal zones, do you think we should introduce inter-zone heat transfer? Y/N. Please provide your reasoning and any supporting evidence.

As it is likely inter zone heat transfer would lead to increased time to run the model for relatively little impact on the results Elmhurst believes inter zone heat transfer should not be introduced.

7. What are your views on heating setpoints for (a) one zone; (b) two zones without interzone heat transfer (i.e. the current assumptions given above); and (c) two zones with inter-zone heat transfer? Please provide reasoning and supporting evidence.

Elmhurst agrees that whatever number of zones is used, the heating setpoints should be based on the most recent research to ensure appropriate values are used.

8. What are your views on the assumptions for space heating hours? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the assumptions for space heating hours should be based on the most recent research to ensure appropriate values are used.

9. What are your views on the ability to specify a control scheme (e.g. setback temperatures and “advanced start” periods) that works for the system being installed? Please provide your reasoning and any supporting evidence.

Elmhurst believes the control scheme and setback temperatures proposed are an area that will be determined by the occupants of the dwelling, not the builder, so should not be included in the wrapper. There could be an unintended consequence here that if using these fields benefits compliance then it may be utilised by assessors but in reality the occupants may not operate the heating in this way resulting in a performance gap.

10. What are your views on the treatment of the heating season vs non-heating season (months where the heating is assumed to be off regardless of the temperature)? Please provide your reasoning and any supporting evidence.

Elmhurst would expect this to be based on recent research and if this supports the notion that heating is not used in the summer months, then the wrapper should apply this.

11. What are your views on the proposed assumptions for the use of space cooling systems? Please provide your reasoning and any supporting evidence.

Elmhurst has concerns about the statement “Please note that a separate Part O (overheating) assessment should be undertaken before running the Home Energy Model: FHS assessment.”

It does not seem sensible to prevent an energy assessor proceeding with the HEM: FHS assessment because a separate calculation for a different area of Building Regulations has not been undertaken. Elmhurst recommends that the AD O: Window Equivalent Area field is a standardised assumption based on the window areas entered into the wrapper.

Domestic hot water assumptions

12. What are your views on the assumptions for the volume of hot water demand? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the assumptions for the volume of hot water demand should be based on the most recent research to ensure appropriate values are used.

13. What are your views on the pseudo-randomly generated hot water use schedule, including the algorithm generating it? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the hot water use schedule should be based on the most recent research to ensure appropriate values are used.

14. What are your views on the proposed hot water / mixed water temperature assumptions? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the hot water/mixed water temperature assumptions should be based on the most recent research to ensure appropriate values are used.

15. What are your views on the assumptions for water heating hours? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the water heating hours should be based on the most recent research to ensure appropriate values are used.

16. What are your views on the cold water feed temperature assumptions? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the cold water feed temperature assumptions should be based on the most recent research to ensure appropriate values are used. However we believe most new homes are mains fed so if this is the case this field could be standardised by the wrapper.

Lighting, cooking, and appliances assumptions

17. What are your views on the proposed assumptions for lighting demand, time of use, and thermal gains availability? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the lighting demand should be based on the most recent research to ensure appropriate values are used.

18. What are your views on the proposed assumptions for cooking energy demand, time of use, and thermal gains availability? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the cooking energy demand should be based on the most recent research to ensure appropriate values are used.

However Elmhurst understands that Building Regulations only considers regulated energy so we are unsure why energy from cooking is needed in the FHS wrapper? If this is the case then the user inputs should either be removed or standardised by the wrapper.

19. What are your views on the assumptions for appliance energy demand, time of use, and thermal gains availability? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the appliance energy demand should be based on the most recent research to ensure appropriate values are used.

However Elmhurst understands that Building Regulations only considers regulated energy so we are unsure why energy from appliances is needed in the FHS wrapper? If this is the case then the user inputs should either be removed or standardised by the wrapper.

20. What are your views on the assumptions for cold water and evaporative losses? Please provide your reasoning and any supporting evidence.

No strong opinion

Chapter 4: Weather assumptions

21. What are your views on the use of climate projections rather than historical averages for the weather assumptions within the model? Please provide your reasoning and any supporting evidence.

Elmhurst supports the use of projections rather than historical averages. Our climate is changing and it makes sense to assess homes against future climate characteristics to ensure homes are suitable for future weather.

Chapter 5: FHS compliance metrics

Metrics

22. What are your views on the additional metrics produced by the FHS assessment wrapper (i.e. metrics produced in addition to the FHS compliance metrics)? Please provide your reasoning and any supporting evidence.

Elmhurst has developed tools in SAP software that allows assessors to draw down hundreds of information points from the SAP engine (values from most SAP worksheet lines can be retrieved to an Excel file). It is vital that the FHS wrapper allows the same level of data to be drawn down as assessors use this data for various types of reporting to their clients.

23. What are your suggestions for additional metrics (i.e. metrics produced in addition to the FHS compliance metrics) not currently produced by the FHS assessment wrapper? Please make suggestions, explaining your reasoning, and providing any supporting evidence.

As per our answer in 22. all data points that are provided in the SAP methodology should be also available as an output from the HEM: FHS wrapper.

Fuel assumptions (emissions and primary energy)

24. What are your views on the methodological approach to define the emission factors and primary energy factors used within the Home Energy Model: FHS assessment? Please provide your reasoning and any supporting evidence.

Elmhurst agrees that the emissions and primary energy factors should be based on the most recently published figures. One of the criticisms with SAP is that the factors were out of date due to the methodology not being updated sometimes for almost ten years. Elmhurst recommends the emissions and primary energy factors are updated frequently to ensure they are as up to date as possible.

25. What are your views on the proposed emission and primary energy factors for electricity? Please explain your reasoning and provide any supporting evidence.

According to the Government's impact assessment due to the transitional arrangements proposed new homes will only start being built to the FHS from 2027 so it makes sense to use future projections for the proposed emission and primary energy factors.

26. What are your views on the penalisation of energy shortfall and the energy shortfall factors? Please provide your reasoning and any supporting evidence.

Using factors that are twice the usual factors seems quite crude and overly penalising where used. Elmhurst does not understand why in scenarios where there is an energy shortfall the additional energy required is not based on the same factors for normal energy use?

Chapter 6: Validating the assumptions used in the FHS assessment wrapper

27. What are your views on the inter-model validation work that has been carried out (i.e. against SAP 10.2, PHPP and ESP-r)? Please provide your reasoning and any supporting evidence.

Elmhurst supports validation against other models. Historically SAP has been subject to criticism from users of other models, when in reality the difference was mainly related to the standard assumptions used in SAP for calculating Building Regulations compliance. It should also be noted that the tools listed have different purposes and the HEM: FHS wrapper is designed solely for demonstration of compliance to Building Regulations. The use of wrappers should improve clarity of the use of HEM for different purposes.

28. What are your views on the monitoring data case study validation work that has been carried out? Please explain your reasoning and provide any supporting evidence.

Elmhurst welcomes validation work against real world homes. However the examples given seem to be quite different to what the majority of new homes will be constructed to based on the performance standards proposed in the FHS consultation.

29. What suggestions do you have for further validation exercises that could be undertaken to refine the Home Energy Model: FHS assessment? Please make suggestions, explaining your reasoning, and providing any supporting evidence.

Elmhurst agrees that more validation should be completed against more representative dwellings built to the FHS. There are many developers already building homes to where they believe the FHS will land, and we suggest these homes should be used to validate the HEM: FHS wrapper.

Public Sector Equality Duty

30. What are your views on the equality considerations of these assumptions and their evidence base? Please provide your reasoning and any supporting evidence.

No strong opinion

Environmental Principles Policy Statement

31. What are your views on the possible environmental impacts of the Home Energy Model: FHS assessment itself? Please provide your reasoning and any supporting evidence

No strong opinion

Contact Details

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