Defining a Fabric Energy Efficiency Standard for zero carbon homes

Appendix E
Task Group Assessment Matrix

The views and recommendations within this report are those of the Task Group and do not necessarily reflect the views of Government
Task Group Assessment Matrix

Introduction

This appendix should be read in conjunction with the main report entitled ‘Defining a Fabric Energy Efficiency Standard for zero carbon homes’.

The Task Group realised the importance of considering the full implications of a policy decision such as defining a minimum Fabric Energy Efficiency. An assessment matrix was considered to be the most suitable approach to bring structure and clarity to the inevitable debate this would require.

This section provides greater detail regarding the workshop process used to develop the matrix and identify the Task Group’s thoughts on each of the criteria.
**Assessment criteria**

At the beginning of its decision making process, the Task Group agreed a set of key Assessment Criteria by which the consequences of differing levels of performance standard should be considered prior to making any decision:

1. Building Practices
2. Future proofed construction
3. Technically achievable in vast majority of situations. (Buildability at mass scale)
4. Complexity of ensuring householder health and wellbeing
5. Desirable homes for householders on a mass-scale
6. Upfront build cost
7. Longer term maintenance and householder energy costs
8. Energy Security
9. Broader environmental considerations

**Decision making process**

The Task Group agreed to form an initial recommendation, and then take this to consultation with wider industry, prior to making a final recommendation.

In order to form an initial recommendation, it was agreed to hold two decision making workshops, the first dedicated to the consideration of the Assessment Criteria, and the second to making decisions against the Key Issues. Once the consultation was complete a final Workshop was then held to form the final recommendation.
**Workshop 01 – Assessment Criteria**

Individual Task Group members with specialist experience in the area of each of the Assessment Criteria were asked to prepare ‘Think papers’ to assist other members in understanding the areas of interest / concern. These papers were distributed to all Task Group Members in advance of the workshop:

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<th>Tink papers presented at workshop</th>
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A decision making matrix was designed (as illustrated below) which used graduated traffic light colours to capture Task Group concerns on the impact of differing levels of performance standard against each of the Assessment Criteria, and which therefore allowed opinion to be captured on a qualitative rather than quantitative basis. Simple numerical analysis was avoided because it was considered that this would have inhibited fluid debate, and encouraged polarisation of the disparate member’s views.

### Decision making matrix

The Task Group members comprised stakeholders representing a large spectrum of the house building industry, whom held disparate views on many issues associated with the Fabric Energy Efficiency Standard. The ZCH spent some time deliberating how best to facilitate agreement on unilateral decisions.

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<td>Broader environmental concerns</td>
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![Traffic light colors](image)

- **Low**
- **Medium**
- **High concern of negative consequences**
Due to concerns that Task Group members may not be able to reach agreement on the Assessment Criteria, an additional tool was developed which allowed Task Group members to simply grade the relative importance of each of the criteria.

A matrix was designed with three tiers (as illustrated below), allowing Task Group members to rate the importance of the criteria within three bands in relation to one another.

Please note the illustration below is purely an example and does not actually reflect the voting that took place.

The matrix was loosely based on Thomas Saaty’s Analytical Hierarchy Process, that places a value on points comparatively, which helps the decision makers find the one that best suits their needs and their understanding of the problem.
Workshop process

The workshop was held over 1 day in a hotel in central London. It was chaired by the ZCH, and attended by approximately 20 Task Group members. At the onset the agenda of the workshop, the outcomes expected from the day, and the context for the Task Group decisions were made clear to all present. The ZCH presented the Task Group activities that had been carried out to date, and the results of the energy, architectural, and financial modelling that had been undertaken to date on behalf of the Task Group.

The main part of the day was spent working through each of the Assessment Criteria, and capturing the Task Group’s concerns against each. The decision making matrix was projected on one screen throughout to remind all present of the status of the decisions.

The same process was used for each criteria:

1. Where available, the author of each of the criteria ‘Think papers’ was invited to present key issues relating to each of the criteria in order to stimulate debate and thinking.

2. The criteria was then thrown open for Task Group debate and wider discussion.

3. Pros and cons for each criteria were suggested by Task Group members, recorded by the ZCH on Post-it notes, and then apportioned against a specific level of standard. (See later diagrams) This process stimulated further ideas and debate, and further pros and cons. Post-it notes were chosen for this exercise due to their ease of adaption to reflect when debate changed perspectives and levels of concern, they were positioned on a matrix drawn on a flip chart.

4. After each discussion, the members were asked to summarise their levels of concern against the criteria, by adding colour to the decision making matrix (green minor concerns, orange some concern, and red major concerns). Colour was applied by ZCH after gaining a general consensus through group debate, it was added to and changed until all were in agreement. The matrix was used to display a perspective scale on where standards should be set. For example, the group could define their minimum standard yet where there were concerns or a range of views, a maximum standard could also be set. The resulting matrix was therefore representative of the members’ opinions and recommendations.

The following diagrams illustrate the specific issues within each criterion:-

- The circled letters at the top related to the construction specifications (A- D)
- Issues in yellow boxes were seen as barriers
- Issues in blue boxes were seen as opportunities
- The arrows from each issue indicate across which range of the construction specifications this was considered to apply
Summer overheating risk

We should do the best we can (Passivhaus)

Health issue concerns about IAQ

Glazing & shading plus right ventilation are needed

If lots of low heat demand designs then not good match for CHP

Does the wall allow fittings for shades etc?

Lots of these issues are not linked to EE specification

Standard could promote innovation in ventilation systems

Low heat demand encourages existing stock export / link ups

Concerns around noise due to insulation in party walls

Overly complex systems will restrict retrofit work

D Energy systems could include internal space
This is beyond the TG debate....

- Gets tougher beyond Spec A but it is a bigger separate issue.
- Need for tools - TSB funding some development but not accelerating at the rate required for 2016.
- The proposed 2016 timeline proposed is of primary importance.
- Is it 2013 or 2016?

Build Specification

A. Is it repeatable? Issue is getting the contractor to do it in time for 2016.
B. Concerns about M/HHR commissioning, will be installation etc.
C. Supply chain concern about large scale testing and certification need.
D. Planning is an opportunity. All tend to favour EE, first and only then L2C.
D. We can assume some lessons will have been learnt by 2016.
D. Need to set standard high for innovation.

General Issues

- How does this affect the smaller developer?
- Everything is technically possible......
- Not just training need. Also risk of losing competitive advantage.
- But cost and other issues lead what is finally accepted.
- Are we doing things right between industry and government?
- Ambition should be to get built what is claimed in the tin. Other wise 2016 is no chance.
- Need to be clear this is for 2016 onwards.

03 Wide scale buildability
**Build Specification**

A. Need to follow instructions and get MVHR maintained. Not within the UK culture.

B. Toxins and moisture are main focus. There is evidence of more cardiovascular problems in low energy housing.

C. Asthma is high in UK linked to dust miles. UCL work showed levels could be up to 3000 times higher in MVHR homes.

D. We need more monitored data to decide whether MVHR is a good thing for asthma.

- Purge ventilation is focused on IAQ and needs to be addressed with both mach and passive ventilation.
- Ventilation heat losses become more significant as air tightness increases. So MVHR increases in importance.

- Going to an airtightness of 1 is too far — nowhere to go.

If we go too tight then might need to consider a linked requirement for maximum VOC emissions and IAQ.

**General Issues**

- Very light fabric and poor thermal detailing can increase mould growth.
- Whatever the design target there will always be a range of tightness. Question is how to ventilate.
- Planning dept need to consider impact on single aspect flats etc.
- Heat recovery is used in Passiv Haus because it has significant space heat gain.

04 Health and well being
Build Specification

A

B

High spec fabric leads to simplification of form and less design choice

C

D

You can have dormers. The way this is styled and marketed is key

Colomnplex form can be a style option, just detailed efficiently

Is a MVHR system really that complex?

Mech vent systems needs modelling?

People do like good passive solar design in homes

General Issues

Biggest concern is MVHR inclusion and long term performance

05 Desirable homes
If we go closer to Passiv Haus then there will be less spikes in electric demand for DHW and space heating.

Some in group would like to see how adoption of Spec C & D would impact if they went all electric:

- Electrical heating choices might be a key influence by 2050
- Large scale shift to electric putting greater pressures on grid supply?

The assumed total number of builds might not be as shown.

Is a MVHR system really that complex?

There is a little difference between A – D but what is it really?

This is just informative, not a key decision issue.

08 Energy security
Energy in use is ~80% of total life time energy
Embodied energy is ~20% of total life time energy
Even in a 2005 B Rees house

Shift to Passiv Haus might increase the embodied energy to ~26 – 30% of total life time energy

Biggest issue is high performance foams and increased concrete in wider foundations. Very dependent on design selected

Less energy demand is a good thing as there is limited biomass available

Possibility if went to Passiv Haus less people likely to use biomass
At the end of the workshop, each criterion on the matrix was revisited for further comment and adjustment, and those which had not been completed using the decision spectrum were re-evaluated. Participants were therefore given the opportunity to adjust or add comments and assess previous decisions, enhancing the final matrix’s validity. It was agreed that concerns should not be recorded against certain criteria, not because the criteria were considered unimportant, but rather that the members felt that their concerns against the criteria did not vary in relation to the different levels of standard.

During the final summary each member was provided with the hierarchy matrix to fill out, which asked each individual to rank the decision criteria in order of importance. The results of these matrices were collated in order to inform which decision criteria hold more weight, and thus define their affect on the overall standard setting.

Outcomes

The completed matrix (as illustrated below) indicated that the Task Group were more concerned by certain criteria at higher levels, principally:

- Building practices
- Health & wellbeing
- Lifetime costs

These subject areas became the focus for additional work activities by the ZCH for presentation at following Task Group Workshops.