

RESPONSE TO THE CONSULTATION ON THE CODE FOR SUSTAINABLE HOMES

from the AECB, the Sustainable Building Association

Response form for the consultation on proposals for introducing a <i>Code for Sustainable Homes</i>	
Respondent details	
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Organisation: The AECB, the Sustainable Buildings Association, has 1600 members who include architects, chartered engineers, energy consultants, local authorities, manufacturers, builders, craftsmen, developers, etc.	

1. Do you welcome the concept of the Code?

The AECB welcomes the concept of the Code in that it provides a vehicle for a single set of national standards to which all new homes in England could be built including those in the private sector, not just those in the public sector.

The AECB also welcomes the government's recognition that climate change is a key driver of the Code and the need to improve standards. We note particularly the following references to climate change:

"... the public and the development industry... are concerned about climate change ... and recognise that without serious and sustained action, the effect will get worse and not better."

"Sustainable building has a price tag. Equally, failing to build sustainably, potentially has large hidden costs to the UK in terms of the effects of climate change and, for example, the need to invest in extra supplies of water and the cost of electricity generation and transmission capacity."

We assume that, given the above, the designers of the Code are making the reduction in CO₂ from homes as fast as reasonably practical a priority. If the UK is to meet its 60% CO₂ reduction target, the domestic sector as a whole will have to emit no more than 19 kg/m².yr by 2050 for all energy uses combined (the 2003 average was 73 kg/m².yr). This assumes 12 million more dwellings and therefore 50% more floorspace by then. Clearly, this requires improving the energy performance of homes as quickly as possible.

The AECB recognises that the current energy performance of even the newest homes is relatively poor and is aware of recent research that indicates that many homes fail to comply with current standards. Some of the reasons for these failures are that:

- energy use in homes has not been measured consistently, so the construction industry has not understood how to design and build to reach a given energy performance;
- the methodologies used to establish whether homes will meet the 2002 or 2006 Building Regulations are inaccurate and contribute to the other problems;
- building design and construction defects occur because design for energy efficiency has never been a part of the education of architects or construction workers;
- there has been a plethora of home building standards, none of which have required the energy performance of the finished building to be measured.

The AECB therefore welcomes the Code as an opportunity to promote a single, common standard which puts CO₂ measurement and minimisation at the heart of a sustainable building strategy. The five levels of the Code also permit the promotion of a clear, stepped pathway to zero carbon buildings. If the industry is to deliver better buildings, it will need the time to learn about low energy homes and how to deliver them.

The AECB's work programme

We are pleased to be able to contribute to the Code's development the results of the work programme that the Association has developed since making reducing emissions from buildings its priority in 2004. We have adapted the programme to fit within the framework of the Code.

It consists of:

- three full and two interim standards for the energy performance of homes;
- proposals for refining the methodologies used to design to a given energy performance and to measure compliance;
- development of a set of design details for each standard;
- training programmes on understanding the energy performance of buildings and design and construction for energy efficiency, tailored to continuing professional development and construction skills courses;
- a compliance scheme for those building to the standards; and,
- a framework for reporting on the energy performance of buildings built to the proposed standards.

Standards

Consistent with the consultation document's reference to 'serious and sustained action' we are providing as part of this response a set of five energy performance standards which could be applied at each level of the proposed Code. We have named them:

- 2006 Building Regulations (Delivered)
- Bronze
- Silver
- Gold
- Platinum

The AECB's five standards therefore represent a staircase of achievable steps leading from the current Building Regulations ADL1-2006 to zero carbon homes. These steps are represented in the table and graph below. The figures for energy use and CO2 emissions refer to a dwelling typical of the stock - the figures will vary for large or smaller homes.

Name of energy performance standard <i>Comparisons for a 80m² semi-detached house.</i>	Gas (or oil or LPG) (heating) plus electricity consumption (lights/appliances) kWh/m2.yr	CO2 Emissions kg/m2.yr	Percent Reduction against 2003 average	CO2 Emissions tonnes/yr
Average UK home (dwelling stock)	278	73		5.8
2006 Building Regulations (ADL1-2006)	183??	57??	22??	4.6??
ADL1-2006 (Delivered)	183	57	22	4.6
Bronze	135	40	45	3.2
Silver	84	22	70	1.8
Gold	38	4	95	0.3
Platinum	38 (1)	0	100	0

NOTE: For ADL1-2006, this is our current estimate of energy use, taking into account as far as possible the physical reality of how the dwelling will actually be designed and built.

(1) Same kWh of energy consumption as Gold but all energy supplied from zero carbon sources.

The difference between ADL1-2006 and ADL1-2006 Delivered is that with the second the developer will post a bond for two years. This will be refundable after two

years if he can demonstrate from measured energy use that the energy and CO2 performance of the building has actually been delivered as specified.

For those who can build to comply with current regulations, Bronze will require a step-change - but a modest one. For those who already aspire to building low energy and carbon homes, such as the Association's own members and many self-builders, the Silver, Gold and Platinum standards will be achieved much sooner and the experience of those building to those standards can be disseminated to provide useful lessons to those further down the staircase.

The benefit of moving to a single set of clearly-written standards is that the job of design and construction becomes progressively easier, because of familiarity with what is required now and at a series of dates in the future. For more detail of the standards, please see our paper attached at Appendix 1.

Improving the current methodologies for the design and construction of better energy performance

Based on our detailed analysis of BREDEM and SAP, we make proposals for refinements which will help ensure that accurate predictions of energy use in homes is made, leading to a better correlation between theory and practice. Combined with the Association's other proposals here, a cumulative 600 million tonnes of CO2 could be saved by 2050. Please see our paper attached at Appendix 2.

Design details

The AECB could provide sets of detailed drawings designed to deliver each of the standards. These could be made available to the construction industry as a whole. This programme would be similar to the existing Robust Details¹ for acoustic insulation, but based on AECB expertise in designing to a high standard of energy efficiency, in turn learning from the experience of our overseas colleagues.

Education and training

For the energy performance of homes to improve at the speed required to reduce climate change emissions, the construction industry as a whole needs massive help in acquiring the knowledge and skills to build more sustainably.

We know from our experience of efforts both here and abroad; e.g., Canada's R-2000 Program, that the rate of change to improve building energy performance cannot be forced and that the industry needs sufficient time and training to absorb the information and meet what might be the highest standards in the Code.

The AECB is therefore able to offer courses on design and construction for energy efficiency which could be rolled out nationally within a structured programme of training to improve the energy performance of buildings.

¹ This term was due to be used for thermal envelope details but this was pre-empted by its adoption to describe suitable acoustic insulation details.

Compliance

The energy/CO2 performance standard certificate should be awarded provisionally on the basis that:

- key approved construction details relating to energy efficiency have been adopted;
- these have been checked *during construction* by a suitably qualified person and a photographic record has been kept and submitted to the responsible authorities (this compliance scheme was employed by Germany's Low Energy Standard in the states which provided grant aid and booklets of approved details)
- random post-construction checks confirm that the home has complied with the design assessment rating (using the revised BREDEM and SAP).

A framework for reporting on the energy performance of buildings

Some AECB members have already built to Silver and Gold. Dozens of houses have been built which broadly meet the Silver Standard, although the Association does not have full records of all projects. Five to the Gold or Platinum Standard are under construction or at design stage in England and Wales. The Association proposes to start publishing details of the as-built energy and CO2 performance of these homes on its web-site, as part of its contribution to making the Code a success. We suggest that as any home-builder builds to one of the standards, especially the higher ones, they should be required to contribute to a similar compendium of data and other technical information to help improve standards faster.

Clearly, data derived from the compliance scheme would add to this databank.

Please see www.aecb.net

The AECB believes that, if this programme were rolled out, it would be possible for the voluntary standards in the Code to contribute to a programme of improved standards in Part L of the Building Regulations in the timescale set out in Table 2.

Name of energy performance standard <i>(comparisons calculated for a semi-detached house 80m²)</i>	Date for voluntary adoption in the Code	Date for adoption by Building Regulations
ADL1-2006 Building Regulations	2006	2007
ADL1-2006 Building Regulations Delivered	2006	2007
Bronze	2007	2010
Silver	2010	2015

Gold	2015	2020
Platinum	2020	2025

NOTE: The date that we move from 5% of current emissions to carbon neutrality is relatively unimportant, set against the extreme importance of how quickly we move to 60% and to 30% or less of current emissions.

2. Do you think that the coverage of six essential elements and other optional elements is correct? No

To deliver consistency for the industry and to ensure that a wide range of sustainability issues are addressed, the AECB believes that the EcoHomes standard is the appropriate model. It covers all the elements which should be considered when establishing more sustainable developments, each of which can be measured in terms of their CO2 emissions impact. In particular, an important element of delivering sustainable communities is minimising travel requirements, ranging from the provision of local services accessible on foot and bicycle, to public transport. For some reason this has been excluded from your proposals. We see no benefit in adding a new sustainable design code which is less comprehensive than one which already exists.

Given that public sector housing providers remain committed to using EcoHomes until 2008, it would be a strangely retrograde step to require the sustainability coverage of their developments to be less if they adopt the Code in its current form from 2008 onwards. Private developers are also using the EcoHomes standard and expect to continue to do so for the foreseeable future because they are familiar with it. For these reasons, the Association believes that parity between the standards should be maintained.

3. Is a mix of essential and optional ‘tradable’ elements helpful? Yes

The EcoHomes methodology was initially deficient because it allowed developers to trade-off elements of unequal value. However, EcoHomes has been progressively improved. The 2006 revisions consulted on making the energy performance element mandatory to ensure that the climate change emissions from new homes could not increase simply because, for example, a bicycle rack had been provided. The government would do well to adopt the methodology as a whole for the Code for Sustainable Homes, including making the energy performance mandatory.

A mix is helpful to the extent that it reflects the complexity of developing sustainable solutions in different areas and types of development. However, the Association believes that both the energy/CO2 and water elements should be mandatory and set at challenging but achievable levels. Adoption of a ‘mix’ with weightings which erodes energy and CO2 performance; e.g. allowing energy-inefficient dwellings to be built as long as they contain sustainable timber and are next to a bus stop or tram line would dilute the Code’s expressed intent.

4. Do you think that a scoring system in terms of points out of 100 is workable? No

We do not think it helpful to design a new system when the EcoHomes approach exists, which has been refined over the years with experience.

5. **Do you think that the concept of a one to five-star rating system is right? Yes.**

We have already stated that we believe that the construction industry needs a structured programme of targets, education and training to deliver homes with significantly lower CO₂ emissions. The five star or five level system is consistent with such a structured approach. This is why the Association has mapped its programme on to your framework.

However, we also see the potential for confusion by introducing yet another system of classifying homes. The energy labelling scheme is about to be introduced and there exist a large number of other standards for homes. The objective should be to rationalise the standards into one simple scale – the Code if need be – not add more. So if the Code is adopted, other standards should be phased out. Other countries have one unified scale and this is a necessary, though not sufficient, condition of public support and participation.

Nor does the five-star system map onto the A-G levels. The use of SAP ratings adds another layer of confusion because it uses energy costs - which can rise 10% in a single month - to compare performance. Until recently, it used a logarithmic equation for all dwellings, which had undesirable effects.

Given that an aim of the Code is to harness consumer choice, and many consumers' obvious enthusiasm for sustainability and desire for better guidance (and frustration that this is not available), this porridge of labelling methodologies will defeat the objective.

We propose that the energy performance of homes should be expressed in a standard and easily understood form which relates to (a) how consumers purchase energy, i.e. in kWh and to (b) how this energy causes climate change; i.e., kg or tonnes of CO₂.

The basic information should always include kWh of different fuels, kWh of electricity, kg of CO₂, and the home's floor area. This would allow people to compare; e.g., one 80m² semi-detached house to another or one 120 m² detached house to another. This is the information that should appear on the energy label. See below.

Energy consumed¹	CO₂ emissions¹	Floor area²
kWh/yr of gas and of electricity	kg/yr	m ²

¹ Both calculated under standard occupancy conditions. Normally gas, LPG or oil for heating, electricity for lights / appliances / ventilation.

² Quoting energy per unit floor area is undesirable as it risks the same consequence as the EU fridge labelling system; it makes large fridges (or homes) look “better” as they use less per

m² (or per litre), yet they emit more total CO₂. Quoting energy and floor area separately in the label largely overcomes the problem.

We can also see that the use of the 5-star methodology could give consumers the impression that the better quality homes will be more expensive than they can afford. This will mean that consumers may focus on capital cost at the expense of running cost. Of course, the running cost of ultra-low-energy homes are very low. We suggest therefore that the 5-star system be inverted so that a 1-star home represents the best, i.e. the cheapest to run; a 5-star home would be costly to run.

Alternatively, by further agreement, the Code could adopt the Association's own nomenclature, which is predicated on the notion of the award of medals for high achievement, not necessarily related to affordability.

6. If you are a house-builder, will you use the Code?

Many AECB members have already built to Silver and some are building to the Gold Standard. These homes will provide a resource for monitoring purposes, particularly as these two standards are awarded provisionally and not confirmed until two years of post-occupancy data has been provided and verified.

A group of AECB home developer members, coming together under the title of Good Homes Alliance, have agreed to build their next developments to Silver Standard. Nine will be on site within the next few weeks, with a further fifty in the pipeline for later this year.

7. Do you agree that no certification should be awarded until a post-construction check to verify that the home complies with the design assessment rating?

Given the problems of non-compliance under the existing regime, this is an important proposal. There should be a monitoring programme on a statistically valid sample of homes to confirm that the design intent of each standard has been met in full. This information should be published, albeit on an anonymised basis (conference papers would refer to "house A, house B", etc) so that lessons can be learnt as with the R-2000 and Passiv Haus Standards and other successful low energy building programmes.

8. Do you have comments on the costs and benefits identified in the draft Regulatory Impact Assessment (RIA)?

The RIA's estimates of the additional costs of meeting the Code must necessarily be inaccurate because the requirements of the Code are not clearly spelt out. The AECB's estimates of the additional costs of meeting higher energy performance standards tend to be lower because they rely more on design and construction teams *understanding* how to achieve genuinely improved energy performance through improved design details and delivery, not through costly proprietary technologies or products. They also assume that we learn from prior successful experience in the UK and abroad of how to successfully introduce sharply higher energy efficiency standards without incurring excessive costs.

In particular, the AECB does not consider that investment in relatively costly “bolted-on” renewable energy sources is an appropriate use of scarce resources before investment has proceeded in more cost-effective measures such as:

- improved thermal insulation and airtightness
- enhanced daylighting
- better insulation of hot water tanks
- more energy-efficient MVHR systems
- more energy-efficient central heating pumps
- boilers with more energy-efficient fans
- ultra-high efficiency domestic lighting, and
- ultra-high efficiency electrical appliances
- passive solar heating (especially in masonry and concrete buildings, which can with advantage fit much larger south windows)
- passive solar water heating (see experience in USA).

The Association also believes the provision of a single set of standards on a trajectory and timescale known to everyone will significantly reduce costs. Instead of having to change designs and procurement plans every few years in line with unpredictable changes in Building Regulations, companies will be able to undertake long-term planning and build in efficiency gains.

Energy

Water efficiency

Surface water management

Waste during construction

Waste during occupation and use

Use of materials

9. Do you have any other comments on the RIA draft?

The Association’s members build to higher standards because they understand the need to build with low environmental impact. However, the voluntary nature of the proposed Code means that it will be most effective if incentives are provided. AECB members may then choose to move from building to Silver Standard to building to Gold. These incentives could take the form of one-off cash grants linked to a design professional certifying that the dwelling has been designed and constructed correctly and an undertaking to provide data on energy performance in use. Planning incentives could also be provided, for example, fast-tracking for homes at Bronze and above for the next three years and thereafter only for Silver and above.

The tendency of self-builders to build to higher standards is exploited in some countries where many developers provide infrastructure and sell off plots to self-builders and many councils favour one-off dwellings. Government may wish to

provide incentives to the UK industry to follow this route; it can provide a cost-free way to improve standards.