

The Government is consulting on ways they could manage the arrangements for the “Allowable Solutions” part of Zero Carbon Homes– the various off-site carbon saving measures that builders will be able to pay for, if they are not going to build to “zero regulated energy” on site.

The consultation closes very soon - Wednesday 15th October – and the consultation paper and impact assessment can be downloaded from <https://www.gov.uk/government/consultations/next-steps-to-zero-carbon-homes-allowable-solutions> and https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/226340/130801_Allowable_Solutions_Impact_Assessment_for_consultation.pdf (this second link goes straight to the pdf)

There is not space here to rehearse the arguments for and against the concept of “zero carbon”, however, there are one or two questions in the current consultation document that might merit informed replies from people who know about sustainable building.

To recap, as the Zero Carbon proposals currently stand, there will be three ‘layers’ of obligation on the builders of new homes, from 2016 (or, at least, from when the “2016” arrangements come into force).

The first layer is the Fabric Energy Efficiency Standard (“FEES”), setting minimum thermal performance for the fabric of new homes to meet (in kWh/m²/a).

On top of this, homes must also meet an “on-site carbon compliance” target for regulated carbon emissions as calculated in SAP, which will either require more ambitious fabric efficiency than required simply for FEES, the addition of on-site renewables, or a mixture of both.

Beyond the carbon compliance target, any remaining emissions (and even a certified Passivhaus will have some) must be balanced either by further on-site measures, or by so-called Allowable Solutions, which will be approved carbon saving measures taking place elsewhere – in other words, bought-in carbon offsets. (what these might look like is discussed towards the end of this article)

The proposed levels were developed by the Zero Carbon Hub and published in 2011 (see table). As DCLG now states: “The government, in May 2011, made clear its intention to use the data values recommended by the Zero Carbon Hub as the basis for future consultation and reflected the values in the impact assessment published by the Department in May 2011.”

Zero Carbon Hub’s recommended targets for carbon compliance and fabric energy efficiency levels

	Detached	Attached (semi detached, terrace)	Apartment (Low rise, less than four storey)	High rise apartment
Fabric Energy Efficiency (kWh/m ² yr)	46	46 <i>(semi-detached and end terrace)</i> 39 (mid terrace)	39	tba
Carbon Compliance (kgCO ₂ /m ² yr)	10	11	14	tba

To illustrate what these might mean in practice, the Zero Carbon Hub published some “recipes” for reaching the standards, (along with very rough costings).¹ They suggested that most builders would be most comfortable with improving fabric only to the FEES level, then doing the rest with add-on technologies on site – what they called the “balanced” approach.: “The balanced approach will become familiar to many house builders. It is likely to be closest to schemes they have built before, and could become accepted as a ‘safe’ or ‘standard’ approach.

The Hub did also suggest that builders using high fabric standards, for example Passivhaus (in their words, the “extreme” fabric approach) could achieve full on-site compliance using fabric and services measures alone.

Up to around the current carbon compliance level, abatement via good fabric and services design could well be more cost-effective than adding renewables (in capital cost terms at any rate)². Housebuilders may however favour renewables because they fit in with their ‘comfort zone’, and/or they are attractive to purchasers (not least because of the associated tariffs and incentives).

However, as experience of ultra-efficient builds increases, more and more builders may find that good fabric is the most economical way to achieve (most of) compliance. And in particular, Passivhaus Certification may also give a head start when it comes to any requirement to demonstrate ‘as-built’ performance (see below).

There is plenty to discuss about how ‘far up’ towards the current carbon compliance target the FEES should reach –and whether carbon compliance should be nudged up too, or whether renewable generation should be allowed to follow the market logic and come off the rooftops (unless people want it of course) and be delivered from more efficient larger scale installations. It would certainly be good to see FEES creep up towards the levels that ZCH has dubbed as “extreme”, but that builders in continental Europe and Scandinavia are increasingly taking as commonplace.

One of DCLG’s first questions asks whether people feel the on-site targets for fabric and carbon have been set at the “right” level – so anyone with strong views and, even better, costed experience, about the relative costs and the relative merits of these approaches should definitely comment on the positioning of the FEES and carbon compliance levels.

Question 1

Do you agree that the government should base its consideration for energy performance standards for 2016 on the fabric energy efficiency and carbon compliance standard recommended by the Zero Carbon Hub and endorsed by the government in May 2011?

Question 2

Do you have evidence, including data on costs, which you can make available to DCLG and could be used in reviewing the assumptions underpinning the Fabric Energy Efficiency and Carbon Compliance standards?

¹ Zero Carbon Strategies for Tomorrow’s New Homes
<http://www.zerocarbonhub.org/definition.aspx?page=9> -

² I do have a reference for some research on this - may be able to add in due course. Apologies

As we saw above DCLG acknowledges the commitment it made in 2011 and continues to say these ZCH proposals are “a reasonable place to start” – but has not yet wholeheartedly committed to the levels recommended:

“The government remains of the view that these values represent a reasonable place to start and it is recognised that a significant amount of work was involved in determining these levels which should not be lightly set aside.”

But they go on to suggest that they are still open to evidence, partly in the light of “significant developments” in the energy landscape since the Zero Carbon Hub made its recommendations two and a half years ago: “The government thinks it right to start work now on thinking about the standards for 2016. In doing so, the government requires robust evidence.”

“As noted above, the Zero Carbon Hub’s recommendations were based on major pieces of analysis and were broadly the subject of consensus amongst the industry. The government therefore intends to work with industry and other partners over the coming months on reviewing the assumptions which underpinned the recommendations made by the Zero Carbon Hub to check that they still represent a sound basis for detailed work to be undertaken in preparing further proposals for Part L in 2016.”

These “significant developments” include:

- the 2013 Part L changes (“modest” in their words),
- the Housing Standards Review,
- recent developments in supporting low carbon heat,
- technological advances such as cheaper PVs and flue gas heat recovery,
- the EU directive on the energy performance of buildings due to come into force in 2020
- the work that the Zero Carbon Hub is undertaking (with industry representatives) on the performance gap.

It is not obvious how DCLG thinks all these developments might impinge on the 2016 targets. Measures such as low carbon heat, RHI and technological advances might be deemed to make it easier for builders to reduce emissions, so it is possible that DCLG could be persuaded they could achieve a little more than was anticipated by Zero Carbon Hub, when they recommended these levels.

Similarly, the 2020 directive at first sight might look at least as stringent as the government’s “zero carbon” target – suggesting there is not a lot of room to relax. This is what the Department has to say about the directive:

“Directive 2012/31/EU of the European Parliament ... on the energy performance of buildings (‘EPBD’)³ [is] now in force. The Directive requires Member States to ensure that all new buildings are ‘nearly zero energy’ from the end of 2020...”

“A ‘near zero energy’ building means a building that has a very high energy performance, as determined in accordance with methodology in ...the Directive. The nearly zero or very low amount

³ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF>

of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable produced on-site or nearby.

“While the Directive sets the framework for the definition of nearly zero energy buildings, the final detailed application in practice of that definition (e.g. what is *“very high energy performance”*) is the responsibility of the Member States. The government considers that its approach to zero carbon buildings is compatible with the Directive’s requirements. Nevertheless, the government has to be conscious of these requirements.”

It isn’t clear either how evidence on the performance gap might affect decisions about the 2016 FEES and carbon compliance levels.

On the performance gap, DCLG says: “The Zero Carbon Hub’s Carbon Compliance report set out as an industry recommended target for the house building industry that by 2020 at least 90% of all dwellings would meet or perform better than the designed energy/carbon performance. This is in the light of evidence from a number of studies which suggest that there is a significant gap between designed and completed building or as-built (post-completion) performance. The Zero Carbon Hub has instituted a major work programme with the industry, which the government has supported financially with a grant, to investigate and address the issues. The Zero Carbon Hub has published a progress report providing a summary of the collaborative work carried out to date and initial findings.”⁴

Again, it is not clear how this work might affect implementation of the Zero Carbon Hub’s zero carbon recommendations. Nor is it clear how “as-built performance” could be assessed, though there has been a suggestion that builders might either have to submit a proportion of their stock to monitoring, or alternatively be given a “performance gap downgrade factor” on their SAP calculated performance, which would have to be made up by higher design performance and/or more allowable solutions – but the process is still in its early stages.

It would possibly be rather cynical to suggest that expectations on housebuilders might be lowered, to give them a better chance of meeting them – but what DCLG do say, is that they are interested in making those expectations more accurate:

“The government also intends to work with industry on the technical issues raised in the Zero Carbon Hub Carbon Compliance report , which need to be considered and where appropriate incorporated into the revision of the National Calculation Methodology which will be required for 2016.”

This is an interesting remark, because many in the industry have pointed out areas where the National Calculation Methodology (SAP) could be improved to give a better reflection of differences in performance, particularly flowing from good (or indeed , poor) services design. Thus for example:

- SAP currently assumes a set 25% heat loss from MVHR installations, when in fact depending on the equipment and the ductwork design and insulation, it can range between about 50% to 5%. If this could be reflected in the calculations, there would be an incentive to ensure good design, and lower emissions could be demonstrated at little if any extra cost.

⁴ See <http://www.zerocarbonhub.org/definition.aspx?page=8> and <http://www.zerocarbonhub.org/definition.aspx?news=40>

- SAP currently gives little credit for good hot water system design – pipe lagging appears only as a tick box, and pipe run lengths are not addressed at all. One again, low or zero cost design improvements could be reflected in better emission rates, and poor ones would be identified at the Assessment stage, and if they are not improved, the poor performance should not come as surprise.
- SAP sets a rather high default for internal heat gains, given recent improvements in the efficiency of many household appliances and lighting systems. While this might make carbon compliance appear trickier, it would be of great assistance both in accurate heating system sizing, and in checking for overheating risk.
- SAP may need improving to take proper account of the glass/frame ratio in windows and thereby give more accurate estimations of (solar) gains and heat losses.

Set against the possible arguments for keeping the FEES and carbon compliance levels up (or even extending their ambition), however, there is also a great deal of talk from DCLG (both here, and even more so in the Housing Standards Review) about protecting the “viability” of development.

In this consultation, the government reiterates that it wants to ensure that development “provides a competitive return to the developer to ensure that development takes place and generates a land value sufficient to persuade the land owner to sell the land for the development proposed.”

In the housing standards review this concern about development land prices falling below “viability” seems to be more or less accepted as a reason not to impose high standards (at least, where they increase costs, and the mainstream industry tends to argue that they all do).

Here the department looks a bit deeper into the arguments – the Allowable Solutions impact assessment says: “It is anticipated that additional costs of zero carbon homes will largely be passed back to landowners in reduced land value uplift (the difference between the value of their land with and without planning permission for housing development), although the recent research referenced in Section 4 on the price premium attached to an energy efficient home should be noted.⁵

“This risks eroding the value of land for housing and potentially reduces the amount of land that will come forward for housing, especially in areas of lower house prices, higher existing/alternative use values and remediation costs. Impacts could be proportionately higher in areas where land values are low.”

In practice, they concede, “the scale of any such impact will depend on a variety of factors such as:

- The scale of the starting land values and uplift – sites and areas with high starting land values will be able to absorb more of the increase in costs without an impact on land being brought forward;
- [Various factors affecting build costs and selling prices]; and lastly:

⁵ DCLG is referring to their own research here ¹³ Fuerst, F./McAllister, P./Nanda, A./Wyatt, P, An investigation of the effect of EPC ratings on house prices, Final Project Report, Department for Energy and Climate Change, 17 June 2013, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207196/20130613_-_Hedonic_Pricing_study_-_DECC_template_2_.pdf - and although this particular study was greeted with scepticism, experience in continental Europe is starting to suggest that very high efficiency homes sell faster than ones built to a standard specification.

- “any change in landowner expectations (as to land values).”

Any local experience on these issues could usefully be added in to the answers to 1&2

Cost of allowable solutions

The viability arguments are brought out particularly in relation to the cost of allowable off-site solutions. DCLG ties itself in knots a bit here. They acknowledge that a higher cost for allowable solutions would incentivise more on-site efforts, yet they don't really want to set a floor price (all though Question 25 does offer it as an option) because this would get in the way of the market delivering the most cost-effective abatement options.

They eventually come down in favour of what they call a 'midrange' price cap of £60 per tone.

Many allowable solutions could be quite cheap, and possibly cheaper than on-site abatement – large-scale renewables, or district heating systems for example, are known to be more cost-effective than many domestic-sized low-carbon add-ons – and indeed making abatement cheaper for housebuilders is the explicit intention. Options mooted by DCLG include builders retrofitting carbon-saving measures to existing buildings, building to higher-than-regs standards in the years before zero carbon comes in, or buying into outside schemes run by the private sector or local authorities (there are a number of consultation questions relating to these suggestions).

Of course, they won't count as an offset if they are not truly additional – and DCLG concedes this is almost impossible to prove. Demonstrating true additionality will both be expensive in itself (in terms of bureaucracy) and also tend to make the actual solutions more expensive, as the “lower-hanging fruit” is more likely to be self-financing. Interested readers can refer to the consultation documents for a detailed discussion of this issue – though in sum, the impact assessment suggests that any carbon savings might need downgrading by a 25-odd % “not entirely additional” factor.

In a sense, there may be no good reason to put a high price on Allowable Solutions to abate emissions beyond what can reasonably be achieved on site with good fabric design. The fact that Allowable Solutions may be cheaper than the marginal cost of adding renewables on-site rather points up the inefficiency of adding renewables on-site.

The problem with cheap allowable solutions is that they could be seen by industry and DCLG as an acceptable alternative to perfectly feasible on-site, and, particularly, fabric achievement - which is why it is important that DCLG is as well-informed as possible about what decent fabric standards can, feasibly and affordably achieve, and carbon compliance is kept up at that level.

Beyond the carbon compliance level, cheap allowable solutions mean that it is unlikely there will be much incentive to improving the fabric beyond that level. If the compliance target is lowered, builders will be able to buy more of their compliance at knock-down allowable solutions prices, rather than putting the effort into the home itself.

And there will of course be every incentive to undercut more conscientious builders by simply “buying off” the zero carbon target with cheap allowable solutions. There is a possibility that customers might one day start to demand more of their homes (how, one wonders, might they respond to a transparent declaration of how much the builder has invested in “allowable solutions”

somewhere else, rather than spending the money on making the home itself more efficient) – but we probably can't count on it just yet.

The danger then is that DCLG is persuaded into relaxing the compliance level – a level that ZCH and industry have already agreed can relatively feasibly achieved on site, and instead, more of the “compliance” can be bought dirt cheap, and once again, housebuilders get out of having to up their game. This seems to be the thing to watch out for, and to resist.