

Fulcrum's Dream Definition of Zero Carbon Buildings

INTRODUCTION

There is a long and detailed back-story as to why we felt the need to write down our 'dream definition' of zero carbon buildings. The more concise version is that we have long been thinking about the sustainability of the built environment and possible ways in which significant and lasting reductions in greenhouse gas emissions can be achieved. When *Building a Greener Future*¹ came out in December 2006, we spent quite some time considering how Government could help facilitate the sort of changes required, and speculated about a locally administered 'offset fund' into which developers could invest as a way of offsetting a proportion of the carbon emissions of new homes, with the money being used to reduce carbon emissions from the existing stockⁱ.

By mid-2007 there were two definitions of 'zero carbon': one for Code for Sustainable Homes Level 6, one for the Stamp Duty Land Tax relief scheme for zero carbon homes; and the threat of a third for the 2016 commitment and a fourth for non-domestic buildings. We lobbied for a single, sensible, universally applicable definition that could cope with innovation while driving the industry toward a coherent vision for a sustainable built environment. We were heavily involved in the UK-GBC task groups responsible for

the 'Carbon Reductions in New Non-Domestic Buildings'² and the 'Definition of Zero Carbon'³ reports. The latter contained a modified version of our fund proposal, now termed a 'Community Energy Fund', as a main recommendation to Government.

In December 2008, Government published their consultation on the *Definition of Zero Carbon Dwellings and Non-domestic Buildings*⁴, specifically ruling out consideration of such a fund. We believe government have missed a crucial opportunity with their proposals, so in addition to responding to the consultation we are actively encouraging discussion and further debate around this topic.

This document gives a brief outline of Fulcrum's 'dream definition' of zero carbon buildings. Please feel free to provide feedback to ZCD@fulcrumfirst.com or join in the debate shortly on the Building website www.building.co.uk. For more information on Fulcrum's thoughts on the zero carbon consultation⁴, please follow this link: <http://www.fulcrumfirst.com/pages/Knowledgebase/zerocarbon.html>

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FULCRUMCONSULTING

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Host to the Zero Carbon Hub

Fulcrum is an international team of leading consulting engineers. Our objective is to facilitate the ongoing development of a low-impact built environment in a way that harnesses innovation and is compatible with economic reality and occupant expectations in terms of comfort, functionality and beauty.



As part of our 2009 debate series, March sees us discussing the recent Government consultation on 'the definition of zero carbon homes and non-domestic buildings'. We expect a lively debate around the hierarchical approach proposed by Government and the list of 'allowable solutions' on offer to achieve 'zero carbon' status. The event will be held in our London office on Wednesday March 11th from 6pm.

For further information on any of our debates please contact natasha.eyre@fulcrumfirst.com

i. See our response to Building a Greener Future here: <http://www.fulcrumfirst.com/pages/Knowledgebase/papers.htm>

Fulcrum's Dream Definition

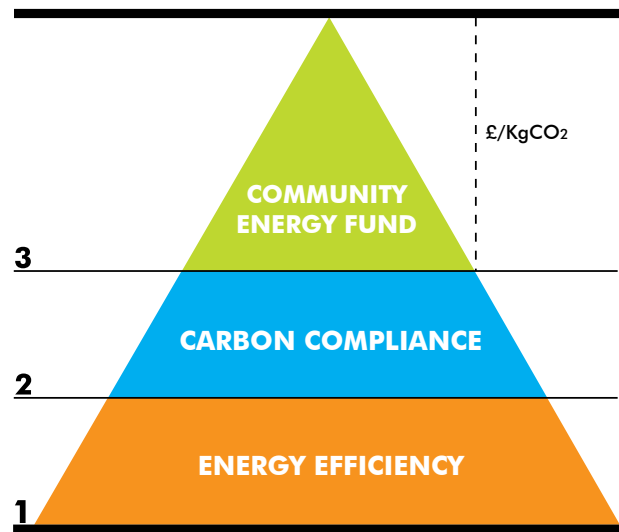
Fulcrum Consulting strongly believe that the delivery of a high-quality, low-carbon built environment should be a top priority for any Government. Buildings impact nearly every aspect of modern life: from the internal environment where we now spend most of our time, to the external environment in which we live, work and play. They are also a major driver of our nations' economies and, when planned and executed properly, can make the difference between soulless sink estates and treasured neighbourhoods.

In the UK, the 'zero carbon' policy has galvanised the industry around the need for action, but all too often there is insufficient data available to inform debates and decision-making on key issues. We believe that the public, political and industry momentum that has gathered behind the 'zero carbon' agenda should be harnessed to deliver the maximum possible emissions reductions from the built environment while delivering tomorrow's infrastructure. Mixed-use developments have been identified as critical in order for this to happen at the scale required, therefore non-domestic buildings must be covered by the same zero carbon definition framework as dwellingsⁱⁱ.

Fulcrum support the hierarchical approach outlined in the consultation document but we believe the 'Allowable Solutions' are inconsistent and risk under-delivering on important, and legally binding, emissions targets. We believe a fund mechanism similar to the proposals outlined in the UK-GBC report³ would be simpler and more predictable; both in terms of cost to the developer and emissions reductions. While developers would always be free to go beyond the minimum standards for steps 1 and 2, once the cost of doing so became excessive, payment into the fund would be the only other way to mitigate emissions. However, the money raised could be spent on a variety of interventions, including those listed as 'allowable solutions' in the current consultation document, but preferably focusing on community infrastructure providing the existing stock with low-cost, low-carbon energy.

ENERGY EFFICIENCY STANDARDS

Fulcrum agree that ambitious energy efficiency requirements should be set but believe the metrics used should be outcome-based. Whatever requirements are



'Zero Carbon' hierarchy

eventually included in the definition; they should represent a step-change in the energy efficiency of our buildings, and will have significant ramifications for the entire industry. It is important that mistakes of the past are not repeated and that, in the future, decisions can be made based on sound evidence. This evidence base should also help the industry learn from its previous attempts.

We also believe that all energy efficiency measures capable of demonstrably reducing the energy demand of a building should be allowed to count toward the regulatory requirements. This means the National Calculation Methodology must be updated to allow developers to gain full credit for measures such as installing advanced building control systems and energy efficient white goods.

CARBON COMPLIANCE

Fulcrum broadly agree with the notion of 'carbon compliance', but we believe the criteria should be widened to include new renewable energy generation installations in the vicinity of the development as per the 'on- or near-site' suggestion in the original UK-GBC report³. Ultimately, we feel that the legislation should drive design teams and developers to construct highly efficient buildings that integrate into an emerging network of smart infrastructure, while seeking to source as much of their energy from low and zero carbon sources as close to the development as possible.

ii. This was a recommendation in the UK-GBC report² that informed the consultation, but even though the title of the consultation refers to "homes and non-domestic buildings", the definition of 'zero carbon' only relates to dwellings.

Ideally, renewable energy should be supplied via existing infrastructure where appropriate, but if installing new infrastructure provides the possibility of upgrading to next generation technology then this should be encouraged. Indeed, funding the extra expense of next generation 'smart grid' technologies could be an option for monies gained under the fund mechanism we propose.

In our view, the level of 'carbon compliance' must be stated in terms of 'total energy' (Part L regulated energy + non-regulated energy). For energy efficient dwellings, the non-regulated energy accounts for around 45%-50% of total predicted CO₂ emissions and thus using regulated energy as the metric will unnecessarily skew the outcomes and create loopholes that consultants can exploit. Using 'total energy' will allow designers the greatest freedom in meeting the challenge, and in doing so, it should encourage the installation of a network of new community infrastructure and renewable energy generation systems.

ALLOWABLE SOLUTIONS: COMMUNITY ENERGY FUND

Essentially we believe the only 'allowable solution' should be a fund mechanism similar to the one outlined in the UK-GBC report³, funding emissions reductions via low and zero carbon infrastructure projects. The price of paying into the fund would be a key lever in the mechanism. A stepped or graduated cost scale could help to incentivise developers to go beyond the minimum energy efficiency and carbon compliance standards, without unduly penalising sites that are genuinely restricted in terms of on-site renewable energy capacity. This reduces the problem of being able to set a 'carbon compliance' standard that is viable for all potential sites (including those with specific planning restrictions, such as conservation areas) while remaining ambitious.

Using the fund mechanism reduces the decision to a financial one that is predictable and fits well with current industry decision-making. While this limits the options available to individual developers, it actually increases the options for how the emissions reductions are achieved. Multiple contributions could be combined in order to fund more ambitious projects delivering greater emissions reductions than if several small projects were taken forward individually.

Meanwhile, land values can be calculated by applying the cost of meeting the minimum energy efficiency and carbon compliance standards and then mitigating the remainder of the predicted emissions via the fund, giving greater certainty to developers. In time, standard figures and formulas will result from experience within the industry. Developers, design teams and product manufacturers will then be incentivised to increase the profit on the land by achieving greater savings via energy efficiency and 'carbon compliance' measures.

'ZERO CARBON' AND THE ECONOMY

We are all struggling with the effects of the current economic climate. But far from using the recession as an excuse to back away from ambitious sustainability targets, we believe it makes it even more important that we have a definition of 'zero carbon' that is viable. Focusing on new-build alone neglects the most important aspect of the built environment, both in terms of social impact and greenhouse gas emissions. The definition that we have proposed in this document will be able to achieve greater overall emissions reductions, at a better £/kgCO₂ ratio. This means that not only will it achieve the original aims of the 'zero carbon' policy, but it will also begin progress towards our 2020 and 2050 emission reduction targets.

We are convinced that such a definition will help spur innovation in effective carbon mitigation technologies at a variety of scales. This will place the UK at the forefront of the battle against anthropogenic climate change, creating new jobs and making our ideas and skills eminently exportable when the global economy recovers.

Please provide feedback to ZCD@fulcrumfirst.com

For further information please contact Fulcrum on

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REFERENCES

1. CLG, *Building a Greener Future: Towards Zero Carbon Development* (Dec 2006) <http://www.communities.gov.uk/archived/publications/planningandbuilding/buildinggreener>
2. UKGBC, *Carbon Reductions in New Non-domestic Buildings* (Dec 2007) <http://www.ukgbc.org/site/resources/showResourceDetails?id=121>
3. UK-GBC, *The Definition of Zero Carbon Report* (May 2008) <http://www.ukgbc.org/site/resources/showResourceDetails?id=180>
4. CLG, *Definition of Zero Carbon Homes and Non-domestic Buildings: Consultation* (Dec 2008) <http://www.communities.gov.uk/publications/planningandbuilding/zerocarbondefinition>