

Regen SW briefing

March 2007

Zero carbon homes

Achieving zero carbon residential development in the South West – a briefing for policy-makers and planners

Introduction

This briefing sets out the main issues around achieving zero carbon emissions in larger new-build housing developments in the region. It describes the findings of a recent report on Zero Carbon Development (ZCD) in the South West that underpins the draft regional policies affecting all larger developments coming through the planning process. This briefing does not cover non-residential developments (although the report does), existing and refurbished housing, and other sources of carbon emissions such as transport.

Defining Zero Carbon: ZCD is development that delivers zero net emissions of carbon dioxide into the atmosphere resulting from energy use in buildings, over the course of a year.

This definition encompasses regulated emissions (space & water heating, lighting and pumps and fans) and unregulated emissions (the rest) but excludes energy used for transport and embodied energy in materials.

Policy

Domestic housing is responsible for 27% of the UK's emissions of carbon dioxide and national policy is swiftly evolving to constrain carbon emissions, in the first instance from new developments. The Department for Communities and Local Government (CLG) is currently consulting on three proposals¹ to change the planning and building control frameworks:

- Building a Greener Future: Towards ZCD
- Planning Policy Statement: Planning and Climate Change
- Code for Sustainable Homes.

National policy for energy use in housing is to progressively tighten planning and building controls to achieve lower carbon emissions with the aim of achieving Zero Carbon in all housing by 2016 where possible. The transition period is to allow technologies and techniques to be developed and to allow the market to adjust to the extra build costs involved, principally through reducing the value of land.

The Regional Spatial Strategy² currently being drafted has two policies specifically relating to energy in housing – Policy G on ZCD and Policy RE5 on a requirement to reduce carbon emissions using renewable energy. Significantly the proposals require the region to do more in reducing carbon emissions from housing than national policies. This is justified by the greater reduction in carbon emissions over the lifetime of new housing and because it will result in more jobs and economic development in the region.

¹ see <http://www.communities.gov.uk/index.asp?id=1505157>

² www.southwest-ra.gov.uk/nqcontent.cfm?a_id=538

Report

The report³ that underpinned the development of the new regional energy policies was commissioned by the South West Regional Assembly, South West Regional Development Agency and Government Office for the South West. It is based on case studies under various scenarios scaled up to measure regional effect. The issues and assumptions are complex and what follows here is a much simplified summary of the detailed report, but the headline results are:

- Zero carbon development is technically feasible now, although not for all scales or sectors of development
- The bulk of the carbon savings are within the residential sector and are delivered by micro renewable technologies
- Delivering zero carbon development within the residential sector will require an increase in build costs that ranges from 7 to 17% now to 6 to 7% in 2020 depending on the technology options and scale of the development
- The potential growth in economic activity generated by the draft RSS policy represents both an opportunity and a challenge
- Policy will need to differentiate scale and sector of development and consider phasing of implementation
- Policy will need to be developed within the context of uncertain national standards.

The report suggests a ‘best fit regional scenario’ as the basis for the development of regional policy. The requirements increase over time as shown in the table below. It should be noted that various alternative actions will not count, such as on-site carbon sequestration, carbon offset payments, and purchase of green energy generated offsite without a direct physical private connection.

Date	Scale of residential development – number of dwellings	Code for Sustainable Homes	Min requirements for on-site CO ₂ reduction against baseline to meet requirements of Policy G
2008-2010	10 or more	Level 4	44% regulated emissions
2011-2015	10 or more	Level 5	100% regulated emissions
2016 on	10 to 50	Level 5	100% regulated emissions
	More than 50	Level 6	100% TOTAL emissions
In all cases the minimum on-site renewables required to meet Policy RE5 is 20% of regulated emissions			

The report suggests that the technical and financial viability at site level is broadly as set out in the following table although particular sites may need to use other technologies such as ground source heat pumps.

³ Supporting and Developing ZCD in the South West – Policy and Technical reports prepared for SWRA, SWRDA and GOSW by Faber Maunsell and Peter Capener see item 5 at www.southwest-ra.gov.uk/nqcontent.cfm?a_id=1866

	Regulated emissions only	Total emissions
<p>Small city infill</p> <p>10 to 50 dwellings</p>	<p>Zero Carbon Regulated emissions (ZCR) is technically viable without wind by a combination of PV and wood fuel (biomass) communal heating.</p> <p>The extra build cost is up to 14%.</p> <p>Developments of this type are too small for biomass CHP and too urban for wind.</p>	<p>ZC Total emissions (ZCD) is technically not viable without the use of wind power.</p> <p>The maximum CO₂ saving that could be achieved with a combination of PV, biomass and energy efficiency is 61%.</p>
<p>Medium scale, small market town</p> <p>50-500 dwellings</p>	<p>ZCR is technically viable without wind through the use of small-scale biomass CHP (100-300kWe) alone, or a combination of PV and biomass communal heating.</p> <p>The extra build cost:</p> <ul style="list-style-type: none"> - biomass CHP 5% - PV and biomass heat 12%. <p>If wind power is feasible, a small-scale wind turbine (200-300kW) in combination with biomass communal heating would also achieve ZCR at an additional build cost of about 5%.</p>	<p>ZCD can be achieved without wind power through a combination of biomass CHP and PV.</p> <p>The extra build cost is in the region of 15%.</p> <p>Alternatively, a single 0.83 MW commercial scale wind turbine would offset total emissions for a 300 dwelling development.</p>
<p>Large scale</p> <p>over 500 dwellings</p>	<p>ZCR is technically viable without wind through the use of large scale biomass CHP (1 MWe plus) sized to meet the heat loads for the residential element only. Alternatively ZCR can be achieved through a combination of PV and biomass communal heating</p> <p>The extra build costs:</p> <ul style="list-style-type: none"> - biomass CHP 4% - PV and biomass heating 12%. 	<p>ZCD can be achieved without wind power by large scale biomass CHP sized to meet both residential and non-residential heat loads on the site.</p> <p>The extra build cost is up to 7%.</p> <p>A single, large scale 2 MW wind turbine would offset about 42% of total emissions.</p>

For full details see the report section 5.3.1

Critical factors for policy implementation

The key factors determining the viability of ZCD in the future are:

- the technical viability of small scale biomass CHP
- the viability of biomass communal heating and CHP in relation to fuel supply chains and Energy Service Companies (ESCo) management
- the reduction of capital costs for photo-voltaic (PV) equipment
- additional build costs are offset against land value or shared with third parties.

The report calls on the South West regional bodies to provide coordinated support for:

- training and guidance for local authority officers and construction professionals to deliver the policy
- local authorities dealing with large developments
- developing regional guidance on balancing competing priorities on section 106 agreements
- enhancing regional biomass supply chains
- enhancing skills, awareness and the achievement of quality standards
- identifying strategic opportunities for the co-location of larger scale biomass CHP and advanced thermal treatment of waste facilities with urban extensions and other large scale developments
- development of locally owned ESCOs to enhance regional benefit.

Policy G of the draft Regional Spatial Strategy requires that developments of fewer than 10 dwellings meet at least the requirements of level 3 of the Code for Sustainable Homes. Further work has been commissioned by the Regional Assembly which will look in more detail at opportunities in smaller developments. This work is due to be completed in April 2007.

What next?

The RSS has been drafted and will go through an Examination in Public (EiP) in Spring 2007. The draft, and wording modifications proposed by the South West Regional Assembly, can be found at the EiP website⁴.

The EiP Panel's report is expected to be issued in mid 2007 and, following any changes required, the revised RSS could be approved by the Secretary of State and come into force by early 2008. It should be noted that:

- the policies in the draft RSS are a material consideration in the planning application process
- even if the revised RSS policies on zero carbon and renewables were rejected by the EiP Panel the national policies on building regulations will drive similar changes over a slightly longer timescale.

Regen SW is the renewable energy agency for South West England. It is core funded by the South West Regional Development Agency.

www.regensw.co.uk

⁴ <http://www.southwesteip.co.uk/participants/>