



Cynulliad National
Cenedlaethol Assembly for
Cymru Wales

Residential Carbon Reduction in Wales

1st report of the Sustainability Committee's Inquiry
into Carbon Reduction in Wales

March 2008

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Chair's Introduction

"There is no place like home. But our homes are responsible for 27 per cent of the UK's carbon emissions. If the UK is to play its part in avoiding catastrophic climate change then we must drastically reduce them..... The investment and the political courage required are substantial. But the results promise to be spectacular: fuel poverty wiped out, energy security enhanced and true leadership in the transition to a dynamic low-carbon economy. There is not a moment to lose".

Tony Juniper Executive Director Friends of the Earth England, Wales & Northern Ireland in: *HOME TRUTHS: A low-carbon strategy to reduce UK housing emissions by 80% by 2050*, Brenda Boardman University of Oxford's Environmental Change Institute 2007.

Global warming is an issue that concerns all of us and, as we experience first hand its effects, impacts on all our lives. One of the biggest contributions to global warming is the emission of carbon dioxide (CO₂) into the atmosphere. CO₂ emissions come from a variety of sources but everything we do, from making a cup of tea to building an office block, has an impact on the amount of CO₂ that is released into the atmosphere.

As soon as the Committee was first established, we were unanimous in our view that our first priority should be to examine how Wales is contributing to the urgently needed task of reducing carbon emissions and contributing to national and international targets.

In this, the first report into carbon reduction in Wales, we look at how CO₂ emissions can be reduced in housing and residential developments. We received evidence from a wide range of people and organisations who outlined the main challenges in reducing CO₂ emissions. We were also given many examples of good practice and it is around these concrete actions that we have built our recommendations.

It is important for every organisation and individual to play their part in reducing the amount of carbon dioxide we emit in Wales. Not only will it help to secure a pleasant, healthy standard of living for our own children but will help to ensure a future for generations across the world.

I would like to thank all those who have given us written and oral evidence for sharing their knowledge and expertise with us and for their openness and frankness in expressing their views to us.

This report will form part of our final report which will be published in the summer of 2008. We have also published an introductory document which is designed to be read as an introduction to any of the topic reports that we produce on carbon reduction in Wales and contains our terms of reference and the policy background to carbon reduction. The introduction document can be found on our website at:

http://www.assemblywales.org/bus-home/bus-committees/bus-committees-third-assem/bus-committees-third-sc-home/inquiries/inquiries_-_carbon_reduction_household.htm

We welcome your thoughts and comments on this report, which can be sent to us at: Sustainability.comm@Wales.gsi.gov.uk or write to us at:

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We would like to publish some of your ideas and views on our website so that other people can read them.

You can also find out more about how to contribute to our written consultations on future topics on our website at:

<http://www.assemblywales.org/bus-home/bus-committees/bus-committees-third-assem/bus-committees-third-sc-home.htm>

Chapter 1 – Introduction

Carbon reduction from the residential sector

1.1 The residential sector is thought to account for about 10 per cent of the carbon dioxide emissions in Wales (plenary speech on climate change by the First Minister, 13 February 2007). Around two-thirds of the housing stock that will be standing in 2050 is likely to have been built before 2005 (*Review of sustainability of existing buildings*, Department for Communities and Local Government, November 2006); the average existing home requires four times the energy to heat as one built to the latest building regulations (*Energy efficiency action plan*, Department for the Environment, Food and Rural Affairs (DEFRA), 2007). In 2004, approximately 84 per cent of domestic energy was used on space and water heating (61 per cent for space heating and 23 per cent for hot water) (*Domestic energy consumption by end use, 1970 to 2005* Department for Business, Enterprise and Regulatory Reform).

1.2 All new buildings funded or built on land disposed of by the Welsh Assembly Government must now meet the BREEAM Ecohomes Excellent environmental standard (*UK energy efficiency action plan*, DEFRA, 2007).

1.3 In 2004, residential customers in Wales consumed 5,600GWh of electricity (Digest of United Kingdom energy statistics, Department for Trade and Industry (DTI), 2006). Of the total residential electricity consumption, the proportions used by different types of usage are as follows: miscellaneous appliances 21 per cent, cold appliances (e.g. fridges and freezers) 18 per cent, internal lighting 16 per cent, consumer electronics 16 per cent (of which two-fifths is from televisions), cooking 15 per cent (more than one-quarter of which is from kettles), and wet appliances (e.g. washing machines, washer/dryers and dishwashers) 14 per cent (Digest of United Kingdom energy statistics DTI, 2006). The standby facility is responsible for an estimated 6 per cent of domestic electricity consumption (Energy consumption in the United Kingdom, DTI and Office for National Statistics, July 2002). By 2020, home computers and consumer electronics are projected to account for 45 per cent of electricity used in the home (The ampere strikes back: How consumer electronics are taking over the world, Energy Saving Trust, June 2007)

1.4 Energy consumption for lighting has increased by 63 per cent between 1970 and 2000, and by 11 per cent between 1990 and 2000, mainly due to the shift from rooms being lit by single ceiling bulbs towards multi-source lighting (DTI and National Statistics, *Energy consumption in the United Kingdom*, July 2002). The UK Government is currently looking to implement a ban on the sale of incandescent bulbs by 2011.

1.5 The main means of reducing the carbon dioxide burden from dwellings currently being used are the following:

Welsh Assembly Government

- Reducing demand for space heating in existing buildings, through **grants or other financial incentives** and awareness-raising about improving insulation.
- Increasing the use of **renewable energy** in **new-build dwellings** (minimum level determined by both Welsh national and local planning guidance).
- Changing the **energy source** for space and water heating to more carbon-efficient sources (encouraging the penetration of the **gas network** throughout Wales – determined by negotiation with private companies; improving the supply infrastructure and consumption of **biomass heating** – determined by the Welsh Assembly Government through grants, and through negotiation with the private sector).

UK Government

- Reducing demand for space heating in new buildings, by requiring better standards of insulation through **Building Regulations (DCLG, *Building Regulations*)**.
- Changing the **energy source** for space and water heating to more carbon-efficient sources (encouraging the uptake of **renewable space and water heating** sources – assisted via the UK Government through grants or other financial incentives Low Carbon Buildings Programme, Department for Business, Enterprise and Regulatory Reform).
- Legislating to **ban energy-inefficient appliances** (such as filament light bulbs – currently determined by the Government, Italy is planning mandatory energy efficiency standards for appliances (Italian Ministry for the Environment, Land and Sea, *Fourth National Communication under the UN Framework Convention on Climate Change*, p.100, November 2007).

Europe

- Reducing the **energy demand of appliances** (reducing stand-by energy use (European Commission, *Eco-design consultation forum discusses concrete action to reduce 'standby' electricity consumption*), and legislating for improved minimum standards for energy-efficiency)
- Requiring **energy labels** on buildings (European Parliament and European Council, *Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings*), cars (European Parliament and European Council, Directive 1999/94/EC of the European Parliament and of the Council of 13 December 1999 relating to the availability of consumer information on fuel economy and CO₂ emissions in respect of the marketing of new passenger cars) and appliances (European Council, *Council Directive 92/75/EEC of 22 September 1992 on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances*).

1.6 The former Environment, Planning & Countryside Minister announced an aspiration in Plenary on 13 February 2007 that all new buildings would be carbon neutral by 2011 and stated that the Welsh Assembly Government would be opening negotiations with the UK Government with a view to seeking devolution of building regulations (Welsh Assembly Government, Carwyn Jones AM, Minister for Environment, Planning & Countryside, *Sustainable Buildings*, Cabinet Oral Statement, 13 February 2007).

1.7 The Welsh Assembly Government launched a consultation on the draft *Planning Policy Statement: Planning and Climate Change*, in December 2006 (Welsh Assembly Government, *Planning Policy Statement, Planning for Climate Change*, Consultation draft, December 2006). One of the aims of the statement is to provide leadership to local authorities, which will start to influence how they consider stepping up the standards of development by the private sector beyond those in current building regulations.

Chapter 2 – Key issues and recommendations

“We will aim to achieve annual carbon reduction-equivalent emissions reductions of 3 per cent per year by 2011 in areas of devolved competence. We will set out specific sectoral targets in relation to residential, public and transport areas.”

One Wales - A progressive agenda for the government of Wales – Labour and Plaid Cymru Groups in the National Assembly – June 2007.

2.1 We are very pleased to see this commitment to carbon reduction in the One Wales document and fully support the coalition government in their efforts to achieve it.

2.2 We have received evidence from many of our witnesses, however, doubting whether the target can be achieved using the methods currently being used by the Welsh Assembly Government and expressing concern over the lack of clarity about how the target will be achieved.

2.3 In this chapter, we outline six ‘headline’ recommendations and illustrate the impact we think they could make on achieving the 3 per cent target in Wales.

2.4 The residential sector is an area in which the Welsh Assembly Government has many powers to influence carbon reduction and we therefore consider that this sector has the potential to make a large contribution to the 3 per cent target.

“It is our strong belief that the majority of actions needed to deliver significant carbon emissions reductions in the household sector can be undertaken within the existing powers of the National Assembly for Wales”.

Energy Saving Trust written evidence SC(3) CR-R3

2.5 We have attempted, for each of the headline recommendations, to indicate the potential amount of household carbon saved in relation to the 2005 figures. We hope that this will give clear guidance to the Welsh Assembly Government on the areas where they can make the most impact in carbon reduction in Wales. The calculations and assumptions used in the carbon reduction figures are at Annex D.

2.6 All our evidence emphasised the importance of leadership in driving through changes and supporting those delivering them. There were calls from several witnesses for the Welsh Assembly Government to show a strong lead in and commitment to reducing CO₂ emissions and support those, especially local authorities, tasked with achieving the reductions.

2.7 The evidence for these headline recommendations is discussed in more depth in later chapters. We wish, however, to highlight these six recommendations at the start of report.

Planning

2.8 We heard a great deal of evidence from all our witnesses about the effectiveness of radical planning policies in gaining reductions in CO₂ emissions.

Based on the evidence of the effectiveness of the 'Merton' rule (see Chapter 3) in achieving CO₂ reductions, we therefore recommend:

Headline Recommendation 1: The Committee recommends that, through a Ministerial Interim Planning Policy Statement (MIPPS), the Welsh Assembly Government require developments of over 5 dwellings and all commercial developments to produce at least 10 per cent of their energy requirements through on site renewable energy or local decentralised sources.

We consider that the implementation of recommendation HL1 would lead to a far greater reduction in CO₂ emissions than the 10 per cent as builders and developers would attempt to reduce the amount of energy needed to be generated on site by making the buildings more energy efficient.

We estimate that the implementation of Headline Recommendation 1 could result in annual carbon savings of around 1,400 tonnes per year.

Headline Recommendation 2: The Committee recommends that, through a Ministerial Interim Planning Policy Statement (MIPPS), the Welsh Assembly Government require developments of less than 5 dwellings to reduce their predicted CO₂ emissions by at least 25 per cent based on current building regulations through improvements to the energy performance of buildings, and/or the efficient supply of heat, cooling and power.

We estimate that the implementation of Headline Recommendation 2 could result in annual carbon savings of around 150 tonnes per year.

New buildings

2.9 Many of the witnesses expressed concern about the Welsh Assembly Government's aspiration for all new build to be carbon zero by 2011.

Based on the concerns about the lack definition or guidance on carbon zero buildings in Wales (see chapter 4), the Committee recommends:

Headline Recommendation 3: The Committee recommends that Building Regulations are devolved to the Welsh Assembly Government as a matter of urgency.

We estimate that the implementation of Headline Recommendation 3 could result in annual carbon savings of around 15,800 tonnes per year from 2011 onwards.

Headline Recommendation 4: The Committee recommends that the Welsh Assembly Government adopts the Code for Sustainable Homes with immediate effect. We also recommend that, when Building Regulations are devolved, those which would enable the highest level of the Code for Sustainable Homes to be enforced should be revised first.

We estimate that the implementation of Headline Recommendation 4 could result in annual carbon savings of around 4,000 tonnes per year in 2009 and 2010 (after which, the zero carbon requirement applies).

Existing buildings

2.10 It was accepted by all our witnesses that Wales has a particular problem with hard to heat homes and that many of these are in the private sector.

2.11 There was also evidence that the uptake of the installation of microgeneration schemes within existing buildings in Wales was low and would not meet the Welsh Assembly Government's targets (see Chapters 5 and 6)

Based on the concerns expressed about the energy efficiency of many homes and the costliness of the installation of microgeneration equipment, we recommend the following:

Headline Recommendation 5: The Committee recommends that the Welsh Assembly Government should fund a programme of retrofitting of all existing hard to heat homes so that they meet one of the agreed levels in the Code for Sustainable Homes.

We estimate that the implementation of Headline Recommendation 5 could result in annual carbon savings of around 98,000 tonnes per year from 2008 - 2017.

Headline Recommendation 6: The Committee recommends that the Welsh Assembly Government actively promotes the Low Carbon Building programme in Wales and provides additional grants for microgeneration schemes in existing housing.

We estimate that the implementation of Headline Recommendation 6 could result in annual carbon savings of around 2,400 tonnes per year from 2009 – 2012 and 10,070 tonnes per year from 2013 - 2020.

The total estimated CO₂ reduction as a result of implementing all of the above recommendations would be between 98,000 and 125,000 tonnes per year between 2008 and 2020, a cumulative total of 1,245,790 tonnes.

The estimated percentage saving of all household emissions over 2005 figures is 16.8% by 2020, an average of 1.3% per year.

Chapter 3 – The role of the planning system in carbon reduction

Areas of devolved competence

“planning officers might become heroes”

Evidence from the Centre for Alternative Technology (Sustainability Committee meeting 11 October 2007)

3.1 The planning system is devolved to the Welsh Assembly Government within the framework of England and Wales planning legislation.

3.2 The overwhelming evidence we received emphasised the fact that, although the **Welsh Assembly Government already has many of the powers needed to achieve substantial carbon reduction in residential buildings, these powers are not being fully utilised**. There were areas where the Welsh Assembly Government was considered to have made progress, for example, the issue of the Draft Climate Change MIPPS. It was generally acknowledged, however, this does not go far enough. The majority of our recommendations, therefore, call for the Welsh Assembly Government to show a strong lead to planners, local authorities, the building industry and consumers to realise the potential for residential sector carbon savings in Wales.

3.3 We received evidence from many witnesses about the **effectiveness of new, radical approaches to planning** in addressing the issues surrounding residential carbon reduction. Two examples of good practice were the London Borough of Merton and Woking Borough Council (Sustainability Committee 18 October 2007 SC(3)-06-06 Papers 3 and 4). The Centre for Alternative Technology considered that planning officers could play a key role in championing new proposals for carbon reduction.

3.4 We also heard that **radical planning policies are not achievable without clear and strong political leadership** to support their implementation. Merton and Woking Councils strongly emphasised that their policies would not have been as effective without clear leadership and support from organisations such as the London Assembly. The vast majority of those who gave evidence (including several Welsh local authorities) called for a stronger direction and more support from the Welsh Assembly Government for more radical planning policies to achieve CO₂ savings in the built environment.

3.5 The use of the ‘Merton rule’ which requires that all new developments use on site renewable energy to cut CO₂ emissions by at least 10 per cent advocated by many of those who gave evidence. Wrexham County Council identified the new Local Development Plan framework as an ideal vehicle for such policies and the establishment of minimum standards across Wales (Wrexham County Borough Council, written evidence SC(3) CR-R19).

3.6 Much of the evidence we received pointed to an apparent lack of leadership from the Welsh Assembly Government. We consider that, in the realm of planning, where the Welsh Assembly Government has substantial devolved powers, these are not being used to their full potential to achieve meaningful reductions in residential CO₂ emissions.

3.7 We consider that local authorities in Wales have the potential to be as innovative in their planning policies as local authorities such as Merton and Woking have been in England and we would strongly encourage them to be so. They need, however, the mechanisms, guidance and support from the Welsh Assembly Government to develop and implement those policies.

3.8 The evidence and discussion above led us to our first two headline recommendations (see Chapter 2) and to the recommendation 7 below which we consider will not only help to achieve CO₂ reductions but will also give a lead to local authorities in Wales to seek other innovative planning policies to address the problem.

Recommendation 7: The Committee recommends that the Welsh Assembly Government revises Planning Policy Wales and the associated guidance to strengthen the requirements for local authorities to include policies aimed specifically at carbon reduction in their Local Development Plans.

3.9 Much of the evidence pointed towards a **lack of commitment to carbon reduction outcomes in the planning process**. It was suggested that planning permission for new build and renovation should be more focussed on carbon reduction outcomes which should be embedded in Local Development Plans. The Wales ECO Centre went as far as to suggest that permission should only be granted if the application meets certain low carbon targets (Wales ECO Centre written evidence SC(3) CR-R14).

3.10 Concern was expressed by some witnesses that the **application process for low carbon technologies associated with new build was often complicated and difficult to understand**. The Wales Home Energy Conservation Association (HECA) Forum recommended that stronger guidance be given by the Welsh Assembly Government to encourage local authorities to accept applications which include microgeneration (Wales HECA Forum written response SC(3) CR-R16).

3.11 We believe that for any schemes or policies to be truly successful, their aims, objectives and methods of implementation should be clear, easily understood and easily accessible.

Recommendation 8: The Committee recommends that the Welsh Assembly Government reviews the application process for the installation and use of low carbon technologies in residential buildings with a view to simplifying and accelerating the process.

3.12 Another obstacle to the granting of planning permission for carbon reduction outcomes which was identified by our witnesses was a **lack of awareness by planners of the benefits of and potential for low carbon development and microgeneration**. It was felt that the existing guidance and information provided to planners, both in their initial training and through their ongoing professional development, does not place sufficient emphasis on low carbon outcomes.

3.13 We consider that it is crucial that those practitioners at the 'sharp end' understand the best ways of developing and implementing planning policies for carbon reduction, and their benefits. They should have access to the most up to date information, techniques and expertise.

Recommendation 9: The Committee recommends that the Welsh Assembly Government works with the Royal Town Planning Institute to develop and promote training, advice and guidance for planners in the areas of low carbon design and the use of microgeneration energy sources.

3.14 We consider that the planning system in Wales should take the lead in enabling low carbon development and technologies. From the evidence we have received so far, it can have the opposite effect.

3.15 We will return to planning as the final topic of our inquiry. Even at this early stage of our inquiry, it has become very apparent that planning and the planning system plays a large part in moving towards a low carbon society in Wales and it is a theme which will be highlighted at each stage of our report.

Chapter 4 – New buildings and carbon reduction

4.1 The way in which new buildings are designed and constructed is regulated through UK Building Regulations. Currently, building regulations are not devolved to the Welsh Assembly Government and so apply across England and Wales. The Welsh Assembly Government has asked for Building Regulations to be devolved to it so that it can meet its target of all new buildings being zero carbon by 2011 (the target in England is for 2016).

4.2 Concerns were expressed by the Wales Environment Link and the Home Builders Federation amongst others about **the lack of a definition of zero carbon building in Wales** (Wales Environment Link written evidence SC(3) CR-R15, Home Builders Federation written evidence SC(3) CR-R8). In England, the Code for Sustainable Homes sets out both a definition and the required minimum standards for a building to be accepted as zero carbon. The code is used extensively throughout the building industry in England. Many of the witnesses called for it to be adopted in Wales as soon as possible.

4.3 We are concerned that the 2011 target does not have a clear definition of what is required to meet it. A standard definition across England and Wales would appear to help those businesses who operate in both countries. The adoption of the Code for Sustainable Homes in Wales, as it appears to be widely accepted as a good, well thought out standard, would avoid unnecessary 'reinvention of the wheel' in Wales.

4.4 The evidence and discussion above led us to our third and fourth headline recommendations (see Chapter 2). We consider that the adoption of the Code for Sustainable Homes in Wales will help the Welsh Assembly Government to show a strong lead in achieving their 2011 target of zero carbon new build (subject to the devolution of building regulations).

4.5 The National Federation of Builders highlighted the lack of knowledge across the building industry of building techniques, materials and technologies for achieving low or zero carbon buildings (evidence to the Sustainability Committee 25 October 2007). Both Merton Council and Sustainable Housing Europe (SHE) emphasised the need for training and up to date, accessible information to be available for all sectors of the building trade (evidence to the Sustainability Committee 18 October 2007). The issue is particularly concerning in the 'grey economy' as a number of smaller builders operate here and are not accessible to national organisations.

4.6 There was also discussion about the importance of the role of consumers in understanding and requesting the use of low carbon technologies and techniques in any building work they are commissioning. The need to change consumer behaviour was recognised by many of the witnesses and is discussed further in Chapter 5.

4.7 We are concerned about this lack of knowledge and information within the building trade whilst we acknowledge the difficulties facing the industry in reaching all its practitioners. We believe that builders and developers are well placed to promote the use of low carbon building techniques and new technologies to their customers, whatever the size of their operation. We believe that, with economies of scale, the costs associated with new, low carbon building materials and techniques will reduce to be comparable with those of existing materials and technologies.

Recommendation 10: The Committee recommends that the Welsh Assembly Government works with the Construction Industry Training Board (CITB) and the Sector Skills Council for Construction to develop and promote training, advice and support for the construction industry in the area of low carbon building.

4.8 The benefits of the installation and operation of microgeneration systems was illustrated by Merton and Woking Councils. It was widely acknowledged that, whilst microgeneration can play an important role in reducing CO₂ emissions from residential buildings, there is a lack of information about and training in their installation and operation.

4.9 We also received evidence indicating that the costs associated with the installation of microgeneration technology could be offset and more people encouraged to install them if there were attractive and realistic feed-in tariffs to the National Grid. These would enable people who had installed microgeneration equipment to sell any surplus energy generated to the National Grid, so reducing reliance on fossil fuel powered energy generation.

4.10 We consider that the use of on site microgeneration can make a substantial contribution to carbon reduction and that every effort should be made to encourage individuals and organisations to consider it as a way of reducing their emissions.

Recommendation 11: The Committee recommends that the Welsh Assembly Government works with the Construction Industry Training Board (CITB) and the Sector Skills Council for Construction to develop and promote training, advice and support for the construction industry in the installation and the use of microgeneration energy sources.

Recommendation 12: The Committee recommends that the Welsh Assembly Government explore mechanisms for creating a market for surplus energy generated by individual microgeneration plants such as the creation of local energy supply companies with agreed feed-in tariffs

4.11 Concern was expressed by the Welsh Local Government Association (WLGA) that developers can often see building zero carbon homes as a competitive disadvantage. They estimated the additional building costs of low carbon homes was 7-10 per cent (Sustainability Committee 25 October 2007). Merton and Woking Councils however, gave examples of developers going

beyond the minimum requirements for carbon reduction whilst providing affordable housing.

4.12 Housing standards imposed on the social housing sector are more stringent than those imposed upon the private sector (e.g. new public sector housing now has to adhere to the EcoHomes excellent standard). Concerns were expressed by the WLGA and the Wales and West Housing Association that this could deter developers from entering the social housing market.

Recommendation 13: The Welsh Assembly Government should engage with developers as soon as possible to identify the benefits to them of pioneering zero carbon house building techniques in Wales.

Recommendation 14: The Committee recommends that the Welsh Assembly Government should identify good practice in the social housing sector and set up a knowledge exchange with private sector developers and builders.

Recommendation 15: Where land in the ownership of the Welsh Assembly Government is to be released for residential development, it should be done so at a discounted rate for the construction of zero carbon housing.

Recommendation 16: Where land in the ownership of the Welsh local authorities is to be released for residential development, the Welsh Assembly Government should encourage and support local authorities to do so at a discounted rate for the construction of zero carbon housing.

Chapter 5 – Carbon reduction in existing buildings.

“To tackle the issue of residential emissions in Wales is to tackle the particular issues that old housing stock poses.”

Countryside Council for Wales, written evidence SC(3) CR-R4

5.1 Wales has the largest percentage of housing stock built before 1919 in the UK, at around 36 per cent. This stock is often difficult to insulate and heat. In addition, a comparatively large proportion of Welsh homes are not connected to the mains gas network, meaning that they rely on electricity or bottled oil or gas to heat them. These two factors mean that Wales has a bigger challenge than other parts of the UK in making its housing stock energy efficient.

5.2 We received views from all our witnesses about the issue of hard to heat homes. There were a range of suggested solutions. The Centre for Alternative Technology suggested a rolling programme of demolition and replacing them with new, energy efficient buildings (Evidence to the Sustainability Committee 11 October 2007). The Countryside Council for Wales and several other witnesses highlighted the German programme for retrofitting all pre1978 housing stock to meet modern energy efficiency standards (funded by the German Government). The German Government also requires all existing housing stock to be remodelled to incorporate renewable energy based heating systems from 2010 with the aid of government funding.

5.3 Wales also has a high proportion of owner occupied housing stock. This was considered to be an advantage by the Countryside Council for Wales whilst several witnesses considered that this was a disadvantage as local authority funding was often directed to social housing. The Wales Audit Office report on the Home Energy Conservation Act (HECA) said that:

“For some councils the ‘quick wins’ of improvements in the energy efficiency of their own housing stock, have already been achieved and more effort needed to be focussed on efficiencies in private housing stock”.

Delivering the Home Energy Conservation Act in Wales, Wales Audit Office, September 2007.

5.4 We are concerned at the apparent lack of ability of local authorities in Wales to tackle the problem of carbon emissions from hard to heat homes and call for leadership from the Welsh Assembly Government on how to address the problem.

5.5 The evidence and discussion above led us to our fifth headline recommendation (see Chapter 2). We believe that, if the Welsh Assembly Government is serious about addressing CO₂ reduction and meeting its 3 per cent target in Wales, then it needs to address the issue of the high level of hard to heat existing housing stock.

5.6 The Low Cost Buildings Programme (LCBP) was identified by many witnesses as an example of how government funding could potentially encourage owners of existing homes to decrease their CO₂ emissions. The scheme provides funding for microgeneration technologies to be fitted to existing dwellings.

5.7 The Wales HECA Forum, however, highlighted the small uptake of the programme in Wales, with only 585 applications being received in two and a half years. This was contrasted starkly with the Welsh Assembly Government's targets for microgeneration of 30,000 units by 2012 (*Microgeneration Action Plan* Welsh Assembly Government March 2007). The programme was considered to be poorly advertised and, as its name and terms and conditions for application had changed, difficult for potential consumers to access and understand.

"Indeed, confusion is a feature of many initiatives - notably the Low Carbon Buildings Programme. Many builders interviewed did not know about it, and various changes to the project mean that people are generally unaware of exactly what is available".

National Federation of Builders, Wales SC(3)-07-07(p1): 25 October 2007.

5.8 Despite programmes such as LCBP, several witnesses identified the costs associated with the initial installation of microgeneration equipment as being perceived as off putting to many consumers. The HECA Forum advocated top up grants from the Welsh Assembly Government and local authorities to encourage uptake.

5.9 We too are concerned at the apparent lack of commitment to microgeneration in Wales despite the aspirations of the Action Plan. We look forward to discussing the results of the Action Plan implementation group's report on the first 12 months of the plan when it is delivered in March of this year with the Minister.

5.10 The evidence and discussion above led us to our sixth headline recommendation (see Chapter 2). We believe that the Welsh Assembly Government's microgeneration targets will not be met without increased funding and the provision of accurate, up to date and easily accessible information about the schemes available.

5.11 During the course of our inquiry, the Wales Audit Office published a report into the implementation of the HECA in Wales. The report pointed to a lack of commitment to implementing the terms of the HECA by many local authorities in Wales. The WLGA, HECA Forum and Wales Environment link all pointed to evidence in the report indicating that the vast majority of local authorities did not meet their targets for energy conservation and only 4 local authorities have full time HECA officers. Friends of the Earth considered that, as funding for the HECA work was not dependant on targets being achieved, there were no incentives for local authorities to meet them (evidence to the Sustainability Committee 11 October 2007).

5.12 Concerns were also expressed at the lack of baseline data against which to measure energy efficiency savings and the different ways in which each local authority measured its efficiency savings, making comparisons between authorities difficult to make.

5.13 During her evidence to the Committee, the Minister for Environment, Sustainability and Housing stated her wish to repeal the HECA for Wales, mirroring current thinking in England (SC(3)-02-08 (p2): 24 January 2008). The requirements placed on local authorities by the Act would be replaced by outcomes based performance indicators aimed at reducing CO₂ emissions.

5.14 From the evidence we have received, we consider that the HECA has not realised its potential to achieve significant CO₂ reductions in the residential sector. We welcome the Minister's aspirations for outcomes based performance indicators.

5.15 We are concerned, however, that there does not appear to be an agreed baseline for local authorities against which to measure their performance.

Recommendation 17: The Committee therefore recommends that the Welsh Assembly Government consults with Welsh local authorities on the most effective way of measuring CO₂ emissions from residential properties in their area to establish a true baseline against which each local authority can measure improvement.

5.16 We are also concerned that many of the issues raised by the Wales Audit Office in their report need to be addressed by local authorities in order to meet any performance indicators that are established.

Recommendation 18: The Committee therefore recommends that the performance indicators should contain targets with milestones for improvement, a clear indication of what is being measured (e.g. CO₂ reduction, average energy efficiency of housing stock, number of homes given advice/grants, reduction in the percentage of hard to heat homes). The targets should also reflect the current state of the housing stock within the local authorities' areas and should be tailored accordingly.

Recommendation 19: The Committee also recommends that the Welsh Assembly Government issues guidance to local authorities on methods of achieving their targets e.g. full time dedicated staff to implement household carbon reduction policies, how reductions can be made in private properties, sharing of good practice.

Chapter 6 – Behavioural Change

“According to DEFRA’s ‘Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990-2004’, the residential sector in Wales was responsible for 11 percent of total CO₂ emissions and that this sector saw the fastest growing increase in emissions between 1990 and 2004 (+16 per cent).

Although there is evidence that the growth in energy demand in the domestic sector in the UK has begun to level off in recent years, the significant improvement in energy efficiency in UK households since the 1970s has not been translated into comparable reductions in overall energy use and CO₂ emissions.”

Friends of the Earth Cymru, SC(3)-05-07 (p1): 11 October 2007.

“The reduction of carbon dioxide is a behavioural change as well as a technical change. In fact, it is probably half and half”.

Environment Agency Wales, Sustainability Committee 4 October 2007.

6.1 Changing people’s behaviour to achieve reductions in CO₂ emissions is becoming a recurring theme of this inquiry and one where we can all, as individuals, make a difference.

6.2 Although the Welsh Assembly Government has limited powers over the production and supply of energy, it does have much wider powers to influence the usage of and demand for energy in households in Wales. The Welsh Assembly Government is able to influence behavioural change through incentives, education, advice and awareness raising.

6.3 As can be seen in the figures quoted by Friends of the Earth Cymru above, in spite of measures aimed at reducing consumption, household consumer energy demand continues to grow because of increasing household temperatures and proliferation of consumer electronics.

6.4 Many of our witnesses indicated that the reason for this was that many consumers fail to understand the benefit of or need for individual energy reduction/energy efficiency actions and investment. The WLGA and Pembrokeshire Coast National Park Authority both highlighted the need for urgent action to educate consumers (Pembrokeshire Coast National Park, written evidence SC(3) CR-R11).

6.5 Several witnesses referred to various recent surveys which have indicated that, although householders agree with the need to combat global warming and reduce CO₂ emissions, they are not making changes in their own behaviour which would contribute.

Recommendation 20: The Committee recommends that the Welsh Assembly Government produces a sustained and widespread marketing and education campaign aimed at encouraging and informing people about the benefits of reducing their energy consumption.

6.6 Many witnesses pointed to the fact that information and advice for consumers is patchy, fragmented and often hard to find. The Energy Saving Trust highlighted their Sustainable Energy Network funded by Welsh Assembly Government which aims to provide consistent, understandable advice which is easily accessible across Wales.

6.7 The Wales Consumer Council advocated a system of One Stop Shops for energy saving advice and help. They and many other witnesses also emphasised the role played by community organisations such as the Women's Institute in leading behavioural change at a local level (Wales Consumer Council, written evidence SC(3) CR-R17).

6.8 We welcome the funding of the Sustainable Energy Network by the Welsh Assembly Government and consider that it has great potential to realise savings in domestic energy consumption. We consider, however, that there is still a need for a more integrated approach to delivering advice on carbon reduction.

Recommendation 21: The Committee therefore recommends that, the Welsh Assembly Government should continue to fund the Sustainable Energy Network. The Network should be expanded and enhanced however to encompass all those organisations providing advice (including the Carbon Trust) into a truly One Stop Shop for all carbon reduction help and advice with additional funding from the Welsh Assembly Government.

6.9 We fully support the work of community groups in Wales. We consider that they have a large and influential role to play in influencing behaviour change on an individual and community level.

Recommendation 22: The Committee recommends that the Welsh Assembly Government makes additional funds available for community based carbon reduction projects.

6.10 The Wales Consumer Council and the Energy Retail Association (Sustainability Committee 18 October 2007) were amongst those who highlighted the need for more information to be given to consumers about their energy consumption. Studies have shown that consumers are more likely to change their behaviour if they have information about their energy consumption on a real time basis that they can access within their own home. Both organisations advocated the use of Smart Meters which show energy consumption within the home in real time in providing consumers with more information.

6.11 We agree with the view that more information should be made available to consumers and welcome the Welsh Assembly Government's current trials of Smart Meters and other display devices in a selection of households in Wales.

Recommendation 23: The Committee recommends that the Welsh Assembly Government, subject to the outcomes of current trials, supports the UK Government in their efforts to encourage the utility companies to fund the installation of Smart Meters or their equivalent in all households across Wales.

If the utility companies do not fund the installation of Smart Meters or their equivalent, the Committee recommends that the Welsh Assembly Government fund their installation for all households.

Chapter 7 – Targets

“So, targets are important as they are the other side of the indicators. The key question that needs to be asked is, ‘What will we do if we do not meet the targets?’ Will we adjust the policies? Do we actually have to invest some money into other ways of achieving those targets?”

Environment Agency Wales, Sustainability Committee 4 October 2007.

7.1 The Welsh Assembly Government has set a series of targets for improving energy efficiency and reducing carbon emissions.

- Aspiration to carbon neutral newbuild target by 2011;
- 3 per cent annual reduction target for carbon emissions by 2011 in areas of devolved competence;
- A commitment to 'contribute fully to meeting UK-wide targets' (20 per cent below 1990 levels by 2010);
- 30,000 microheating and electricity units installed by 2012, 300,000 such units installed by 2020;
- Individual targets for local authorities to improve domestic energy efficiency of between 3 and 16 per cent by 2006/07 through policy agreements
- 4 TWh of renewable energy in Wales by 2010

7.2 Various witnesses we heard doubted whether there are sufficiently robust mechanisms in place to enable the Welsh Assembly Government to meet these targets. The majority of them now have deadlines of between 2 and 3 years for their implementation but there was much concern expressed about the lack of guidance from the Welsh Assembly Government on how they are proposing to achieve them.

7.3 There was unanimous agreement that the newbuild aspiration could not be realised without the devolution of building regulations to the Welsh Assembly Government which has still not been achieved. As discussed in Chapter 4, there was also concern expressed about the lack of definition of zero carbon in Wales. The Home Builder’s Federation highlighted the extent of information and strategic planning already available in England leading up to their target of zero carbon newbuild by 2016 (*Code for Sustainable Homes, Building a Greener Future policy document, Draft Strategy for Sustainable Construction*).

7.4 When questioned about the ability of the Welsh Assembly Government to fulfil its aspiration for zero carbon newbuild and whether there would be additional funding available for resources to revise and maintain devolved regulations, the Deputy Minister for Housing said:

“It is an aspiration that we are pursuing. It is out in the public domain and everyone is aware of it. The important thing is that there is clarity that this is an aspiration that we are pursuing with the revenue that we have available.”

Sustainability Committee, 15 November 2007.

7.5 Although welcomed by all the witnesses, the 3 per cent annual reduction target was criticised for being 'aspirational' and showing a lack of commitment and for being unclear as to the definition of areas of devolved responsibility.

7.6 It is unclear how the targets set by the Welsh Assembly Government fit with the UK Government's current targets and how they will fit with the target of 60 per cent proposed in the current Climate Change Bill. Many of our witnesses sought to address this issue and a number of different answers were forthcoming.

7.7 The microgeneration and local authority target have already been discussed elsewhere in this report and the 4 TWh of renewable energy in Wales by 2010 will be discussed as part of the energy production part of this inquiry.

7.8 We too welcome the setting of targets by the Welsh Assembly Government and their commitment to contribute fully to the UK targets. We share the concerns of many of our witnesses, however, about the lack of strategic direction and leadership in making explicit how those targets are to be achieved. We look forward to the outcome of the Renewable Energy Route Map consultation and the first evaluation of the implementation of the Microgeneration Action Plan to show the way forward in achieving these targets.

Recommendation 24: The Committee recommends that the Welsh Assembly Government produce detailed action plans outlining how they intend each of the targets they have set to be met.

Recommendation 25: The Committee recommends that the Welsh Assembly Government reports progress on achieving the targets every six months to the Assembly in plenary and to the Sustainability Committee or its equivalent.

Recommendation 26: The Committee recommends that, in addition to recommendation 16, the Welsh Assembly Government reports to the Committee every six months on its progress in implementing the recommendations from this report that it has accepted.

Annex A: Summary of recommendations

Headline recommendations:

Headline Recommendation 1: The Committee recommends that, through a Ministerial Interim Planning Policy Statement (MIPPS), the Welsh Assembly Government require developments of over 5 dwellings and all commercial developments to produce at least 10 per cent of their energy requirements through on site renewable energy or local decentralised sources.

Headline Recommendation 2: The Committee recommends that, through a Ministerial Interim Planning Policy Statement (MIPPS), the Welsh Assembly Government require developments of less than 5 dwellings to reduce their predicted CO₂ emissions by at least 25 per cent based on current building regulations through improvements to the energy performance of buildings, and/or the efficient supply of heat, cooling and power.

Headline Recommendation 3: The Committee recommends that Building Regulations are devolved to the Welsh Assembly Government as a matter of urgency.

Headline Recommendation 4: The Committee recommends that the Welsh Assembly Government adopts the Code for Sustainable Homes with immediate effect. We also recommend that, when Building Regulations are devolved, those which would enable the highest level of the Code for Sustainable Homes to be enforced should be revised first.

Headline Recommendation 5: The Committee recommends that the Welsh Assembly Government should fund a programme of retrofitting of all existing hard to heat homes so that they meet one of the agreed levels in the Code for Sustainable Homes.

Headline Recommendation 6: The Committee recommends that the Welsh Assembly Government actively promotes the Low Carbon Building programme in Wales and provides additional grants for microgeneration schemes in existing housing.

Other recommendations

Recommendation 7: The Committee recommends that the Welsh Assembly Government revises Planning Policy Wales and the associated guidance to strengthen the requirements for local authorities to include policies aimed specifically at carbon reduction in their Local Development Plans.

Recommendation 8: The Committee recommends that the Welsh Assembly Government reviews the application process for the

installation and use of low carbon technologies in residential buildings with a view to simplifying and accelerating the process.

Recommendation 9: The Committee recommends that the Welsh Assembly Government works with the Royal Town Planning Institute to develop and promote training, advice and guidance for planners in the areas of low carbon design and the use of microgeneration energy sources.

Recommendation 10: The Committee recommends that the Welsh Assembly Government works with the Construction Industry Training Board (CITB) and the Sector Skills Council for Construction to develop and promote training, advice and support for the construction industry in the area of low carbon building.

Recommendation 11: The Committee recommends that the Welsh Assembly Government works with the Construction Industry Training Board (CITB) and the Sector Skills Council for Construction to develop and promote training, advice and support for the construction industry in the installation and the use of microgeneration energy sources.

Recommendation 12: The Committee recommends that the Welsh Assembly Government explore mechanisms for creating a market for surplus energy generated by individual microgeneration plants such as the creation of local energy supply companies with agreed feed-in tariffs.

Recommendation 13: The Welsh Assembly Government should engage with developers as soon as possible to identify the benefits to them of pioneering zero carbon house building techniques in Wales.

Recommendation 14: The Committee recommends that the Welsh Assembly Government should identify good practice in the social housing sector and set up a knowledge exchange with private sector developers and builders.

Recommendation 15: Where land in the ownership of the Welsh Assembly Government is to be released for residential development, it should be done so at a discounted rate for the construction of zero carbon housing.

Recommendation 16: Where land in the ownership of the Welsh Local Authorities is to be released for residential development, the Welsh Assembly Government should encourage and support local authorities to do so at a discounted rate for the construction of zero carbon housing.

Recommendation 17: The Committee therefore recommends that the Welsh Assembly Government consults with Welsh local authorities on the most effective way of measuring CO₂ emissions from residential

properties in their area to establish a true baseline against which each local authority can measure improvement.

Recommendation 18: The Committee therefore recommends that the performance indicators should contain targets with milestones for improvement, a clear indication of what is being measured (e.g. CO₂ reduction, average energy efficiency of housing stock, number of homes given advice/grants, reduction in the percentage of hard to heat homes). The targets should also reflect the current state of the housing stock within the local authorities' areas and should be tailored accordingly.

Recommendation 19: The Committee also recommends that the Welsh Assembly Government issues guidance to local authorities on methods of achieving their targets e.g. full time dedicated staff to implement household carbon reduction policies, how reductions can be made in private properties, sharing of good practice.

Recommendation 20: The Committee recommends that the Welsh Assembly Government produces a sustained and widespread marketing campaign aimed at encouraging and informing people about the benefits of reducing their energy consumption.

Recommendation 21: The Committee therefore recommends that, the Welsh Assembly Government should continue to fund the Sustainable Energy Network. The network should be expanded and enhanced however to encompass all those organisations providing advice (including the Carbon Trust) into a truly One Stop Shop for all carbon reduction help and advice with additional funding from the Welsh Assembly Government.

Recommendation 22: The Committee recommends that the Welsh Assembly Government makes additional funds available for community based carbon reduction projects.

Recommendation 23: The Committee recommends that the Welsh Assembly Government, subject to the outcomes of current trials, supports the UK Government in their efforts to encourage the utility companies to fund the installation of Smart Meters or their equivalent in all households across Wales.

Recommendation 24: The Committee recommends that the Welsh Assembly Government produce detailed action plans outlining how they intend each of the targets they have set to be met.

Recommendation 25: The Committee recommends that the Welsh Assembly Government reports progress on achieving the targets every six months to the Assembly in plenary and to the Sustainability Committee or its equivalent.

Recommendation 26: The Committee recommends that, in addition to recommendation 16, the Welsh Assembly Government reports to the Committee every six months on its progress in implementing the recommendations from this report that it has accepted.

Annex B: List of respondents to the call for written evidence

http://www.assemblywales.org/bus-home/bus-committees/bus-committees-third-assem/bus-committees-third-sc-home/inquiries/inquiries_-_carbon_reduction_household/carbon_reduction-household.htm

Brecon Beacons National Park
Cardiff Council
Centre for Alternative Technology
Countryside Council for Wales
Energy Saving Trust Local Support Team (South East Wales)
Energy Saving Trust Wales
Friends of the Earth Cymru
Home Builders Federation
Neath Port Talbot Council
Pembrokeshire Coast National Park Authority
Swansea Housing Association (1) and Swansea Housing Association (2)
Wales and West Housing Association Ltd
Wales Environment Link
Wales Home Energy Conservation Association
Welsh Association of National Park Authorities (WANPA)
Welsh Consumer Council
Welsh Local Government Association
West Wales ECO Centre
Wrexham County Borough Council
WWF Cymru

Annex C – List of witnesses providing oral evidence.

Thursday 4 October 2007 [SC\(3\)-04-07 : Transcript](#)

Environment Agency Wales

[SC\(3\)-04-07 : Paper 1 : Environment Agency Wales](#)

Carbon Trust

[SC\(3\)-04-07 : Paper 2 : Carbon Trust](#)

Energy Saving Trust

[SC\(3\)-04-07 : Paper 3 : Energy Saving Trust](#)

Sustainable Development Commission

[SC\(3\)-04-07 : Paper 4 : Sustainable Development Commission \(pdf 112KB\)](#)

Thursday 11 October 2007 [SC\(3\)-05-07 : Transcript](#)

Friends of the Earth Cymru

[SC\(3\)-05-07 : Paper 1 : Friends of the Earth Cymru](#)

Wales Environment Link

[SC\(3\)-05-07 : Paper 2 : Wales Environment Link](#)

Centre for Alternative Technology

[SC\(3\)-05-07 : Paper 3 : Centre for Alternative Technology](#)

Coal MTAN Petition

[SC\(3\)-05-07 : Paper 4 : Petition PO61\(GR\): Coal MTAN](#)

Coal MTAN Petition Annex

[SC\(3\)-05-07 : Paper 4 : Petition PO61\(GR\): Coal MTAN \(pdf 308KB\)](#)

Thursday 18 October 2007 [SC\(3\)-06-07 : Transcript](#)

Energy Retail Association

[SC\(3\)-06-07 : Paper 1 : Energy Retail Association Evidence](#)

[SC\(3\)-06-07 : Paper 1 : Energy Retail Association Presentation \(pdf 449KB\)](#)

Sustainable Housing in Europe (SHE)

[SC\(3\)-12-07 : Paper 2 : Sustainable Housing in Europe \(SHE\) Project \(pdf 1.71MB\)](#)

[SC\(3\)-12-07 : Paper 2 : Sustainable Housing in Europe \(SHE\) Annex \(pdf 1.58MB\)](#)

[SC\(3\)-12-07 : Paper 2 : Sustainable Housing in Europe \(SHE\) Synopsis \(pdf 2.77MB\)](#)

London Borough of Merton

[SC\(3\)-06-07 : Paper 3 : Report by London Borough of Merton \(pdf 1.33MB\)](#)

[SC\(3\)-06-07 : Paper 3 : Presentation by London Borough of Merton \(pdf 449MB\)](#)

Woking Borough Council

[SC\(3\)-06-07 : Paper 4 : Woking Borough Council Paper](#)

[SC\(3\)-06-07 : Paper 4 : Presentation by Woking Borough Council \(pdf 133MB\)](#)

Thursday 25 October 2007 [SC\(3\)-07-08 : Transcript](#)

National Federation of Builders Cymru

[SC\(3\)-07-07 : Paper 1 : National Federation of Builders Cymru](#)

Welsh Local Government Association

[SC\(3\)-07-07 : Paper 2 : Welsh Local Government Association Evidence \(pdf 255KB\)](#)

[SC\(3\)-07-07 : Paper 2 : Welsh Local Government Association Appendix 2 \(pdf 2.29MB\)](#)

Community Housing Cymru

[SC\(3\)-07-07 : Paper 3 : Community Housing Cymru](#)

energywatch Wales

[SC\(3\)-07-07 : Paper 4 : energywatch Wales \(pdf 173KB\)](#)

Thursday 15 November [SC\(3\)-09-07 : Transcript \(PDF, 178kb\)](#)

Deputy Minister for Housing

[SC\(3\)-09-07 : Paper 4 : Paper from the Deputy Minister for Housing](#)

Thursday 24 January [SC\(3\)-02-08 : Transcript \(PDF, 292kb\)](#)

Minister for the Environment, Sustainability and Planning

[SC\(3\)-02-08 : Paper 2 : Home Energy Conservation Act, UK Planning Bill, UK Climate Change Bill](#)

Annex D: Carbon reduction calculations

Headline Recommendation 1: The Committee recommends that, through a Ministerial Interim Planning Policy Statement (MIPPS), the Welsh Assembly Government require developments of over 5 dwellings and all commercial developments to produce at least 10% of their energy requirements through on site renewable energy or local decentralised sources.

Assumptions:

- Only carbon savings from residential new build are calculated
- All new build attains a 10 per cent reduction in energy use in order to reduce the cost of providing 10 per cent of on-site energy generation
- Approximately 8,315 new residential dwellings are built per annum in Wales (average annual new build 1999-2003), of which 8,000 are assumed to be in developments of 5 dwellings and greater
- Carbon emissions from gas are 0.19kg CO₂ per kWh; from electricity are 0.43kg CO₂ per kWh
- New build to current Building Regulations averages 1.9 tonnes of CO₂ per annum (based on average energy performance of new build), of which approximately 50 per cent are from gas and 50 per cent from electricity (5,000kWh gas; 2,209kWh electricity)
- On-site renewables generate electricity
- Carbon emissions from zero carbon dwellings are zero or better

Energy efficiency gains of 10 per cent over current Building Regulations will be 0.19 tonnes per dwelling.

Electricity generated will be 10 per cent of reduced consumption

$(7,209 \times 0.9) \times 0.1 = 650 \text{ kWh}$

Carbon emission by displacing grid electricity = $650 \times 0.43 = 280 \text{ kg} = 0.28$ tonnes per dwelling

Total savings = 0.47 tonnes per new dwelling = 3,800 tonnes annually from 2009/10

Headline Recommendation 2: The Committee recommends that, through a Ministerial Interim Planning Policy Statement (MIPPS), the Welsh Assembly Government require developments of less than 5 dwellings to reduce their predicted CO₂ emissions by at least 25% based on current building regulations through improvements to the energy performance of buildings, and/or the efficient supply of heat, cooling and power.

Assumptions:

- Approximately 8,315 new residential dwellings are built per annum in Wales (average annual new build 1999-2003), of which 8,000 are assumed to be in developments of 5 dwellings and greater
- New build to current Building Regulations averages 1.9 tonnes of CO₂ per annum (based on average energy performance of new build)

Energy efficiency gains of 25 per cent over current Building Regulations will be 0.48 tonnes per dwelling.

Annual savings = $0.48 \times 315 = 151$ tonnes

Total savings = 151 tonnes annually from 2009/10

Headline Recommendation 3: The Committee recommends that Building Regulations are devolved to the Welsh Assembly Government as a matter of urgency.

Assumptions:

- The Welsh Assembly Government implements its policy of all new buildings being zero carbon by 2011
- Only carbon savings from residential new build are calculated
- Approximately 8,315 new residential dwellings are built per annum in Wales (average annual new build 1999-2003)
- New build to current Building Regulations averages 1.9 tonnes of CO₂ per annum (based on average energy performance of new build)
- Carbon emissions from zero carbon dwellings are zero or better

Energy efficiency gains will be 1.9 tonnes per dwelling

Annual savings from 2011/12 = $1.9 \times 8,315 = 15,800$ tonnes

Total savings = 15,800 tonnes per annum from 2011/12, of which 14,200 tonnes are in addition to those savings from Headline Recommendation 1

Headline Recommendation 4: The Committee recommends that the Welsh Assembly Government adopts the Code for Sustainable Homes with immediate effect. We also recommend that, when Building Regulations are devolved, those which would enable the highest level of the Code for Sustainable Homes to be enforced should be revised first.

Assumptions:

- Code Level 3 is attained by 2009/10, and Code Level 5 by 2011/12 (assuming that Building Regulations are not devolved and the 2011 zero carbon target is not achieved)
- Approximately 8,315 new residential dwellings are built per annum in Wales (average annual new build 1999-2003)
- New build to current Building Regulations averages 1.9 tonnes of CO₂ per annum (based on average energy performance of new build)

Energy efficiency gains will be 0.48 tonnes per dwelling in 2009/10, and 1.9 tonnes per dwelling in 2010/11.

Annual savings from 2009/10 = $0.48 \times 8,315 = 4,000$; from 2011/12 = $1.9 \times 8,315 = 11,800$

Total savings = 4,000 tonnes in 2009/10, and a further 11,800 tonnes per annum from 2011/12 (these savings are not additional to those achieved from Headline Recommendation 3)

Headline Recommendation 5: The Committee recommends that the Welsh Assembly Government should fund a programme of retrofitting of all existing hard to heat homes so that they meet one of the agreed levels in the Code for Sustainable Homes.

Assumptions:

- 'Hard to heat' homes are those with solid walls that are not on the gas network¹. Because information on hard to heat homes is unavailable, the proxy used here is those in fuel poverty: approximately 245,000 homes in 2006 were fuel poor².
- Average gas consumption in Wales was 20,442kWh in 2003³; average electricity consumption was 4,278kWh
- Fuel poor homes use the Wales average amount of fuel
- New build to current Building Regulations averages 1.9 tonnes of CO₂ per annum (based on average energy performance of new build), of which approximately 50 per cent are from gas and 50 per cent from electricity (5,000kWh gas; 2,209kWh electricity)
- Retrofits meet Level 1 of the Code for Sustainable Homes (4,500kWh gas; 1988kWh electricity)
- 10 per cent of fuel poor homes are retrofitted each year from 2008/09 to 2017/18 to meet the Welsh Assembly Government's target of eliminating fuel poverty by 2018⁴.
- Carbon emissions from gas are 0.19kg CO₂ per kWh; from electricity are 0.43kg CO₂ per kWh

Carbon reductions for gas are $15,942 \times 0.19 = 3$ tonnes per dwelling

Carbon reductions for electricity are $2,290 \times 0.43 = 1$ tonne per dwelling

Annual carbon savings for each of the ten years 2008 to 2017 are $4 \times 24,500 = 98,000$ tonnes

¹ National Assembly for Wales, <http://www.assemblywales.org/5184cb73296aceee2208323a52de7b20.pdf>.

² Welsh Assembly Government, *Fuel poverty in Wales, 2004: Modelled headline fuel poverty statistics for 2005 and 2006*,

<http://new.wales.gov.uk/dsjlg/research/fuelpoverty2004/modelled.pdf?lang=en>.

³ DTI, *Welsh homes burn more gas but use less leccy*, 28 July 2005,

<http://www.gnn.gov.uk/Content/Detail.asp?ReleaseID=165260&NewsAreaID=2>.

⁴ Welsh Assembly Government, *Fuel poverty in Wales, 2004: Fuel poverty analysis*, <http://new.wales.gov.uk/dsjlg/research/fuelpoverty2004/analyse.pdf?lang=en>.

Total savings = 98,000 tonnes per year from 2008 to 2017

Headline Recommendation 6: The Committee recommends that the Welsh Assembly Government actively promotes the Low Carbon Building programme in Wales and provides additional grants for microgeneration schemes in existing housing.

Assumptions:

- The microgeneration targets of 20,000 heating and 10,000 electricity units by 2012 and 100,000 heating and 200,000 electricity units by 2020⁵ are achieved in equal steps from 2009/10
- Microgeneration heating units generate 1,500kWh per year, of which 1,000kWh replaces fossil fuel (gas) generation
- Microgeneration electricity units generate 800kWh per year, all of which replaces fossil fuel (electricity) generation
- Carbon emissions from gas are 0.19kg CO₂ per kWh; from electricity are 0.43kg CO₂ per kWh

Annual carbon savings from 2009/10 to 2011/12:

Microgeneration heat = $6,666 * 1,000 * 0.19 = 1,266$ tonnes

Microgeneration electricity = $3,333 * 800 * 0.43 = 1,147$ tonnes

Total savings = 2,400 tonnes per year from 2009 to 2012

Annual carbon savings from 2012/13 to 2019/20:

Microgeneration heat = $10,000 * 1,000 * 0.19 = 1,900$ tonnes

Microgeneration electricity = $23,750 * 800 * 0.43 = 8,170$ tonnes

Total savings = 10,070 tonnes per year from 2013 to 2020

⁵ Welsh Assembly Government, *Microgeneration action plan launched*, 20 March 2007, <http://wales.gov.uk/news/archivepress/enterprise/2007/1422044/?lang=en>.

The Table below indicates the total carbon savings achieved by each of the Headline Recommendations from 2008 to 2020. Carbon emissions reductions are those over household emissions in 2005 in all cases (7,451kt)⁶. The emissions reductions are regarded as being cumulative over the 2005 household emissions. It is assumed that the goal of zero carbon for new build is achieved by 2011.

Because the total excludes those measures that are mutually exclusive, the following sums are allowed:

- Recommendation 1: 1,400 tonnes (the reduction results from Recommendation 4, which assumes that new build houses achieve Level 3 of the Code for Sustainable Homes by 2009)
- Recommendation 2: 150 tonnes from 2009 to 2010 (after which the zero carbon requirement applies)
- Recommendation 3: 15,800 tonnes from 2011 onwards
- Recommendation 4: 4,000 tonnes from 2009 to 2010 (after which the zero carbon requirement applies)
- Recommendation 5: 98,000 tonnes from 2008 to 2017
- Recommendation 6: 2,400 tonnes from 2009 to 2012, and 10,070 tonnes from 2013 to 2020

⁶ DEFRA, *Local and regional CO2 emissions estimates for 2005*,
<http://www.defra.gov.uk/environment/statistics/globalatmos/download/regionalrpt/local-regionalco2emissions2005.xls>

Recommendation	Year													Total
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
1 - 10% on-site (>5 dwellings)		1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	16,800
2 - 25% reduction (<5 dwellings)		150	150	150	150	150	150	150	150	150	150	150	150	1800
3/4 - Building Regs (zero carbon)/ - Code for Sustainable Homes		4,000	4,000	15,800	15,800	15,800	15,800	15,800	15,800	15,800	15,800	15,800	15,800	158,000
5 - Retrofit hard to heat homes	98,000	98,000	98,000	98,000	98,000	98,000	98,000	98,000	98,000	98,000	0	0	0	980,000
6 - Support microgeneration		2,400	2,400	2,400	2,400	10,070	10,070	10,070	10,070	10,070	10,070	10,070	10,070	80,170
Total	98,000	105,950	105,950	117,750	117,750	125,420	125,420	125,420	125,420	125,420	27,420	27,420	27,420	
Cumulative Saving (over 2005 figures)	98,000	203,950	309,900	427,650	545,400	670,820	796,240	921,660	1,047,080	1,172,500	1,199,920	1,227,340	1,254,790	
% saving	1.3	2.7	4.2	5.7	7.3	9.0	10.7	12.4	14.0	15.7	16.1	16.5	16.8	