Climate Change and the Built Environment

February 2013

Comisiwn Cymru ar y Newid yn yr Hinsawdd
Climate Change Commission for Wales

Grŵp Carbon Isel/Di-garbon Cymru
Wales Low/Zero Carbon Hub

The Climate Change Commission for Wales

The Commission was established in 2007 as an important forum for developing and driving forward the Welsh programme of action to tackle the causes and effects of climate change. It brings together leaders and representatives from all sections of Welsh society, business, academia, the voluntary sector, environmental groups, political parties and local government. The Commission seeks to advise Welsh Government on climate change, mobilise action, build consensus across sectors and scrutinise and report on progress.

Wales Low Zero Carbon Hub (WLZCH)

Created in April 2009, the Wales Low/Zero Carbon Hub was developed to act as a dissemination mechanism to stakeholders and a source of advice to Welsh Ministers over activities and actions needed to achieve the aspiration of zero carbon new build and the contribution to be made by buildings that will help to deliver the 3 % annual target to cut greenhouse gas emissions.

About this Position Paper / Developing this Position Paper

This is the second position paper produced by the Commission and first by the WLZCH, and follows the position paper on transport and climate change in Wales. It sets out our assessment on the trends and progress of measures put in place by the Welsh Government, and outlines recommendations and priority actions on climate change and the built environment to inform and prioritise and advance the work of the Commission and Welsh Government and to advise stakeholders and the public.

Climate Change and the Built Environment

The links between Climate Change and the built environment are well defined and widely accepted as fact. In the UK carbon emissions directly attributed to buildings represent approximately 30% of the total. The latest data available from DECC indicates a down turn in emissions from both the residential and business sectors, which when verified and confirmed should be welcomed.

Many factors however could be affecting this down turn, as the figures released do not reflect the upward trend that can be clearly seen in the previous year's totals (see table 1). In addition the provisional data for the first two quarters of 2012 indicate an upward movement in emissions (see table 2). The links between the economy and the built environment must be considered and the subsequent down turn in economic activity will have played a significant part in the reported drop in greenhouse gas emissions, rising unemployment in the UK due to budget cuts, a lack of growth in industry and reduced disposable income for heating will have all impacted on the situation, any progress made could easily be undone in the pursuit for growth and recovery. It is therefore important that a robust mechanism for reporting and monitoring of the greenhouse gas emissions from the Welsh built environment is in place.

Climate change is not the only driver of change within the built environment. Other social, economic and environmental objectives and pressures are also part of the context in which the standards to address the production of greenhouse gases and improve the condition of the building stock must evolve. The primary driver of improvements to the existing built environment must be reduction of energy consumption. By ensuring that all properties that can be improved are in a reasonable time, there will be an alleviation of fuel poverty, an area which is no longer only faced by the economically disadvantaged and increased fuel security. The current fragile Welsh economy and low GDP levels mean the accessibility of employment and training opportunities are vital for the nation's sustainable development.

The UK and Welsh Government have a legal duty under the UK's 2000 Warm Homes and Energy Conservation Act to do everything reasonably practicable to eliminate fuel poverty. The average household energy bills have increased by 33 per cent in the last year, exceeding £1,200 per annum and twice the average bill five years ago. High energy prices in Wales are compounded by poor housing stock quality, high incidence or low income and poverty in addition to households' lack of access to gas mains.

In 2010 the Fuel Poverty Charter for Wales reported "Nearly a quarter of households in Wales experience fuel poverty, resulting in 320,000 households having to spend 10 per cent or more of their income on energy to heat their homes adequately". This may result in a choice between heating and powering their homes as well as eating properly. In Wales, householders pay 5 per cent more for their electricity than the rest of the UK with 50,547 households in debt to electricity suppliers and 46,588 in debt to gas suppliers.

The impact of fuel poverty goes beyond financial consequences. Living in fuel poverty can affect people's health, increasing the risk of common ailments such as colds, flu and respiratory infections including bronchitis. This has resulted in excess of 1500 winter deaths per year in Wales, with older people particularly susceptible. There are indirect effects; stress in children and adults and long-term depression and anxiety, social exclusion, health and life chances of families and individuals and educational attainment. Moreover there are broader economic implications for education, employment and health services in Wales.

The Welsh Government has legally binding targets to eliminate fuel poverty in every household by 2018. Since the target was established fuel costs have risen significantly with the latest price increases yet to take effect on the most vulnerable within our society. With these increases in energy prices and future predictions of fuel costs it is unlikely that the Welsh Government will be able to achieve this target.

It should be acknowledged that the Welsh Government has endeavoured to stimulate significant economic and employment opportunities associated with research, such as the Local Carbon Research Institute and Academia for Business initiatives, but the benefits of those initiatives are yet to be reported on and evaluated for impact.

Welsh Geography and Society

Welsh geography and the shape of its society and economy also pose a unique set of challenges for addressing climate change within the built environment – due to its location, orientation and exposure to the prevailing weather conditions much of the country is unsuitable for the easy to install improvements such as cavity wall insulation, and solar technologies.

The far west of the country suffers extreme wind driven rain, and whole swathes of the valleys area are constructed in such a way that the roads and subsequently the building stock is east/west orientated, these effects render many of the simple solutions to greenhouse gas emission reduction inappropriate. Coupled with much of the middle and west of Wales not benefitting from mains gas only exacerbates the challenges that lay ahead, with numerous properties off gas, off orientation and of solid wall construction that poses significant challenges to improve.

The population of Wales is mainly restricted to the south and south east and the far north of the country, with poor distribution networks linking the two areas, so even if solutions can be identified for these areas, the logistics of undertaking the work is at best challenging.

GREENHOUSE GAS EMISSIONS WEIGHTED BY GLOBAL WARMING POTENTIAL (MILLION TONNES CARBON DIOXIDE EQUIVALENT)

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 (p)
Net CO_2 emissions (emissions minus removals)	Energy supply	242.5	239.9	229.2	213.3	211.7	211.5	214.2	199.8	204.2	193.5	203.4	214.1	211.1	218.3	217.9	217.6	223.4	219.3	212.8	189.8	195.7	183.8	192.1
	From power stations	203.5	200.1	188.2	170.8	166.6	163.5	163.1	150.3	155.4	147.3	158.7	168.9	164.5	173.5	173.1	172.7	181.7	177.5	172.5	150.9	156.3	146.0	156.1
	Other Energy supply	39.0	39.8	41.0	42.6	45.1	48.0	51.1	49.5	48.8	46.2	44.7	45.3	46.6	44.8	44.7	44.8	41.7	41.8	40.4	38.9	39.3	37.8	36.0
	Business	110.6	114.8	110.4	108.4	107.6	104.5	106.5	103.6	102.8	103.9	104.2	104.0	93.8	95.4	93.7	94.1	91.0	89.3	87.5	76.0	75.6	69.6	79.2
	Transport	119.4	117.7	118.9	120.1	120.5	119.6	124.1	125.4	124.6	125.7	124.6	124.8	127.4	127.0	128.2	128.8	129.2	130.9	126.4	120.9	120.6	118.9	116.0
	Public	13.0	13.9	14.6	13.2	12.9	12.7	13.8	13.4	12.4	12.2	11.5	12.0	10.2	10.2	11.1	11.0	10.0	9.3	9.3	8.2	8.4	7.9	7.4
	Residential	79.0	87.7	85.2	89.2	85.0	80.8	92.0	85.0	86.9	86.7	87.1	89.3	86.1	86.9	88.4	84.3	81.7	78.1	79.9	74.7	86.5	67.5	74.2
	Agriculture	5.2	5.2	5.3	5.3	5.3	5.3	5.4	5.3	5.1	5.1	4.8	4.8	4.8	4.8	4.6	4.6	4.3	4.1	4.1	4.1	4.1	4.1	4.2
	Industrial process	16.3	14.1	13.5	13.4	14.6	15.0	15.6	15.5	15.7	15.6	14.8	13.5	12.7	13.6	13.9	14.2	13.3	14.6	13.3	8.6	9.0	8.7	9.8
	Waste Management	1.2	1.2	1.2	1.1	0.9	0.9	0.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	LULUCF	3.1	3.1	2.5	1.4	1.2	1.6	1.4	1.1	0.4	0.2	-0.4	-0.9	-1.7	-2.0	-3.1	-3.7	-3.8	-4.2	-4.6	-4.9	-4.5	-4.5	-3.9
	Total CO_2	590.3	597.5	580.6	565.5	559.8	552.0	573.7	549.5	552.6	543.3	550.5	562.1	544.9	554.6	555.0	551.2	549.4	541.8	529.0	477.8	495.8	456.3	479.1
Other greenhouse gases		179.0	178.7	172.0	164.9	159.0	158.4	157.5	155.7	149.3	127.4	121.6	114.2	109.9	104.6	102.9	101.3	98.5	96.3	94.6	91.8	92.0	90.4	90.7
Kyoto greenhouse gas basket		766.4	773.3	750.3	729.1	717.4	708.4	729.3	703.4	700.6	669.6	671.5	676.4	655.7	660.1	659.9	654.7	650.3	640.9	626.7	572.5	590.4	549.3	571.6

GREENHOUSE GAS EMISSIONS WEIGHTED BY GLOBAL WARMING POTENTIAL (MILLION TONNES CARBON DIOXIDE EQUIVALENT)

		2009				2010				2011				2012	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Net CO_2 emissions (emissions minus removals)	Energy Supply	211.8	203.8	197.4	189.8	187.1	188.7	191.0	195.7	194.0	189.8	187.4	183.2	184.3	189.7
	Business	83.1	78.2	76.3	76.0	77.3	77.4	76.7	75.6	74.2	74.0	74.1	71.9	70.1	72.2
	Transport	124.0	122.4	122.1	120.9	119.5	119.5	119.1	120.6	121.0	120.7	120.4	119.7	120.4	118.5
	Public	8.9	8.3	8.1	8.2	8.7	8.6	8.6	8.4	7.9	7.8	7.9	7.3	7.1	7.6
	Residential	80.6	79.0	78.0	74.7	77.3	79.0	79.3	86.5	80.3	76.9	76.9	66.4	65.3	69.6
	Other sectors	11.7	10.4	9.1	8.1	8.4	8.7	8.8	8.9	8.8	8.7	8.7	8.7	8.6	8.8
	Total CO_2	520.1	502.0	491.1	477.8	478.3	481.8	483.6	495.8	486.3	477.9	475.3	457.1	455.8	466.4
Other greenhouse gases		93.9	93.2	92.5	91.8	91.9	91.9	92.0	92.0	91.6	91.2	90.8	90.4	90.4	90.4
Kyoto greenhouse gas basket		617.1	598.2	586.5	572.5	573.0	576.5	578.2	590.4	580.5	571.7	568.7	550.1	548.8	559.4

Governance, Policy and Delivery (to include devolution)

For the first time Wales has policy control for the built environment, with the devolution of the ability to set standards in Building Regulations in 2012 forming the final element.

This significant change gives Wales the ability to reinforce its position as being at the forefront of the UK in tackling Climate Change and the attributed causes. Historically, the Welsh Government has positioned itself at the forefront of setting standards in the built environment, with the creation of TAN 22 Planning for Sustainable Buildings a positive step was made on delivering the sustainability credentials set in the Assemblies Constitution. It is therefore critical that Welsh Government maintains the consistency of this drive and ensures that TAN22 is not withdrawn until alternative means for delivering sustainability are delivering this goal 'on the ground'; removing TAN22 before this time will open a loophole for relaxed environmental performance.

Many sectors of industry raise concerns over the costs of delivering TAN 22 requirements, but available data indicates that the costs are outweighed by the clarity and standardisation of requirements that the requirement brings. Many other factors affect the delivery of housing in Wales, and it is therefore an easy target for sectors that have always been reluctant to improve the quality and performance of buildings. Examples exist in Wales, where delivering the requirements of TAN22 have been achieved at no or little additional cost, which when taken into consideration with the whole life benefits has resulted in a more sustainable, affordable and cost effective building.

Principles (Recommendations for Progressing Action to Tackle Climate Change within the Built Environment)

It is widely accepted across all sectors of society in Wales, that action to mitigate climate change, can only be delivered by addressing the issues of the existing building stock. Wales has the oldest stock profile in the UK, with some 700,000 properties being of non-traditional construction, classified in wider circles as "hard to treat", in reality what this really equates too is, expensive to treat, and difficult to identify what is required to improve them. Many studies and projects have looked at effective ways to deliver the 80% reduction target set by UK Government. The Retrofit for the Future programme is a prime example of the principles needed to reduce the carbon emissions from the existing housing stock. The indications from the majority of these pilots is that the costs of achieving the reduction target are prohibitive, with all property types requiring not only extensive improvements to the performance of the fabric of the buildings, but the use of multiple technologies, such as air source heat pumps, solar hot water panels and photovoltaics. The resulting cost of these measures are in the region of £12k to £28k per property. If these indicative costs were to be replicated across Wales, then the sum of investment required to address just the non-traditional properties would be in the region of £8 billion. It is only when considered in the wider context that the full scale of investment required can be understood.

To address these issues in Wales the Welsh Government must consider looking wider than the measures and incentives that are currently in place. Arbed, NEST and ECO will all play their part, but it must be acknowledged that the impact that will be made by all those initiatives will be insignificant given the scale of the problem. For example, Arbed at its current rate of investment would require over 500 years of financing to address the greenhouse gas emissions from the existing solid walled stock, and will not address the issues posed by the other construction forms in existence in Wales.

The UK Government's Green Deal initiative appears unlikely to deliver the carbon savings predicted in its early forecasts. Recent figures released by DECC indicate that there will be a significant drop in energy efficiency installations upon commencement , and that the predicted carbon savings will be less than those anticipated .

Early improvement measures set in place by the UK Government such as the Energy Commitment initiatives have provided improvements, but reported issues have become more widespread as measures introduced in these schemes were not always undertaken with the correct level of assessment or expertise. There are growing instances of cavity walls in Wales being insulated that if assessed using the British Standard should never have been undertaken due to the level of severe exposure in the west of the UK. The issue of solid wall insulation, if not considered correctly has the potential to replicate these problems and issues. There are problems with the solid wall insulation industry, for example there is no national standard for assessment, surveying or installation. The cumulative effect of these short comings can result in properties which are of a construction type where only certain measures are applicable, or are not in a suitable state of repair or water tightness being selected for external wall insulation without due consideration. This can often be attributed to a lack of impartial and easy to understand guidance and the tools necessary to ascertain potential risk.

Evidence and Best Practice

There are numerous examples of best practice across Wales which demonstrate the benefits of carbon reduction projects.

Community Scale Projects example

Llangattock Green Valleys Initiative
These include community scale projects such as the Llangattock Green Valleys initiative which deliver a community's integrated approach to sustainability. Initiatives include:

- monthly litter picks (money earned from recycling the litter goes to help the local school)
- a thriving allotment society and woodland group (which together are working to reduce food and woodfuel miles)
- an innovative community group-buying scheme for renewable energy technologies that has already seen homes and business in Llangattock and beyond fitted with solar PV.
- energy efficiency improvements for the school and community hall that have helped to significantly reduce energy use over the past two years. The school has already seen 51% red=uction in its gas bill for the three months up to the end of November 2011, compared with the same period in 2010.

In addition, the community is also hoping to proceed with five local micro-hydro schemes and is currently in talks with the local Glanusk Estate regarding the development of an anaerobic digestion project fuelled largely by grass clippings harvested on the Estate.

Construction Products example

New Welsh House Project
Examples also exist which demonstrate how different sectors of the construction industry are endeavouring to identify welsh solutions using welsh products. For example the New Welsh House Project, look to take an established product and deliver an innovative use and end product that can be replicated across Wales, whilst making use of an abundant Welsh sustainable product 'timber'. The New Welsh House Project has developed a way of using FSC Welsh spruce to produce super-insulated structural panels. These can be built in the factory workshop in Wales and then transported in large enough pieces to erect on site very quickly. It can be built with low embodied energy by using local, sustainable materials. The result is a super-insulated, breathable, affordable and locally produced new eco-building component. In 2009, the first super-insulated 3-bedroom house achieved Code Level 4 for Sustainable Homes. This represents a significant improvement above current Building Regulations. Their latest project has witnessed a further increase in standards, and by aiming for Code Level 5 this will far exceed the acknowledged requirements for new homes in Wales post 2015.

Ty Unnos System
A further example is the Ty Unnos system, which employs a highly adaptable, additive, modular system which can create a range of house types and sizes based upon four standard modules. The system makes use of a simplified, standardised kit of parts based on a 600mm basic layout grid. Locally sourced timber in standard, readily available lengths is utilised to create a simple housing system suitable for self or assisted build. The Ty Unnos system is now being tested, developed and refined through a series of real design projects which consider parameters such as economic and environmental performance. Initial interest in the Ty Unnos system yielded a number of challenging projects including an Environmental Research Classroom at Ebbw Vale, a Visitor Centre at Coed Llandegla, Ty Unnos House in Ebbw Vale and a studio at The Old Sawmill, Tregynon.

Domestic New Build example

Code Pilot Programme
In the new build social housing sector the Welsh Government has been funding and delivering the Code Pilot Programme. The programme consists of 16 sites across Wales delivering dwellings to Code Levels 4 and 5 of the Code for Sustainable Homes. The principle aim of this initiative was to understand the costs and barriers to delivering low carbon dwellings in Wales. The technical review of the projects currently being undertaken and is due for publication early 2013. These projects offer valuable insight into many of the challenges that faces Wales in the low carbon future, including end user satisfaction with new technologies, maintenance and reliability data. On site monitoring is being undertaken by the CRiBE unit within Cardiff University to determine the actual

performance compared to the design performance, other RSL's have also commissioned additional monitoring and evaluation via Cardiff Metropolitan University and their own workforce, including Gwalia at the Groves Road, Code 5 Project.

Welsh Passivhaus
United Welsh, BRE, Blaenau Gwent County Borough Council & Welsh Government (source: Constructing Excellence in Wales)
United Welsh commissioned the three-bed Larch House as a prototype social home to develop a design standard for social housing that is low cost, energy efficient and sustainable. Using a Wales specific Passivhaus design the property has eliminated as far as possible the need for space heating and cooling by keeping heat loss to a minimum. The south facing building is timber-framed, with triple glazed windows, highly insulated closed panel timber framing, draught free construction, heat recovery ventilation system and photovoltaic panels. The building fabric used untreated softwood, wood fibre insulation, Welsh grown thermally-modified larch cladding, ecological paints and low energy LED lighting. The property exceeded its design brief to achieve Code Level 5 and was rated Code Level 6, making it the UK's first zero carbon rated Passivhaus.

The house is being monitored throughout the first two years of occupation to analyses actual energy consumption. It has generated as much energy during the summer months as it uses for the whole year and income from the feed in-tariff over expenditure is over £900 per year. This information is key to demonstrating the lower whole life costs in comparison with a traditionally built new home, as the build costs are generally higher. The learning from the design and construction of this Passivhaus will be taken forward and used to inform the development of larger social housing schemes being developed.

Non-domestic New Build Example

Regain Building, Ebbw Vale (source: Constructing Excellence in Wales)
The £1.27 million Regain building is part of The Works development in Ebbw Vale, a £250 million project to deliver high quality community and educational facilities, business and commercial space and sustainable new homes on the site of the former Corus Steelworks. Regain stands for Reducing the Effects of Greenhouse gases through Alternative Industrial Management, a collaborative European project with partner buildings in Belgium, France and Scotland. The 500m2 building houses eight business incubator units, and was funded by the Heads of the Valleys and EU Interreg IV B programmes. The building has been designed to minimise maintenance requirements and energy costs with a low tech, simple design using readily available locally sourced materials. It is an extremely sustainable and aesthetically pleasing building which came in under budget, with virtually no compromises from the original vision. The building has an A EPC rating and has achieved BREEAM excellent. The building is well insulted and naturally ventilated with high levels of natural daylight and intelligent sensor-operated controls. An air source heat pump provides heat energy for the under floor heating, achieving an 80% saving in fuel costs compared to a gas boiler. An array of PV panels offset the energy for the pump and during the summer months solar thermal panels provide all the domestic hot water. The facades are zero maintenance, coupled with interiors designed for simple minimal maintenance from local contractors. The building is expected to achieve an energy consumption of 19kWh/m2 – a 24% improvement on the performance required by current Building Regulations.

Domestic Retrofit Example

Peulys Estate, Old Colwyn (source: BRE & Cartrefi Conwy)
In the retrofit sector many area based improvement and energy efficiency programmes are being undertaken by Registered Social Landlords in Wales. A prime example of this is the Peulys Estate in Old Colwyn, an area based programme part funded under the CERT initiative and on a system built housing system known as the Lowton Cubitt. The initiative includes all the properties on the estate, both owner/occupied and tenants of Cartrefi Conwy. The residents are benefitting from external wall insulation which has been rigorously assessed and modelled for suitability and future proofing, whilst at the same time the Cartrefi Conwy residents are benefitting from additional Welsh Housing Quality Standards (WHQS) works.

Non-domestic Retrofit Example

North Wales Police Headquarters (source: Carbon Trust)
North Wales Police (NWP) Headquarters undertook its first major refurbishment almost 40 years after initial construction. The internal working environment had limited control in both summer and winter with extreme fluctuations in temperature being reported. The key driver for the refurbishment was to improve the thermal performance of the external envelope to enable a low carbon solution for heating and cooling, whilst maintaining a naturally ventilated building. NWP set a minimum target of 20% reduction in carbon emissions, on the basis of design modelling. The retrofit achieved a 30% reduction in emissions by improving the fabric and the addition of solar shading, together with a zoned heating system with a localised building management system.

Reviewing Progress -Welsh Government Climate Change Strategy Measures

To measure progress in the built environment the Welsh Government has a number of indicators set out in the Climate Change Strategy (CCS) for Wales. This includes 6 measures (WR1-6) to reduce residential emissions and one adaptation action for the built environment (Actions 14). Assessing progress is difficult without a full set of indicators or a baseline, but our review and engagement, along with WG's first annual report, suggest progress is being made:

The indicators set out are as below, and will be discussed individually.

WR1 - Area based Domestic Energy Efficiency Programmes

The focus of this indicator is to deliver area based improvements to the existing housing stock. The prime delivery mechanism is Arbed Phase 1, 2 and onwards. The level of investment is insufficient to make any serious progress in the scale of the problem in Wales, and from the evaluation of Arbed Phase 1 it was difficult to quantify the achieved reduction in greenhouse gases. In addition, the properties that have been improved will need future investment and re-visiting to undertake additional measures to meet the 2050 target. It would be prudent if any further properties that are to benefit from improvement measures be taken to such a standard that they are sufficiently future proofed as to need no further improvements to meet the 2050 target. We acknowledge that this will result in a thinner spread of the properties receiving benefits, but would ensure the properties are already achieving the 2050 target and ensuring longer term alleviation of fuel poverty. Acknowledgement is given to the positive changes that have been made to the delivery mechanism for Arbed 2, from the mechanisms in Arbed phase 1.

WR2 - Demand-led Energy Efficiency Programmes Focused on those at Risk of Fuel Poverty

The second of the Welsh Government indictors which focussed on the outcomes of NEST is supported by the WLZCH. A report outlining the achievements 2011/2012 has been published by British Gas on behalf of the Welsh Government. More than 14,700 householders have been provided with advice and 3,600 have received home energy improvements. The modelled energy usage savings for households total lifetime emissions are modelled to reduce by over 157kt CO.

An area where NEST should look to redress is its failure to capture some of the most vulnerable people in our society, a situation which also existed in its predecessor the Home Energy Efficiency Scheme (HEES). Groups of people, who sit just outside benefit dependency, such as single pensioners and older people on a small pension are unable to access support but may be equally in need of support to reduce fuel bills. Indicators of support and financial help will always address the same groups, and miss the same cross sections who sit on the cusp of this process.

WR3 - Supporting Community Scale Energy Generation

The setting up of the Ynni'r Fro Programme is welcomed and supported. The programme helps to provide expert advice on the feasibility of renewable energy that is effective, efficient and driven by the desire of the local community. Its impact however has been diminished by the advent of the Feed in Tariff (FiT) by DECC. This is because communities must now decide whether to opt for a capital grant which is repaid by previously agreed financial arrangements, or pay for the installation themselves via a private loan arrangement which uses the FiT to subsidise the repayment.

WR4 - Improving the Energy Performance of Social Housing

This indicator is to its credit evidence based, but its value is limited in the context of climate change and fuel poverty alleviation. The standards set by the WHQS of a SAP rating of 65, does not deliver the long term targeted reduction of 80% by 2050. In reality, the standard falls well short of this target, with the end result being that all the properties reported on as meeting the WHQS target will need to be improved further in the not too distant future. The approach of meeting the WHQS target needs to be revisited with clearer guidance and advice on what measures should be introduced to properties, in line with the principles of the energy hierarchy. The fabric first approach has been much heralded in the new build sector but, as mentioned earlier in this report, in order to meet the long term targets, more than insulation will be needed. There is little evidence to suggest that the business models used by the social housing movement can carry or meet the additional burden of multiple technologies per property, even if assessment indicates they are suitable.

The indicator also sets out that all new social housing in Wales must meet the requirements of the Code for Sustainable Homes at Level 3. This equates to an 8% increase in the requirements of the Building Regulations Part L 2010. With the reduction in grant funding the Welsh Government needs to demonstrate commitment and provide clear guidance on the future requirements of social housing in Wales. The anticipated proliferation of privately funded endeavours delivering new social housing models, Welsh Government needs to provide clear direction to ensure industry delivers well considered schemes with decisions made on a value basis.

WR5 - Behaviour Change at Home

Progress on the cause and effect of behaviour change should not be underestimated. Simple measures can help deliver reductions in energy usage and subsequent reductions in greenhouse gas emissions It is right that this is one of the indicators for progress used by the Welsh Government, but it is concerning is that following its initial launch, little if any evidence of progress or intervention measures being published has been forthcoming.

WR6 - Low Carbon New Build in Wales

The Welsh Government' policy of introducing a first change to Part L in 2013, representing a 40% improvement over the 2010 Part L requirements, sent a clear and firm message that it intended to continue on its path of being the UK leaders on environmental standards. It was therefore disappointing to see a stance change with a revised implementation date for the new standard of 2015. In many ways this negates the relevance and positive impact of devolving the Building Regulations to Wales. This revised date will effectively realign the requirements set by both UK and Welsh Governments, as the current position in England is to move in 2013 to where Wales have been since 2009 with National Planning Policy. The raising of standards is often quoted as reason for house builders not meeting the number of new properties required in the UK. However, recently released statistics on the quantity of successful planning applications for properties which exceed the requirements set for new housing suggest that there are many underlying reasons can be attributed to them not being constructed yet. Factors such as land being purchased at the peak of land prices, the down turn in the economy restricting people's ability to obtain mortgages and level of uncertainty in job security currently being experienced have all contributed to a downturn in activity. Higher standards are not the only cause of reduced building numbers and this must be taken in the full context of the current economic climate.

The consultation states that the new standard, whenever it is introduced is the last change to Part L in Wales. If that remains the case, the Welsh Government should give clear direction on its stance on the allowable solutions mechanism and instigate work that ensures that solutions which are relevant to Wales are considered and included in any framework. It is in our opinion insufficient to wait for England to decide on a mechanism and then Wales form a view.

National Plans

The Welsh Government plans to address the issues that exist in the built environment in Wales are discussed below.

The Programme for Government establishes the annual plan of action for government, addressing growth and sustainable jobs, public services in Wales, education, healthcare, people, welsh homes, safer communities, equality, tackling poverty, rural communities, environment and sustainability and culture and heritage in Wales.

Fuel Poverty Strategy 2010 was published in July 2010 the strategy outlines how the Welsh Government will support the most vulnerable households who live in the most energy inefficient properties.

Energy Wales – A Low Carbon Transition - published in March 2012, sets out how it is intends to attract investment in low carbon and renewable energy.

National Energy Efficiency and Savings Plan 2011 focuses on what the government are doing to reduce fuel poverty, reduce emissions, and increase energy efficiency.

New natural resource planning will provide a clear picture of the Welsh Governments priorities and aspirations for the use of Wales' natural resources. Proposals were set out in the **Sustaining a Living Wales Green Paper**.

Although all of the strategies referred to above are welcomed and supported they are not yet sufficient to capture the full extent of the issues facing Wales in the 21st Century. A clear and sustainable series of actions and interventions must be set in place and reported on if the Welsh Governments aspirations are to be realised.

The recently released 2012 progress report on environment and sustainability reflects upon the progress made to date. The report makes interesting reading however there are some exclusion's in the content. The report states: "Emissions have been falling over time, from over 56 million tonnes of carbon dioxide (CO_2) equivalent in 2000 to 42.6 million tonnes in 2009".

The **Climate Change Strategy for Wales**, published in 2010, remains the statement of this administration's commitments and targets for tackling climate change. The progress made to date is therefore welcome but will require building on if the targets are to be achieved. The Welsh Government's first progress report on implementation of the Climate Change Strategy was published in March of this year. It confirms the progress being made to implement the Emission Reduction and Adaptation Delivery Plans and measure our delivery. The report also responds to recent advice from the UK Committee on Climate Change and Climate Change Commission for Wales, both of which recognise the progress that has been made.

The report highlights:

- The success of the Welsh Government's strategic energy scheme, Arbed, which helped to make 25,000 Welsh homes easier and cheaper to heat during 2010/2011
- The on-going support and advice that Welsh Government is giving to businesses on energy efficiency and low carbon opportunities.
- The delivery of plans to drive down emissions by managing waste better.
- The new guidance for public bodies on adapting to climate change and a new national strategy on flood management.

The report could be strengthened with the introduction of a clear mechanism to indicate how the small scale initiatives referred to will be magnified in order to deliver the level of improvement which is set out not only by Welsh Government targets, but also those set on the wider UK agenda. There is a need to introduce interventions and/or indicators regarding the progress towards the alleviation of fuel poverty or simple energy efficiency measures within the private sector.

Priority Actions

To escalate and continue to make progress there are a number of key actions needed, namely:

1. Clarity on Green Deal

A clear statement on the stance of the Welsh Government on the Green Deal, and what they will be doing to promote its uptake.

2. Development of the Right Allowable Solutions for Wales

Provide clear direction and provide a positive stance on the allowable solutions debate to ensure that solutions which are relevant and viable for Wales are included and encouraged as part of any mechanism.

CCCW needs to work with Welsh Government to ensure that the contribution to the energy performance to a building from good maintenance, repair and improvement work is recognised and considered as a valid option for retrofit.

3. Awareness on the Risks & Opportunities for Solid Wall Insulation

Clear guidance on the risks and opportunities that are posed by solid wall insulation endorsed by the Welsh Government for all scheme and initiatives they fund.

4. Development of Retrofit at Scale

Eighty per cent of the 2050 building stock already exists (Wales has the oldest building stock profile in the UK) and hence reducing the energy used by the built environment can only be delivered by addressing the issues of the existing building stock. To address this, the Welsh Government will need to look wider than the measures and incentives that are currently in place.

There needs to a focus on improving the existing building stock to achieve real reductions in greenhouse gas emissions. Consideration needs to be given to how Wales can deliver retrofit solutions through opportunities at very large scale. Welsh Government needs to fully understand the scale of refurbishment to high energy fabric performance standards that is required to achieve the 2050 targets. This challenge may not be met through the Green Deal, but through more joined up working the best comes from this scheme can be achieved.
To achieve the targets there will need to be a mechanism to accelerate the scale of carrying out of any appropriate and well considered retrofit works, acknowledging that the current levels of funding may be inadequate.

5. Ensure Consistency and Progress through Establishment of Appropriate Targets and Indicators

The current indicators established in the Climate Change Strategy are not sufficient to enable full consideration to be given to how Wales is progressing against the 2050 targets. Priority needs to be given to the establishment of a full set of indicators toe report progress, which may include the acknowledgement that at present the data is not available.

6. Low Energy Demand Buildings

The use of energy must be addressed in the built environment. It is of paramount importance that buildings are designed and constructed to demand the minimum possible quanta of energy for their effective operation, whilst being well designed for the occupant's needs to engender a long built life and spread the construction impact energy use over a longer period.

Achieving very low energy demand (where opportunistically possible) will minimise the need for buildings to have to generate energy. Energy generation is best undertaken at scale, with maintenance and operational procedures in place for efficient management. As such, Welsh Government needs to ensure that "allowable solutions" for legally tying specific buildings to off-site power generation are developed and implemented as an urgent priority. This measure will

allow both new build and refurbishment projects to focus on energy reduction and allow energy generation to be delivered as a 'commuted sum' through the Community Infrastructure Levy or similar mechanism.

7. Buildings Don't Use Energy: People Do

CCCW with Welsh Government and others need to raise awareness of energy use within buildings through both regulated and unregulated emissions, highlighting both the opportunities and benefits. An intelligent understanding of the consequences of energy use should be engendered across Wales, with an acceptance that a degree of 'comfort payback' (enhancement in quality of life) is both inevitable and desirable as a perceived individual's reward.

8. Value in the Built Environment

The issue of value for the built environment must be influenced. Current development methods do not adequately value the lifecycle impacts of buildings in any construction sector, and this places low energy demand property (with its potentially higher capital cost) at a significant disadvantage. CCCW needs to assist Welsh Government to rebalance this valuation within the existing development frameworks. Methods will vary for different sectors for example, with offices a tangible link between service charges and energy rating must be demonstrated that will, in turn, oblige surveyors to highlight higher charges and ultimately influence capital valuations. For domestic, working with banks and building societies to develop mortgage offers that allow higher total lending against low energy homes (resulting from the homeowners lower overall month bills and hence the lending institutions lower risk of repayment failure). Such measures use existing levers and mechanism to drive the value of low energy building stock, and in turn result in an upturn in demand.

Moving Forward

We look forward to working closely with Welsh Government and stakeholders to help achieve climate change and sustainability objectives within the built environment, including taking forward the actions proposed above. The Wales Low Zero Carbon Hub, the CCCW sub group on the built environment will continue to monitor and review progress, and will follow up on this position paper with targeted reviews and advice, as well as continuing to engage with stakeholders interested in advancing the sustainable built environment agenda.

Climate Change Commission in Wales

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You can find out more about the work of the Climate Change Commission for Wales and keep up to date with the latest research and briefings by visiting its web pages at:
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