



Urban Retrofit in Cardiff City-Region: Reframing Sustainability and Economic Development

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WP1 Case Study Report: Cardiff City Region

Urban Retrofit in Cardiff city-region: Reframing Sustainability and Economic Development

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1. Introduction

This report highlights the finding of the research conducted in the Cardiff city-region under WP1 ‘Urban Transitions Analysis’. It draws from a number of key stakeholders’ interviews that have been conducted since July 2011. Key issues under investigation included the vision (s); the policy drivers; the skills; the technology; the type of projects and projects details, learning and scaling up opportunities of current and prospective retrofit initiatives in the city region.

Stakeholders interviewed are representatives from Welsh Government, Utilities and suppliers, Local Authorities, Housing Associations/ RSLs, organisations and interest groups, architects, community initiatives representatives. A list of organisations interviewed is provided in table 1.

Tab 1. Organisations interviewed

Cardiff Council	Energy Saving Trust Wales
BRE Wales	Constructing Excellence Wales
Zero Carbon Hub	National Landlords Association Wales
Carbon Trust	Welsh Local Government Association
Welsh Government Energy Efficiency	Rockwool
United Welsh Housing Association	Community Housing Cymru
Caerphilly County Council	Warm Wales
Neath Port Talbot	Cynon Taff Community Housing
Torfaen County Borough	

2. Wales central organising principle of Sustainable Development

2.1 The legacy of SD

Since 1997 there has been a progressive process of devolution and the development of a regional government in Wales. The Government of Wales Act (1998) provided two statutory obligations for the Welsh Government: an emphasis on inclusive governance and equal opportunities and a requirement to pursue sustainable development. The former has been translated into extensive partnership working; the latter called for stakeholder participation on matters of sustainability and regular reviews of the work being done towards environmental aims (Wells et al., 2009). Subsequently, Section 79 of the 2006 Act provided the Welsh Government (WG) with a statutory duty to promote sustainable development. Welsh Ministers have therefore a duty to have a scheme setting out how they propose to promote sustainable development (SD).

The current SD Scheme (Tab.1) was launched in 2009 setting out the Welsh Government ambition for a sustainable Wales.

Tab.1 Sustainable Development Scheme in Wales

SD in Wales means:

- Enhancing the economic, social and environmental wellbeing of people and communities, achieving a better quality of life for our own and future generations.
- In ways which promote social justice and equality of opportunity.
- In ways which enhance the natural and cultural environment and respect its limits -using only our fair share of the earth's resources and sustaining our cultural legacy.

Sustainable development is the process by which we reach the goal of sustainability.

Source: One Wales One Planet – 2009 (WG)

The SD scheme which comprises a strategy for delivering SD requires that SD becomes the basis for all decision making. This translates in recognising SD as the central organising principle of all policies and programmes, across all Ministerial portfolios. SD as central organising principle means that on the one hand the WG has set an aspiration to become an exemplar organisation in the way it mainstreams SD and demonstrates leadership, encouraging and enabling others to embrace SD. On the other hand, the key expected outcomes are that, firstly, SD considerations are put at the core of the evaluation and development of WG policies and new and existing investment proposals.

The Welsh Government currently has a variety of mechanisms in place to help embed SD in decision making and to allow effective and participative systems of governance in all levels of society to ensure the delivery of SD¹.

Recently, the First Minister announced the forthcoming of a SD Bill² to strengthen the SD agenda and to further embed SD as central organising principle in all Government and public bodies' actions and to establish an independent body to continue the legacy of the Sustainable Development Commission.

The current government (2011) identifies that :

Sustainability lies at the heart of the Welsh Government's agenda for Wales; it also lies at the heart of this legislative programme. Taken as a whole, it will promote the economic, social and environmental wellbeing and enhance people's quality of life in Wales. Our approach to sustainable development has been to focus on fairness, social justice and the protection of our outstanding culture and heritage. However, sustainability is more than just a green idea. It is about defining the long term development path for our nation. It means healthy, productive people; vibrant, inclusive communities; a diverse and resilient environment and an advanced and innovative economy. This legislative programme provides new powers, duties and institutional capacity to advance our goals of building a sustainable Wales (First Minister, 12 July 2011, The Welsh Government's Legislative Programme 2011-16).

¹ As part of its commitment to embed SD within Wales, the WG has set up a voluntary SD Charter, which provides a framework for organisations to embed SD as their central organising principle

² A discussion document has been circulated and a full consultation will be launched in autumn 2012.

This highlights that SD in Wales firmly focuses on improving and sustaining people's quality of life, the wellbeing of people and communities, embedding social justice and equality for all. The approach to decision making embraces therefore the long-term, encouraging joined-up thinking and active participation at all levels (people, communities, businesses, the third sector, and the public sector). Despite the fact that the WG has shown strong political and organisational leadership in relation to SD, the challenges to establish specific actions and outcomes that reflect SD aspirations refers mainly to the lack of consistency in understanding SD as the Central Organising Principle and how to apply and interpret SD principles in practice (PWC, 2011)

This is coupled with the challenge of the relationships and influence that the Welsh Government has over its delivery agents. Local authorities, for example, are democratically elected organisations with their own political priorities and tensions may arise between priorities at the national, regional and local levels. For instance, neither the legal duty to have a SD scheme nor a duty to make sustainable development the central organising principle have been passed onto other public bodies such as local authorities.

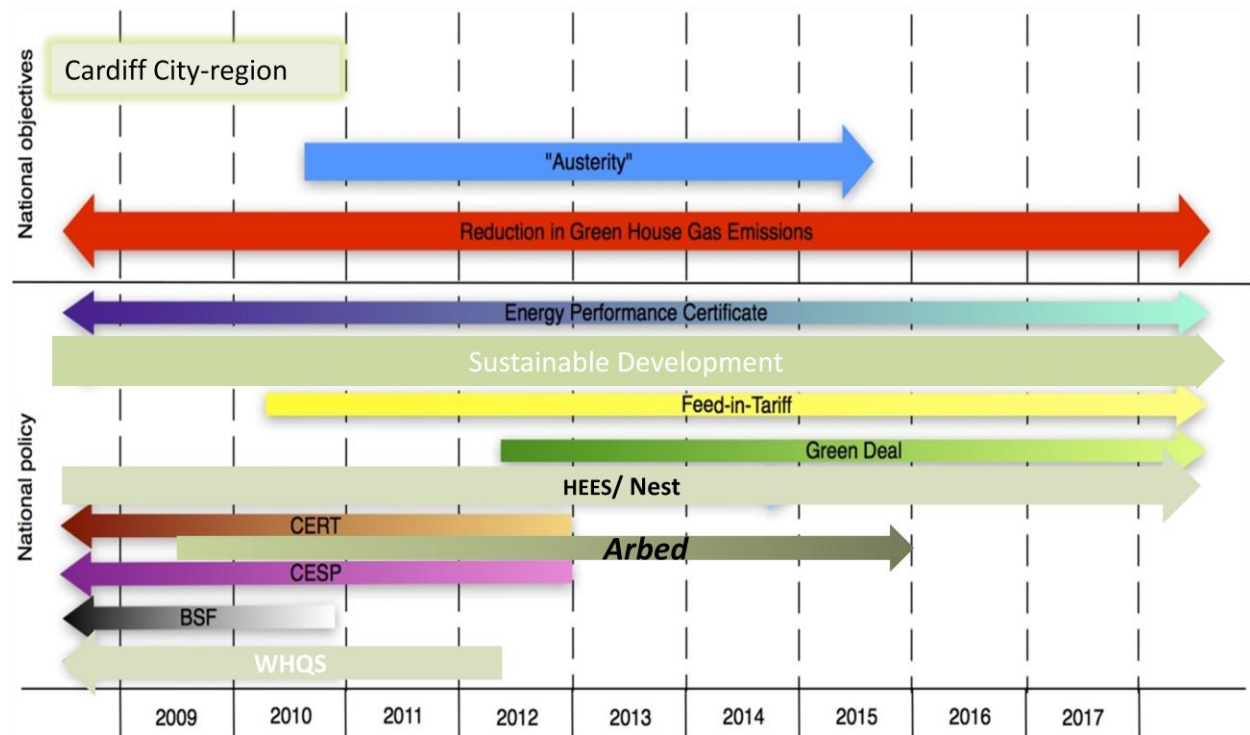
SD is still seen as one of a number of competing priorities, rather than the means by which the WG manages its competing priorities (WAO, 2010). This to some extent is manifested in the resource capacity of the SD branch, seen often as marginal to Welsh Government activity and the fact that the Welsh Government is still highly focused on Gross Value Added in establishing progress and growth, rather than wider SD measures and impacts (PWC, 2011).

A further problem is represented by the a tendency towards setting long-term, unrealistic targets without adequate measures in place for monitoring progress towards target achievement (The National Assembly for Wales – Sustainability Committee, 2011).

2.2 Retrofit in Cardiff city-region: a response to several pressures?

Sustainable development is seen therefore as a cross-cutting theme that informs individual strategies, policies and initiatives that are put in place to respond to the several pressures that impact upon the environment, resource use, the economy and the wellbeing of people. While retrofit is not framed formally as a policy area within the Welsh Government, the research has highlighted that retrofit is slowly emerging as a potential delivery mechanism (solution) for addressing/ implementing different policy priorities stemming from the SD agenda. A narrative for retrofit is constituted around the challenges of climate change (adaptation and mitigation), a wider low carbon economy goal, which include the creation of green jobs, maximising the opportunities offered by the deployment of renewable energy sources and fuel poverty. A summary of key policy objectives and pressures is represented in fig. 1. How the broad climate change, economic development and fuel poverty agendas refer to retrofit are reviewed in the following sections.

Fig.1 Time line of national/ regional objectives & policy pressures around retrofit in Cardiff City-region



2.2.1 Climate change and reducing carbon emission in the built environment

Following the establishment of the Climate Change Commission in 2007, the WG published in 2010 a Climate Change Strategy (CCS) which contains specific targets and delivery plans for the public sector. This established a vision for a sustainable, low-carbon Wales, detailing existing and new initiatives designed to reduce emissions and adapt to change across a range of policy areas, including among others housing and residential energy, agriculture and land management and waste (WG, 2010). Through the One Wales agreement in 2007, the WG committed to a 3 % annual reduction in carbon emissions in areas of devolved responsibility from 2011. Reducing energy and resource consumption and increasing energy and resource efficiency in the domestic, public, business and industrial sectors, through behaviour change initiatives, financial incentives, regulation and standards is a key area where the WG plans to act to reduce emissions.

The fig. below summarises the key areas of action for both the residential and the public sectors.

Fig. 2 Actions for Emission Reductions- Residential and Public Sectors

Public Sector: key interventions	Residential Sector: key interventions
Embedding action on climate change. Reducing the carbon footprint of the Assembly Government estate Reducing the carbon footprint of the NHS Reducing the carbon footprint of education services. Enabling wider contributions from others. Land use planning. Spatial Plan Low Carbon Regions work and Marine Spatial Planning.	Area based domestic energy efficiency programmes. Demand-led energy efficiency programmes focused on those at risk of fuel poverty Supporting community scale energy generation. Improving the energy performance of social housing. Behaviour change at home. Low carbon new build Wales
Source: WG, 2010, Climate Change Strategy for Wales, Delivery Plan for Emission reduction	

The key challenges that the Welsh Government has identified in delivering its plan refer mainly to changing behaviour and to financing the scale of investment in energy efficiency measures, in both the residential and public sectors, during the global recession.

The climate change strategy also highlights that tackling climate change requires a spatially differentiated approach. This links to the Wales Spatial Plan (WSP), once regarded as one of the key delivery mechanisms for the WG's duty to promote sustainable development.³ Currently, however, the WSP seems to have been put aside '*there's been a bit of a kind of pause and review*'⁴.

2.2.2 A Low Carbon Economy for Wales

As argued above, the investments and other activities required to cope with the compelling issues and challenges posed by climate change are seen as an opportunity to make progress on a range of other policy objectives. This narrative is represented in many policy documents that the WG has published in recent years, these include:

- The Green Jobs Strategy for Wales, Capturing the Potential (2009). This stresses the WG commitment in investing in a more sustainable economy that will generate green jobs. The strategy prioritises investment in physical infrastructure (energy, water, transport,

³ As part of the WSP, Low Carbon Regions were identified to provide a focus for action on climate across Wales. The WSP 2008 Update provided a commitment for each region to contribute practical plans. However, only the South West Wales region produced a document 'Towards a Low Carbon South West Wales: a Route map' to map the transition of South West Wales towards a low carbon region.

⁴ Some argue that the WSP has been replaced by the new 'Wales Infrastructure Investment Plan' that the Welsh finance minister announced recently. The WIIP, although not a spatial document, will set out the main areas in which infrastructure investment is being made and that could attract investment in the region.

buildings, housing, broadband and ICT, waste management and environmental infrastructure), community energy generation and strategic regeneration.

- The Welsh Government's Economic Renewal Programme (2010). The renewal programme sets out the WG new approach in terms of support for a *sustainable* economy, focussing on key sectors, especially those where Wales is perceived to have a comparative advantage, which include among others energy and environment and construction.
- The Low Carbon Revolution, the Energy Policy Statement for Wales (2010). This aimed at explaining what the government will do to make its ambition a reality. It emphasises the role renewable energy can play in Wales and reinforces the role that the interventions in the housing sector could play in ensuring a transition to a low carbon Wales: *'Welsh housing stock currently has a relatively poor energy performance.... Tackling this backlog of hard-to-heat homes will create jobs, encourage skills, improve local areas, and directly reduce fuel poverty and carbon emission (WG, 2010, A Low Carbon Revolution)'*.
- The National Energy Efficiency and Savings Plan- NEESP (2011). The Energy Statement, the Climate Change Strategy and the Green Jobs Strategy are closely intertwined with the NEESP which aims at setting out the immediate, practical actions to take and list the actions already taken by the WG and working with partners to promote energy efficiency and secure benefits for people, businesses and the environment in Wales. The plan is seen as an opportunity to connect together the different policies that the WG has produced in the recent years that refers to improving the energy performance of homes, communities, businesses and the public sector.

Interestingly, the focus of action has been on generating *demand* for low carbon and energy efficient products and services, to reduce fuel poverty and to use regeneration projects as catalysts for private investment in sustainable development and low carbon community friendly development. The specific theme on energy efficiency for individuals and householders refers to several retrofit projects and schemes that have been reviewed under this project, in particular: the demand-led Home Energy Efficiency Scheme (HEES) that has now been replaced by NEST, the new Fuel Poverty Programme; the area-based retrofit programme Arbed; and the improvement and repair carried out under the Welsh Housing Quality Standard.

2.2.3 Fuel poverty and housing standards

The WG has recently renewed its focus on tackling fuel poverty⁵. The new Fuel Poverty Strategy (2010) represents a further attempt to demonstrate how SD is at the core of the Welsh Government's actions. It is stressed that fuel poverty and its impact are a cross cutting theme in many different areas of the WG's policy, and the strategy is well suited in delivering social, environmental and economic benefits.

⁵ Fuel poverty is defined as having to spend more than 10 per cent of income (including housing benefit) on all household fuel use to maintain a satisfactory heating regime. Where expenditure on all household fuel exceeds 20 per cent of income, households are defined as being in severe fuel poverty.

The actions highlighted in the Strategy do not just include improving household energy performance and helping people to pay less for energy adopting a whole house approach⁶, but also seek to build a referral network and stakeholders' cooperation that will maximise the support and funding available and provide advice on income maximisation. Better coordination and collaboration is regarded as key to the delivery of the scheme; advices and support services are delivered in partnership with energy saving advice providers; local support agencies; local authorities; national and local third sector organisations; health and social service organisations; energy companies and WG fuel poverty and/or energy efficiency scheme managers.

The Fuel Poverty Strategy represents to some extent a turning point in the WG response to energy efficiency and retrofitting the built environment as it has provided a new targeted direction in tackling energy efficiency in homes and households establishing that all the funded energy efficiency measures provided through both demand-led programme (the new HEES) and area based programmes (such as ARBED) are targeted *at those householders most in need and living in the most energy inefficient homes*.

As argued earlier, housing is considered fundamental to the sustainability agenda as it directly contributes to the health and well-being of individuals and provides a significant contribution to economic and environmental outcomes. The National Housing Strategy Improving Lives and Communities: Homes in Wales (2010) sets out the WG's long term vision for housing highlighting that there is a need to radically reduce the ecological footprint of housing and to tackle climate change. The theme of sustainability runs through the current housing policy (WG, 2010) as it focuses on:

- Building sustainable communities where people want to live and work, now and in the future;
- Providing access to good quality affordable housing;
- Increasing energy efficiency and use of renewable energy sources;
- Adopting sustainable approaches to development, design and construction of new homes and renewal of existing properties
- Meeting diverse needs, supporting independence and contributing to health and well-being.

The WG has also set up sustainable building standards for all new buildings⁷. While there is consensus that these standards have been trivial in achieving carbon reductions for all new buildings, they do not apply for extensions, alterations or refurbishment⁸. Nevertheless, as discussed later in this report, with the transfer of building regulations powers to Wales at the end

⁶Improvement measures are recommended on the basis of which measures are most appropriate and cost effective to improve the energy performance of the home, and could include renewable energy technologies.

⁷ The standards comprise: a minimum Code for Sustainable Homes level 3 for residential development; Building Research Establishment Environmental Assessment Method (BREEAM) excellent or equivalent for non-residential development and at least 10% of the total value of materials recycled or reused.

⁸ For extensions, alterations or refurbishment there is a requirement for just 'an energy efficient solution'.

of 2011 the WG has set proposal to require higher standards for both new buildings and retrofit activities.

The WG is also engaging with local authorities and registered social landlords in order to promote sustainability issues, providing guidance to local authorities on preparing local housing strategies that will integrate SD issues and providing guidance on the achievement of the Welsh Housing Quality Standard⁹ (WHQS) that will include the promotion of energy efficiency targets¹⁰. In parallel with the objective of meeting WHQS, the WG has also encouraged local authorities and housing associations to use a targeted recruitment and training scheme (i2i) to stimulate the economic regeneration of communities. This includes local training and employment programmes aimed at the economically inactive, to provide real skills and employment prospects. This has also included the promotion of renewable energy.

Moreover, in order to engage even further with stakeholders from the voluntary and private sectors, in 2008, the Environment Minister and the Sustainable Development Commission for Wales signed up, together with more than 40 leading companies and organisations representing the construction sectors, to a 'green building charter' committing themselves to take a 'can do' approach to tackling climate change through the built environment, including both new build and refurbishment projects and to support progress towards a low or zero carbon emissions built environment. The focal point of this 'Coalition of the Willing' is the newly established Low/Zero Carbon Hub, which acts as a dissemination mechanism to stakeholders and a source of advice to Welsh Ministers to achieve zero carbon new build and contributes to deliver the 3% annual target to cut greenhouse gas emission in buildings.

2.3 Establishing the vision (s) for the region

The discussion above has stressed how the emerging narrative for retrofit is strongly linked with the discourse on SD and how SD within Wales is understood in terms of achieving carbon reductions in the built environment, promoting economic development and regeneration of long-term deprived areas. We could argue therefore that the Welsh Government's vision is one that put sustainability and climate change at the centre of their agenda, coupled with the goals of increasing energy efficiency as a means of eradicating fuel poverty and generating new jobs opportunities. However, during the interviews, the fuel poverty agenda was certainly one of the areas that was regarded as the main driver for change.

This renewed interest into fuel poverty as the main driver is somewhat of a relative recent feature in the political agenda. On the one hand, fuel poverty has provided a new targeted direction in implementing carbon reductions measures. This has followed the publication of an

⁹ This standard requires all social landlords to improve their housing stock to an acceptable level by 2012 or by agreement with Welsh Ministers. <http://wales.gov.uk/docs/desh/publications/091207housingwhqsguide.pdf>

¹⁰ The standard requires that all social housing are adequately heated, fuel efficient and well insulated. The standard requires that a minimum of SAP (Standard Assessment Procedure for Energy Rating of Dwellings 2005) 65 must be achieved, equivalent to an Energy Performance Certificate rating of D by 2012. Recent data has indicated that by the end of 2012-13 over 78% of all housing association homes will meet this standard, together with 87% of local authority homes.

inspirational but also fuzzy Climate Change Strategy, that was loaded with long-term goals, perceived by many to be unrealistic targets.

As it is seen as a way to tackle more tangible problems (problems that people relate to) it has allowed the alignment of interests and coordination between WG and local authorities, offering an example of how different configurations of interest are mediated. On the other hand, addresses a further problem that relates to the geography and demography of Wales, as discussed in the next section.

3. *The context of the Cardiff city-region*

The concept of a Cardiff city-region is a nebulous one without the clear geographic boundaries of regions like Greater Manchester. The Wales Spatial Plan, as last updated in 2008, defines the South East “Capital Region” as incorporating three distinct areas: the City Coastal Zone, the Connections Corridor and the Heads of the Valleys Plus (figure 3). While the interdependence between Cardiff and its surrounding areas is clear both historically and in the contemporary region, they each have very different characteristics: the coastal area is relatively prosperous, housing the cities of Cardiff and Newport while the Heads of the Valleys area is in need of regeneration. As such, a question mark remains as to how a more unified city-region would function and is currently a matter of investigation for the Welsh Government’s *City Regions Task and Finish Group*.



Fig 3: South East Wales in the Wales Spatial Plan.

Source: WG, 2008



Fig 4: The Retrofit 2050 Cardiff region

For the purposes of the Retrofit 2050 project this conceptual city-region has been extended to include the local authorities of Neath Port Talbot and Swansea to the west (fig.4). This is intended to capture the strong economic connections between the three urban regions along the south coast (Newport, Cardiff and Swansea) which differ significantly from the neighbouring rural regions of West and Mid Wales. Furthermore, strong retrofit agendas in both local authorities mean that they are likely to influence transition dynamics in the Cardiff region.

The Cardiff region¹¹ is home to 1,831,915 people, 60% of the Wales' population despite spanning only 17% of its area; indeed, the three urban centres of Swansea, Cardiff and Newport account for 24% of the Welsh population. Population density varies across the project area, with Cardiff by far the most concentrated (figure 5).

As figure 6 indicates, 'public administration' accounts for a high proportion of total employment: 38% in Swansea and Merthyr Tydfil and 1/3 for the region as a whole. 'Wholesale, retail, transport, hotels and food' are also prevalent, representing 30% and 29% of jobs in Monmouthshire and Torfaen respectively, and ¼ of jobs in the study region. 'Professional, scientific and technical activities' account for 12% of total workplace employment, concentrated in Cardiff (16%).

Description	Area	Density	Population
Area			
Wales	20,780	145	3,006,430
Swansea	378	615	232,501
Neath Port Talbot	442	311	137,392
Bridgend	251	537	134,564
The Vale of Glamorgan	331	377	124,976
Cardiff	140	2,431	341,054
Rhondda, Cynon, Taf	424	552	234,309
Merthyr Tydfil	111	502	55,699
Caerphilly	277	624	173,124
Blaenau Gwent	109	629	68,368
Torfaen	126	718	90,533
Monmouthshire	851	104	88,089
Newport	190	742	141,306

Figure 5: Population and density by local authority 2010.
Source: Stats Wales, 2011b

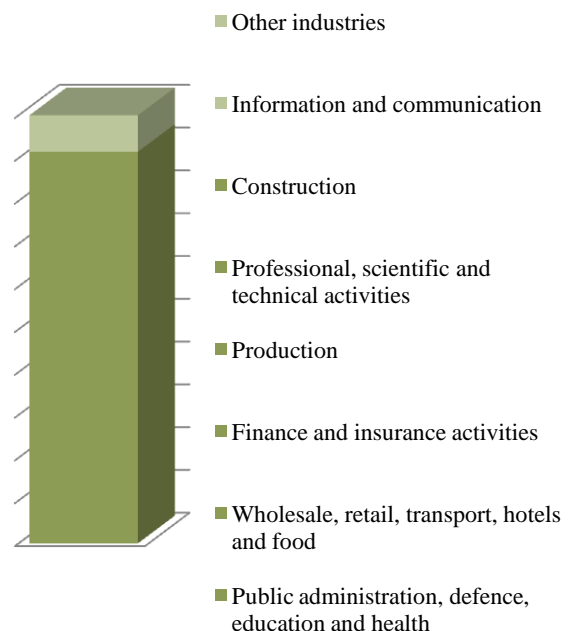


Figure 6: Workplace employment by industrial group 2009 in the city region. Source: Stats Wales, 2011c

The region continues to suffer pockets of social and economic deprivation, with gross value added (GVA) standing at 80% of the UK average in 2009 and average gross weekly income at 86% of the UK figure in 2011 (Stats Wales, 2011; 2011a). Figure 10 maps the Welsh Index of Multiple Deprivation for 2011¹². Deprivation levels vary across the region (see fig. 7), with concentrations in the urban centres and the Heads of the Valleys regeneration area. Notably, Caerphilly is home to two of the five most deprived Lower Super Output Areas (LSOA) in Wales, while Merthyr Tydfil, Rhondda Cynon Taf, Swansea and Bridgend all house LSOAs ranked in the ten most deprived (ibid).

¹¹ As defined by the Retrofit project.

¹² This represents the official measure of relative deprivation for small areas in Wales incorporating employment, income, education, health, community safety, access to services, housing and physical environment indicators (WG, 2011).

The historical development of the region (for a review see Hunt, 2011) coupled with the economic and population growth experienced in the 1800s has had an important role in shaping the built environment (both in terms of infrastructure and the housing stock) in the city region. Mass immigration in South Wales Valleys put several pressures on the housing stock and in order to accommodate its swelling population (Minchinton, 1969) a number of houses were quickly built to low standards.

Fig 7: Welsh Index of Multiple Deprivation 2011

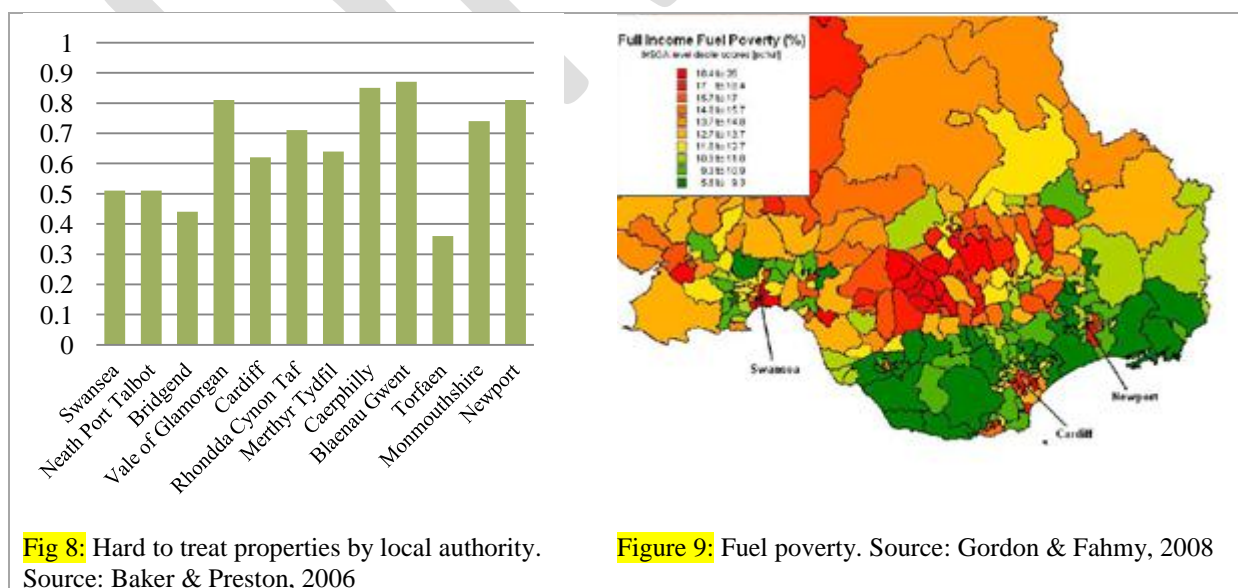
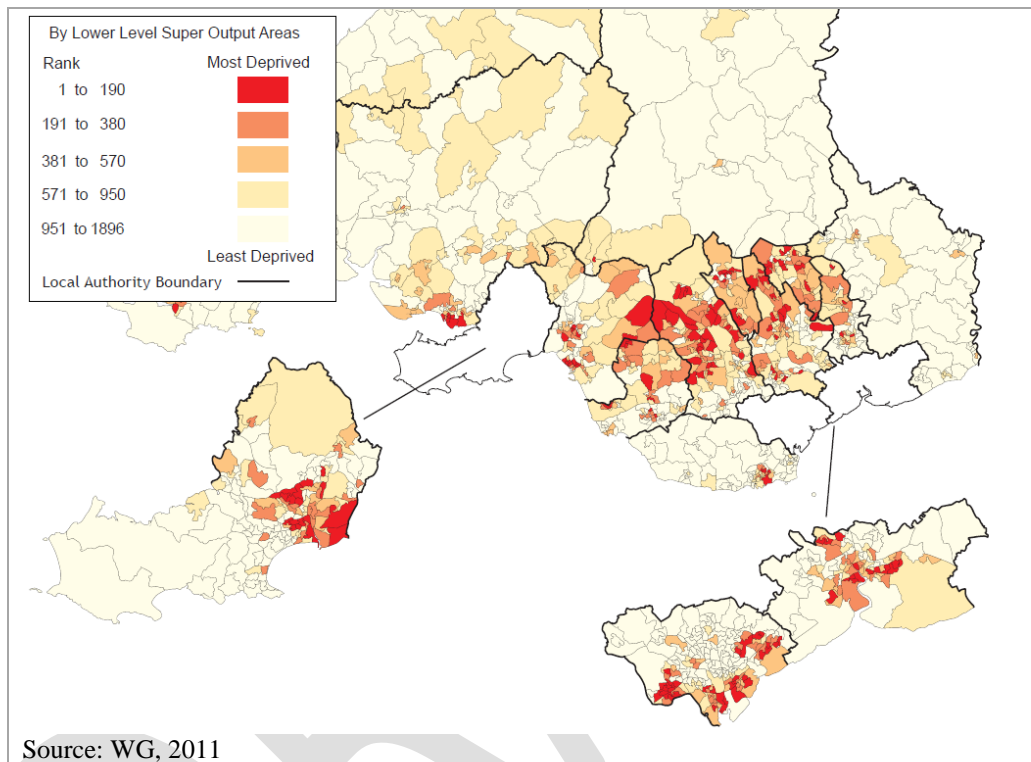


Figure 8 shows the prevalence of hard to treat homes in each of the local authorities of the study area, showing the number of properties off gas plus the number of solid wall properties as a percentage of total households. This hard to treat indicator (HTT) is considerably higher in Cardiff than in other parts of the UK: for example, the North East of England has a HTT of 23%, Yorkshire and the Humber 29% and the South East of England 30%. Indeed, the only English region with a HTT greater than 45% is London (at 64%) while the Vale of Glamorgan, Caerphilly, Blaenau Gwent and Newport all have HTT scores of greater than 80% (CSE, 2011).

The issue of poor quality housing stock is closely related to the issue of fuel poverty as, in Wales, 332,000 households were estimated to suffer fuel poverty in 2008, an increase of 15% since 2004.

As figure 9 shows, some parts of the region have relatively low incidence of fuel poor households. However, the urban regions of Swansea, Cardiff and Newport and the Heads of the Valley regeneration area report a high percentage of households spending more than 10% of their income on heating their homes.

4. Retrofitting in the Cardiff city-region

4.1 Constructing a typology of retro-fit activities

For the purposes of this study, retrofit has been defined as the ‘directed alteration of the fabric, form or systems which comprise the built environment in order to improve energy, water and waste efficiencies’ (Eames, 2011). In particular, the main focus is on incremental and disruptive improvements to the built environment - through (inter alia) a combination of systemic technological and social (institutional governance and behavioural) changes - operating across the building, neighbourhood and city-regional scales¹³ (Eames, 2011).

As one can expect, within the Cardiff city-region, different retrofit initiatives are taking place. A possible typology was identified that brought together the issues of space (at which level the retrofit initiative took place e.g. city/region; neighbourhood or building) and the different type of retrofit. Retrofit activities can also be identified according to:

- the basis of the coordinator(s) of the programme e.g. Technology Strategy Board, domestic retrofit or community retrofit;
- whether it involves private (domestic and/or non domestic) vs. public establishments or both;
- whether the retrofit initiative goes beyond the aim of carbon reduction and aspire to achieve wider aims (e.g. transition or economic retrofit).

¹³ This definition of retrofitting also include new build but only the 1-2% of renewed stock that operates within cities, excluding therefore the construction of new cities or towns.

As highlighted earlier, the definition of retrofit includes improvement in energy, water and waste efficiencies. The domain of energy is the dominant one in the retrofit agenda as often this dimension reflects the policy drive towards energy efficiency and fuel poverty in retrofit projects. Nevertheless, it is important to recognise that ‘energy’ has multiple and contested meanings for different social interests and stakeholder groups, encompassing not just carbon emissions and fuel poverty but a wide range of other environmental and resource impacts, and social and economic concerns (for instance this includes the embodied energy/carbon implications of different materials used in retrofitting).

With respect to waste, the project focuses on the potential of energy-from-waste technologies as disruptive innovations at an urban scale. However, it also includes waste in terms of waste energy, particularly heat, where significant opportunities may exist for improving utilisation (through CHP, district heating, etc) at an urban scale. The domain of waste also includes issues relating to construction waste arising from the scaling-up of retrofit programmes. In some instances waste can also be seen as an opportunity to ‘up-cycle’ waste materials to produce new products (such as insulation materials) for the retrofit market.

The water domain, on the other hand, is particularly related to the individual building scale and the project focuses upon retrofit technologies which reduce energy demand through reducing the use of (potable) water and hot water at an individual building scale¹⁴.

4.2 What type of retrofit activities are found in the city-region and where?

A scoping exercise was conducted to establish the extent of retrofit activities in the case study region (a non-exhaustive list of initiatives is provided in fig. 10). While it is relatively easy to find out information regarding retrofit activities that are sponsored under national (e.g. TSB or Low Carbon Community Challenge) or regional (Arbed, HEES/ NEST) government programmes, it is more difficult to capture the extent to which private domestic retrofit activities (such as those conducted in privately owned households) are taking place. An exception to this would be the availability of some data on private retrofits showcased as part of networks of pioneering green households such as Superhomes and/ or case studies reported as part of interactive web based tools such as T-Zero.

Three out of the four TSB projects sponsored in Wales were located in the Cardiff city-region and 3 community groups were also awarded funding through the Low Carbon Community Challenge (2 of which are within the city-region boundaries).

The former aimed at retrofitting social housing. These types of retrofits were considered *exceptional/ experimental* refurbishments and they are often referred to as *learning properties*. The latter involved mainly community renewable energy systems, mostly hydro and wind

¹⁴ These would include not only more efficient taps, showers, cisterns and domestic appliances but also grey water technologies which substitute for potable water use.

schemes. Recently, 9 Welsh communities groups were also awarded funding through the Local Energy Assessment Fund¹⁵ (7 of which were located in the city-region), including initiatives to showcase solid wall insulation to the public, to promote and advise on energy efficiency at home and in the community and invest in renewable energy. A further community initiative was sponsored by the British Gas Green Street initiative and included among other things generating renewable energy and engaging with the local community.

Fig. 10 A typology of retrofit initiatives

Figure *: Typology of retrofitting activity in Cardiff				
Regime Space	Social housing	Private housing	Non-domestic	Infrastructure
City/region	Arbed 1 GENuS Consortium Neat Port Talbot and Warm Wales	Arbed 2 (50:50 split public/private) Green Deal? Neat Port Talbot & Warm Wales	Carbon Trust Local Authority Carbon Management Programme	British Gas Green Skills Centre Prosiect Gwyrdd Waste Partnership
Street/Neighbourhood	Angelina Street, Cardiff Tyrfelin Street, Penrhiwceiber Wales Co & RCT homes	Transition Monmouth e.g. Monmouthshire Community Climate Champions British Gas Green Streets e.g. Llangattock Green Valleys Wales Co: Penrhys Estate & Neath Port Talbot East RCT Borough Heat and Save Scheme	The Works, Ebbw Vale Local authority stock improvement e.g. leisure centres NHS e.g. CRC Commitment, energy efficiency improvements	DECC Low Carbon Community Challenge e.g. Cwmclydach Development Trust, Awel Aman Tawe, Tintern Angiddy Project Ltd
Building	TSB Demonstration Properties Welsh Housing Quality Standard The Works, Ebbw Vale - Passivhaus	Nest – WG's fuel poverty scheme Superhomes T-Zero Project (BRE)	21 st Century Schools Display Energy Certificates Cardiff Bus Depot	

Nevertheless, most of the retrofit initiatives in the city-region have been undertaken under:

- the area-based ARBED, Strategic Energy performance Investment Programme, Phase I which improved the energy efficiency of over 6,000 homes in Wales (nearly 4,500 homes in the city-region);

¹⁵ LEAF is managed by a consortium of community networks to be administered by the Energy Saving Trust. Funds are intended to be used for understanding energy efficiency at a local level and renewable energy generation issues.

- the demand-led Home Energy Efficiency Scheme (2001-2010) that has improved energy efficiency in 124,000 households since being set-up (the scheme has now been replaced by the NEST scheme);
- the WHQS, with 75% of LAs and 82% of housing associations homes reaching SAP 65 in 2011/2012 (WAG, 2011, Social Landlords' Performance in Achieving the Welsh Housing Quality Standard).
- the Heads of the Valleys (HoVP) Low Carbon Zone Programme which aimed at installing up to 40,000 micro generation technologies, assessing 65,000 homes for energy efficiency and implementing 39,000 energy reduction measures in social housing.

While the aforementioned programmes have a strong emphasis on retrofitting social housing, some other projects focus more on renewable energy and community development, reflecting the different drivers- and funding streams- under which the retrofit agenda falls. The Ynni'r Fro project, for instance, a WG programme funded under the EU structural funds and delivered in collaboration with the Energy Saving Trust Wales (EST), aims at supporting social enterprises to develop community scale renewable energy projects across Wales.

Some local authorities are also delivering retrofit projects that aim at developing quality new homes and improving energy efficiency of the existing ones. One example is provided by the Angelina Street Development, undertaken in 2004, which represents one of the first examples of area-based approach and utilised a partnering approach¹⁶ that delivered cost efficiency and savings (one interviewee considered this project '*a very small version of Arbed*'). A similar approach has been used for the St Mellons Regeneration Project.

Many local authorities in the city-region are also taking forward smaller retrofit projects. These include often a few measures at a time (such as EWI, loft and cavity insulations and energy efficiency measures), for a small number of properties adopting a street-based approach (e.g. RCT Borough 'community approach') or type of property approach (Cardiff Council 'bungalows project'), in order to retrofit some of their housing stock but also including privately owned homes. The areas are selected by '*targeting the right areas first*', often deprived areas in fuel poverty, with elderly occupants and houses that represents the '*worst performing stocks*'. These improvement works, referred to as '*pilot projects*' by one interviewee, have been beneficial in attracting attention from the public to increase take up from privately owned households and also showcasing the opportunities and benefits achieved to other departments and members of each local authority.

In some instances, a LA programme of energy efficiency started 10 years ago, providing loft and cavity wall insulation; while another LA took step to undertake external wall insulation about 5/6 years ago to tackle the non traditional stock.

¹⁶ The Cardiff Partnering Scheme is a management guidance concept to assist partners to work together to share information and a more open form of working practice. The concept has a number of qualitative aims rather than benchmarks. It is freely available with guidance being available from Constructing Excellence, a UK Government supported organisation.

As shown, retrofit in the region has focussed somewhat on social housing, both local authorities and RSLs stocks. The reasons given for this are threefold. Firstly, it is argued, the private and the private-rented sectors are more difficult to reach when delivering retrofit projects; Secondly, homeowners and the private-rented sector have also been excluded from grants and incentives *'the private rented sector's never been able to bid for anything'*. And thirdly, some of the retrofit *'is not sort of financially viable from a private point of view'*.

Nevertheless, community interest companies in the city-region have been able to reach out for the private rented and the private sectors in rolling out retrofit activities. Wales Co, for instance, identified the private owner occupier sector as an opportunity and is delivering projects in the city-region. The type of projects funded by the community interest companies are often grassroots, in which a wider range of problems and needs of the communities are addressed. Retrofit becomes therefore part of a wider agenda to regenerate deprived areas and tackle fuel poverty. To secure engagement with the community and the private owners, the company has established links and partnerships with existing organisations that provide services to communities and recruited local people to provide information and advice on a door to door basis.

Similarly, Warm Wales¹⁷ started targeting city areas or large conurbations employing energy assessors, trained by the company. These energy assessors went out into the communities, knocking doors and identifying, on a piecemeal basis, individuals who needed insulation in their properties and who qualified to get grants to provide free installations. The company was funded by Npower and National Grid to assist them in delivering their social objectives and to meet their Government targets in terms of CO2 reduction. Any surplus money has been re-invested in the community to pay for further efficiency measures following the company ethos of regenerating communities providing local benefits. This has been quite successful in reaching out the private sector.

A successful example is represented by the collaboration between Warm Wales and Neath Port LA that provided 19,000 houses in deprived areas in the borough which achieved the refurbishment of 53 % privately owned houses.

Some local authorities, especially those that do not have social housing stock, are also delivering projects to solely the private sector, for example RCT Borough offers two demand-led schemes, exclusively to private owners, to help cover loft and cavity wall insulation (the Heat and Save Grant and the Energy Efficiency Grant for households with income up to £20,021). Other local authorities limit their activities to providing publications (e.g. flyer and bi-monthly publication) that goes to every household informing households of new housing grant or *something* that could potentially be accessed by private individuals.

Organisations such as the Energy Saving Trust Wales (ESTW) and the National Landlords Association Wales (NLAW) are promoting energy efficiency in the private-rented sectors. The

¹⁷ A community interest company set up with the support of National grids and Npower to assist them in delivering their social objectives, and to meet their Government targets in terms of CO2 reduction and in particular to assist them in delivering affordable warmth within communities

ESTW Advice Centre has run a pilot project targeting landlords to promote the Landlords' Energy Saving Allowance and make landlords aware of CERT offers. EST is also working with local authorities to promote the energy efficiency of the private rented sector. There seems to be evidence that some landlords (*'good landlords'*) see the benefit in having efficiency measures installed but there is very little awareness of the available funding and support. Within the sector, policy intervention and regulation could drive change. At national government level, there has been proposal to introduce some regulatory requirement for rented houses to achieve a certain level of the energy performance certificate before been let out. The NLAW, on the contrary, is working with all major stakeholders to try and recreate successful schemes that roll out energy efficiency measures to the private-rented sector (eg. the work done by Bournemouth Council and Dorset Energy Trust in collaboration with the NLA UK). Working in collaboration with community interest companies such as Warm Wales, the Association is also aiming at involving the private rented sector in mainstream projects such as Arbed and lobbying the Welsh Government for the private rented sector to get access to grants available for social housing.

For non domestic retrofit projects, the majority of local authorities now have carbon reduction targets that echo the WG target of the 3% year on year reduction. Most of the local authorities are also working in partnership with the Carbon Trust, funded by the WG to provide advice and support to businesses and local authorities.

A pivotal role has been played by the Carbon Trust's Local Authority Carbon Management programme, which focuses, among other things, on good housekeeping, cost-effective investment to save, and the integration of renewables across local authorities' portfolio. All LAs in Wales have signed up to a carbon management strategy health check to benchmark the delivery of their initial carbon reduction strategy. The Carbon Trust is also helping disseminate best practice to local authorities. Within non domestic buildings (council estates, leisure centres), it has been argued, enabling energy, facilities and maintenance managers to understand the business case for replacement and appropriate maintenance of equipments based around energy savings and cost effective measures is a major driver for local authorities to invest in retrofit projects and renewable energy. It is often the energy managers that have influence on the budget that can take projects forward: in some more pro-active LAs, for instance, the energy manager sits in the finance department. Some retrofit projects are funded through 'rolling maintenance' rather than capital funding. A further funding mechanism is represented by the Salix Invest-to-Save fund¹⁸, managed by WG. Through the Salix fund the WG has invested £4.5m in 2009/10 and £2.9m in 2010/11 in public sector carbon reduction projects (a further 11 million has been announced for projects in 2012/13).

At national level, display energy certificates (DEC) have also played a role as building over 1000 square meters must display a DEC. Further drive is represented by the CRC Energy Efficiency Scheme (previously known as the Carbon Reduction Commitment) which is a mandatory carbon emissions reporting and pricing scheme to cover all organisations using more

¹⁸ The Salix Finance is a social enterprise established by the Carbon Trust to provide public sector bodies with interest free loans for works which will deliver carbon and energy savings.

than 6,000MWh per year of electricity (equivalent to an annual electricity bill of about £500,000).

Within the non-domestic sector in Wales, school buildings are playing an important role and one refurbishment project that has been particularly important is the Welsh Government '21st Century Schools programme', representing a £1.4 billion investment¹⁹. The programme, delivered in collaboration with local governments and WLGA includes a *21st Century Schools Standard* for all schools in Wales which will reduce recurrent costs, energy consumption and carbon emissions. The aim of the standard is to ensure that school buildings and the way they are managed will reinforce positive messages on how sustainable development principles work in practice.

4.2.1 Retrofit projects: the technology

A wide range of technologies have been employed in the different retrofit projects that have been highlighted. These span from loft, cavity and solid wall insulations to the application of different renewable technologies such as domestic wind, hydro power, air source and ground source heat pumps, solar thermals hot water, PVs, micro CHP and rainwater harvesting. Some retrofit projects also included installation of gas central heating, connection to the gas grid and fuel switching. However, there seems to be an understanding that energy efficiency should come first and then renewable energy application follows. For instance, in Arbed, retrofitting was organised subject to an energy hierarchy approach: first installing energy efficiency measures, then renewable energy systems.

The uptake of different technologies has been driven by funding availability and eligibility. As argued above, some retrofit projects focussed mainly on cost-effective measures; Arbed was quite successful in driving uptake of solid wall insulations (over 40% of measures installed were solid wall insulation) and FITs have played a central role in the rise of PV uptake.

As one can expect, retrofitting newer technologies is considered more problematic and endorsing more technical measures represented a high risk factors for local authorities, RSLs and CICs. Issues of maintenance, warranties and guarantees represented a particular concern in the retrofit projects undertaken. On the one hand, stock owners are installing unfamiliar measures with unfamiliar maintenance needs. Often, renewables and energy efficiency are targeted by the more technical officers of the stock owners' organisation while the people who deal with tenants on a day to day basis sit in the housing management section. Newer technologies also required '*the tenant to buy into this as well*' and more effort was required to educate the tenants/ occupiers to use the systems to the most efficient way possible (for instance air and ground source heat pumps were not used efficiently/properly).

¹⁹ The 21st Century Schools Programme is a One Wales commitment and a unique collaboration between the Welsh Assembly Government (WAG), the Welsh Local Government Association (WLGA) and local authorities. It is a major, long-term and strategic capital investment programme with the aim of creating a generation of 21st century schools in Wales. The programme will focus resources on the right schools in the right places, for early years through to post-16, with funding jointly provided by WAG and local authorities.

On the other hand, guarantees and warranties were provided for the products but not for the installation. Local authorities and RSLs needed to push for guarantees as these were not given. When the guarantees were provided, the technical information was often difficult to understand. Some local authorities and RSLs delivered together with the grant officer and the installers an easier to understand ‘*after care pack*’, highlighting some of the key issues with the measures installed.

The deployment of newer technologies in providing longer term solution does not seem to be taken into account (e.g. replace/renew an old roof with solar tiles rather than solar PV).

4.2.2 Retrofit projects: Energy, water and waste

It is evident from the discussion above that most retrofit initiatives have focussed solely on energy efficiency. However, recently there has been some renewed focus on a joined up approach to tackle water and energy efficiency measures following the work done by the Environment Agency Wales (EAW) and ESTW. The two organisations are compiling guidance for the standard on water and energy efficiency, the benefits of carbon and water savings and the benefit of tackling water efficiency and fuel poverty. Water efficiency measures, they argue, should be applied and installed at the same time with energy efficiency projects under schemes such as Arbed, WHQS and NEST. The ESTW and EAW have also conducted a pilot project with Wales and West and Valleys to Coast housing association undertaking a combined approach to the installation of water and energy efficiency measures.

Waste, on the contrary, is considered a priority for LAs as the WG has set local authorities progressive recycling and composting targets up until 2025, with organic waste treatment being a key part of each local authority’s Waste strategy. Good examples for recycling are set by Cardiff LA who has recently switched to a weekly recycling and food waste collection service, recycling more than half of its household waste. The case of waste recycling is often used as a good example to follow for introducing and promoting energy efficiency and behavioural change.

As mentioned earlier, the domain of waste also includes construction industry waste. This is an important aspect when dealing with refurbishment activities. Prevention and recycling support is provided in Wales by ‘Constructing Excellence in Wales’. The organisation runs several programmes to provide support in the built environment supply chain to ensure that 85 per cent or more of the waste generated by the construction and demolition sectors in Wales will be re-used or recycled.

4.2.3 How retrofit is constituted and understood

The refurbishment projects highlighted show how retrofit is an emerging process within the city-region that ranges from planned and responsive maintenance programmes (e.g. WHQS) to

targeted energy efficiency improvements and major refurbishment programmes (e.g. Arbed). There seems to be a move towards a more '*scaled up approach*' to increase impact and above all, deliver the ambitious targets that the WG and LAs are aiming to achieve. Most of the activities are driven by public funding which targets mainly social housing, excluding the private rented and private housing sector. It is important to highlight that most of the projects reviewed focussed on regeneration areas and aimed at reducing fuel poverty and establishing a demand for greener technologies that will create local jobs. Since the outset of the flagship refurbishment programmes Arbed, it was realised that '*the full potential of energy efficiency schemes can be realised if these schemes are embedded into Wales' broader economic development and regeneration agenda*'. As stressed, this focus on regeneration and community renewal has offered a more inclusive approach to retrofit.

4.3 Modes of financing retrofit activities

A number of funding streams exist to help with home improvements to reduce energy use. These include funding obligations on energy suppliers as well as government schemes and EU funding. The recent Economic Renewal Strategy estimated that around £1bn is likely to be invested into the energy performance of Welsh homes over the next decade. This includes: Arbed; European funding; the HEES; the WHQS; financial instruments; statutory obligations on energy companies; and UK regulatory and pricing changes (Economic Renewal, WG, 2010).

The flagship programme Arbed, which runs from 2010 to 2015 was first conceived as a £450 million project over four years. However, it will be delivered in two phase, consisting of £61 million investment for Phase 1 and £45 million Phase 2. Arbed I ran from March 2010 to March 2011 and aimed at '*testing and feeling the water*'. £30 million was invested through the WG Strategic Capital Investment Fund²⁰ (SCIF), comprising £8 million from the WG regeneration department, £20 million from WG climate change and energy efficiency department and £2 million from the housing department (Low Carbon Buildings Programme/DECC). This initial investment was matched with investment from energy suppliers through their carbon saving obligations (the Carbon Emissions Reduction Target (CERT) and the Community Energy Saving Programme (CESP)), housing associations, councils and gas distribution network providers through their fuel poverty obligations; housing renewal area and regeneration funding were also utilised. This allowed the programme to become quite '*a substantial programme*' with a total investment of about £61 million²¹.

²⁰ The SCIF stems directly from the One Wales agenda, and aims at delivering a step change in the WG's approach to planning and delivering capital investment strategically. A budget of £400m has been set aside over the period 2008/09 to 2010/11 to enable innovative, cross-cutting and strategic capital projects to be taken forward.

²¹ A further £6.6 million has been allocated recently to Arbed I, resulting from consequential funding and additional capital funding allocated by the finance minister. It is expected that this additional £6.6m will again leverage in additional funding from both energy companies and registered social landlords.

Arbed phase 2 was launched at the end of 2011 and is expected to be delivered in three years, starting in March 2012. It consists of £45 million investment, supported by the European Regional Development Fund and match funded by Welsh Government²².

There are also expectations around national funding schemes such as the Energy Company Obligation (£1.3bn across the UK), that will replace CERT and CESP and the Green Deal that will be launched in autumn 2012.

Funding opportunities are also provided by market mechanisms such as feed in tariffs (FITs) and the Renewable Heat Incentive. To maximise the opportunities provided by FITs, local authorities and RSLs have both embarked on self-funding their own PV installation schemes, exploring different financial mechanisms (e.g. the Revolving Guarantee fund) and raising private finance. A group of 7 housing associations led by CHC have committed to the Revolving Guarantee fund to provide about 700 PV installations, that will generate revenue to be reinvested for retrofit projects and community renewal programmes. Nevertheless, many local authorities and RSLs did not manage to proceed with the installations²³ before the change in FITs, as procurement delayed the installations. Consequently, some projects have now been put on hold or cancelled.

Some local authorities and housing associations are making more innovative use of available funding to support the implementation of retrofit schemes and energy efficiency improvements (e.g. seeking consent to use social housing grants, which fund the new build programme, to deliver major refurbishment) or using LAs capital budget to fund refurbishments, with match funding coming from other sources such as CERT and CESP.

An example of leveraging different funds is provided by the 'Heat & Save' Scheme offered by RCT Council which consisted of an initial council investment of around £50,000 that has led to external investment of over £600,000 and private investment of over £135,000 totalling around £800,000 investment into the borough.

4.4 Regenerating the Valleys: the Low Carbon Zone Programme

It was highlighted earlier that the emerging narrative for retrofit is strongly linked with the discourse on SD, economic development and the regeneration of long-term deprived areas. The Heads of the Valleys (HoVP) Low Carbon Zone Programme provides an interesting example of how the narrative of retrofitting at scale is constituted in the city-region. The HoVP²⁴ programme, a 15 year' regeneration strategy to develop a low carbon zone spread across 5 local authorities boundaries in the Welsh valleys, aimed at:

²² This has followed the recent change in EU funding that allowed Member States to redirect up to 4% of ERDF allocation to energy efficiency / renewable energy measures in existing housing.

²³ Initial results of a survey conducted by CHC have revealed that around 15,000 solar PV installations were planned within the HA sector by the end of March 2012. The survey revealed that only around 4,000 installations will be complete by the 12th of December deadline-the date of the proposed tariff change. The other 11,000 planned solar panels installations are now at risk.

²⁴ The low carbon zone project secured funding which includes £10 million from HoV, £12 million from Welsh Assembly Government's Strategic Capital Investment Fund, £8 million through CERT and £8 to £10 million from registered social landlords.

- installing up to 40,000 micro generation technologies,
- assessing 65,000 homes for energy efficiency,
- implementing 39,000 energy reduction measures in social housing and
- developing the largest concentration of renewable energy businesses in Europe in the Heads of the Valleys regeneration area.

The project intended to transform Aberdare in a Low Carbon Town, offering the opportunity to showcase *retrofit at scale* in a town environment. The programme also contributed to the opening of the first dedicated Green Skills Training Centre, run by British Gas in partnership with JobMatch, Jobcentre Plus, Summit Skills and Blaenau Gwent County Borough Council to train 1,300 people a year, including long-term unemployed, in energy efficiency and renewable energy technologies. Further to this, the programme consisted of two pilot projects:

- the refurbishment of six traditional terraced social houses in Penrhiwceiber - ‘Ty’r Felin Street’ - owned by Cynon Tâf Community Housing Group in partnership with Rhondda Cynon Taff County Council and the British Research Establishment (BRE) to create a showcase for energy efficiency and provide a model that could be adopted and adapted anywhere in Wales;
- the construction of two eco- homes, built on the site of a former steel works at Ebbw Vale in Blaenau Gwent, aimed at showcasing the *passivhaus* standard in partnership with BRE and United Welsh Housing association.

The HoVP encompassed a much broader social agenda and included a range of priorities that goes beyond retrofit (e.g. education and tourism). Although it could be argued that the primary focus of the programme was on micro-generation, jobs creation and supporting the economy of the Valleys, retrofit played an important part and illustrated how refurbishing the built environment can support many outcomes.

Since its conception, however, there have been some political changes and less capital funding has been going into some of the projects. Some activities are still undergoing but some of the organisations involved complained that there is limited information as to whether the funding will stop or carry on.

4.5 Strategic Regeneration areas and the Social Housing sector: Arbed phase I

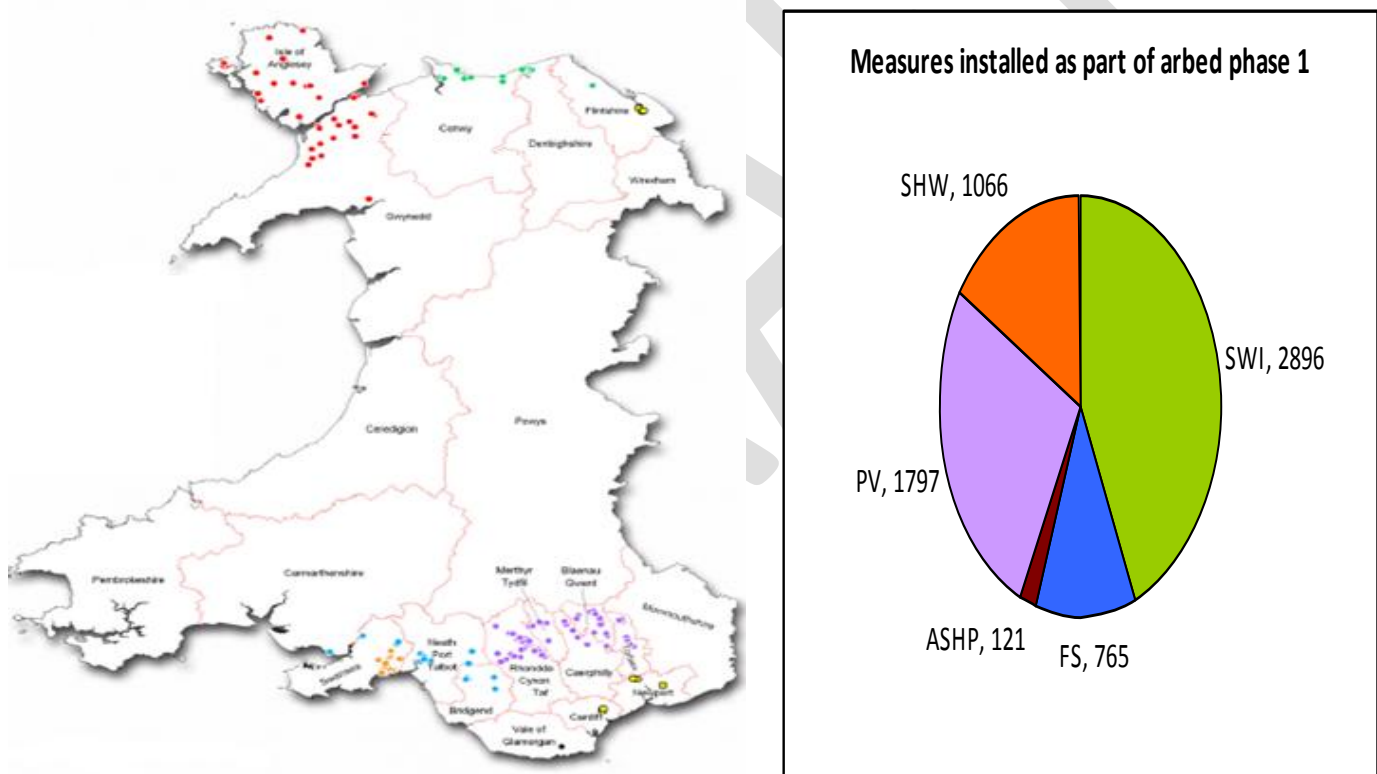
Importantly, the HoVP highlighted the importance of a spatial focus in delivering regeneration activities. The regeneration department in the WG recently made a policy decision to roll out the area-based approach to all policy decisions and initiatives and with Arbed²⁵ constituting a joined-up initiative with the economic development/ regeneration department, the decision was made to adopt an area-based approach for the programme. This approach facilitated, on the one

²⁵ The aim of Arbed is to retrofit the Welsh housing stock in a way that is holistic, both in terms of taking a ‘whole house’ approach to selecting measures and taking an area based approach to planning intervention.

hand, a focus on specific spatial areas in order to create a critical mass of activity and build on comparative advantage (in terms of energy generation) and specific requirements of the different regions of Wales. On the other hand, it allowed channelling available funding into interventions/areas where it would have greatest impact. The area-based approach assisted in accessing economies of scale²⁶ and involving a critical mass of local installers.

The properties targeted were located primarily in the strategic regeneration areas (SRAs) of Wales characterised by particularly low household incomes²⁷, targeting both areas in need of regeneration and households in fuel poverty. Support was also provided to projects outside SRAs where significant energy supplier funding was available. It is worth noting that most of the interventions took place in the Cardiff city-region as defined in the project. Figure 11 shows the location of Arbed Scheme funded portfolio and the measures installed. In total, 28 schemes were rolled out, with measures delivered to properties of a mixed tenure (21% privately owned or rented and 79% social housing).

Fig. 11 Location of Arbed portfolio and Measures installed



Source: WG, 2011

Developed in partnership with the BRE Wales and the EST Wales, and delivered in conjunction with Community Housing Cymru and the WLGA, the project had a strong focus on social

²⁶ In particular, two types of economies of scale achieved were identified 'the easy one to attain around bulk purchasing' (which generated about 33% savings) and a much harder one to realize around efficient programme management and delivery'

²⁷ Households in the lowest 15% income domain of the Welsh index of multiple deprivation

housings. The reason for this is twofold. On the one hand, housing associations (HAs) have been very receptive to energy efficiency and carbon emission reduction and have interpreted their role in a wider sense, encompassing strategic development, economic development and reducing climate change.

On the other hand, HAs have been involved in several projects that aimed at achieving energy efficiency. The first code level 4 homes in Wales were built by housing associations and they all been involved in the improvement required by the WHQS, helping to build capacity in the sector. The previous experience meant that HAs had '*confident, capable and experience people*' in place that had familiarity with delivering projects of this kind and had experience of engaging with occupants and delivering projects to wider communities, which included private households²⁸.

It was pointed out that there were many HAs that were innovating before Arbed came into place. These '*driver*' HAs were able to find the best prices, put in place projects before contractual negotiations were finished, allowing them to showcase some of the refurbishment to their tenants and were more innovative in the delivery of the refurbishments (e.g. they re-aligned their roof extension programme to fit in with the retrofit activity). Working cross-tenure represented a bigger risk for HAs; however, RSLs managed to sort of negotiate contracts, guarantees and warranties with their contractors in order to roll it out to private sector housing.

Some projects were delivered in partnership with intermediaries such as Warm Wales who delivered eight projects under the Arbed, managing about £9 million worth of contracts. These intermediaries often designed the schemes, looked at the best technologies to optimise the energy conservation opportunities within those properties, surveyed houses and targeted individual families or individual people who could benefit the greatest from the grant intervention and the insulation. Working for RSLs and local authorities, the intermediaries also optimised access to the various grants.

As part of the Arbed funding, contractors were required to utilise local workforce and sustain the local supply chain. Although difficult to achieve, Arbed represented a massive stimulus for the industry. Warm Wales, for instance, required their delivery vehicle, an NPower's subsidiary, to act as management contractor so that all the installation work could be done by local businesses.

The different stakeholders involved in the Arbed scheme felt that this funding opportunity has certainly played a key role and had a huge impact on the Welsh industry. One of the best outcomes, it is argued, is:

'that none of the housing associations involved in Arbed will do a re-rendering programme without thinking about putting insulation externally. And this even before the changes and the requirements of the new building regulations'.

²⁸ Some social housing associations, however, were newer than others (some had only just become new stock transfers or were only just set up), and had no experience on delivering projects at scale.

'Because the education of the housing association is one of the best things that came out of it, before they treated it as alien materials (e.g. to do a payback calculator on sticking a solar panel), by the end of it they treated it as general upgrade, maintenance work.'

During the delivery of Arbed, it was realised that there were not many skilled installers and contractors. Therefore, for example in the case of external wall insulation, many training activities (such as workshops, free training, monitoring and site supervision) took place to increase the knowledge base and the skill set of contractors in Wales. Some of these activities were carried out by existing manufactures in the region. The training activities were delivered in two ways: on the one hand, training involved companies who had never done it before to up-skill their workforce; on the other hand, existing and experienced installers, were ask to offer unemployed people training and opportunities using the Job Match service.

Interestingly, the RSLs were able to deliver the Arbed-funded projects free from excessively rigid audit and scrutiny procedures. As long as they could demonstrate that they did it *'fairly and openly'* and as long as they could demonstrate that they were delivering *'value for money'*, RSLs were able to undertake their *'procurement as they liked and in range of different ways'*. This allowed the majority of RSLs to developed relationships with suppliers, to use existing frameworks or do small tender exercises. These experiences provided RSLs with access to the world of energy companies and Govt obligations. More RSLs have since developed relationships with those energy companies and are working in partnership with them to secure more funding. It seems that energy efficiency and renewable energy programme became Some local authorities and social landlords have carried out a number of programmes just under CESP. As FITs came into operation half the way through Arbed, the flexibility built-in the programme allowed RSLs to move the funding used for solar PV to other measures (or give them back to the WG) so they could benefit from FITs.

Nevertheless, the programme had some shortcomings. In many instances, the projects failed to deliver a mixture of private and RSL properties and the local labour requirement was not really followed through by all of the schemes. Arbed phase I was delivered within 18months from its conception. The tight timescale was most challenging for the social housing providers and local authorities that were involved because of all the internal sign offs required to allocate resources, time and people. Some of the retrofits have also been done incorrectly due to the lack of time dedicated to monitoring and the lack of capacity and skills.

One of its biggest criticisms, however, was the fact that Phase I stopped suddenly and there has been a year gap between phase I and II. This caused many job opportunities and job contracts for trainees to fall through, raising many concerns on sustainable employment and the lost of training and job opportunities of the upskilled workforce.

This highlighted that the Welsh market has been dependent on the funding streams coming in from the WG. Besides, local authorities and social landlords were fully aware of Arbed phase II coming along and the fact that they could match fund it with CESP money meant that their plans

to do carry out external insulation projects following Arbed I were put on hold to take advantage of match funding with Arbed II.

4.6 Engaging with the private sector: Arbed phase II

Phase 2 of the Arbed scheme was designed to integrate all the different learning outcomes derived from Arbed phase I. Despite the fact that local authorities were less flexible in delivering Arbed phase I they have been more able to mobilise and engage with communities, tenants and private sector households. This, coupled with the requirements of the new funding streams (EU), is the main reason that Arbed phase II has been designed with a focus on providing a key leadership role for local authorities.

Although it follows the same grounding rules of delivering economic, social and environmental benefits in strategic regeneration areas to more vulnerable households, phase II has a different funding stream, which allows more flexibility, but brings in its own complexity as well. Arbed phase II consists of £45 million budget that will fund 10-20 refurbishment schemes per year (each schemes consisting of between 50 to 500 homes) up to a total of 50 schemes for the entire 3 year phase. Arbed II also aligned match funding from three WG departments' regeneration, energy efficiency and housing.

The private sector will play a more prominent role then in Arbed I as it is anticipated that private sector homes will account for at least 50% of the total homes in the schemes selected each year (50% across the scheme as a whole and not necessarily each individual project)²⁹.

We've just put a bid in now for ARBED 2, but that's obviously going to be more private sector focused than public sector and the other is a mix of private sector and public sector, about 55 to 45% mix in tenure.

A strong element of partnership has also been promoted as Local Authorities and RSLs will have to collaborate in order to identify projects. At end of 2011 all the 22 LAs in Wales had put forward projects submitted to them by RSLs. In order to assess and select projects, the WG has identified scoring criteria, based on Arbed's critical success factors and are designed to ensure that the scheme successfully targets:

- hard-to-treat and hard-to-heat homes;
- low-income households;
- private-sector households;
- alignment with strategic areas.

²⁹ If this is not the case, the WG reserves the right to select, each year, a portfolio of projects which does reflect this.

Priority measures supported range from solid wall insulation, heat pumps, solar PV, solar hot water and heating system upgrades³⁰. The scheme also includes measures such as draught proofing, energy saving advice and, for the first time, water saving devices.³¹

Arbed II differs from phase I in two ways. Firstly, the on-the-ground delivery of each scheme will be managed centrally, at WG level, by two OJEU-procured scheme managers (one for north Wales and one for the South) that will be responsible for selecting and appointing various contractors and overseeing appropriate installers and materials. The scheme managers will also send in experienced surveyors and decide on the type of measures to deliver. A team of four people within the WG is tasked with monitoring the delivery of the project as a whole and its aims. The scheme managers will project manage all the works, from the surveying to the actual delivery of works on site.

The scheme managers are yet to be appointed, but particular care has been put in identifying the particular skills required as the delivery of the scheme will demand not just technical skills (understanding of building fabric, building heat and ventilation) but also *'how to engage with vulnerable tenants'*.

This choice of delivery, however, has met contrasting views, as many of the delivery agents that took part in Arbed Phase I (from RSLs to intermediary organisations and from contractors to installers) may not be directly involved in the delivery of phase II losing much of the knowledge accumulated during phase I. Secondly, as the scheme managers will deliver the schemes, procurement procedures have also been centralised.

In summary, the WG will procure two top tier contractors (the scheme managers) who will have regional responsibility and look after their schemes in their sub-regions, which, in turn, will be responsible for procuring a list of approved suppliers to act as installers, running mini-tender exercises to select installers on a scheme-by-scheme basis and taking contractual responsibility for both installers and installations.

A centralised procurement, it is argued, will be able to generate big economies of scale, in terms of bulk purchasing of products and scaffolding and sub contractual relationships. This model of delivery will also allow for shared apprenticeship schemes, across projects, and represents a move towards establishing a specific qualification. On the other hand, there is a fear that this new system will just become *'a large scale contract of construction delivery and construction management rather than a tool for regeneration'*.

³⁰ Each scheme must include, for each household supported, basic energy saving advice and instruction in using (and maximising the impact of) any materials installed in a home.

³¹ Other measures that could be included are: fuel switching and loft and cavity insulation. These measures should be funded through induced external investment but could be funded by WG wherever external investment is not available (subject to cost-effectiveness, value-for-money, etc).

5. Governing the change: exploring the capacity and capability to act

5.1 The Role of the Welsh Government

As highlighted by this report, the WG is playing a key role in managing the transition to a low carbon built environment. Firstly, it could be argued, it has attempted to articulate pressures for change, collated under the overarching aim of SD. This also translated in the promotion of inclusive governance and extensive partnership working, including the encouragement and the enablement of others to embrace SD. In this sense, the WG has contributed resources and support to key intermediaries (such as EST Wales and Carbon Trust) and to the formation and maintenance of key stakeholders networks (the Zero/ Low Carbon Network).

The WG's Arbed flagship programme represents an interesting example of how the SD rhetoric has worked in practice and how it has become the overarching goal that helps to align all other policies. In this sense, the Arbed has fulfilled two main conditions. On the one hand, it has provided a visible action and a measurable effect of government interventions; on the other, it has contributed to build consensus around environmental issues such as energy efficiency aligning them with economic (micro-generation and green jobs) and social (tackling fuel poverty) benefits. This has provided an interesting example of 'governance by government' *à la* Hisschemöller et al. (2006) in governing the low carbon transition in the built environment.

A shared awareness of the pressures and the willingness to have a programme that could have an impact in achieving the ambitious targets set by the WG were behind the design of the programme. At the very outset of the programme its strategic aims comprised economic, social and environmental benefits and this has attained consensus from all the different stakeholders involved in terms of the objectives pursued and the specific actions required, mobilising a relatively large amount of resources.

Internally, within the WG, the three strategic aims set were critical in aligning different departmental goals and achieving a more joined-up approach, which also resulted in the coordination of resources across diverse interdependent actors from the environmental, regeneration and economic development and housing departments. This allowed: to bring together people *'wanting to broadly to do the same thing but not been able to speak each other's language'*; *'to keep everyone happy, to bring everyone on board'*.

Interestingly, many interlocutors pointed out that trivial to this action of change was the clear leadership demonstrated by the previous Environment and Sustainability Minister and the innovativeness brought in by the designer and director of the Arbed project.

Furthermore, as the distribution of resources was aimed at obtaining these given objectives, the WG also played a key role in coordinating and designing phase I projects, acting as a *'knowledge transfer unit'*. This involved assisting in the design (redesign) of some of the projects that did not meet all the three criteria and providing knowledge and skills to those actors that lack essential capabilities for the delivery of the projects. Further to this, participation and stakeholders engagement was also associated with the delivery of workshops, at which attendance was made compulsory for the grantees for Arbed.

The WG also played an important role in promoting relationship with local manufactures, assuring that, where possible, local products were used during the delivery of the projects (Wales is home to some key leading companies in the sectors such as Sharp and Rockwool). The WG also set up an account management mechanism whereby the ARBED programme account managed all Arbed grantees on the one hand and the big six energy companies on the other. This provided the big six energy companies with a single point of contact if they wanted to invest in Wales.

The design of Arbed II will further strengthen this coordination role and the original team responsible for the overall delivery within the WG grew to 4 *‘it will be an unusual Govt scheme in that there will be a four person team sitting above the scheme manager to make sure it aligns with the objectives’*.

This work has involved primarily social housing. However, through the involvement of other intermediaries such as community interest companies, private companies and local authorities engagement reached a wider audience (e.g. private sector and entire communities). Besides, as seen, Arbed II is committed to achieve an equal split of private and social housing stock.

The area-based approach followed in Arbed provides an example of retrofitting at scale; however it only reached a very limited amount of properties (6,000 in phase 1 and around 5,000 are expected to be treated in phase 2). A recent presentation by Arup³² stated that there are about 440,000 solid wall homes in Wales and to reduce carbon emission in the built environment a number of 55,000 properties should be treated per year by 2020 or 25,000 a year by 2030.

5.2 Retrofit at Local Authority level: eradicating fuel poverty and regenerating long term deprived areas

At local authority level, although there is no overarching duty to promote sustainable development, the WG is playing an important leadership role as the set of visions that are often set at regional level are ‘cascaded’ down to local governments and organisations. However, the regional vision (s) often gets translated and re-aligned with local interests³³ in the local context. The vision of SD with its complementary visions of energy efficiency, fuel poverty, economic development and regeneration, at local authority level, is often re-oriented towards more doable, preferable and credible pathways (tackling fuel poverty).

LAs seem to be playing a threefold role. Firstly, they are acting as delivery arm of the WG aims and objectives; secondly they are providing support ‘from below’ and resonance with these regional aims³⁴. Thirdly, as seen, some have been innovative and proactive in providing new

³² Chris Jofeh, speaking at the Climate Change Commission Summit event Housing and the Built Environment: A Low Carbon Future for Wales, Cardiff, 14 March 2012

³³ As argued, LAs are democratically elected organisations with their own political priorities and tensions may arise between priorities at the national, regional and local levels

³⁴ Important is also the work carried out by the Welsh Local Government Association (WLGA). The association has developed a Sustainable Development Framework in order to raise awareness amongst local authorities about steps they need to take to recognise and understand SD principles and to provide support, training and learning opportunities to build capacity and equip local authorities with the knowledge and understanding to deliver

ways of delivering these aims and objectives. It appears that often energy efficiency, fuel poverty, emission reduction and low carbon economy are dealt with in different departments within the LAs. This reveals a much compartmentalised picture at LA level. However, LAs that have in place the figure of the SD Manager seems to enable better coordination among departments. Those LAs that also can count on the support and buy-in of senior management levels seem more likely to promote and develop a more prominent culture of SD.

Nevertheless, there is the perception that the dealing with a high number of LAs, there are a total of 22 local authorities in Wales (11 in the Cardiff city-region) can hamper the delivery of retrofit at scale. This is also coupled with the limited power that the 22 local authorities have (cf. the proposal under the Localism Bill in England).

5.3 Networks and key actors in the city-region: New entrants, incumbents, and intermediaries

Retrofitting activity in Wales is constituted and delivered at a number of levels, with multi-level governance processes taking place at the UK, Wales and regional levels. Figure 12 presents a non-exhaustive list of key actors and institutions responsible for driving or delivering retrofit in the Cardiff city-region.

At the UK level, public sector bodies such as DECC are influential in setting overarching guidelines and targets for action. A number of large UK (or indeed multinational) firms have a presence in the region, e.g. Sharp, Rockwool insulation manufacturers in Bridgend, influencing industrial pressures for retrofit and building capacity. Furthermore, a number of UK utility companies have interests in the region, for example the British Gas Skills Centre in Tredegar.

The regional level plays a decisive role in the delivery of retrofitting initiatives, with local authorities and housing associations active in the delivery of projects. Many of these bodies also take part in various strategic partnerships: the Prosiect Gwyrdd Partnership, for example, brings together Caerphilly, Cardiff, Monmouthshire, Newport and the Vale of Glamorgan councils on waste issues, while GENU S is a consortium of housing associations across Blaenau Gwent, Monmouthshire, Newport, Powys and Torfaen. A number of community or charity initiatives are also important at the local level, ranging from Community Development Trust with regeneration aims that incorporate sustainability to Transition Movement groups.

sustainable development. Through membership of the SD Charter Network (a membership of over 58 public and private organisations), local authorities are also able to learn from and share information and good practice from the public and independent sectors across Wales.

Recently, however, the current Welsh Government provided a clearer direction of travel with an increased shift of accountability to local authorities to deliver “sustainable” social services. In this respect, the Wales Programme for Improvement has provided a framework to drive improvement in local services and makes sustainability a central theme for the effective and efficient performance from service delivery to strategic planning and community strategies³⁴ (WG, 2010).

These actors fulfil a number of roles with regard to incentivising, orchestrating and delivering retrofitting activity. Key roles include:

- Vision making: articulating visions of the future to motivate action
- Translating the vision: aligning visions with the interests and capabilities of local actors
- Networks and intermediaries: bringing together actors and interests
- Capacity building: developing resources needed for retrofitting e.g. skills, capital

The WG has played an important role in fulfilling the first two roles; nevertheless, this does not undermined the role played by networks of actors in building capacity, delivering retrofit initiatives or setting up social enterprises to catalyse community energy projects. Networking is facilitated by spatial proximity and the scale of the region allow stakeholders to work together and share knowledge and experience: *‘the housing association sector in Wales work very closely together’*; *‘We’ve previously set up a consortia’*; *‘it’s such a close network of contractors, consultants, and associations’* *‘we’re all very much familiar with each other’*.

Some companies have evolved into specialist project management and advisory company to provide a more holistic approach that includes *‘job creation, training, learning, regeneration within communities, supply chain development and business start up’*. The type of organisations involved includes both existing organisations (incumbents) but also new entrants. It is worth emphasising that some existing organisations have also adapted their mission to encompass wider sustainability objectives such as for instance Keep Wales Tidy³⁵.

5.4 Multi-level policy framework in the region: the Green Deal and New building regulations for Wales

Two forthcoming policy interventions are set to have a big impact in influencing retrofit and the transition to a low carbon economy in the city region. Firstly, there has been a transfer of responsibility for building regulations from the UK government to Wales. This is seen as *the* opportunity to increase standards for new and existing homes and non-domestic buildings:

‘With the full devolution of Building Regulations from 2012, the Welsh Government will be able to set ambitious standards for new build in Wales (...). There will also be opportunities to encourage improvements to the existing stock by requiring consequential improvements in energy performance or the resilience of a building to climate change impacts when dealing with applications for extensions and other work’.

Secondly, there are high expectations surrounding the Green Deal. These expectations are often contested. On the one hand, it seems that businesses (often small installers) are busy preparing for the Green Deal against a backdrop of uncertainties in its implementation. They are concerned that the regional and/or local governments could play a more proactive role (e.g. setting up pilot schemes for the Green Deal). There are concerns that Wales is lagging behind other regions of the UK. Some LAs are looking at the opportunity of becoming providers or brokers. They are in

³⁵ An independent organisation working towards achieving a clean, safe and tidy Wales.

favour of becoming providers as this will allow them to have better control of the measures and their deployment. Nevertheless, local councils have put their plan aside due to local elections.

On the other hand, the WG maintains that:

'the new Energy Company Obligation (ECO) and the Green Deal are two key UK Government initiatives that we must ensure work for Wales. When the proposals for the ECO and Green Deal are finalised, we will review our existing energy efficiency programmes to ensure that the support they provide complements, and does not compete with, these initiatives'

As argued earlier, retrofit is delivered adopting an area-based approach that ensures that deprived areas and most disadvantaged households are prioritised. The choice of focussing on fuel poverty from the WG makes the market mechanism of the Green Deal less appealing. It is argued that the 'golden rule' will not work on fuel poor households and that the Green Deal might exacerbate disadvantaged communities.

1. Concluding remarks

This report has sought to highlight the drivers and practices in retrofit in the Cardiff city region. Summarising, it could be argued that the current retrofit dynamics in the region show that there are signs of an emerging, *socially* driven, city-region 'owned', transition pathway.

The Arbed programme offers an interesting example of how the narrative of sustainability is used to address several pressures; specifically, to align heterogeneous actors and mobilising resources that encompass the environment (energy efficiency), regeneration, housing and economic development. The Welsh Government is playing an important role in articulating visions for the future and providing leadership.

However, two main issues are worth emphasising.

On the one hand there are only a very limited number of households that have been retrofitted and the focus is still very much on social housing. Nevertheless, some of the initiatives have shown that the business model can be more inclusive and success can be driven by a wider community engagement (cf. retrofit projects that are driven by community interest companies).

On the other hand, there are issues with the Welsh Government's commitment for the long term. Programmes are initiated but can stagnate due to other, competing, priorities. This, as argued, happened with the Low Carbon Regions of the Wales Spatial Plan and the HoVs programme. Ineffective and unsuccessful outcomes are often difficult to ascertain as monitoring and evaluation is rarely built in as part of the programmes (e.g. Arbed I). This problem also rises when long-term, unrealistic targets are set without adequate measures in place for monitoring progress towards target achievement.

Figure 12: Actors and institutions in retrofitting activity, Cardiff

UK Level						
DECC	Committee on Climate Change	British Gas	nPower	Sharp Solar Panels	EDF Energy	Mark Group
Summit Skills		Wales & West Utilities	Calor gas	Rockwool	CERES (Micro Fuel Cell)	Mabey Bridge
Wales Level						
	Nest			BRE Wales		Wales Co
Welsh Government	Low/Zero Carbon Hub	Climate Change Commission for Wales	Dwr Cymru	GB Sol	SWEA Cymru	WRAP Wales
Arbed			Environment Agency Wales	SWALEC	Carbon Trust	Keep Wales Tidy
Energy Savings Trust Wales	Constructing Excellence in Wales	British Gas Green Skills training centre	Sustainable Futures	National Landlords Association for Wales	Eco Centre Wales	Sustainable Wales
Regional Level						
Consortium of Local Authorities Wales	Housing Associations	Cwmclydach Community Development Trust	South East Wales Energy Partnership	Monmouthshire Community Climate Champions	Awel Aman Tawe Project	Caerau Development Trust
Monmouthshire County Council	City and County of Swansea Council	Vale of Glamorgan Council	Pathfinder		Talybont on Usk Energy	Llangattock Green Valleys
Blaenau Gwent County Borough Council	Merthyr Tydfil County Borough Council	Rhondda Cynon Taff County Borough Council	Torfaen Council	Prosiect Gwyrdd Partnership		Filsol
Cardiff County Council	Newport County Council	Caerphilly County Borough Council	Neath Port Talbot County Council	GENuS Consortium	Green Valleys	G24 Innovations
			Bridgend County Borough Council	Cardiff Futures	Transition Monmouth	Excel Fibre Technology
Key						
Public						
Community/charity						
Private						

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