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Retrofit2050
Re-engineering the city 2020-2050: urban foresight and transition management

Cardiff and South East Wales: Social, Economic and Sustainability Context

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1. Introduction

The aim of this report is to provide some background information on the Cardiff/South East Wales city-region focussing on its historical development and economic and sustainability agendas. In doing so, it will frame the socio-technical transition discourse in the region and provide a reference for the RETROFIT 2050 project as it considers potential regional futures. By considering the historical development of urban settlements in the region and the shape of sustainability policy to date, it is intended to offer some context for considering future pathways to a low carbon economy in the region.

Section 2 is concerned with the historical development of the region, focussing on the urbanisation, decline and regeneration of the contemporary region, as well as considering the nature of the 'city-region' agenda. South East Wales' leading role in the industrial revolution transformed the region from a largely agricultural economy to one driven by the mining communities of the Valleys and urban centre of Cardiff. The subsequent decline of industry saw the region struggling severe economic decline as it struggled to find a new role. As well as laying the foundation for the enduring interdependencies across the region, this narrative of rise and fall is influential in the contemporary sustainability discourse: an ambition to play an exemplar role in the transition to a low carbon economy sits alongside the desire to build a vibrant, competitive economy.

Sections 3 and 4 investigate the social and economic context of the region. Despite decades of regeneration efforts, the region continues to suffer extensive economic difficulties. However, the area is far from homogenous, with different strengths and weaknesses being felt across different regions, with the 'Heads of the Valleys' strategic regeneration area of particular note. As well as considering the difficulties faced regionally, these sections will also consider the social and economic drivers at work.

Section 5 will outline the sustainability agenda to date. Sustainability issues have risen up the political agenda in recent years, driven by concerns over climate change and increasing resource constraints as well as growing public awareness of the issues at stake. In the Welsh context, policy is written and implemented at a number of scales, with energy policy remaining largely centralised with UK government and responsibility for a number of related policy mechanism devolved to Welsh government. This section will consider the context in the area in terms of current emissions and the regional housing stock as well as relevant policy. Finally, section 6 will attempt to draw some conclusions as to the context for sustainability transitions in South East Wales.

2. Development

2.1 Economic Boom and Urban Growth

While the settlement at Cardiff can be traced back to Norman origins in 1262, it did not experience intensive urbanisation until a relatively late date (Hooper, 2006). Indeed, Wales was largely left behind by the first Industrial Revolution, associated with water power and the textile industries, and it was not until the iron boom of 1760 that the economy began to expand, with South Wales driving it forwards (Wang and Eames, 2010).

As of 1801, Cardiff and its hinterland were home to about 40,000 people, eclipsed by the nearby towns of Merthyr and Swansea. From the mid nineteenth century onwards, however, the region experienced rapid population growth, from 208,145 in 1861 to 485,000 in 1891 and 885,000 by World War 1 (Hooper, 2006). For the latter part of the nineteenth century, South Wales was a boom economy built on the export of raw materials, at once a major centre for iron production and the greatest coal exporting region in the world (Minchinton, 1969). While the volume of raw materials exported from the region grew significantly, this was not based in improvements in productivity; rather, mass immigration saw the South Wales Valleys lined with rows of houses to accommodate its swelling population (Minchinton, 1969).

Transport and communications infrastructure played a significant part in facilitating this growth. The entire region benefited from a rush of large-scale transport projects, starting with the construction of the Glamorganshire Canal in 1872-4, with the first dock at Cardiff being built in 1839 and the Taff Vale and Rhymney railways opening in 1840 and 1858 respectively. In 1850, the South Wales Railway connected Chepstow to Swansea, and Cardiff along with it. All of these developments served to establish the priority of the port at Cardiff and the relationship between the new town and its surrounding areas (Hooper, 2006).

By 1913, the landscape of South East Wales had changed. The coalfields had been populated with industry and housing for the labour force; Cardiff, for its part, had developed new residential areas to meet the growth in population (Hooper, 2006). However, the changing wider economic climate began to impact on the local economy. The region was highly specialised and export-orientated in its activities, both of which left it open to changes in the global market. As international competition rose, South Wales lost its competitive advantage and the region began to decline.

2.2 Decline and regeneration in a changing Wales

As its traditional industries faded, the Cardiff region struggled to find a new role. Indeed, it did not lose these industries entirely – the slow decline of the South Wales coal industry would continue until the 1980s - but the loss of international markets, the rise of new fuels and the increasing cost of raising Welsh coal eroded the region's former advantage (CWM, 2002). While a lack of manufacturing presence, somewhat paradoxically, meant that it was less affected by the inter-war depression years, the decline of the port was a blow to the Cardiff economy. Instead, the city looked to capitalise on its position as regional centre, turning to commercial, retail and wholesale activities. Significant spatial change accompanied this shift. The docks were increasingly underused and in some cases abandoned; activity concentrated instead in the business district which underwent its own transformation from mixed residential use to commercial (Hooper, 2006).

While the service industry continued to maintain growth in Cardiff, the loss of industry had economic and social consequences throughout South East Wales. The South Wales Valleys felt the decline harshly. Between 1921 and 1936, the number of coal miners in South Wales fell from 270,000 to 130,000 as 241 mines closed: Dowlais, for example, suffered unemployment of 73% (CWM, 2002). Elsewhere, the now disused docks of Cardiff and Barry suffered extensive physical and social decline. The call for improvements in productivity in agriculture instigated by WW2 led to mechanisation, which in turn led to job losses across Wales (CAG Consultants, 2005).

Wales was dependent on external funding for regeneration goals for much of the twentieth century. As early as 1934, South Wales was designated a Special Area in recognition of dire levels of deprivation (CAG Consultants, 2005). Such funding came in varying guises, with the bodies responsible for regeneration in Wales changing significantly between the 1960s and the present day. The Welsh office was founded in 1964 against a wave of feeling that Wales was suffering a democratic deficit; this same sentiment led to a referendum on devolution in 1979, culminating in a negative vote and another in 1997, which passed by a narrow margin. This laid the foundations for the Government of Wales Act in 1998 and the creation of the National Assembly for Wales in 1999. A number of regeneration bodies were created within these larger governance structures, with the Welsh Development Agency opening in 1976, the Cardiff Bay Development Corporation in 1987 and the Valleys Initiative Regeneration Programme in 1989 (CAG Consultants, 2005). Such governmental bodies have by no means been the only actors in regeneration in Wales – voluntary groups such as Groundwork Cymru, NGOs such as Community Enterprise Wales and the social enterprise sector

have been, and remain, important in renewal. Indeed, a tendency for partnership working has seen the private sector taking part in government led regeneration with the CBDC, mentioned above, a notable example (CAG Consultants, 2005).

Post war regeneration was necessarily concerned with physical renewal issues such as housing. During the 1950s and 60s, policy included the building of extensive housing estates which would, ironically, become something of a problem to be addressed by future regeneration efforts. Infrastructure improvements were also prevalent, with the A55 in the North and the M4 in the South entering the planning agenda in the 1950s, though the 1960s actually saw the loss of many rural railway services, increasing dependence on the car. The 1970 and 80s saw a focus on attracting inwards investment to South East Wales. For example, the Welsh Office offered a grant of £87million to a proposed LG factory in Newport (CAG Consultants, 2005). However, these efforts fell victim to branch office syndrome, with multinational companies establishing routine production centres in the area. These factories were sensitive to the cost of labour and changes in technology and as such offered low-skilled, low-paid jobs and proved highly mobile. Critics have commented that many were more interested in collecting their subsidies than developing a base in Wales, and some Welsh-based plants were short-lived (Wang and Eames, 2010). In the 1990s, a renewed focus on regeneration led to a glut of new initiatives to stimulate growth in the region. One of the guiding principles of this new wave of regeneration was the importance of a competitive urban environment and civic boosterism (Hooper, 2006).

This boosterism mentality can be traced back to 1992, when a report commissioned by South Glamorgan Council recommended that if Cardiff aspired to European city status, it needed to take a pro-growth strategy and turn to the city marketing of other continental cities. Furthermore, it added that this marketing could be made more convincing by considering Cardiff on a regional scale rather than the city itself so as to achieve a size more comparable to its competitors (Cooke, 1992). This agenda seemed to be taken to heart by local government and appeared in the Cardiff City Council Economic Development Strategy 2001-6, the Community Strategy 2004 and the white paper Building for the Future (Boland, 2006) and indeed appears in the Wales Spatial Plan. With foundations in the concepts of Hall's mega-city region (Hall and Pain, 2009) and Harvey's entrepreneurial city (Harvey, 1989), this discourse suggested that the South East region could benefit socially and economically from operating as one networked region.

2.3 The Cardiff City Region

The Wales Spatial Plan 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. While the three are interdependent, they each have very different characteristics. The coastal area is relatively prosperous, housing the two cities of Cardiff and Newport. The Heads of the Valleys area, on the other hand, is in relative need of regeneration. These differences within the region are both a driver for and a question mark over the proposition of a unified city-region. For the Welsh Assembly Government, greater integration would open up the prosperous South to more deprived areas; for critics, it poses a potential problem for delivery of services given the diverse needs of different communities (Morgan, 2006).

The concept of the Cardiff city-region, or Cardiff and South East Wales, is a rather nebulous one without the clear geographic boundaries of regions like Greater Manchester. In the Wales Spatial Plan the "South East Wales Capital Region" stretches from Bridgend in the West to Chepstow in the East and from Abergavenny in the North to the south coast (figure 1). The Wales Spatial Plan envisions that the area will function as a "networked city region, on a scale to realise its international potential, its national role and to reduce inequalities" (Welsh Assembly Government, 2008).

Figure 1: South East Wales in the Wales Spatial Plan (WAG, 2008)

The conceptual shift towards regionalism is primarily driven by an economic agenda supported by moves in EU and national policy (Gibbs, Jonas and While, 2002). It is geared to the promotion of regional economic competitiveness in the context of an increasingly globalising market place and the idea that competition within areas undermines the ability to attract mobile capital (Morgan, 2006). It also has its place in fulfilling national sustainability commitments – government at a regional scale can be seen to be in a stronger position to manage the "sustainability fix" i.e. the sometimes conflicting demands of economic and environmental aims and respond to pressures within and

around the immediate urban area (While, Jonas and Gibbs, 2004). Its proponents argue that governance at this scale has greater economic and cultural relevance than local authorities; its critics, meanwhile, argue that it is driven by solely economic concerns and neglects social issues (Morgan, 2006).

The Cardiff/ South East Wales region is perhaps best thought of as an interdependent but unplanned urban region with a vision of a single networked city-region. The benefits of such a transition include efficiency savings in the delivery of public services by achieving economies of scale, a regional scale of planning for strategic issues such as transport and waste management and making the relatively prosperous coastal zone more accessible to Valleys communities. However, the significant social and economic differences between Cardiff and its hinterlands provides a barrier to a unified region as it raises questions of how these intra-regions inequalities can be addressed. Additionally, there is as yet a delivery deficit as to how public services and policy could be provided to the whole region (Morgan, 2006). The interdependence between Cardiff and its surrounding areas is clear both historically and in the contemporary region. Nonetheless, a question mark remains as to how a more unified city-region would function.

3. Population

3.1 Demographics

In 2009, South East Wales was home to around 1,445,509 people, over half of the population of Wales. As table 1 shows, population density is far from uniform. Though it covers only 5% of the area of the region, Cardiff is home to 23% of the population. Monmouthshire, for example, represents 30% of the area but only 6% of the population. This variation in density reflects the rural nature of much of Cardiff's surrounding area, as well out-migration from poorer areas in the Valleys.

Year	2009		
Description	Area	Density	Population
Region			
Bridgend	251	535	134,197
The Vale of Glamorgan	331	376	124,605
Rhondda, Cynon, Taf	424	553	234,403
Merthyr Tydfil	111	501	55,657
Caerphilly	277	623	172,737
Blaenau Gwent	109	631	68,630
Torfaen	126	719	90,720
Monmouthshire	851	103	87,967
Newport	190	737	140,355
Cardiff	140	2,397	336,238
Wales	20,780	144	2,999,319

- Area is in Square kilometers
- Density is in Persons per square kilometers

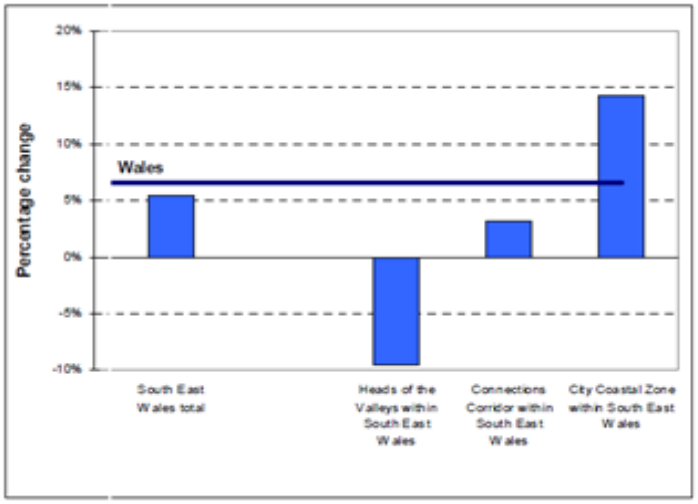

Table 1: Population Density (StatsWales, n.d)

Figure 2: Percentage Change in Population 1981-2009 (WAG, 2010)

Figure 2 illustrates the divergent growth patterns of the different areas. Between 1981 and 2009, the coastal region grew by 14%, significantly above the average for both South East Wales and Wales. Conversely, the Heads of the Valleys area contracted by almost 10% over the period with the Connection Corridor reporting modest growth of around 3%. It is also worth noting that the Heads of the Valleys region was the only of the three to experience a decrease in the percentage of its population aged between 16 and 64, falling 7% between 1981 and 2009 (WAG, 2010). These trends in population reinforce the idea that the Heads of the Valleys region is in greater need of regeneration efforts than the other two, while the coastal region performs strongest.

Despite these differences, the three areas have similar age structures in their populations. Looking at the South East Capital region as a whole, just under 2/3 of the population falls within the 16 to 64 age group, with under 16s representing 19% and over 64 year olds making up the smallest part of the population (16%). Household sizes are predominantly small, with one and two person

households representing the largest and second largest groups respectively (Statistics for Wales, n.db).

3.2 Education

In 2007, 68% of all adults of working age in South East Wales had a qualification of level 2 or above (GCSE or equivalent) and 28% held qualification at level 4 or above (certificates of higher education). On the other hand, 15% had no qualifications at all (Learning and Skills Observatory Wales, n.d). Furthermore, the Future Skills Wales programme, a research project undertaking surveys across Wales, found that in 2003 almost 40% of people in South East Wales reported practical or financial barriers to learning (Stats Wales, n.d.a).

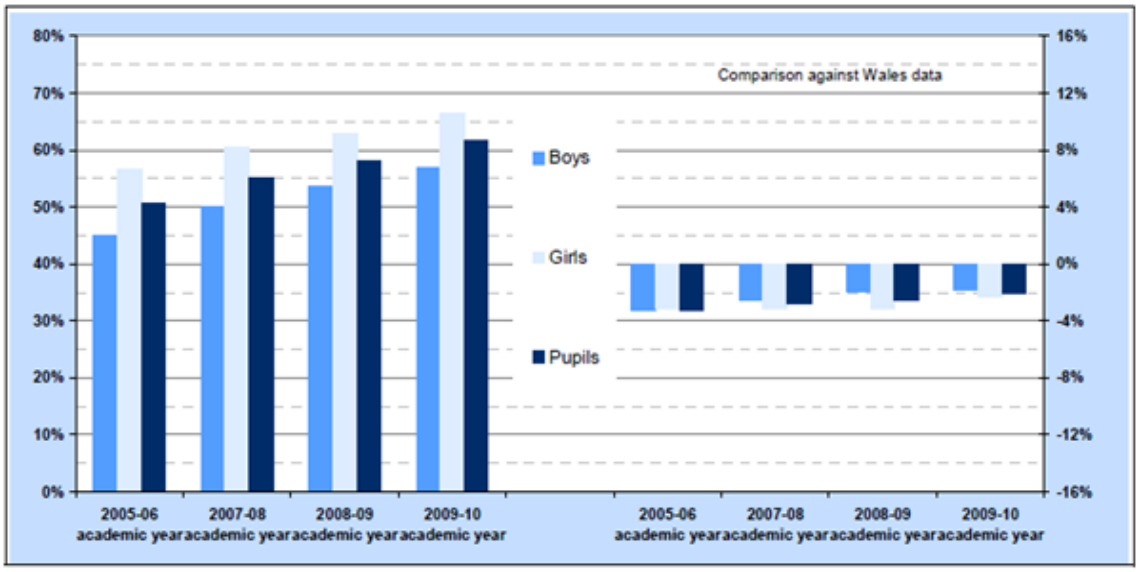

Figure 3: Pupils Achieving Level 2 Threshold at KS4 (Statistics for Wales, 2010)

Figure 3 illustrates the percentage of students attaining level 2 at key stage 4 – that is, gaining GCSEs or equivalent at secondary school. There is a year on year rise in the proportion of students achieving level 2, rising from 50% in 2005-6 to over 60% by 2009-10. However, attainment remains lower than the Wales average with relatively little improvement over the period. In the 2008 Welsh Index of Multiple Deprivation (WIMD), Cardiff, Rhondda Cynon Taf, Swansea and Newport contained the highest percentage of Super Output Areas (SOAs) in the most deprived ten percent in Wales for education deprivation measures; Cardiff, Merthyr Tydfil, Newport and Rhondda Cynon Taf had the highest percentage of their SOAs in the most deprived ten percent (Statistics for Wales, 2008). As such, the South East Wales region incorporates a large number of areas with severe education problems. These problems can't be considered in terms of a split between the Valleys region and the

urban coast – the WMID found that areas of high deprivation in the education, skills and training domain can be found across the region.

More positively, the percentage of people aged 16 to 64 with no qualification fell from 18.7% in 2003 to 15.8% in 2009, broadly in line with the Welsh average of 14.8%, with the proportion of those holding qualifications below level 2 also showing a decline (19.2% and 16.9% in 2003 and 2009 respectively). The level of people achieving level 3, on the other hand slightly over the period (0.5%) to 18.2% while the percentage achieving level 4 qualifications rose from 23% to 28.4%, exceeding the Welsh average (Welsh Government, 2010).

4. Economy

4.1 Employment

The employment rate varies across South East Wales, with the City Coastal Zone once more faring better than its northern counterparts. Figure 4 graphs the employment rates of the local authorities (LAs) of the region for the year leading up to June 2010. The percentage of people in employment in South East Wales is less than that in either Wales or the UK, skewed by poor performance in LAs like Blaenau Gwent and Caerphilly. Only Monmouthshire exceeds the UK average, with all other LAs falling short. Cardiff and the neighbouring Vale of Glamorgan both exceed the Welsh average.

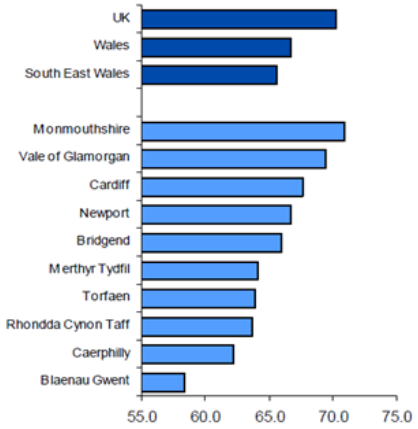

Figure 4: Employment rate, 2010 (Statistics for Wales, 2010)

In 2010, 20% of all people of working age in South East Wales claimed benefits, with 17% being characterised as out-of-work. The 'most claimed' benefit, by a considerable margin, was incapacity benefit, with 10% of the working age population claiming. Job seekers allowance was the next most prevalent, with 4.1% of people of working age receiving it. All of these proportions exceeded the Welsh average. More positively, the average earnings in South East Wales are higher than the Welsh average: residents received mean average weekly earnings of £539 compared to £527 nationally (Welsh Government, 2010). Gross value added (GVA) in the region stood at £16,700 per head in 2008, above the Welsh average but nonetheless 81% of the UK average (Statistics for Wales, 2008).

The consequences of the global economic downturn have had significant impact on unemployment across the region: between 2001 and 2011, unemployment rose by 79% compared to 61% in Wales and 66% in the UK. All 10 of the local authorities experienced increases in this period, though some

felt it worse than others. Merthyr Tydfil, for example, saw its unemployment rise by 134% while Caerphilly experienced a relatively modest, though by no means small, increase of 29% (Statistics for Wales, 2011).

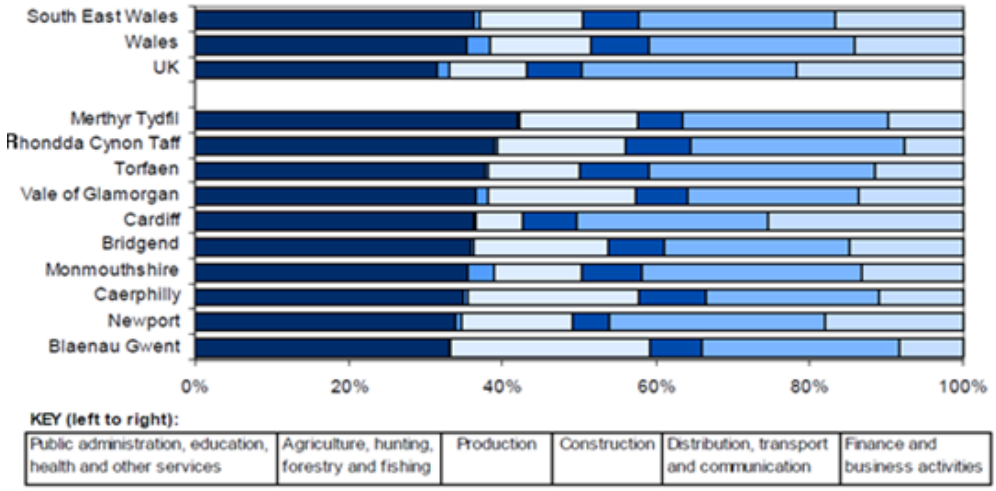

Figure 5: Workplace Employment by Industry (Welsh Government, 2010)

As of 2009, just below 30% of employed people held jobs in customer service, plant operation or elementary roles, while slightly over 30% in administrative or skilled trade roles and 40% in managerial, professional or technical roles. These figures are broadly in line with the Welsh counterparts (Welsh Assembly Government, 2010). In terms of industry, the nature of employment in the region is shown in figure 5. Public administration, education, health and others services account for a large part of employment throughout the region, rising to over 40% in Merthyr Tydfil. Indeed, the dependence on public sector employment across the region is well documented. Distribution, transport and communication is another significant employer across the region, incorporating transport, communication and hospitality industries and accounting for a little under 25% of workplace employment. One industry with a notable variation across the region is that of finance and business activities, accounting for around 25% of employment in Cardiff but less than 10% in the Valley LAs of Rhondda Cynon Taf and Blaenau Gwent. Similarly, the proportion of the workforce employed in production industries varies across the region, ranging from 6% in Cardiff to 26% in Blaenau Gwent.

4.2 Index of Multiple Deprivation

The last review of the Welsh Index of Deprivation was carried out in 2008, investigating deprivation in the domains of income, employment, education, health, access to services, housing, environment and community safety at the level of Super Output Areas (SOAs). These domains are then combined,

subject to different weightings, to form an overall index of deprivation. This index is mapped in figure 6.

A concentration of deprivation can be seen across the South East Wales area. Not in keeping with the divides between the Coastal City, Connections and Head of the Valleys zones, this concentration seems to focus on urban areas, though the relatively rural Heads of Valleys area is also a focus of high levels of deprivation. It is not in keeping with local authority boundaries, indicated by black lines, and as such presents a challenge for addressing the issue at a spatial level.

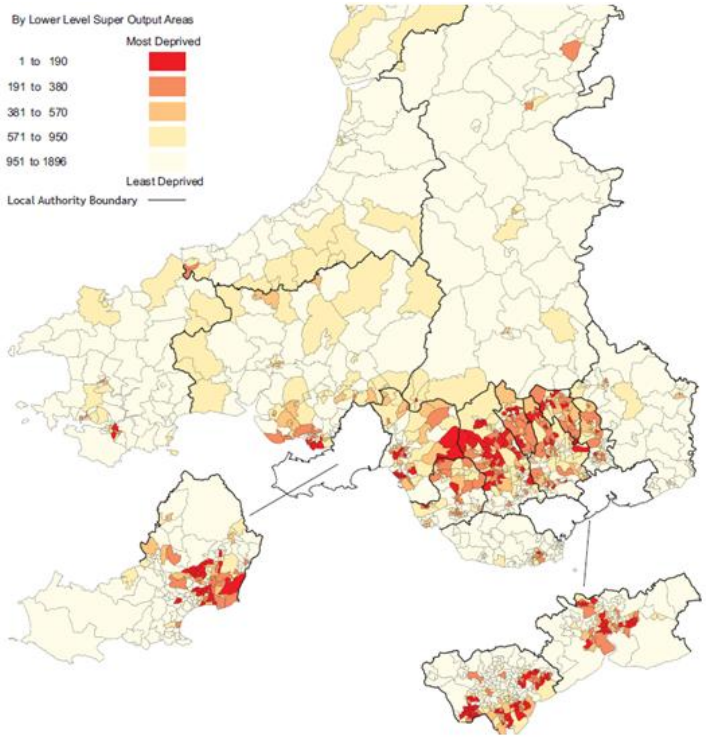

Figure 6: Index of Multiple Deprivation in Wales (Statistics for Wales, 2008)

A few comments can be made on the spatial dispersion of areas of deprivation within the different domains. Firstly, the concentration patterns for income, employment, health and education deprivation all follow remarkably closely with the overall index, likely reflecting their importance in the weighting mechanism. For South East Wales, this means that all four of these domains present dispersed areas of high deprivation across the region. Secondly, housing deprivation is far more prevalent in the north of Wales, with relatively few pockets of high deprivation in the capital region – perhaps surprisingly, little of the Valleys area fall into the top two boundaries in terms of deprivation 'score'. Thirdly, in the physical environment deprivation domain, the urban areas of Cardiff and Newport stand out as falling almost comprehensively within the top two boundaries,

indicating that high levels of deprivation are concentrated here. Other areas in the South east region are also highlighted in this domain, again dispersed across local authorities. Fourthly, in the access to services domain, the majority of Wales is highlighted as suffering high levels of deprivation, with only the South East, excluding rural areas in the North east of the region, reporting lower levels (Welsh Assembly Government, 2008).

An important conclusion to be drawn from this is that the dispersion of problems across the region is very difficult to define into neat areas, even at local authority level. This provides a case for city-regional governance in order to provide assistance to deprived areas across the region. Furthermore, it highlights the fact that while the concentration of economic activity in the South East provides opportunities for the future, it also presents a number of social problems that will need to be addressed in order to fulfil a vision of sustainable development.

4.3 Drivers

The Welsh Assembly Government has published a broad array of spatial and economic strategies intended to drive development across the country. Notable amongst them is the Wales Spatial Plan, which "sets out cross-cutting national spatial priorities" in order to create a strategic framework for development. It defines six separate regions: Central Wales, North East Wales: Border and Coast, North West Wales: Eryri a Môn, Pembrokeshire: the Haven, South East Wales: Capital Region and Swansea Bay: Waterfront and Western Valleys. For South East Wales, it sets out a vision of an integrated, internationally competitive region that acts as the key economic driver for the rest of Wales (Welsh Assembly Government, 2008). The plan is intended to influence development in Wales by provided an integrated framework for policy documents – the 2008 update notes that transport, housing and tourism strategies had already been designed to adhere to the Spatial Plan. For South East Wales, this means a cross cutting theme to policy that aims to integrate the region more fully and capitalise on the capital status of Cardiff to create a competitive European city.

The "Wales: A Vibrant Economy" economic development strategy was launched in 2005, looking to further explore the economic concerns noted in the more general "Wales: A Better Country". It cites closing the income and employment gap with the rest of the UK as a key priority, along with attracting higher value added economic activity, improving transport infrastructure and providing demand led training to improve skills. It identifies a list of key drivers for business (innovation, entrepreneurship, skills, investment and trade) as well as a list of sectors that could prove important in the future of Welsh growth. It does not make special reference to the South East region, beyond citing the Spatial Plan, but it is worth noting that the region hosts a number of important centres for

some of the sectors considered e.g. the aerospace centre at Glamorgan University in Treforest. It does, however, make special reference to the Heads of the Valleys area, noting that it is an area with particular income and skills problems (Welsh Assembly Government, 2005).

Released at the Hay Festival in 2009, the "One Wales: One Planet" report aims to provide "leadership and direction for suitable development in Wales". It lays out a framework for embedding environmental and economic sustainability in government policy (Welsh Assembly Government, 2009). It will be considered in more detail later.

Looking more specifically at the South East region, the South East Wales Economic Forum (SEWEF) released its 10 year economic strategy, "Enter the Dragon Economy" in 2005, with an update in 2010. It was predicated on the belief that development in the South Wales Valleys would be led by the strong performance of the coastal region, facilitated by strong connections. As such, connectivity was one of its key themes, along with business development and innovation and the now familiar agendas of education and skills and marketing the city. It cites the relative performances of Merthyr Tydfil, linked to Cardiff by the A470 and the more remote Gwent Valleys as evidence for this coast-centric approach, which can be seen to indentify strongly with the mega-city region described by Hall as the foundation of the success of the South East of England (Hall and Pain, 2004). The importance of this document for the region was the emphasis on an economically led approach focusing on the cities of the South with the expectation of trickle down effects (SEWEF, 2010).

The Heads of the Valleys programme takes a somewhat different approach, opting for a direct investment to the area (SEWEF, 2010). It aspires to create "balanced communities" in the Valleys with a mix of housing, retail, tourism and leisure, drawing on the mixed-use communities discourse first championed by Jane Jacobs in 1961 and now found internationally in regeneration policy (Grant, 2002). Delivery of the programme is intended to take place through a dedicated team with close partnership working across the public, private and voluntary sectors (Welsh Assembly Government, 2006).

It has been noted that the Spatial Plan sets out a number of key sectors for the future of the Welsh Economy. SEWEF notes six industries that have been identified by the WAG as a special focus for national support, analogous to priority sectors elsewhere in the UK: information and communication technology, financial and professional services, energy and environment, creative industries, advances materials and manufacturing and life sciences. These six industries account for 30% of business in Wales. SEWEF comment on their importance, noting that life sciences have enjoyed a 20% increase across Wales in the last three years and manufacturing is an area in which Welsh

productivity exceeds that of the UK by 8.6%, with employment in manufacturing in the South Wales valleys standing at 22% despite a general decline across Wales. However, it cautions against neglecting the other 70% of Welsh business, making particular reference to the tourism industry that contributed £5.9 billion to the Welsh economy in 2009 (SEWEF, 2010).

As has been noted above, the public sector provides a large proportion of employment in the region and as such is an important local economic driver. The WAG, like other UK government bodies, has expressed a desire to increase the importance of the "green economy" to employment and economic growth. They have launched a national strategy for creating jobs in the field of environmental sustainability; furthermore, the Heads of the Valleys programme aims to establish a Low Carbon Zone as part of its regeneration package, looking to creating a hub for businesses as well as addressing fuel poverty (Heads of the Valleys programme, 2009). As such, the South East Wales region is at the very least seeking to embrace Low Carbon industry.

4.4 EU Funding

European funding is a vital driver for economic growth in Wales. For the programming period 2007 – 2013, Wales qualifies for European support for three types of projects: convergence in the West Wales and Valleys areas, regional competitiveness and employment in East Wales and territorial co-operation across Europe. As such, South East Wales is in a position to receive particular attention in Europe-funded projects. In the Valleys, convergence funding is the successor to objective 1 programme and focuses on regenerating deprived communities, promoting the knowledge economy and business, improving transport and tackling climate change. Drawing from the European Regional Development Fund (EDRF) and the European Social Fund (ESF), convergence will drive a total investment of £3.5 billion, including match funding. Regional Competitiveness and Employment programmes in the South East will draw from the same two structural funds, but will focus around £280 million (again including match funding) on encourage business growth with a view to increase the value added of activity in the area, as well as tackling economic inactivity, low skill levels, unemployment and climate change concerns (WEFO, 2011). These objectives are in keeping with the rhetoric of stimulating growth by developing a competitive European city of the South East city-region, as well as recognising the need for special regeneration measures in the Valleys area.

5. Sustainability

5.1 The sustainability agenda to date

Cardiff embraced the aspiration of becoming a "Green City" in the early 1990s but the initiative was dropped when the city became a unitary authority in 1996 (Morgan, 2006). Awareness of environmental issues has been an active discourse for some decades. As early as the 1950s an environmentalism movement was emerging, most notably in the campaign for and creation of national parks (CAG Consultants, 2005). However, the need for economic and physical renewal has largely superseded environmental concerns until more recent years.

Cardiff was swept along by the wider political momentum of the sustainable cities movement, leading to a surge in interest in environmental concerns and a flurry of activity in the early 1990s, including participation in European initiatives such as the International Council for European and Towns Towards Sustainability and the International Council for Local Environmental Initiatives as well as taking greater account of ecological issues in land use planning. This flurry of activity was followed by a period of stagnation in terms of sustainability policy. While resident groups were influential in looking to such issues, a lack of influence within local elites resulted in a lack of resources and a weak institutionalisation of the issue (Morgan, 2006). The conflict over the Cardiff Bay Barrage is notable in that it pitted the city's ambitions directly against environmental concerns. The barrage was envisioned as a vital part of the waterfront regeneration project, but faced opposition for the threats it posed to the natural habitats of the bay area. Despite a high-profile battle spanning fifteen years parliamentary permission was eventually granted subject to the management of any environmental consequence (Cowell, 2006).

The new millennium brought with it an increase in government and public concern for the environment, motivated by a number of factors. Firstly, there was a wider resurgence in awareness of the impacts of climate change and increasing resource constraints. Secondly, on a more practical level, conflicts in other areas of policy such as decreasing capacity for road expansion to cope with congestion or landfill space to accommodate continuing high levels of waste brought environmental pressures to the attention of policy makers (Cowell, 2006). Thirdly, devolution in 1998 ushered in a new era of sustainability rhetoric. The Government of Wales Act obligated the new National Assembly for Wales to take an inclusive and strategic approach to sustainable development; the Sustainable Development Unit was created to fulfil this, which in turn created a strategy going

forward and sustainability advocates across regional government. They enjoyed success in improving the level of discourse in policy documents, but there is little evidence that they had significant impact on practice (Wells et al, 2009).

Recent years have seen an increase in environmental policy, with a rush of sustainability minded policy documents and strategies being released at UK, Welsh and regional levels and visible initiatives such as recycling initiatives and cycle path networks, but issues of environmental sustainability remain second to those of socio-economic development, with governments largely seeking compromise situations which do not detract from the growth agenda. With growth spearheaded by private development, in particular large leisure and sports orientated projects such as the Millennium Stadium, Cardiff Bay restaurant quarter and new sports facilities for both swimming and football, there has been a reluctance to ask too much of developers in terms of ecological credentials. Furthermore, intra-region competition to keep development within the city boundaries has resulted in a lack of consideration for the environment in planning, for example the location of new industrial sites in the wetlands of Wentloog (Cowell, 2006). The Cardiff 2020 visioning exercise illustrates this prioritisation of growth – the lack of environmental discourse is notable and couched in terms of attracting and retaining skilled labour. It also advocates growth in size for international competitiveness and the need for increases in major transport infrastructure such as aviation despite the environmental costs this would entail (Cowell, 2006). It would seem, then, that while sustainability has made its way onto the public and governmental agenda, it is still held to be less important than the needs of economic development.

5.2 Climate and Energy Policy

Energy policy in Wales remains largely centralised at the UK level, with planning and regulatory responsibility for major energy supply resting with Westminster rather than the devolved government. As such, UK Climate and Energy policy is important in the Welsh context and is summarised in appendix 1. Nonetheless, the Welsh Government has been proactive in carving its own path in terms of climate change and emissions policy (Wang and Eames, 2011). It holds a number of key policy levers which can be used to reduce emissions, including energy efficiency, land use planning and waste policy. Wales has set a target of 3% greenhouse gas emission reduction per year in such areas of devolved competence (Commission on Climate Change, 2011). A far from exhaustive list of Welsh Climate and Energy policy is shown in table 2.

“A Low Carbon Revolution: Wales’ Energy Policy Statement” lays out the Welsh Assembly Government’s (WAG) ambitions for energy and climate policy. As well as highlighting the “moral and

practical imperative" to change posed by climate change and growing resource constraints, the document identifies three themes to be addressed through energy policy: energy efficiency, establishing indigenous, low carbon sources of energy and economic renewal. As such, energy security and regeneration issues are strongly tied into the low carbon agenda. This horizontal integration of policy aims can be seen in schemes such as the NEST Fuel Poverty scheme and Arbed, "Wales' strategic energy performance investment program" which takes a community-based approach to retrofitting social housing, with an initial focus on strategic regeneration areas (WAG, n.d).

Name	**Description**
One Wales, One Planet	Launched May 2009, overarching sustainable development strategy
Climate Change Strategy	Published October 2010. Sets out policies and programmes to reduce GHGs by 3% a year in areas of devolved competence
A Low Carbon Revolution: Wales Energy Statement	Published in March 2010, framework for increasing energy efficiency and low carbon energy sources, links low carbon agenda to wider economic and social sustainability
Green Jobs Strategy	Published July 2009. Strategy to support greening of existing jobs and stimulation of green economy to create new jobs
Fuel Poverty Strategy	Published 2010 to replace Fuel Poverty Commitment for Wales (2001). Includes HEES, referral network
National Energy Efficiency Plan and Savings Plan	Published 2011. Focuses on actions and intended actions of WG to support sustainability
Building regulations	Will devolve to Wales in December 2011. Aims for consultation in 2012 and implementation in 2013
Technical advisory notes 8, 12 and 22	Provides advice on renewable energy provision, good design including environmental sustainability, transport planning and sustainable building respectively
Arbed 1 and 2	Established 2009. Wales' strategy energy performance investment programme/ Phase 1 (2010/11) involved energy efficiency projects in social housing. Phase 2 will incorporate private and public sector housing
Nyth/Nest	Launched April 2011, all-Wales scheme to combat fuel poverty, targets means tested households
Home Energy Efficiency Scheme (HEES Wales)	In operation since November 2000, WAG;s primary vehicles for meeting fuel strategy commitments, grants directed a low-income households
Welsh Housing Quality Standard (WHQS)	Standard to which all social landlords must bring all their properties by the end of 2012
Table 2: Welsh Climate and Energy Policy	Source: wales.gov.uk

Planning is an important tool at the WAG's disposal, in terms of land use, smaller scale renewable energy installations and new builds. TANs 8, 12 and 22 (Renewable Energy, Design and Sustainable Buildings respectively) are all influential in guiding energy generation and use. Furthermore, building

regulation responsibilities are to be devolved to Welsh Government in December 2011, who intend to bring new, stricter measures for consultation in 2012 and implementation in 2013 (Green Building Press, 2010).

It can be seen, then, that Welsh Government has sought to act as more than just policy takes (Wang and Eames, 2011). Rather, climate and energy policy Wales is driven by a combination of UK and Wales-specific documents and policies.

5.3 Carbon Emissions

The Assembly has chosen to use the Carbon Footprint as one of its headline indicators of sustainable development, along with the percentage of biodiversity action plan habitats and species that are stable or increasing, gross value added, the percentage of the population in low-income households and wellbeing (Welsh Assembly Government, 2009). The footprint measure represents the area of land needed to provide raw materials, energy and food as well as absorb pollution and waste. As of 2003, Wales' footprint was 5.16 global hectares (gha) per person, less than England or Scotland. However, it has been increasing at an average rate of 1.5% per year between 1990 and 2003, a trend that has been replicated across the UK (Dawkins et al, 2008).

Within Wales, carbon footprints vary across both local authorities and spatial plan regions, mapped in figure 7 below. The North West region had the largest impact, using 5.33gha per person while the South East has the smallest, accounting for 5.08gha per person, smaller than any English region. The South East region is home to both the highest and lowest scoring local authorities, however, with Monmouthshire using 5.46gha compared to Blaenau Gwent, using 4.89gha (Dawkins et al, 2008).

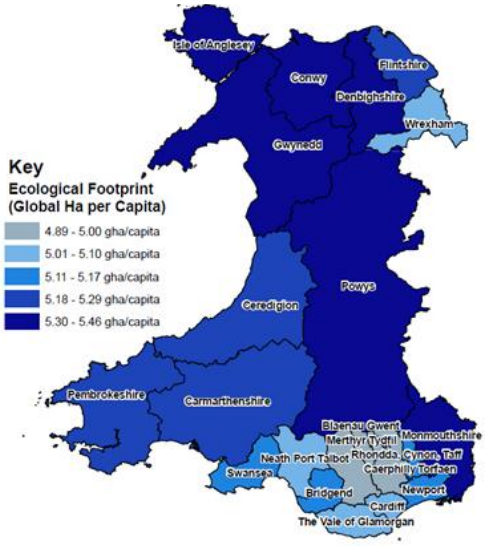

Figure 7: Ecological Footprint, 2003 (Dawkins et al, 2008)

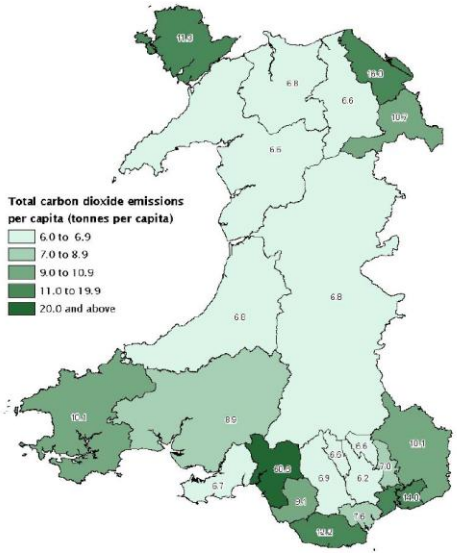

Figure 8: Carbon Dioxide Emissions per Capita (NAW, 2009)

When looking at the composition of Wales' footprint, four sources emerge as particularly important. Housing – including direct household energy use, housing maintenance and construction – accounts for 25%, while food accounts for 25% and transport a further 18%. Consumer items – measured here as the amount of energy used in producing the goods consumed by households – account for 15%. By far the biggest contributors to this footprint are households, representing 74% of 'land' used, with capital investment and government contributions accounting for the remaining 26%. It is also worth noting that 77% of the footprint resulting from consumption is generated by indirect impacts i.e. consumption of goods that do not emit pollution at the point of use but entailed resource and energy use further along the supply chain. As such, addressing consumption habits has an important role in reducing the Welsh carbon footprint to more sustainable levels.

In 2007, Wales emitted 39 million tonnes of carbon dioxide. This marked a 9.5% decrease on the 1990 base year, and a 7% drop since 2006. Of the EU-27 Annex 1 parties of the UN Framework Convention on Climate Change and the devolved UK administrations – 46 countries in total – Wales achieved the 17th largest reduction since the base year, but still had the 6th highest carbon dioxide emissions per capita, significantly higher than the UK which was ranked 17th. Indeed, within the UK Wales was responsible the highest level of CO^2 emissions, emitting 13.1t per capita compared to 9, 8.4 and 8.4 in Northern Ireland, Scotland and England respectively (National Assembly for Wales, 2009).

Figure 8 maps the total carbon dioxide emissions per capita across Wales. Neath Port Talbot stands out immediately as emitting significantly more than its neighbours, with the main contributor to this figure being the Corus steelworks in Port Talbot which emitted 6.9Mt if CO_2 in 2008. The Spatial Plan's City Coastal zone also reports relatively high emission levels, but the South Wales valleys emit relatively little carbon dioxide, with the lowest per capita figures in the country occurring in Caerphilly. Domestic emissions are more uniform across the country, ranging between 2.1t on the Isle of Anglesey and 2.6t per capita in Cardiff (National Assembly for Wales, 2009).

5.4 Fuel Poverty

A household is defined as fuel poor if its inhabitants need to spend more than 10% of their income on energy to heat their homes adequately. In Wales, 332,000 households were estimated to suffer fuel poverty in 2008, an increase of 15% since 2004. This increase occurred alongside the introduction of new Welsh Assembly Government targets to eradicate fuel poverty in vulnerable households (i.e. households that contain one or more children under 16, adults over 60 or person who is long term sick or disabled) by 2010, in social housing by 2012 and in all households by 2018.

This would suggest that the increase in fuel prices was more influential on the affordability of heating than government assistance. In fact, in 2008 29% of vulnerable households were surveyed as suffering fuel poverty, an increase of 17% on 2004 figures (Statistics for Wales, 2010).

Commissioned by the Welsh Assembly Government to investigate incidence of fuel poverty, Gordon and Fahmy (2008) found higher levels to be correlated with building age and household income. While these relationships are somewhat intuitive, it is worth noting that in 2008, almost half of all households living in dwellings built prior to 1850 were fuel poor. In terms of income, 94% of people living in the 1st decile for income were fuel poor – compared to 51% of the same group in 2004. This would suggest that increasing energy prices have proved difficult to manage for low income groups. It is also worth noting that around 50% of non-fuel poor households spend between 5% and 10% of their income on fuel, meaning that approximately 530,000 households could move into fuel poverty if energy prices continue to increase.

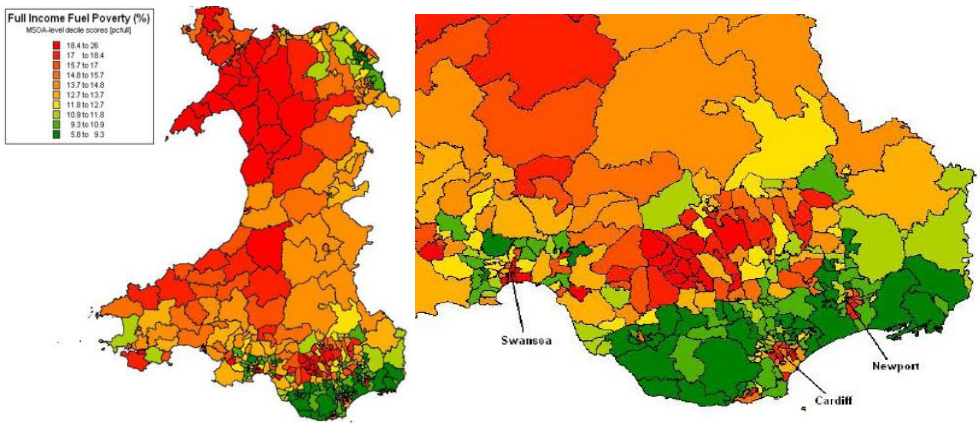

Figure 9: Fuel Poverty (Gordon and Fahmy, 2008)

Figure 9 maps the percentage of households in fuel poverty by local authority. Looking to the South East region, much of the region has a relatively low percentage of households in fuel poverty but there are concentrations of fuel poor households in the central urban areas of Cardiff and Newport and in the South Wales Valleys area.

5.5 Housing Stock

In 2010, Wales was home to an estimated 1.34 million dwellings, representing an increase of 8% on 1997. In keeping with UK trends, the majority of these were owner occupied (70%), with a further 14% renting privately and 16% living in social housing, 8% renting from local authorities and 8% from registered social landlords (RSLs). Within the private sector, the largest change in tenure was the increased proportion of privately rented households, rising from 7% to 14% between 1997 and 2010. In this period the proportion of dwellings that were owner occupied fell by 3% though numbers

continue to rise. In the public sector, the percentage of dwellings rented from LAs halved while those from social landlords doubled, driven by the large-scale voluntary transfers of stock from LAs to RSLS over the period (Statistics for Wales, 2011a).

In terms of types of household, terraced houses represent the greatest proportion of the Welsh housing stock at 36% in 2005. Semi detached and detached properties represent the second and third largest proportions of stock at 26% and 15% respectively. Flats were less prevalent, accounting for 12%, with bungalows making up the smallest single group at 11%. These proportions have remained fairly consistent since 1967 despite the increase in the number of households. Wales has the oldest stock in the UK, with 61% built before 1960. This older housing stock has repercussions in terms of energy efficiency, with a small proportion of houses being built with modern efficiency codes in mind and a relatively large proportion predating cavity walls, which were uncommon until 1935 (Utley and Shorrock, 2008).

The Carbon Footprint 2020 project, noted earlier, identified housing as its single largest contributor. Indeed, Wales compares fairly poorly to other areas of the UK in terms of energy efficiency measures in its housing. Only Wales reports less than 90% of households with lofts having some form of loft insulation, while only 38% have lost insulation of 100mm or more compared to 74%, 57% and 47% in Northern Ireland, England and Scotland respectively. Similarly, levels of double glazing are relatively low, standing at 32% compared to 62% in Northern Ireland. However, levels have increased significantly in recent decades, rising from 7.1% of its potential in 1976 to 84% in 2005. Cavity wall insulation has followed this same trend, still standing at a level below elsewhere in the UK but rising from 2.6% of all households with cavity walls to 40% between 2976 and 2005 (Utley and Shorrock, 2008). As such, there is cause for both concern and optimism when it comes to retrofitting Wales' housing stock. With only 0.6% of stock being replaced with new build each year, improving energy performance in existing households is paramount. It should be noted, however, that the high level of privately owned households and the older profile of dwellings will prove barriers to retrofitting.

Table 3 below provides a snapshot of the private housing stock by local authority (data regarding this section of the building stock is relatively widely available from in the form of Private Housing Stock Condition Surveys carried out by many councils). However, it must be noted that data was not available for Monmouthshire or Newport. Furthermore, the figures reported for Cardiff and RCT are from surveys reported in 2004 and 2005 respectively; since the SAP rating scale changed from a scale of 1 to 120 to one of 1 to 100 in 2005, they cannot be directly compared to other LAs (BERR and Defra, 2007).

Nonetheless, it is apparent that the SAP rating across the region is relatively uniform, with all average values falling into the 50-59 SAP bracket. Indeed, such a rating was prevalent across the region with Bridgend reporting that 35% of its private housing stock fell into this category in its 2009 Private Housing Stock Condition Survey, and Blaenau Gwent reporting a figure of 51%. This does not reflect badly on the region: the Audit Commission (2011) state that a SAP of 35 or less can be considered an indicator of low energy efficiency while a rating of 65 or more indicates high energy efficiency. It can be observed that, where reported, social housing SAPs are higher than their private sector counterparts, perhaps reflecting the relative ease of regulating energy efficiency improvements in such housing. Registered social landlords (RSLs) in Bridgend and council housing in Caerphilly both achieve 'high energy efficiency' by the criteria noted above.

	SAP	Proportion of dwellings in fuel poverty
Vale of Glamorgan (2009)	51	1/3
Bridgend (2009)	55 (66 in RSL)	13%
Merthyr Tydfil (2008)	56	39%
Caerphilly (2007)	54 (58 in HA, 72 in council)	-
Blaenau Gwent (2008)	-	43%
Torfaen (2009)	59	-
Cardiff (2005)	52	6%
Rhondda Cynon Taf (RCT)(2004)	59	-
Table 3: Private housing stock by local authority		

While only ½ of the region's LAs reported the proportion of dwellings living in fuel poverty, there is a notable variation in the figures reported, ranging from just 6% in Cardiff in 2005 to 43% in Blaenau Gwent in 2008. Such a large may well be influenced by differences in calculation – for example, Cardiff Council use a definition of fuel poverty that does not account for housing costs – but it still worthy of note.

Wales was home to around 3,500,000m^2 of commercial and industrial floorspace in 2008, a relatively small area compared to that of other regions in the UK (figure 10). Within this, the most prevalent type of premise was factories with offices proving least common (apart from the residual 'other' category). This reflects the somewhat low value added character of the Welsh economy. In terms of rateable value, Wales again reports lower figures than some other UK regions, mapped in figure 11.

It is notable that much of Wales fall into the 'less than £25' or '£25 to £50' per m^2 category with higher value floorspace highly concentrated on the South coast.

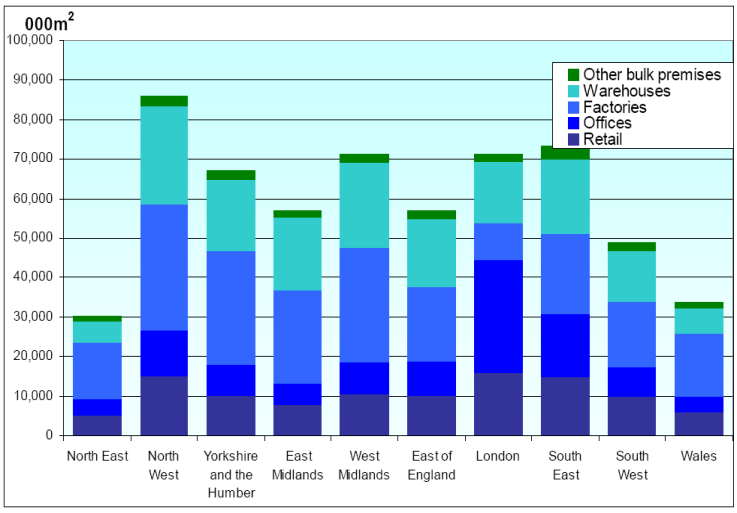

Figure 10: Commercial and industrial floorspace 2008 (CLG, 2009)

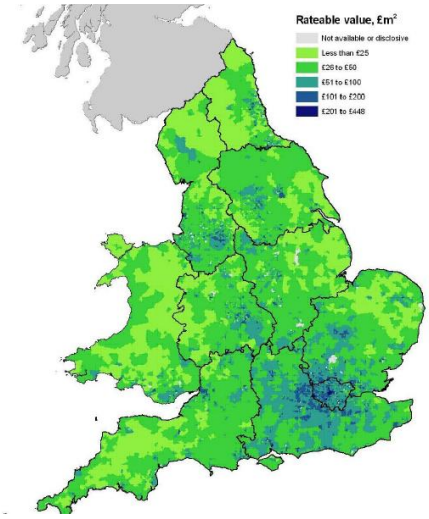

Figure 11: Rateable value per m2 2008 (CLG, 2009)

The age distribution of commercial floorspace is similar across the English regions and Wales with the biggest variations occurring in area of commercial property built before 1940 and 1940-70. In Wales, pre-1940 stock accounts for around 1/5 of commercial floorspace and 1940-1070 stock just under 1/3. The age distribution of commercial floorspace since 1970 is fairly even, with around 15% of the commercial building stock originating in the 1970s, 1980s and 1990s respectively. Due to availability of data, it is hard to say how much of the current commercial stock was built from 2000 onwards.

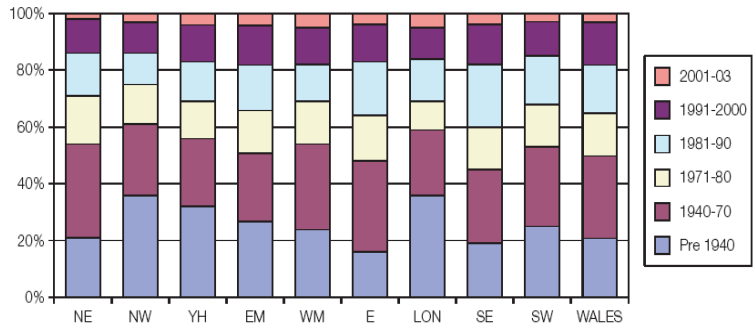

Figure 12: Age distribution of floorspace by region – all bulk 2004 (CLG, 2004)

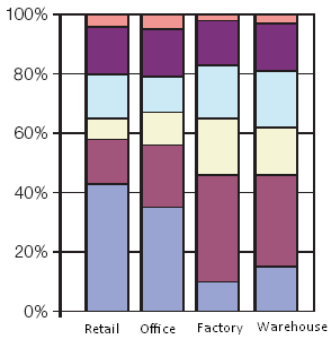

Figure 13: Age distribution of commercial floorspace in Wales 2004 (CLG, 2004)

Figure 13 charts the age profile of commercial floorspace in Wales by type. As in the English regions, much of the retail and office stock was built pre-1940. This prevalence of older stock will have repercussions for energy efficiency since cavity walls did not become common until 1935, as has been noted previously. The warehouse and factory stock are relatively modern, with less than 20% of the stock built between 1940 in each case and 35-40% of the stock originating from the 1940-1970 period. For warehouse space, this is largely in keeping with the English regions, though there are notable differences between the East and the West of England, but there is greater variation in terms of age of factory floorspace. Indeed, Wales has the newest factory floorspace, with 16% built after 1990 compared to 5% in London (ODPM, 2004).

6. Conclusion

The aim of this paper was to present some of the regional context that will frame any future pathway to sustainability in the Cardiff/South East Wales region, considering the historical factors that shape the modern city region as well as regional growth and sustainability agendas. In conclusion, a few key points can be made on each of these areas.

The urban areas of South East Wales are relatively young, with intensive urbanisation occurring alongside the second industrial revolution in the latter part of the eighteen century. This growth was rapid and characterised by a mass immigration that radically altered the shape of the settlements and landscapes of the area. Driven by the export of raw materials, economic and population growth was instrumental not only in the urbanisation of Cardiff but also in the creation of strong links within the region characterised by transport infrastructure and economic interdependence.

The decline of traditional industries in the twentieth century marked the end of the region's rapid growth and the start of a period of stagnation and recession. Regeneration effort began as early as the 1930s but it is arguable the 1980s that heralded the start of a push for regeneration in the area. Results, however, were limited, with social and economic problems prevailing to the present day and growth occurring unevenly. Significant links exist within the modern city-region – and are explicitly written into regional policy such as the WAG's Spatial Plan - but are perhaps best characterised as interdependence rather than co-ordination.

Economic and social indicators vary widely across the region with growth rates, educational attainment, unemployment levels and deprivation indices being notable examples. A reliance on public sector employment can be seen across the area, as can a bias towards low value added industries. These factors inform regional policy drivers which are at once concerned with generating a vibrant, competitive economy and fostering sustainable development. While regional policy displays an ambition to integrate the two objectives, trade-offs can be seen in practice and hold implications for the sustainability agenda.

Energy policy in Wales remains decentralised to UK level but Welsh government has been proactive in pursing sustainability in areas of devolved competence; attempts at horizontal integration of policy aims have been a notable feature of such policy. The built environment is acknowledged as a vital part of a shift towards a more environmentally friendly region, with a relatively old housing stock the biggest single contributor its carbon footprint. Any transition to sustainability in South East Wales will need to address social and economic development and linkages in the area, which are characterised both by interdependence and inequality.

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Appendix 1: UK Climate and Energy Policy

Energy legislation			
Year	**Name**	**Description**	**Scale**
2012	Energy Bill 2012	Currently awaiting report stage in parliament, includes provisions for Green Deal, low carbon electricity and security of the energy supply	UK
2011	Energy Security and Green Economy Bill	To be introduced following Summer recess 2011. To include further details on the Green Deal, to introduce Energy Company Obligation (ECO) to replace CERT post 2012 and outline guidelines for private rental retrofitting	
	Carbon Plan 2011	Plan of action on climate change. Includes provisions for the Green Deal, GIB, electricity market reform	
	Heat and Energy Saving strategy	Consultation finished in May 2011. Sets out aim for emissions from existing buildings to be approaching zero by 2050.	
	Local transport white paper: creating growth, cutting carbon	Published January 2011. Announces new funding structure for transport, emphasises initiatives for modal shifts	
	Electricity Market Reform white paper 2011	Sets out key measures to attract investment and create a secure mix of electricity sources. Key elements include carbon price floor, long term contracts	
	UK Renewable Energy Roadmap 2011	Comprehensive action plan to accelerate deployment and use of renewable energy sources	
	National Energy Efficiency Plan and Savings Plan	Published 2011. Focuses on actions and intended actions of WG to support sustainability	
	Energy Bill 2010-11	Has received first and second readings and is at report stage. Will include provisions for the Green Deal, ECOs and smart meter rollout	
2010	Energy Act 2010	Provides a framework for supporting elements of the Low Carbon Transition Plan. Includes provisions for CCS incentives and market and social fairness	
	Fuel Poverty Strategy	Published 2010 to replace Fuel Poverty Commitment for Wales (2001). Includes HEES, referral network	Wales
	Wales Climate Change Strategy	Published October 2010. Sets out policies and programmes to reduce GHGs by 3% a year in areas of devolved competence	
	A Low Carbon Revolution: Wales Energy Statement	Published in March 2010, framework for increasing energy efficiency and low carbon energy sources, links low carbon agenda to wider economic and social sustainability	
2009	Low Carbon Transition Plan	Plan to meet emissions reductions target from Climate Change Act 2008. Includes provisions for	UK

	2009	governmental carbon budgets, renewable energy, PAYS and demonstration projects	
	One Wales, One Planet	Launched May 2009, overarching sustainable development strategy	Wales
	Green Jobs Strategy	Published July 2009. Strategy to support greening of existing jobs and stimulation of green economy to create new jobs	
	Bioenergy Action Plan for Wales	Consultation held in 2009. Actions identified being addressed by WAG, SECC and local authorities	
	UK Renewable Energy Strategy	Published June 2009. Strategy to meet EU target of 20% energy from renewable sources	UK
2008	Energy Act 2008	Provides a legislation framework for underpinning energy and climate change strategies. Includes provisions for FiT, smart metering and RHI	
	Climate Change Act 2008	Introduced world's first long-term legally binding framework for tackling climate change. Key provisions included a legally binding emissions reductions target of 80% by 2050 and 34% by 2020, carbon budgeting, creation of the CCC	
Energy programmes/schemes			
Year	**Name**	**Description**	**Scale**
2014	Smart meter roll out	Proposed obligation on energy suppliers to roll out smart meter to all UK homes over 2014-2019	UK
-	Welsh Housing Quality Standard (WHQS)	Standard to which all social landlords must bring all their properties by the end of 2012	Wales
2011	Renewable Heat Incentive (RHI)	Announced in March 2011, financial support scheme for renewable heat. To work alongside FiT and RO	UK
	Nyth/Nest	Launched April 2011, all-Wales scheme to combat fuel poverty, targets means tested households	Wales
	Warm Front		England
	Green Investment Bank	Spring 2011 Budget committed £3million in funding for GIB to provide finance for low carbon growth with borrowing powers from 2015-16	UK
2010	Feed in tariffs (FiT)	Introduced in April 2010 under powers in the Energy Act 2008. Grant scheme to support small-scale investment in low carbon energy generation. To work alongside RO and RHI	
	EU Energy Performance of Buildings Directive	Established 2002, amended 2010. Contains provisions for DECs, EPCS and definition of low carbon buildings	EU
	Decent Homes Standard	Standard to which all social landlords must bring all their properties by the end of 2010	England
2009	Community Energy Saving Programme (CESP)	Started September 2009, first live scheme commenced in January 2010. Targets areas of low income, provides financial support improved energy efficiency according to community based, whole house approach. Funded by obligation on suppliers	UK

	Arbed 1 and 2	Established 2009. Wales' strategy energy performance investment programme/ Phase 1 (2010/11) involved energy efficiency projects in social housing. Phase 2 will incorporate private and public sector housing	Wales
2008	Carbon Emissions Reduction Target (CERT)	Requires all domestic energy suppliers to make savings in carbon emitted by householders. The supplier obligation phase of CERT was launched in 2008, intended to run until December 2012	UK
	Display Energy Certificates (DECs)	Since 2008 public building in the UK over 1000m^2 must display a DEC reporting actual energy usage	
	Energy Performance Certificates (EPCs)	As of 2008, required whenever a building is built, sold or rented out, provides an energy efficiency rating	
2007	Code for Sustainable Homes	Established 2007, sets minimum performance standards for the design and construction of homes covering energy, waste, materials and water	
	CRC Efficiency scheme	Announced in Energy White Paper 2007, launched April 2010. Mandatory scheme aimed at large public and private sector organisations	
2006	Climate Change programme	First released in 2000, updated in 2006. Sets out policies and priorities for action.	
2002	Energy Efficiency Commitment (EEC)	Introduced 2002, requiring energy supplier to assist the implementation of home energy efficiency improvements. Second phase 2005-2008.	
2005	EU Emissions Trading Scheme	Started in 2005, a Europe wide cap and trade scheme.	EU
2002	Renewables Obligation (RO)	Replaced the Non Fossil Fuel Obligation in 2002, subject to consultation and amendment regularly since. Places an obligation on electricity suppliers to source an increasing proportion of electricity from renewable sources	UK
2001	Climate Change Levy (CCL)	Introduced in April 2001. A tax on the use of energy in industry, commerce and the public sector. Climate Change Agreements (CCA) give special dispensation for certain industries	
2000	UK Climate Change Programme	Published in 2000 following the 1997 Kyoto Protocol. Included a target carbon reduction of 20% by 2010 and provisions for the CCL and building regulations	
1989	Non fossil fuel obligation (NFFO)	Established under the Electricity Act 1989. Originally intended to support nuclear electricity generation, expanded in 1990 to include renewables	Wales and England
Planning			
2013	Building regulations	Will devolve to Wales in December 2011. Aims for consultation in 2012 and implementation in 2013	Wales
2010	Community Infrastructure Levy	Came into effect April 2010. New charging structure to require developers to contribute to local infrastructure	UK
2008	Planning Act 2008	Introduced the Infrastructure Planning Commission for nationally significant infrastructure projects	

		and the community infrastructure levy	
	Planning and Energy Act 2008	Came into force November 2008. Allows local authorities to require a proportion of renewable or low carbon energy to be generated for new developments	
2007	Planning policy statement 1	Published December 2007. Supplement that provides government guidance on planning policy and climate change. Discusses targets and evidence for low carbon development in local authorities	
-	Technical advisory notes 8, 12, 18 and 22	Provides advice on renewable energy provision, good design including environmental sustainability, design, transport planning and sustainable building respectively	
2000	Home Energy Efficiency Scheme (HEES Wales)	In operation since November 2000, WAG's primary vehicles for meeting fuel strategy commitments, grants directed a low-income households	Wales

Appendix 2: Climate and Energy Research Projects in or near South East Wales

Name	Organisation	Description	Website
Targeting energy efficiency resources in Wales	Centre for Sustainable Energy	Mapping fuel poverty, hard to treat housing and HEES grant take-up	http://www.energyefficiencywales.org.uk/
Delivering Renewable Energy Under Devolution	CPLAN, Cardiff University	Assessing the impacts of devolution in the UK on the provision of renewable energy	http://www.cardiff.ac.uk/cplan/research/renewableenergy/
Wales' ecological footprint – scenarios to 2020	Stockholm Environment Institute	Modelling ecological footprint of Wales based on 2003 data	http://wales.gov.uk/docs/desh/publications/110413walesecofootprintscenarios2020.pdf
Reducing emissions through behaviour change – scoping pilot programmes in Wales	Brook Lyndhurst and Energy Saving Trust	Exploring reducing emissions through behaviour change, including providing advice to the Welsh Assembly Government and households	http://www.brooklyndhurst.co.uk/reducing-emissions-through-behavioural-change---scoping-pilot-programmes-in-wales-_152.html
Refit West	Forum for the Future	Modelling energy efficiency retrofit in private homes, using case study of Bristol	http://www.forumforthefuture.org/project/refit-west/overview