



Low Carbon Research – South West England 2010

ConstructionSkills

ConstructionSkills Research



Executive Summary: Low Carbon Research – South West Region

This research was commissioned by the South West Region Employment and Skills Board (SWRESB) to develop a view on what the implications are for the region in responding to the Low Carbon challenge. Given the backdrop of emerging policy, understanding and responding to the impact that the low carbon agenda could have was clearly identified as a specific cluster area in the White Paper, New Industry, New Jobs¹.

This report looks to develop the UK view taken in the Low Carbon Cluster² report and place it in context for the SW region of England, with a focus on the implications for the built environment. As new policy direction has emerged, the report started by reviewing the current situation, both from a UK policy and SW Regional view, discussing how low carbon is influencing the built environment in terms of output, employment and skills. The report then developed what ConstructionSkills sees as the most likely core scenario for how this will unfold for the built environment, covering both the medium term from 2010-2015 and then longer term from 2016-2020.

Even with the emerging policy that is centred around decarbonisation of buildings, there were a number of main conclusions that can be drawn from this report.

Firstly, in developing the core scenario the future scale of the impact that addressing carbon emissions in buildings is clearly evident. Under the core scenario work related to decarbonising buildings is likely to account for over 40% of construction output in the South West by 2020. However it is also evident that low carbon related work will become the accepted norm as buildings are constructed to increasingly stringent Building Regulations that have energy efficiency as an integral part.

As the South West has a relatively larger share of both new housing and housing repair and maintenance (R&M) work compared to the UK average, decarbonising houses will be an important driver of work in the South West. While the Code for Sustainable Homes gives a good indication of the direction for low carbon new housing, the lack of a comparable benchmark for upgrading existing homes, particularly for private owners, will have implications for housing R&M work.

There will be a number of challenges that will need to be overcome and improving the energy efficiency of existing housing stock, particularly that of private homeowners, will be a key area to address. The national government will be looking to use initiatives such as Green Deal to support and encourage this; however additional support from local authorities could also assist.

When it comes to employment and skills, low carbon measures will impact the whole range of construction occupations. By 2020, if there is a rapid uptake of low carbon measures, this could affect the skills and or knowledge of around two thirds of the workforce.

There will be key occupations where there will be a significant skills impact, whereas for other the impact will be less. Occupations that are expected to show a significant impact are the likes of;

- Architects – who will have to incorporate low carbon measures into the design of structures
- Construction Managers – who will have to understand and monitor the build process to ensure optimum energy efficiency

¹ New Industry, New Jobs (2009) Department for Business, Innovation and Skills

² Low Carbon Cluster (2009), UKCES

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- Insulation Installers – solid wall insulation, either internal or external, will be part of the energy efficiency mix for upgrading existing buildings
- Electricians – installation of solar photovoltaic systems
- Plumbers – installation of solar hot water and heat pump systems
- Building Services Engineers – improvements in energy efficiency for non-housing structures

With the range of energy efficiency options that are available, the occupations likely to be involved with them can be identified, and this analysis highlights that these occupations do form a small percentage of the overall workforce. However it will be critical to understand how the skills required for these occupations will be affected. The current view is that for some it will be more about additional knowledge rather than completely new skills, while for others it will be more about new skills. Examples here are;

- Solar installation – core skills will be existing plumbing and/or electrical skills with a top up to meet Microgeneration Certification Scheme standards.
- Insulation Installation – increasing use of solid wall insulation has already been identified as an area for qualification development.

Despite the fact that policy is evolving in this area, it is clear that decisions both at national government and local authority levels over the next few years will establish the foundations for success in reducing the carbon emissions from buildings. It is also clear that addressing the low carbon challenge while effecting large segments of the construction workforce, will have a more significant impact on a relatively small range of occupations. For the South West this highlights the need for a more accurate, defined picture for these occupations; however any analysis would also require a more defined view of future low carbon investment, which is not readily available at this point in time.

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1 – Introduction

This research was commissioned by the South West Region Employment and Skills Board (SWRESB) to develop a view on what the implications are for the region in responding to the Low Carbon challenge. Under the previous government the South West (SW) of England was the first area of the UK to be designated as a low carbon economic area³, recognising the regions expertise around marine energy development, engineering and research, and the contribution that this could make as part of the wider Low Carbon Industrial Strategy⁴.

Given the backdrop of emerging policy, understanding and responding to the impact that the low carbon agenda could have was clearly identified as a specific cluster area in the White Paper, New Industry, New Jobs⁵. To inform government plans, the UK Commission for Employment and Skills (UKCES) commissioned the Low Carbon Cluster Sector Skills Assessment Report⁶, which combined the views of 11 Sector Skills Councils (SSCs) covering four areas that currently represent significant sources of carbon generation. The four areas are:

- Power industry
- Industry
- Transport
- **Built environment**

This report looks to develop the UK view taken in the Low Carbon Cluster report and place it in context for the SW region of England. As relevant SSCs led and contributed to different areas, the report will therefore focus on the implications for the built environment, as this is the area specific to ConstructionSkills.

One very important point to note from the outset is that although the strategic aims around reducing carbon emissions are widely recognised and set out in the Climate Change Act (2008), the challenges in responding to this are being developed through documents such as the Low Carbon Industrial Strategy and the Low Carbon Cluster report. This means that some aspects of policy are really a work in progress at the moment, which makes it challenging to give a precise view on future initiatives at this point in time. While there is a shared view on the aims and challenges that will be faced, the new coalition government may implement changes in policy that could effect how responses are shaped.

From a Sector Skills Council (SSC) point of view, understanding the impact of low carbon policy and how measures will influence employment and skills is an area of intense focus at this moment. However emerging details will have a significant effect upon this aspect and play a key part in shaping future employment and skills.

In order to take account of these recent changes, the report will start off by reviewing the current situation, both from a UK policy and SW Regional view, discussing how low carbon is influencing the built environment in terms of output, employment and skills. The report will then take a view of the low carbon challenge facing the built environment, outlining current indications on policy and initiatives, before developing what ConstructionSkills sees as the most likely core scenario for how this will unfold. The core

³ South West RDA:

http://www.southwestrda.org.uk/working_for_the_region/working_for_the_environment/low_carbon_economy/low_carbon_in_dustrial_strategy.aspx

⁴ Low Carbon Industrial Strategy (2009), HM Government

⁵ New Industry, New Jobs (2009) Department for Business, Innovation and Skills

⁶ Low Carbon Cluster (2009), UKCES

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scenario will cover two periods for the built environment, medium term from 2010-2015 and then longer term from 2016-2020.

Following on from the core scenario the report will look at the gap analysis between the output, employment and skills issues identified in the core scenario against those outlined in the current situation. The conclusions drawn from this are intended to inform thinking and influence decisions that will need to be taken by SWRESB in order to ensure that the region is best placed to take advantage of the opportunities that may lie ahead.

While the report will focus on the low carbon aspects in relation to reducing carbon emissions from buildings identified in the cluster report, there are elements of construction work that will not be covered, for example infrastructure work. Infrastructure work will be very relevant to South West employment and skills as there are some significant projects planned, such as Hinkley Point nuclear power station.

The construction of a nuclear power station will result in low carbon energy generation; however the skills required during the construction phase are essentially civil engineering related. These skills are unlikely to be influenced to the same extent as skills required to reduce carbon emissions from buildings, which will require newer techniques specific to low carbon measures being applied.

For the South West, the proposed nuclear new build programme will have a significant impact upon employment, however for the purposes of the report and to ensure comparability with the Low Carbon Cluster report, infrastructure related work was viewed as being out-of-scope.

2 - Current Situation

As mentioned in the introduction, this area is essentially a work in progress at the moment with different bodies working on different aspects such as;

- Zero Carbon Hub; new housing
- Energy Efficiency Partnership for Homes; energy efficiency in homes
- Low Carbon Construction Innovation and Growth Team, due to report end of 2010
- UK Green Building Council, sustainability in the built environment
- Sector Skills Councils, employment and skills aspects

Over the course of this year and into next year will therefore be crucial years in shaping the future direction of low carbon policy and details that emerge from the range of work that is being carried out could therefore have a strong bearing.

However bearing this in mind, this section will briefly review the main low carbon policy drivers that are influencing the built environment at the moment before going on to outline how this is reflected in construction output, employment and skills in the SW.

(i) Main low carbon policy drivers

The Low Carbon Cluster report clearly sets out the main national and international policy drivers around this area, namely the Kyoto Protocol and Climate Change Act (2008)⁷. These set legally binding targets to reduce greenhouse gas emissions, with carbon dioxide being one of the main contributory emissions.

Meeting the greenhouse gas emissions reduction targets requires a;

- 26% reduction by 2020, and a,
- 80% reduction by 2050

(Note: reduction % is relative to 1990 base year)

This means that the UK has to reduce carbon emissions from its main contributory sources, of which construction and the built environment is one.

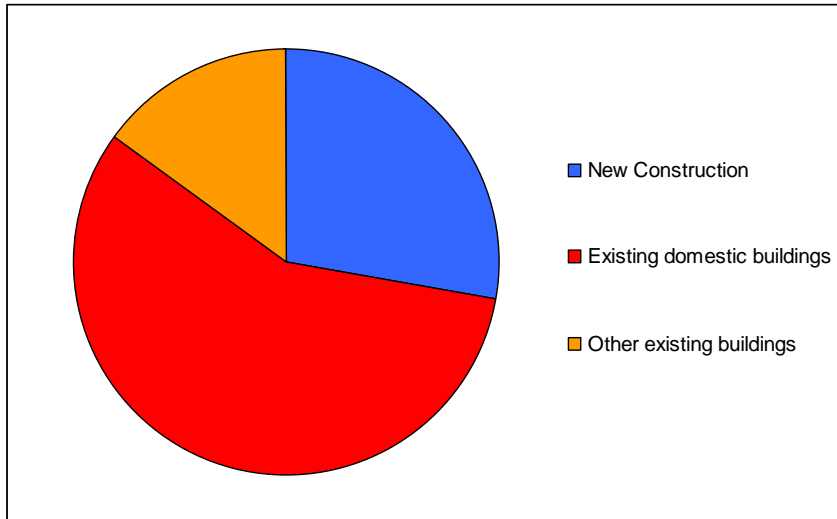
With heating and power used in buildings, the built environment is currently responsible for around 47% of all UK carbon emissions⁸. Measures to improve the energy efficiency of buildings while incorporating low carbon/renewable power systems will therefore play a major role in being able to reduce emissions. However tackling the emissions from new construction alone is unlikely to give the required reduction as Chart 1 shows that existing buildings, both domestic and non-domestic are the main source of current carbon emissions.

The importance of tackling emissions for existing domestic buildings is further emphasised by the report noting that *“80% of the homes that will be standing in 2050 have already been built”* (Low Carbon Cluster, pg54).

⁷ Low Carbon Cluster Sector Skills Assessment Report (2009), UKCES

⁸ Low Carbon Cluster Sector Skills Assessment Report (2009), UKCES

Chart 1 – Source of carbon emissions from UK construction industry



Source: Low Carbon Cluster (2009)

In response to these national and international policy drivers, strategies have been implemented to improve the energy efficiency of new buildings, while also tackling the energy efficiency of existing structures. The main government strategies that are relevant to the SW region are outlined in Table 1 below (*note: these strategies apply to England. Different strategies and targets can apply in Scotland or Wales.*)

Table 1 – Main government strategies for addressing energy efficiency

Strategies	Details
Building Regulations, Part L	Changes to part L (energy efficiency) come into effect October this year. Will be further reviewed in 2013 and 2016, in line with energy requirement of Code for Sustainable Homes.
Energy Performance Certificates (EPC)	Part of the Home Information Packs (HIPs) and although the requirement for HIPs has been removed, EPC is still required for properties to be sold or rented.
Decent Homes Standard	Aim by 2010 that 95% of social housing will meet the standard of being warm and weatherproof with modern facilities.
Warm Front	Providing packages of insulation and heating improvements
Carbon Emissions Reduction Target (CERT)	This has now been extended to December 2012. Initiative means that 68% of the work must be met through professionally installed loft, cavity and solid wall insulation with the inclusion of DIY. Now 80% of the obligation will now be met through improved insulation and 15% of homes helped will be in the lowest income households more at risk of fuel poverty.
Community Energy Saving Programme (CESP)	Originally introduced under the Home Energy Management strategy to replace the obligation on energy suppliers when CERT ended. Does not appear to be part of the Green Deal and CERT has now been extended until Dec 2012
Feed in Tariffs (FITs)	April 2010. Generate income for each kW of energy you use in property plus additional payment for each kW generated and sold back to the National Grid
Household Energy Management	Aims - where practical, all homes to have loft and cavity wall insulation by 2015. By 2020, 7 million homes to have received a form of eco-upgrade such as solid wall insulation or micro renewable installation.

In addition to government strategies, work is also being progressed by the likes of the UK Green Building Council, Energy Saving Trust, BRE, ConstructionSkills and the Zero Carbon Hub to ensure that the construction industry is aware of the challenges being posed, and how to respond appropriately.

There is also scope for local authorities to have a direct influence by setting standards higher than the minimum levels for England, which highlights the importance of understanding both the national and local context.

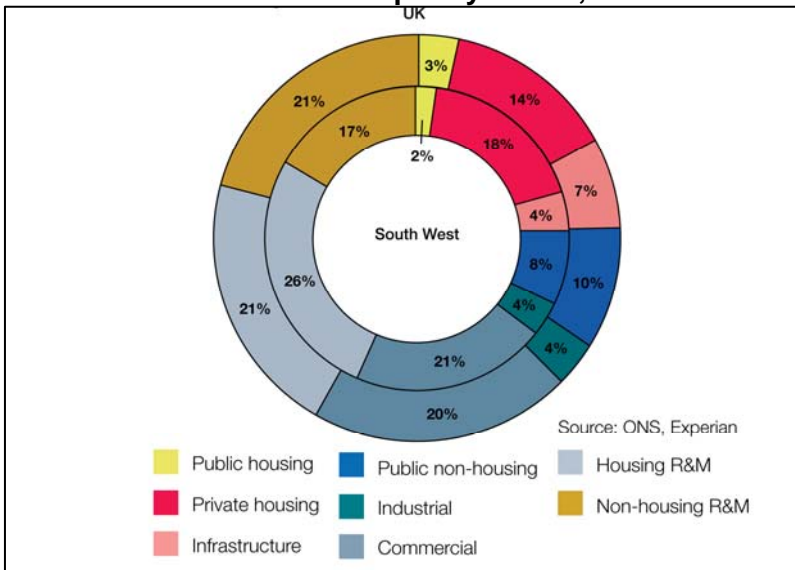
What is common though is that the current focus is mainly on improving existing domestic buildings through measures such as loft insulation, cavity wall insulation and double glazing. The Decent Homes and Warm Front initiatives have been progressing for a number of years; however more recent initiatives such as CERT and Feed in Tariffs clearly support the overarching Household Energy Management strategy. Earlier initiatives such as Decent Homes and Warm Front have delivered improvements using loft insulation, cavity wall insulation and draught proofing, while the and more recent strategies look to continue and extend this by using solid wall insulation and micro renewable power sources. The general view at the moment is that any strategies or initiatives used should address issues with the fabric of the building, improving the energy efficiency as far as practicable, before moving on approaches that look to generate low carbon heat or power.

(ii) Low carbon construction output

Construction output figures are produced at regular intervals by the Office for National Statistics and give a time series for the value of construction work being undertaken. The detail can be examined across the different sectors that make up the construction industry and the work of the Construction Skills Network (CSN) also provides a regional view of output across England.

Chart 2 below shows how the sectors for construction output in the South West compare to the UK and while there are some broad similarities, there are some noticeable differences. Private housing and Housing repair & maintenance (R&M) work account for slightly more work in the South West, while Non-housing R&M and Infrastructure work in the past has accounted for less work.

Chart 2: % Construction output by sector, South West v UK (2008)



Source: Construction Skills Network, 2010

This emphasises the potential importance that low carbon housing, both new build and R&M could have in the SW region, although it is difficult to isolate specific low carbon related work from official sectoral data as it is not captured or categorised in this way.

Using the details available from policy statements and supplementary research it is possible to outline what the current situation appears to be for each of the areas identified.

New housing (public and private)

With the time taken for planning and developments to start there will still be new housing developments carried out that do not have to meet the Code Levels, however this will quickly change as the standard for new builds from 2013 is Code Level 4. In a short space of time low carbon new housing will become the norm for both the public and private housing sectors.

Housing R&M

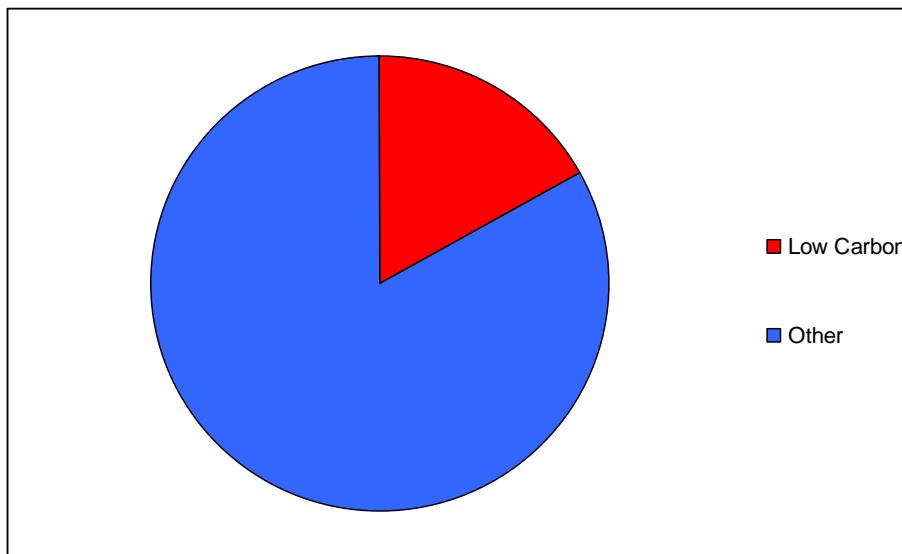
Various estimates have been made about the current low carbon market in housing R&M work. At a UK level, indications^{9, 10} are that it accounts for around 20% - 25% of work, although there appears to be a lack of detail at regional level.

Non-housing, new build and R&M (commercial, industrial and public non-housing)

For these sectors there does not appear to be data available at this moment in time that gives a view as to low carbon related work, however Building Regulations do apply and as such new buildings and major refurbishments will have to conform to increasingly stringent guides for energy efficiency. There is also the EU's Energy Performance in Buildings Directive that will impact upon these sectors.

This does give a mixed view as to how much of the South West's construction output could be considered as low carbon at this point in time. However working from the details that have been outlined and making some assumptions for output allows a view of the current situation to be taken. Chart 3 shows an estimate of the impact that low carbon related work is having on output value for the SW, accounting for around 19% of current output value.

Chart 3: Estimated current value of low carbon work in the South West, 2010



Source: Construction Skills Network, 2010

⁹ UK Green Building Council (2008)

¹⁰ Experian (2010)

The assumptions that were made are that:

- New public housing – 100% low carbon
- New private housing – 30% low carbon at the moment
- Housing R&M – 25% low carbon related
- Non-housing new build – less than 10% low carbon
- Non-housing R&M – less than 10% low carbon

(iii) Low carbon employment and skills

Before covering the current situation with regard to employment and skills it would help to define what we view each of these terms to mean.

By employment we are considering data derived from the ONS's Standard Occupational Classifications, which was developed to give a common classification of occupational information. However, definitions may not always coincide with a specific job, especially as new jobs and occupations emerge with changing skill needs.

For skills, the measure we use here is that of formally accredited training and education, such as a NVQ, VRQ, Diploma, HNC/HND or Degree. As with employment, these may not always coincide with a specific job, however a formal qualification relating to skill can be used to take a view on the overall skill profile of the workforce.

Having defined what we are using as a measure of employment and skill, it should also be pointed out that as with construction output, it is very rare to find employment and skills that can be readily identified and linked to low carbon. The notion of a low carbon job or skill for the built environment is a relatively new addition, although as the industry comes to terms with what is required, that may change. The Low Carbon Cluster report makes the point that for existing occupations it may be a case of new knowledge rather than completely new skills that will be required, while going to note that it is problematic to define the current situation as it is evolving.

However, given the type of work being carried out at the moment, it is possible to give a view on relevant occupations. Table 2 gives an indication of the occupations that are mainly involved with the main low carbon measures being taken at the moment, such as insulation measures and micro-renewables. However the impact would also be felt at the design and planning stage for the likes of architects and planners, both at professional and technical levels. Plans and designs for developments would need to take into account relevant changes in building regulations as well as incorporating adaptations to build methods for improved energy efficiency.

Low carbon strategies would then impact on the skilled occupations that would install the measures, either as part of a new build or retro-fit to an existing building. Examples of this would be plumbers and HVAC engineers installing solar hot water heat pump systems, electricians and/or roofers installing solar photovoltaic systems, and insulation operatives installing solid wall insulation systems.

There is then the impact upon aftercare as checks would have to be carried out to ensure that the system is operating efficiently, and with the likes of solar thermal or photovoltaic systems some form of regular maintenance would be recommended.

There would also be a more general impact across the full range of occupations that would be involved in the build process. With more attention having to be paid to aspects such as the energy efficiency and air tightness of buildings, as all occupations involved in the fabric of the structure would have to be aware of how their activities relate to this.

Table 2 – Low carbon; relevant occupations

Occupation	Low carbon elements
<p>Design and Planning Town planner Architect Chartered surveyor Civil engineer Domestic Energy Assessors Home Energy Advisors Environment professionals Environmental assessment engineers Quantity surveyor Civil and structural engineers Architectural and town planning technicians Architectural technologists Landscape designers</p>	<p>Main skills will be around compliance with regulations and how to incorporate low carbon approaches into the design phase of buildings. For example designing the fabric to ensure maximum energy efficiency or maximising solar potential by considering location and aspect of a building.</p>
<p>Installation of Measures Electricians and electrical contractors Electrical engineers Solar energy installation Gas engineers Gas installers Plumbers & HVAC Pipework contractors Cavity wall insulation installers Loft insulation Floor insulation Draft proofing installers Solid wall insulation installers – internal Solid wall insulation installers – external Roofers Project/Construction managers Glaziers – double/triple glazing Mechanical Engineers Building Services Engineer Domestic Heat Installer Engineering technicians Scaffolding Technicians to test and commission installed systems</p>	<p>Skills here will obviously vary with the specific measure that will be installed.</p> <p>Although qualifications are being developed and introduced, existing qualifications are also adapting to low carbon challenges, for example Roofing Occupation NVQs now include an optional module to cover the installation of solar panels while the installation of internal and external solid wall insulation are unit modules within the Build Treatments NVQ.</p> <p>Specific manufacturer training is also carried out and an example here is for the different external solid wall insulation systems that can be used. Systems are slightly different and installation is usually carried out by approved installers.</p>
<p>Aftercare Technicians to inspect and service installed systems Energy advice Energy auditing Building Control</p>	<p>Checks to ensure that systems have been installed and are operating efficiently. Continued energy support to customer/client</p>

By using the list of occupations from Table 2 with the output assumptions made for Chart 3, and the data that underpins the Construction Skills Network model, an estimate of employment numbers relating to low carbon can be made. The first stage is to link the occupations on Table 2 to the 26 CSN occupational groups and once this is done it can then be related to the output for each sector.

Note: In making this estimate of employment numbers there is a degree of employment mobility across sectors that is very difficult to model, for example an architect or surveyor could be working across the full range of sectors while someone with brickworking skills is more likely to be involved in housebuilding.

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Table 3 below shows where the identified occupations would appear in the CSN Occupational groups

Table 3: Identified occupations to CSN Occupational Groups

Occupation	CSN Occupational Group
Design and Planning	
Town planner	Other construction professionals and technical staff
Architect	Architect
Chartered surveyor	Surveyors
Civil engineer	Civil engineers
Domestic Energy Assessors	Professionals
Home Energy Advisors	Professionals
Environment professionals	Professionals
Environmental assessment engineers	Professionals
Quantity surveyor	Surveyors
Civil and structural engineers	Civil engineers
Architectural and town planning technicians	Other construction professionals and technical staff
Architectural technologists	Other construction professionals and technical staff
Landscape designers	Other construction professionals and technical staff
Installation of Measures	
Electricians and electrical contractors	Electrical trades and installation
Electrical engineers	Electrical trades and installation
Solar energy installation	Electrical trades and installation
Gas engineers	Plumbing and HVAC trades
Gas installers	Plumbing and HVAC trades
Plumbers	Plumbing and HVAC trades
Pipework contractors	Plumbing and HVAC trades
Cavity wall insulation installers	Specialist building operatives nec*
Loft insulation	Specialist building operatives nec*
Floor insulation	Specialist building operatives nec*
Draft proofing installers	Specialist building operatives nec*
Solid wall insulation installers – internal	Specialist building operatives nec*
Solid wall insulation installers – external	Specialist building operatives nec*
Roofers	Roofers
Project/Construction managers	Construction managers
Glaziers – double/triple glazing	Glaziers
Mechanical Engineers	SummitSkills
Building Services Engineer	SummitSkills
Domestic Heat Installer	Plumbing and HVAC trades
Engineering technicians	Other construction professionals and technical staff
Scaffolding	Scaffolders

Source: *Construction Skills Network, 2010*

Note: ConstructionSkills is one of a number of Sector Skills Councils (SSCs) involved in the built environment. For electrical, plumbing, HVAC and building services, Summit Skills have responsibility, while for energy assessors and facilities management Asset Skills have responsibility. Although the CSN figures do include elements of these occupations in its figures, we acknowledge that Summit Skills and Asset Skills are the SSCs for these areas.

For a number of occupations there is a clear link while for others there are a number of different occupations that link to the same group. This is slightly complicated by the fact that there are also some additional occupations that come under the same group, for example specialist building operative nec* would also cover the likes of maintenance workers and demolition workers along with insulation installers. Therefore within these groups we have used additional research¹¹ to estimate the relevant percentage within them.

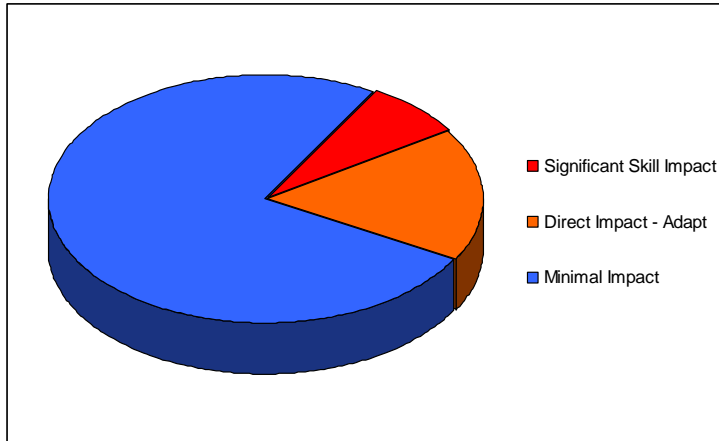
¹¹ Employment by Occupation (2005), ConstructionSkills

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By taking assumptions on the output related to the occupational breakdown for employment developed by the CSN we are able to estimate;

1. The percentage of the current workforce that is directly related to low carbon. This will be the occupations listed on Tables 2 & 3 working in the sectors outlined in section 2 (ii). Significant skill impact
2. The percentage of the current workforce that is involved in low carbon related work, for example a carpenter or bricklayer working on a new housing development. Direct impact - adapt
3. The percentage of the current workforce whose work is not impacted at this point in time. Minimal impact.

Chart 4: Low Carbon Skills Impact - South West workforce, 2010.



Source: *Construction Skills Network, 2010*

The significant skill impact for the identified occupations represents just under 8% of the current workforce, while the direct impact accounts for an additional 17%, giving a total figure of a quarter of the current workforce with work that can be related back to de-carbonising of buildings.

3 - Low Carbon Challenge

The previous section outlined the current situation along with the nature of emerging policy, and this section looks forward to outline how the main policy drivers are likely to shape the low carbon agenda. As mentioned before, although the main national and international reasons for progressing a low carbon agenda have remained the same, the political landscape of the UK and England in particular has changed since the Low Carbon Cluster report was published. The new government is reviewing strategy, and is likely to continue to do so in the short term, therefore policy in this area will evolve and possibly change from previous thinking.

(i) Policy

The main challenge here will be how future policy is set to evolve, and the direction that the new government will implement. Future policy around low carbon for the built environment is an area that ConstructionSkills' Future Skills Unit has been actively involved in and the table below reflects current thoughts as of July 2010.

Table 4 – Low carbon strategies for the built environment

Strategies	Details
Building Regulations Part L	Will be reviewed in line with energy requirement of Code for Sustainable Homes. 2013 all new homes to meet Code 4 2016 all new homes to meet Code 6
Public Sector Housing	2010 new public sector housing to Code 4 2013 new public sector housing to Code 6
Smart Meters	To be installed in all homes by 2020
Green Deal	Mentioned in the Energy Bill 2010, however details still to be finalised. Similar to previous administration's Household Energy Management strategy in promoting energy efficiency. Delivery likely to be different as Green Deal looks to give householders access to finance to make energy efficiency improvements.
Non-housing new build	Objectives from previous administration were: 2015 – new NHS Buildings to be Zero Carbon 2016 – new schools to be Zero Carbon 2019 – new public non-housing to all be Zero Carbon
Renewable Heat Incentive	Complements the Feed in Tariff by encouraging homeowners to install systems that generate heating, as opposed to electricity, from renewable sources, for example solar hot water or biomass systems. Due to be implemented from April 2011, tariff levels yet to be established.

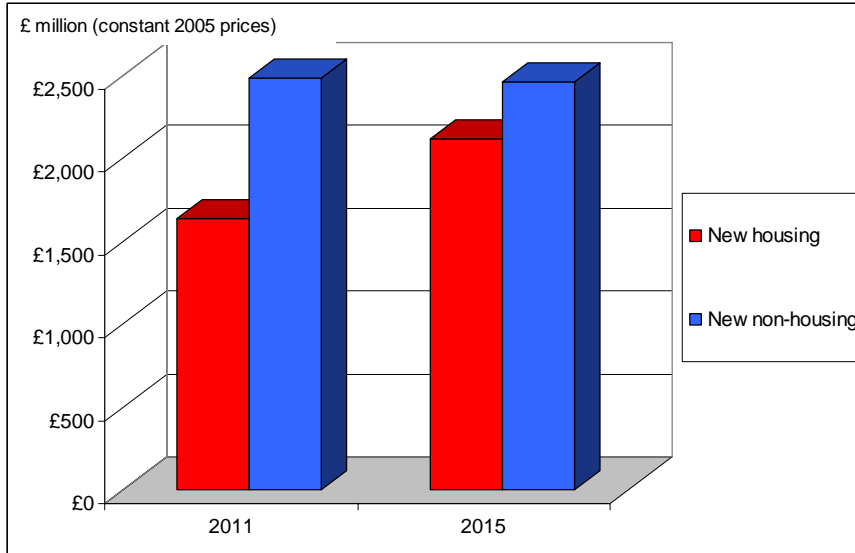
In addition to these strategies the government is also looking to establish a Green Investment Bank to provide funding for major low carbon investments such as offshore wind farms, though again the detailed funding of how this is to be achieved is not clear.

From looking at the list outlined in Table 4 it is evident that there are strategies that look to tackle the new build along with the repair and maintenance aspects of housing stock, and Chart 1 showed that existing housing was the main contributor of carbon emissions for the built environment.

As noted earlier, housing is an important sector for the region and Chart 5 shows the relative values of output for new build housing and non-housing in the South West

forecast for 2011 and 2015. While the total value of housing work is less than non-housing, it is forecast to rise between 2011 and 2015, while non-housing work is expected to reduce very slightly over the same period. This shows that new housing build will become more important for the SW region and understanding how the low carbon strategies will impact upon this sector are likely to be a key area.

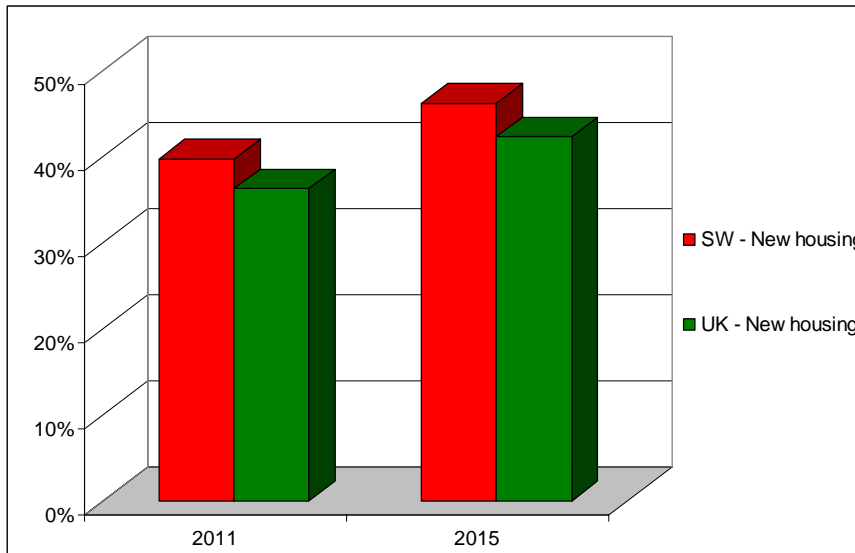
Chart 5: Relative output values for new build, 2011 - 2015



Source: Construction Skills Network, 2010

When compared to the UK housing output in the SW is still forecasted to make up a larger percentage of overall new work from 2011 to 2015, ref. Chart 6 below.

Chart 6: Housing output as a % of new work, SW v UK 2011 - 2015



Source: Construction Skills Network, 2010

However, as Chart 5 shows, non-housing work will continue to be a significant part of output in the South West. Although there is less certainty around measures to tackle carbon emissions from non-housing buildings at this point in time, emerging strategies

could have an important impact upon new build work and will need to be monitored closely, such as the European Union Energy Performance of Buildings Directive¹².

(ii) Construction output

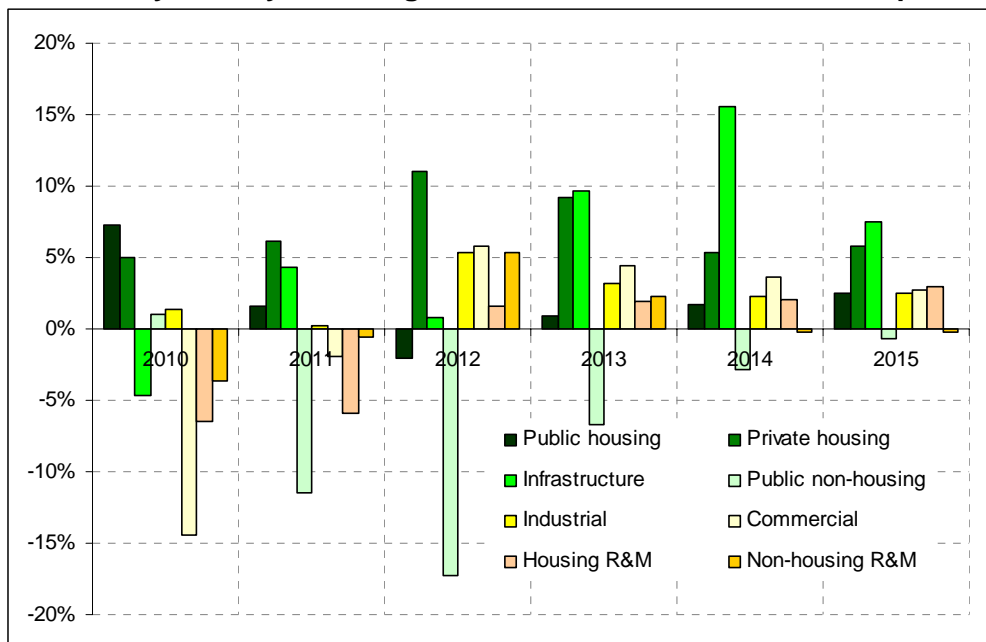
For construction output the main challenge will be trying to understand how much of output is driven by low carbon related work and how much is not.

Through the work of the Construction Skills Network (CSN), ConstructionSkills, in partnership with Experian, produce forecasts of future construction output across the UK. In general construction output is linked to economic performance, though it is not a perfect relationship. Understanding this relationship and taking a view on planned work allows the CSN to produce rolling 5 year forecasts, with work currently being undertaken to prepare the 2011 - 2015 view. Initial forecasts through to 2015 for the South West, prepared before recent government announcements, showed that the region is set to have a lower level of construction output growth (1.6%) compared to the UK average (2.1%).

Chart 7 below gives a more detailed breakdown of construction output across the different sectors and in terms of low carbon related work, the main area looks to be new housing as the region looks to address underlying housing shortages.

With pressure on public finances, such as recent Building Schools for the Future announcements, the potential to carry out new low carbon related public non-housing work will be constrained, while it will also take time for both the commercial and industrial sectors time to recover.

Chart 7: % year on year changes in South West construction output



Source: Construction Skills Network, 2010

The repair and maintenance sectors are set to show low levels of growth, however the main issue here will be the extent to which low carbon measures are taken up and the key area will be take up by private users, both large scale and domestic.

¹² Energy Performance of Buildings Directive, European Union Directive 2010/31/EU

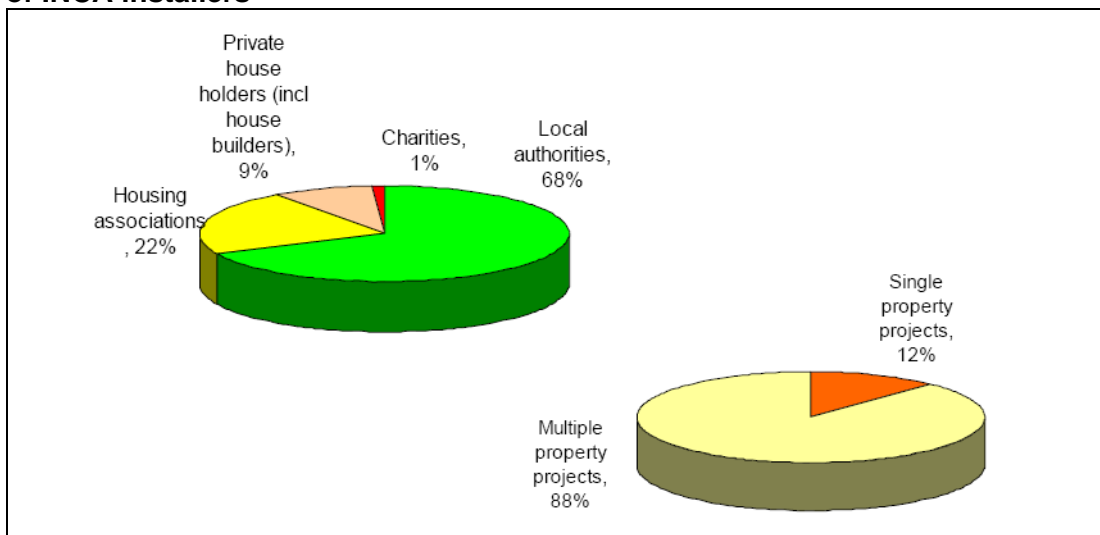
Although the detail for projections around the delivery of the previous government's Household Energy Management actions are likely to change under the newly proposed Green Deal, it is unlikely that the measures for reducing energy use in buildings will alter significantly. Therefore measures such as solid wall insulation, solar thermal and heat pumps will continue to play an important part in plans to retro-fit existing homes.

The Energy Saving Trust / Energy Efficiency Partnership for Homes¹³ commissioned a report in 2009 that looked at the supply chain for solid wall insulation. Estimates of work currently being carried out were similar to figures use in the HEM delivery plan¹⁴, however the HEM delivery plan projections by 2020 were for around;

- 1,000,000 external solid wall installations
- 2,300,000 solar thermal installations
- 120,000 air/ground source heat pumps

One of the findings that is very relevant to the repair and maintenance sector, and shows the scale of the task to be undertaken, was the breakdown of properties and clients that Insulated Rendering and Cladding Association (INCA) installers were working with, ref. Chart 8 below.

Chart 8: Breakdown on clients and properties for external wall insulation – survey of INCA installers



Source: Energy Saving Trust / Energy Efficiency Partnership for Homes, 2009

Although the survey was limited in size and applied to external wall insulation measures, it clearly shows that single property projects for private householders represented a small percentage of current work.

In order to tackle low carbon emissions from domestic buildings, installation of measures such as external wall insulation to existing domestic property will be needed and this will require engaging with single property, domestic clients, for whom costs will be a significant factor. Although factors such as energy prices and initiatives like Green Deal may be able to stimulate demand for private repair and maintenance activity, at the moment future uptake of low carbon repair and maintenance work is far from clear.

¹³ Solid Wall Insulation Supply Chain Review (2009), Energy Saving Trust / Energy Efficiency Partnership for Homes

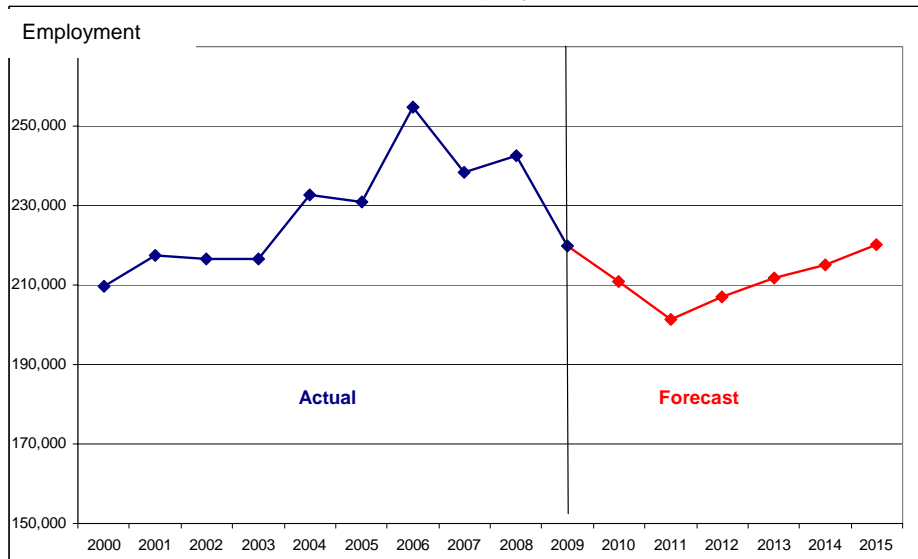
¹⁴ Household Energy Efficiency Delivery Model – Initial Assessment of Impacts (2009), Department of Energy and Climate Change

(iii) Employment and skills

Understanding the challenges around employment and more so skills, are possibly the most complex at the moment, although employment and skills will be intrinsically linked to the output that is required. As output is set to be lower than the UK average, employment growth in the South West region is also set to be lower, in fact through to 2015, only the North West of England is predicted to have a lower level of overall growth than the South West.

Having said that, current CSN forecasts do indicate that construction employment will rise through to 2015, although as Chart 9 shows below, employment by 2015 will be on a par with 2009 and less than peak employment during 2006.

Chart 9: South West construction employment forecast, 2000 - 2015



Source: Construction Skills Network, 2010

The challenge when trying to understand low carbon employment is making the link between an occupation and the work being carried out.

For some occupations this link might be quite clear, a Home Energy Advisor is a new occupation that can be directly linked to low carbon, the same could also be said of someone whose sole occupation was to install solid wall insulation. However, construction employment and the type of work being carried out often does not fall into the nice, neat categories that are used to understand what is quite a complex and fragmented industry.

Some solid wall insulation will be installed by specialist workers who do nothing else, while it may also be installed by the likes of a general builder who will carry out a range of work which would not be considered as low carbon. The same situation applies to the likes of electricians, plumbers, HVAC engineers and roofers where only part of their work might be classed as low carbon, and they would also be able to use their skills across the full range of industry sectors.

For similar reasons the skills challenge is also complex because the existing skills and qualification system has begun to adapt as the need for low carbon skills emerges. As with employment there are specific qualifications that can be identified and linked to low carbon, however qualifications are now being enhanced with low carbon elements which makes identifying and separating them from existing qualifications very difficult.

A search of the National Database of Accredited Qualifications¹⁵ for energy assessment returns ten specific qualifications for energy assessment such as:

- City and Guilds, L3 Diploma for Domestic Energy Assessors (500/1628/3)
- Awarding Body for the Built Environment, L4 Diploma in Non-Domestic Energy Assessment (500/3629/4)

with fourteen units being listed.

The same search for the keyword “solar” does not give any qualifications, while a unit search identifies two units that relate to installing solar collectors as optional parts of a roofing qualification. Searching for “wall insulation” yields two relevant qualifications, which have three optional units to cover cavity wall and external wall insulation.

This may at first seem to point to a weakness in the current skills system, however as the Low Carbon Cluster¹⁶ report points out, it is really a case of new knowledge rather than new skill. This applies to all levels of skills within the industry, from craft through to professionals, and to a substantial degree the existing skills are relevant for the work that is required. Also with the introduction of the Qualification and Curriculum Framework (QCF) for further education later this year the qualification system will become even more flexible with learners able to combine units in a more flexible way to achieve qualifications.

This adaptation of the skills system will enhance the skills of new entrants, however there is the challenge about how to develop skills for the existing workers, where it may only be short top-up training that is required rather than a raft of new skills.

¹⁵ National Database of Accredited Qualifications, QCA 2010
<http://www.accreditedqualifications.org.uk/index.aspx>

¹⁶ Low Carbon Cluster Sector Skills Assessment Report (2009), UKCES

4 - Core Scenario

Through the work of the Construction Skills Network we already have a view of output for the region through to 2015 that stakeholders in the South West contribute too. Talking a detailed view beyond 2015 to 2020 is problematic, as events over the last two years have shown, however the most likely view is that the UK construction industry will experience slightly lower levels of long term growth than have been seen in the past. We expect long term growth to be around 2.0%, compared to around 2.5% seen over the previous decade.

In terms of how this impacts on the South West, over the last two years regions have been effected by the recession to different extents, and this is likely to continue with the impact of public spending cuts being felt. In general there is quite a lot of work focused in Greater London, South East and the East of England, although large scale projects can begin to have an influence at regional levels. With energy infrastructure related work a key element of future workload, the proposed nuclear new build programme would help to boost output in the South West with plans for reactors sited at Hinkley Point and Oldbury. Should the Severn Barrage scheme progress then this would also have a major effect in the region, therefore the signs are encouraging and we believe the South West should perform at least in line with the UK average for output growth through to 2020.

With construction output growing, employment is also expected to increase, however productivity gains and the likely balance of work within the South West means that employment growth would be at a lower level than output growth.

The main interest for this report is the impact that low carbon related work is likely to have both in terms of output and employment. Previous sections have outlined the direction of policies and strategies and it is clear that for the UK to meet its greenhouse gas emissions targets carbon emissions from buildings will have to be addressed. Some sectors of the construction industry have some clarity around this, while for others it is still an area of development, therefore our core scenario covers the baseline assumptions that we are making for each area as well as some of the key risks.

New Housing, Public and Private

Assumption – 100% low carbon related from 2013 through to 2020.

General points

- Building regulations mean that low carbon will become the norm for these sectors and effect everyone involved.
- Increasing emphasis on energy efficiency for the fabric of structures
- Increasing use of micro-renewable technology during build
- Skills needed at all levels of the workforce from professional through to skilled crafts
- Housing recovery driven by long term mismatch in supply and demand.

Key Risks

- Enforcement of building regulations
- Future tightening of regulations proceeds as planned
- Effect that building to higher standards has on house prices and possible reduction in demand

Housing R&M (Public and Private)

Assumption – 25% low carbon in 2010, 27.5% by 2015 and rising to 35% by 2020

General points

- The likes of Household Energy Management, Feed in Tariffs and Green Deal will encourage adoption of energy efficiency measures, however will take time to establish.
- As economy picks up and current situation improves, consumer confidence returns
- Greater opportunity for incorporating low carbon measures when buyers move house – easier to do alongside a major renovation or improvement.
- Market will reach saturation point for measures such as loft and easy to treat cavity wall insulation by 2015
- Post 2015 there will be increasing emphasis on solid wall insulation, solar thermal and heat pumps

Key Risks

- Lack of legislation to drive change at this moment
- Householder behaviour will be influenced by factors such as energy prices and costs of installations
- Balance of private against public work – two thirds of R&M is private, only one third public, which will come under budget pressures
- Multi-skilling may blur who carries out the low carbon work – will solar panels be installed by a roofer with plumbing top up and/or vice versa
- Microgeneration Certification Scheme, will there be sufficient approved installers

Non-housing New Build (Commercial, Industrial and Public Non-housing)

Assumption – 7.5% low carbon in 2010, 15% by 2015 and rising to 25% by 2020

General points

- Building regulations cover energy efficiency
- Will be increased pressure for improved energy efficiency
- Buildings are being built to BREEAM ratings at the moment
- More focus on design, planning and whole life costing of buildings along with facilities management/building engineering services to improve efficiency.
- Use of larger scale renewable technology that would not be as viable for a domestic home such as combined heat and power systems.

Key Risks

- Lack of clear data at this point in time
- Lack of an equivalent Code for Sustainable Homes for buildings in these sectors
- Government ability to set examples restricted by spending cuts
- Low carbon impact can be difficult to measure if there is a significant change in use of the building – less likely with a domestic dwelling
- Impact of fuel costs and carbon trading prices

Non-housing R&M

Assumption – 7.5% low carbon in 2010, 15% by 2015 and rising to 25% by 2020

General points

- Building regulations cover major refurbishments
- Will be increased pressure for improved energy efficiency
- Impact upon facilities management and building services engineering

Key Risks

- As with non-housing new build, there is a lack of clear data at this point in time

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- Lack of an equivalent Code for Sustainable Homes for buildings in these sectors
- Government ability to set examples restricted by spending cuts
- Low carbon impact can be difficult to measure if there is a significant change in use of the building – less likely with a domestic dwelling
- Impact of fuel costs and carbon trading prices

In producing this scenario the obvious weakness is around the Non-housing elements as there is a clear lack of existing data upon which to base the scenario and the future direction needs clarification.

It may be that there is significant progress in these areas and as such a high uptake assumption can be made where significant introduction of low carbon measures increases output from 35% to 50% by 2020 across all non-housing sectors.

Having outlined what we see as possible scenarios for the South West, the following section examines the implications for both the base case and the high uptake scenarios in relation to overall employment and skills.

5 - Gap Analysis

In this section we look to apply the assumptions outlined in the previous section to employment and then develop probable implications that may arise from the low carbon scenarios.

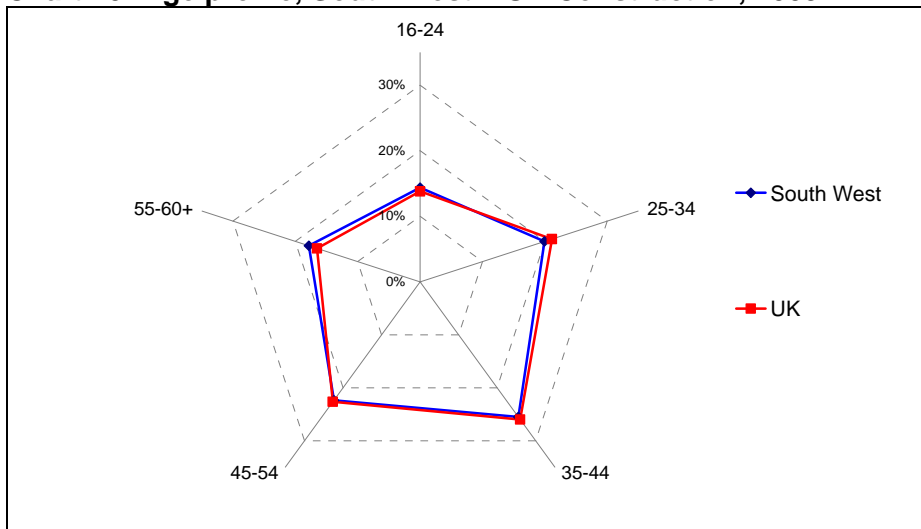
(i) Total Employment

Key Outcome – low level of growth, main driver will be replacement demand

In terms of overall employment numbers, it is unlikely that there will be significant change in the South West. Forecasts to 2015 show employment returning to a similar level of that in 2009, while projections through to 2020 indicate modest growth with overall numbers increasing to around 230,000. This is still below peak employment during 2006 of over 250,000.

Although employment numbers are not going to rise significantly, there will still be growth and there will also be the need to replace workers who will leave the industry through retirement. Analysis of Labour Force Survey data shows that the age profile of construction workers in the South West is very similar to the UK construction profile, ref. Chart 10 below, with 19% of workers currently aged 55 and over who would be eligible for retirement over the next ten years .

Chart 10: Age profile, South West v UK Construction, 2009



Source: *ConstructionSkills, ONS, 2009*

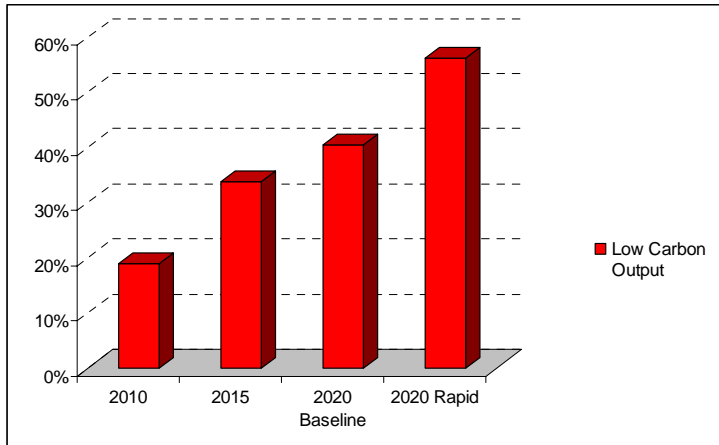
This highlights the issue that while overall employment growth may be modest, there will be a need to replace existing skilled workers who will leave the industry over the next ten years and 19% of the current workforce means nearly 42,000 people.

(ii) Low Carbon – Output effect

Key Outcome – Low carbon will have an increasing effect on output

The general impact of the transition to low carbon in terms of construction output is illustrated by Chart 11. Taking the assumptions and applying them to forecasts for construction output shows 2010's output level of 19% rises to nearly 40% with the baseline and to over 50% if there is a rapid uptake of measures in the non-housing sectors.

Table 11: % of Low Carbon Construction Output



Source: Construction Skills Network (2010)

(iii) Low Carbon Employment and Skills– Baseline scenario.

Key Outcome – low carbon will impact on 43% of workforce by 2020

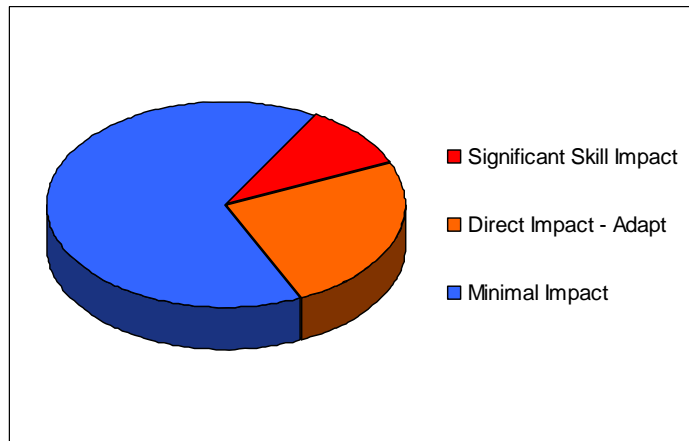
By taking the baseline scenario and relating the assumptions about increasing low carbon output to employment in the same way the current workforce in Section 2, we are able to gauge the increasing effect that the low carbon transition will have in 2015 and 2020.

2015

Significant skills impact: 10%

Direct impact – adapt: 25%

Total Low Carbon: 35%

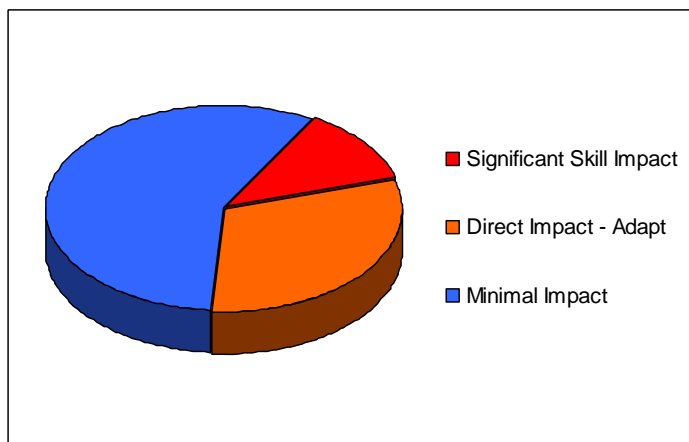


2020 Baseline

Significant skills impact: 12%

Direct impact – adapt: 31%

Total Low Carbon: 43%



(iii) Low Carbon Employment and Skills– Rapid uptake scenario.

Key Outcome - low carbon will impact nearly two thirds of workforce by 2020

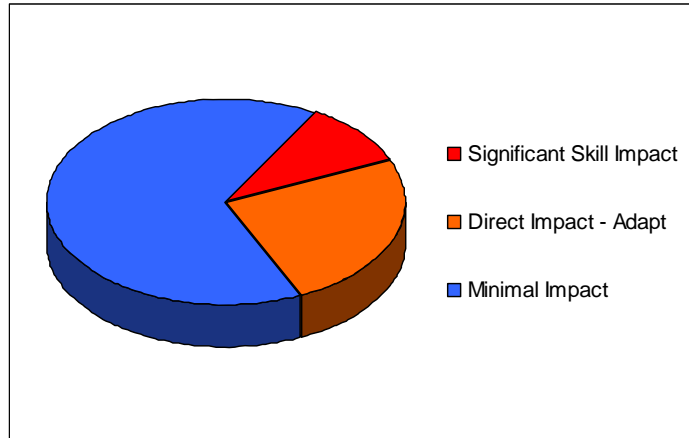
In the same way, if there were to be a rapid uptake of low carbon measures, particularly in the non-domestic sectors the impact here would be that:

Note 2015 assumptions remain unchanged as rapid uptake would be expected from 2015 - 2020.

2015

Significant skills impact: 10%
Direct impact – adapt:25%

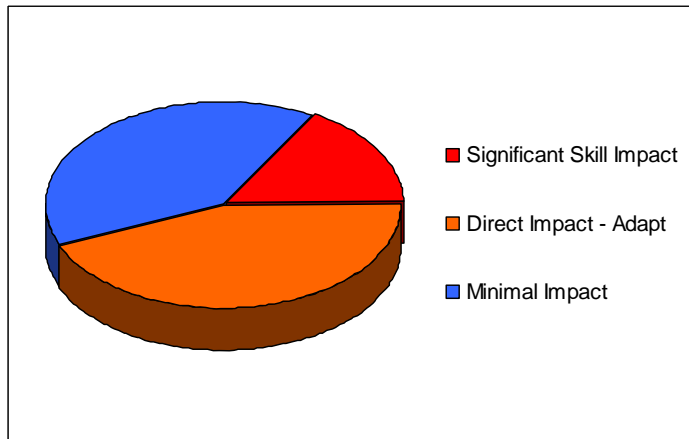
Total Low Carbon 35%



2020 Rapid Uptake

Significant skills impact: 17%
Direct impact – adapt:44%

Total Low Carbon 63%



There are a number of interesting points that emerge from this analysis. Firstly, although there is a significant impact both in output and employment terms when considering low carbon measures for buildings, the significant skills impact increases by quite small margins.

- 8% - 2010
- 10% - 2015
- 12% - 2020 Baseline

This will be due to the relative number of the currently identified occupations against all those involved in the range of work, however it highlights that accurate identification of employment opportunities and skill development for these occupations will be required.

Across the wider workforce, low carbon work has a significant impact with adaptation of skills required by up to half of the workforce if there is a rapid uptake of measures used across the sectors, which is a significant step up from the current estimate of 17%.

In terms of how this skills requirement could be delivered, as with all areas of the UK there is an established network of further education colleges, higher education institutions and

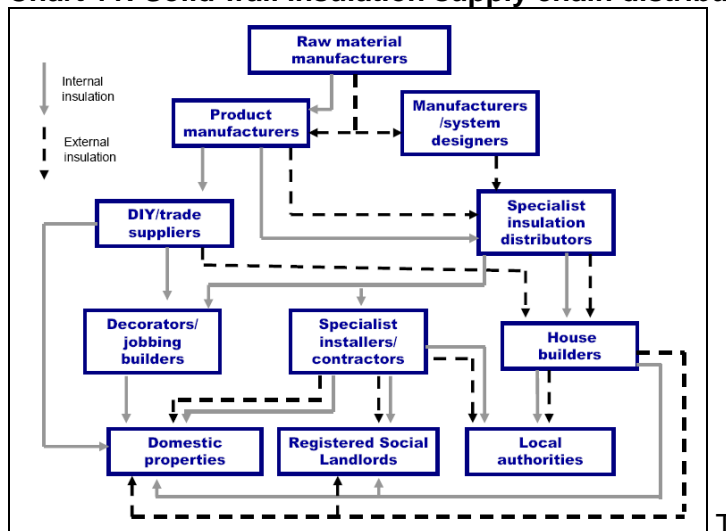
private training providers that deliver a range of training for the construction industry and the wider built environment. It has also been highlighted earlier that existing qualifications have begun to adapt to cover low carbon aspects, a process that will no doubt continue as awareness and demand increases.

In many respects the existing deliverers will be able to cover the likely adaptation demand and to some extent the significant demand as well. Where issues may arise is those areas of significant skill where delivery does not yet appear to be established and a good example of this is insulation skills.

A search of training providers across the South West did not show anyone who was currently delivering the NVQs that covered insulation occupations. A search of data across England showed that from 2008 to 2010, less than 300 NVQ certificates were issued for insulation occupations, which is a very small number compared to the tens of thousands issued for wood trades over the same period.

Although there appears to be a potential mismatch, this may not be the case because of the range of insulation systems that are used and the manufacturer training that is given to ensure they are installed correctly. This was highlighted in the Solid Wall Insulation Supply Chain Review¹⁷, ref. Chart 11, with many of the manufacturers having their own installation teams, or working with installers who are trained on their particular systems.

Chart 11: Solid wall insulation supply chain distribution map



Source: Energy Saving Trust, Energy Efficiency Partnership for Homes (2009)

Manufacturer based training is not isolated to insulation systems and it is one aspect that is unlikely to be identified by looking at formal qualifications, although that may change with the introduction of QCF. Understanding this balance between formal and other forms of training is a key aspect that needs further investigation with work in this area is being progressed by the Energy Efficiency Partnership for Home in conjunction with the Future Skills Unit of ConstructionSkills.

With regard to training provision, the lack of a clear way to identify qualifications as being low carbon related at this point in time, is a severe restriction on analysis and projection of potential supply.

¹⁷ Solid Wall Insulation Supply Chain Review (2009), Energy Saving Trust / Energy Efficiency Partnership for Homes

6 – Conclusions

Even with the emerging policy that is centred around decarbonising of buildings there are still a number of main conclusions that can be drawn from this report.

Firstly, in developing the core scenario the future scale of the impact that addressing carbon emissions in buildings is clearly evident. Under the core scenario work related to decarbonising buildings is likely to account for over 40% of construction output in the South West by 2020. However it is also evident that low carbon related work will become the accepted norm as buildings are constructed to increasingly stringent Building Regulations that have energy efficiency as an integral part.

As the South West has a relatively larger share of both new housing and housing R&M work compared to the UK average, decarbonising houses will be important driver of work in the South West. While the Code for Sustainable Homes gives a good indication of the direction for low carbon new housing, the lack of a comparable benchmark for upgrading existing homes, particularly for private owners, will have implications for housing R&M work.

Although the South West will be affected in the same way as other areas of the England by the national policies that apply, there will still be scope for local authorities to shape this by setting standards above the national levels. Therefore local authorities can influence future work around decarbonising buildings, especially when it comes to specifications for public buildings, either new or existing.

There will be a number of challenges that will need to be overcome and improving the energy efficiency of existing housing stock, particularly that of private homeowners, will be a key area to address. The national government will be looking to use initiatives such as Green Deal to support and encourage this, however additional support from local authorities could also assist.

When it comes to employment and skills, low carbon measures will impact the whole range of construction occupations in given sectors. By 2020 if there is a rapid uptake of low carbon measures then this could affect the skills and or knowledge of around two thirds of the workforce, and even with a more conservative baseline estimate, low carbon measures will have implications for more than 4 in 10 construction workers.

Looking at skills more closely, there will be key occupations where there will be a significant skills impact, whereas there will be others where the impact is less.

Occupations that are expected to show a significant impact are the likes of;

- Architects – who will have to incorporate low carbon measures into the design of structures
- Construction Managers – who will have to understand and monitor the build process to ensure optimum energy efficiency
- Insulation Installers – solid wall insulation, either internal or external, will be part of the energy efficiency mix for upgrading existing buildings
- Electricians – installation of solar photovoltaic systems
- Plumbers – installation of solar hot water and heat pump systems
- Building Services Engineers – improvements in energy efficiency for non-housing structures

From the range of energy efficiency options that are available, the occupations likely to be involved in them can be identified. From this analysis these occupations do form a small percentage of the overall workforce, however it will be critical to understand how the skills

required for these occupations will be affected. The current view is that for some it will be more about additional knowledge rather than completely new skills, while for others it will be more about new skills. Examples here are;

- Solar installation – core skills will be existing plumbing and/or electrical skills with a top up to meet Microgeneration Certification Scheme standards.
- Insulation Installation – increasing use of solid wall insulation has already been identified as an area for qualification development.

Understanding the changes required for different occupations is an area that all SSC's are developing at the moment therefore it is not easy to give a precise view. All SSCs recognise that work needs to be carried out to get a better view around identified areas of significant skill needs as having the right number of workers at the right time will be a key issue. For some sectors there is more clarity about the nature and impact that low carbon measure will have, such as energy infrastructure where there is longer lead times on investment programmes. However for the built environment policy is being developed and data is currently being developed by a range of organisations to better inform this view.

It is also evident that the qualification systems are adapting to cover low carbon elements, and will continue to do so. In the way that low carbon will become a norm for the industry, low carbon will become a fundamental part of existing qualifications and this does not make it easy to identify and categorise qualifications in the same way as occupations.

Despite the fact that policy is evolving in this area, it is clear that decisions both at national government and local authority levels over the next few years will establish the foundations for success in reducing the carbon emissions from buildings. It is also clear that addressing the low carbon challenge while effecting large segments of the construction workforce, will have a more significant impact on a relatively small range of occupations. For the South West this does highlight the need for a more accurate, defined picture for these occupations, however any analysis would also require a more defined view of future low carbon investment, which is not readily available.

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