Liverpool City Region Skills for Growth

LOW CARBON

A Skills for Growth Agreement

Contents

Skills for Growth Agreement

This agreement, produced by the Liverpool City Region Labour Market Information Service, is one of a suite of agreements that will be produced for key sectors and employment locations within the City Region.

The agreements have been commissioned by the Liverpool City Region Employment and Skills Board, as part of the 'City Region Deal' with Government. The purpose of the agreements is to capture the current and future skills needs of businesses and communicate this to schools, colleges, learning providers and universities to enable them to plan courses and provision.

As part of publicising this agreement, employers, skills providers and local employment partnerships within the Low Carbon sector will be encouraged to work together to resolve the mismatch in employment and skills within the City Region.

It is hoped that individual (or where applicable groups of) employers, and providers, will agree bespoke Skills for Growth Agreements and will publicise these agreements to encourage others to do likewise.

Headline Actions

Focus provision on building the competences of existing employees

The Low Carbon sector exhibits strong growth and has transformative potential for the economy of the Liverpool City Region. This includes businesses accessing new national and international markets and increased Gross Value Added (GVA). This has significant implications both for City Region policy and the offer made by providers to employers.

- Providers will need to support employers to upskill their existing workforce to adapt to new market requirements.
- Top-up training needs to be flexible and delivered in the workplace; shaped around low carbon products and business processes.

Define a City Region Low Carbon offer

The diverse character of the Low Carbon sector has led to fragmentation of provision and careers information across a range of Sector Skills Councils. This Agreement provides intelligence for employers and providers to establish the skilled workforce we need. This is particularly important to foreign direct investors, who see skills as a major issue in choosing where to invest.

- Work with the National Skills Academies and other partners to raise awareness of the training on offer for the sector.
- Utilise greater employer ownership of skills funding through the Liverpool City Region Skills for Growth Bank. This provides a way to raise capacity within the City Region for employer-led training provision.
- Embed basic conversational and technical foreign language skills into appropriate low carbon course content. For example, on technical foreign language skills, knowledge of the main component parts of a wind turbine in the language of the main supplier companies.

Building Skills for the Future

Central to the success of the Low Carbon sector in the Liverpool City Region is the availability of strong underlying skills based at NVQ level 2 and in STEM subject areas including for Higher Level Skills. Core skills need to be complemented by employability, innovation and enterprise.

Work with National Skills Academies and other specialist organisations to further develop training/employment routeways to meet the needs of the sector. For example Centres for Off-shore Renewable Engineering (CORE), Maritime Skills Alliance and National Workboat Association.

- School and further education focus on application and numeracy, with links to product and services examples from the Low Carbon sector.
- Low Carbon employers have an opportunity to support the work of schools support organisation MerseySTEM, identifying STEM Ambassadors from their workplace that can give careers and educational talks and take part in events for prospective and current students, including for the Robot Challenge STEM days for schools. There is also an opportunity to explore holding a Schools Hydrogen Challenge for Liverpool City Region.

- Through the Skills for Growth Agreement expand employer commitment to vocational training and accreditation for existing staff and increased take up of Apprenticeships.
- Business leadership in Low Carbon skills - contributing intelligence to providers on significant shifts in the Low Carbon market and working with supply chains to commit to skills for the future workforce.
- Building higher level skills provision to carry forward further education and Apprenticeship provision into new market opportunities including the Making it campaign: www.liverpoollep.org/priorities/knowledge_economy/advanced_manufacturing/making_it.aspx

Sector Briefing
Low Carbon

The creation of a Low Carbon economy is now well established as an international goal through multilateral agreements to reduce the emission of greenhouse gases and has created a trillion dollar market place for goods and services. The movement to decarbonise affects all aspects of the economy from the production of sustainable energy through to the daily practices and behaviours of households, businesses and employees to reduce waste. This creates a vast array of challenges to adapt to new ways of working and to capture new business opportunity by realising the full potential of existing industrial and labour market capability.

The international market for Low Carbon environmental goods and services is estimated to be some £3.3 trillion in 2010/11 and showing a rising annual growth rate, which for 2010/11 was 3.7%. The UK is a major participant in this globalised market ranked 6th by value of global sales representing £122.2 billion in 2010/11. The UK has strong performance in the international economy with consistent annual sales growth of around £4.5 billion per year since 2007/8 a trend that is forecast to continue over the medium term. UK businesses are among the international leaders in a number of high value sub-sectors including carbon finance, alternative energy, geothermal, photovoltaic and wave and tidal energy[1].

While rapidly growing and sizable, the international Low Carbon sector is highly complex and competitive with rapidly changing regulations and standards being applied as new markets emerge and new industries mature. A key challenge for UK business and government is to build the essential capabilities of the private sector, and that of Liverpool City Region, to maintain a leading edge in the development and application of technology. **Central to this is improving the underlying labour market as this will be vital to maintaining the global share in the sale of goods and services within a highly dynamic international environment[2].**

Few other locations in the UK or Europe have the natural potential and low carbon business capability of the Liverpool City Region

Source: Liverpool City Region Growth Plan & Strategic Economic Plan 2014

UK Government has sought to maximise the opportunities offered by the Low Carbon economy as a means to build the international competitiveness of business and attract trade and investment to the UK[3]. National policy has included commitments from Government to support the development of skills to complement investment by business and underpin a transition to a Low Carbon and resource efficient economy[4]. Liverpool City Region policy also supports local gearing of skills investment activity through the City Region Deal with Government. Businesses working alongside education and training providers create an important opportunity to ensure the right skills are being developed locally. Business investment in skills also raises the 'absorptive capacity' of companies to benefit from innovation in the sector, contributing overall to the value and competitiveness of the sector[5].

1 Data from BIS (2012) LCEGS Report for 2010/11

2 See Romani et al (2011); CBI (2011)

3 See for example UK government international trade and investment promotion of low carbon sector:https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/199886/UK_Capabilities_Report_EN.pdf

4 DECC (2010); HMT / BIS Plan for Growth (2011)

5 Jagger et al (2012)

Liverpool City Region is well placed to develop its role in the global Low Carbon sector. With existing strengths in marine, logistics and heavy engineering sectors combined with international research facilities and specialist financial services, the City Region has the potential to build on its regional hub status. **Data from kMatrix estimates that there are some 1,280 companies in the Low Carbon sector across the Liverpool City Region employing circa. 23,400 people (with significant numbers of self-employed workers).** These businesses generate approximately £2.7 billion Gross Value Added (GVA) annually to the national economy[6]. Given the diverse range of business activity within the sector, there are estimated to be **an additional 4,000 companies in the engineering, manufacturing, process and professional services sectors identified as having the potential to diversify into the Low Carbon sector[7].**

When this underlying capacity is combined with a growing base of contracts that include; construction of on-shore and off-shore wind farms (Liverpool City Region has been awarded CORE status as a Centre for Offshore Renewable Engineering based on assets centred around the Wirral); retrofitting of social housing and the micro-generation of energy; combined heat and power networks; civil nuclear supply chains; biomass; and low emission vehicles **there is a substantial opportunity to create further jobs in the City Region[8].** It is notable that in the face of such a severe economic downturn as that experienced since 2008, the Low Carbon sector in Liverpool City Region has held its own in terms of economic performance. In addition to the opportunities identified above, the recent upturn in the housing sector should also feed through to increased demand in the order books of City Region manufacturers producing low carbon products.

Central to the challenge to the Liverpool City Region is creating a labour market able to meet the anticipated demands of employers and investors. As discussed below this is a complex area of economic activity that overlaps with a number of other sectors and creates demand for skills from a diverse range of vocational areas and disciplines. Existing studies of the Low Carbon sector[9] indicate that in addition to an increased requirement for labour **much of the additional demand will require adaptation of existing skill sets, particularly those founded on science, technology, engineering and mathematics (STEM) knowledge.**

> There are some 1,280 companies in the Low Carbon sector across the Liverpool City Region employing circa. 23,400 people

This affects not just existing vocational and higher education training providers but creates a requirement for in-work up-skilling and safeguarding of existing jobs by refocusing competences to reflect emerging market demands.

Low Carbon Sector Composition

The Low Carbon sector is difficult to define because of the diverse range of business activities to which the umbrella term 'Low Carbon' can be assigned. **When considering the skills implications it becomes particularly problematic to limit where the sector begins and ends.** For example, while the construction of offshore wind turbines may be considered part of a Low Carbon energy sector it also forms part of Advanced Manufacturing and Marine sectors. Equally business consultancy advising on waste minimisation can be considered as part of Low Carbon sector while also a Financial and Professional service. **Low Carbon is both a description of a productive process - making or creating fuel cells or wind turbines but is also a set of practices or behaviours across business activity as a whole such as acting to reduce waste or energy consumption.** Within discrete business activity there may be significant overlap of these activities, especially given the use of technology by the sector and the degree of convergence between functional activities.

[6] BIS (2012)

[7] kMatrix data for LCR LEP on Low Carbon Economy 2012/13

[8] Based on previous econometric work 12,000 low carbon jobs were predicted to be created in Liverpool City Region by 2015. However this figure did not take into account the impact of the recent recession and new econometric work is currently being developed to update this figure (2011)

[9] OECD (2011)

> An additional 4,000 companies in the engineering, manufacturing, process and professional services sectors in the City Region have the potential to diversify into the Low Carbon sector

For the purpose of this Skills for Growth Agreement the definition developed by Government of the Low Carbon Environmental Goods and Services (LCEGS) sector has been adopted[10]. While the coverage of the national definition is imperfect, by using this national definition, Liverpool City Region is able to access a range of comparable statistics both on composition and relative performance of the sector to inform skills planning. BIS has defined the sector using 24 sub sectors divided across 3 broad categories as set out in Figure 1 below. **The current definition includes 2,800 product and service activities that derive from sector supply chain and value chain activities.**

FIGURE 1
BIS DEFINITION OF LOW CARBON AND ENVIRONMENTAL GOODS AND SERVICES (LCEGS)

Level 1	Environmental	Renewable Energy	Low Carbon
Level 2	Air Pollution	Biomass	Additional Energy Sources
	Contaminated Land	Geothermal	Alternative Fuel & Vehicle
	Energy Management	Hydro	Alternative Fuels
	Environmental Consultancy	Photovoltaic	Building Technologies
	Environmental Monitoring	Wave & Tidal	Carbon Capture & Storage
	Marine Pollution Control	Wind	Carbon Finance
	Noise & Vibration Control	Renewable Consulting	Nuclear Power
	Recovery and Recycling		
	Waste Management		
	Water Supply & Waste Water Treatment		

Source: BIS (2012)

Total employment in the Low Carbon and Environmental Goods and Services sector in the City Region is estimated to be 23,460 full time equivalent jobs in 2012/13. A breakdown of figures across the level 1 sub-sectors is shown in Figure 2 below.

FIGURE 2
KEY DATA FOR LOW CARBON AND ENVIRONMENTAL GOODS AND SERVICES SECTOR, LCR 2012/13

	Businesses	Employees	Sales (£m)
Low Carbon	715	13,691	1,558
Renewable Energy	367	6,422	794
Environmental	199	3,346	427
Total	**1,281**	**23,460**	**2,778**

Source: BIS (2012)

[10] BIS (2012)

Sales growth is expected to continue over the medium term with projections indicating a growth rate of 4.8% in 2014/15

Low Carbon Sector Performance

The LCEGS in the City Region has experienced growth in sales between 2008 and 2013 of around 4% per annum. **Sales growth is expected to continue over the medium term with projections indicating a growth rate of 4.8% in 2014/15**[11]. It has been particularly strong, compared to the UK average, in a number of **sub-sectors including building technologies; geothermal, environmental consultancy, additional energy sources, photovoltaic and wind.** LCEGS exports from businesses in the City Region are valued at over £271 million per annum and are increasing annually.

While sales growth is strong, the data indicates that the growth in sales is not mirrored by an equivalent growth in employment. This has been a feature of the LCEGS sector across the UK since 2008/09 and is not restricted to the Liverpool City Region and therefore this is to be expected. In the current economic situation, many companies are still recovering from the economic shock of 2007-08 and are currently working at comparatively low productivity levels, thus able to absorb growth within their current workforces. Likewise, new company formations are replacing company failures in the sector. **Until the general economy starts to grow this is likely to remain the case, in spite of market growth.**

New business models and contract opportunities are providing growth, including in the off shore wind sector

Place greater emphasis on supporting companies to adapt and update the skills of existing staff

This has important implications for the labour market response in the City Region and places **greater emphasis in most sub-sectors on supporting companies to adapt and update the skills of staff rather than increasing the volumes of new entrant training.** Alongside adaptations, there are also **opportunities arising from new business models and new contract opportunities including in the off shore wind sector.** It is important, as far as possible, the City Region gets the skills pipeline right to benefit from these opportunities or over the medium term risk severe labour and skills shortages. For example, it takes 4 years of training to become a qualified marine welder.

Locating Sector Skills

The diversity of business activity within the Low Carbon sector is reflected in the wide range of skills demanded by employers operating Low Carbon businesses. From a labour market perspective, while there is a narrow band of specialist skills requirements emerging from the sector, the majority of skill sets derive from existing competences present in, for example, engineering, construction, marine and energy sectors as illustrated in Figure 3. **Based on discussions with City Region employers, their primary requirements are for strong underlying craft and technical skills at level 3 and above that can be augmented by specific additional or adaptive training around Low Carbon products or processes.**

The key challenge for employers in utilising existing skills and future workforce planning is sourcing recruits that have core competences that can be enhanced to fit the needs of the sector. This includes for example plumbing, plastering or HVAC (heating, ventilation, and air conditioning) skills needed by employers in the home energy efficiency and micro-generation market or electrical engineering and technical skills for energy and environmental services.

[11] Unpublished kMatrix report to Liverpool City Region LEP on Low Carbon Economy 2012/13

Employer demand for strong underlying craft and technical skills at level 3 and above, supplemented by knowledge of specific Low Carbon products or processes

Demand arises from both new specialist companies formed to compete for business opportunities in the sector as well as existing companies extending their range of products and services in order to maximise the expanding market.

In the context of a fast changing and globalised market place for Low Carbon Goods and Services, there is a need for individuals, employers and training providers to commit to raising the level and maintaining the relevance of skills to market conditions. A major EU study of the impacts of climate change policy on skills levels suggests that to date employers response has focused on updating of the skills of existing staff rather than large scale recruitment of new employees with a different set of skills[12].

In addition to enhanced competences the character of 'softer' skills has heightened importance within dynamic sector conditions. **Businesses are seeking not just sufficient skills to meet basic occupational requirement but favour flexibility, entrepreneurial flair and ability among staff to contribute to company innovation and efforts to access competitive markets.** According to DTZ[13] this reflects an articulated need by Low Carbon employers to address issues including multi-skilling to cover cross sector opportunities; more diagnostic and fault finding skills; greater integration of installation and design skills, more leadership and project management skills; and greater environmental and legal knowledge and health and safety awareness.

FIGURE 3
SECTOR SKILLS CONNECTIONS - LOW CARBON AND ENVIRONMENTAL BUSINESSES

Skills sector	Environmental				Renewable Energy			Low Carbon		
	Environmental consultancy	Energy management	Water / Waste treatment	Land remediation	Hydro	Photovoltaic	Wind	Alternative fuels	Building technology	Carbon finance
Chemicals industry			✓	✓				✓		
Energy	✓	✓			✓	✓	✓	✓		✓
Manufacturing production					✓		✓	✓	✓	
Construction		✓		✓	✓	✓	✓		✓	
Marine/Logistics	✓	✓	✓		✓		✓			
Engineering		✓	✓		✓	✓	✓	✓	✓	
Finance and professional	✓			✓						✓

[12] GHK (2009)
[13] DTZ (2009)

Low Carbon Skills Profile

The Low Carbon sector has a diverse mix of occupational requirements that extend from the highest levels of innovation and scientific knowledge through to the application of traditional craft and technical skills, albeit employed in the creation of a new set of products and processes. The following section provides an overview of the types of occupations and skills currently demanded by employers operating in the Low Carbon sector of the City Region economy.

Low Carbon Job Types

In order to describe the range of job types present within the Low Carbon sector it is helpful to consider the occupations of employees within the sector at various skill levels. **Overall, the sector has a comparatively high skill requirement with almost 40% of employees qualified in the Low Carbon energy generation sector, for example, qualified to level 4 / 5 according to UKCES**[14]. There is also a significant overlap in occupational types with workers more generally identified with the manufacturing, construction and logistics sectors. Figure 4 illustrates occupational type by broad skill level for the Low Carbon sector, and drawing on data from UKCES, identifies areas where there is a reported undersupply of skills.

Employers in the Low Carbon sector are competing with construction and manufacturing employers for workers with similar skills. From its research with UK business UKCES states by way of an example that "the design, installation and maintenance of micro-generation systems does not require very different skills than those which already exist within the building service engineering sector" comprising electrical trades and installation, plumbing, heating and ventilation and air conditioning and refrigeration[15]. They identify cross-over of skills with employers providing task related top-up training for those with good basic craft and technician skills.

The sector also has a strong concentration of the highest levels of research, development and engineering skills across a range of sub sectors of Low Carbon addressing new product challenges in alternative energy, fuel cell technology, the chemicals industry and associated support services in financial, legal and international business management occupations. The labour market for these occupations operates on an international scale. UKCES identify unmet demand in civil and mechanical engineering alongside skills shortages for project managers with engineering qualifications.

[14] UKCES (2010: xi)
[15] UKCES (2010: xxiii)

FIGURE 4
OCCUPATIONAL TYPE AND EMPLOYER DEMAND - LOW CARBON

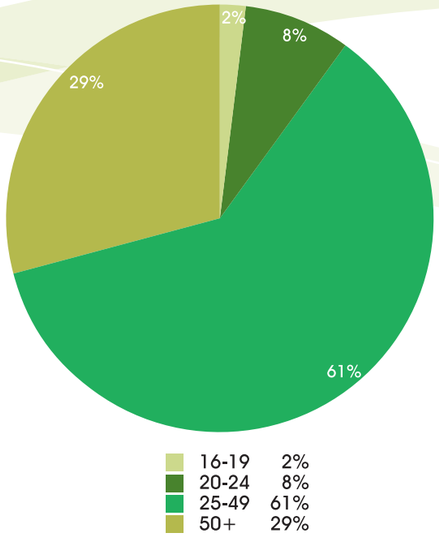
Skill Level / Occupational Type	Skill Level / Occupational Type
Level 5+ Researchers, Adv. Engineers, Product Development, International Business Management	• Fuel cell technology development • Design of wind turbines gearing systems • Marine geology and mapping • Electrical control systems • Specialist legal advice including patenting • Process Engineers
Level 4 Engineers, Project Managers, Financial and Professional Services	• Electrical / grid engineering • Design of wind turbines • Specialist financial services and accounting • Chemical treatment of waste • Process management and quality control
Level 3 Engineering Technicians, Fabrication Team Leaders, Supply Chain Managers	• Turbine technicians • High integrity welding • Health and safety technicians • Plumbing to solar thermal systems • Logistics managers
Level 1/2 Semi-skilled workers in manufacturing production, logistics and construction	• Plant operatives / drivers • Warehouse workers • Installation of solar panels • Construction - housing refit / marine • Waste management and recycling

* Demand occupations sourced from UKCES (2010)

Workforce Composition - Age Structure

As indicated previously, due to Low Carbon being a relatively new sector of the economy, complete national statistics are unavailable. For this reason data has been extracted from a range of comprehensive sources to build a picture of the sector. As the occupational mix demanded by Low Carbon employers reflects those found in more traditionally defined sectors of the economy, we can assume that the age profile of workers in Low Carbon mirrors the sectors from which staff are being drawn. Using national standardised data for industrial employment the established sectors of 'Energy', 'Manufacturing', 'Construction' and 'Transportation' have been used, in aggregate, as a proxy for Low Carbon. While imprecise it provides sufficient data to construct a broad picture of the composition of the sector and a basis for identifying key issues of importance to employers.

FIGURE 5
LOW CARBON SECTOR ESTIMATED AGE PROFILE, LIVERPOOL CITY REGION 2012



Source: ONS APS (2012)

Drawing from employment data for the Energy, Manufacturing, Construction and Transportation sectors we can estimate that the Low Carbon sector has fewer younger workers (aged 16-24) than the average for the City Region economy at 10% compared to 15% for LCR but the same number of 50+ at 29% as the City Region. Within these figures there is considerable variation by sector with employees in Manufacturing and Construction occupations having a higher average age than that found generally in the City Region[16].

Latest figures from CITB highlight that 20% of construction workers in the North West are aged 55 and over, with a further 24% aged between 45 and 54 (announced 6 July 2013). This suggests a serious risk of a skills shortage in construction if today's young people shun construction in favour of other industries. Nationwide, CITB's Construction Skills Network (CSN) forecast also shows that more than 29,000 new construction workers will be required each year over the next four years in order to meet the industry's demand.

Steve Housden, Sector Strategy Manager for CITB in the North West, commented:

> With 20% of local construction workers nearing retirement, we are facing a potential skills 'time bomb', so we urge local young people to consider construction as one of their options as they think about taking their next step.
>
> Construction offers a huge range of opportunities for young people, particularly in the current economic climate where going to university involves taking on a huge amount of debt before emerging into an uncertain job market. Construction boasts an exciting range of career options, including CITB's Ofsted Outstanding, gold-standard Apprenticeships, which meet the needs of a high-tech, world-class industry.[17]

While a lack of detailed information prevents a more specific analysis of the Low Carbon workforce, the proxy data indicates a challenge of increasing the numbers of young entrants to Low Carbon in common with 'feeder' sectors. As the Low Carbon sector matures in the medium-term it may begin to distinguish a discrete set of requirements that will require bespoke training provision. **However, short term it is important that careers information emphasises the potential for employment pathways through vocational training and Apprenticeships into Low Carbon businesses.**

With nearly two thirds of **employees aged between 25-49 age group, this group are a prime target for in-work up-skilling and adaptive training to meet the specific needs of new areas of Low Carbon activity** and reflect the anticipated shift from the production of high to Low Carbon goods and services[18]. As the Low Carbon sector grows, in the context of national economic recovery, this segment of the workforce will face the greatest demand from employers across a range of sectors. Training that increases the flexibility of employees to adapt to changing demands of employers for skills will contribute to overall labour market performance and expand the range of access points into employment available to workers resident in the City Region.

> The 25-49 age group are a prime target for in-work up-skilling and adaptive training to meet the specific needs of new areas of Low Carbon activity

[16] Data analysis using ONS APS (2012)
[17] www.citb.co.uk/
[18] Ecorys (2008)

> Around half of all jobs in Low Carbon are likely to be in skilled trades and plant and machine occupations. A further 30% of jobs are in managerial, professional and technical roles

Workforce Composition - Occupational Profile

Figure 6 below profiles the likely occupational mix of employees within the Low Carbon sector. This is intended to give a broad indication of the distribution of occupational types based on the Energy, Manufacturing, Construction and Transportation sectors. **The data indicates that around half of all jobs in Low Carbon are likely to be in skilled trades and plant and machine occupations. A further 30% of jobs are in managerial, professional and technical roles.** This is likely to under estimate the level of skills demand within the broad occupational structure. UKCES analysis indicates for Low Carbon that 40% of employees in Low Carbon are qualified to level 4+[19].

While this profile provides an indication of the share of jobs by occupational type it is likely to understate the impact of the dynamism of the sector on the skills content of more traditionally defined jobs. This, in areas such as precision welding, may blur occupational boundaries between skilled trades and associate professional / technical occupations. **Similarly the growing importance of on-site diagnosis and problem solving in a range of roles may create demand for technicians who can work at a higher occupational level.** This dynamism is a key characteristic of a new and evolving sector where existing occupational definitions are being reset through on the ground practice. Employers in the City Region report that this situation is addressed through on-site training which is unlikely to be certificated. This practice may resolve specific skills gaps for the employer but, being outside of national accredited training frameworks, limits the transferability of skills within the sector.

National studies indicate that employees in the Low Carbon sector on average have a higher skill level when compared to the wider economy. **Additionally, the average market value per 'green' job is higher than the national average for all jobs[20].** This differential reflects a perceived underlying shortage of skills available to employers and may in turn contribute to wage inflation. In fast changing market conditions, and as employers seek to attract the highest calibre of staff, the availability of labour has a direct effect on business performance. Just as low skill levels dampen innovation and productivity so high skill levels can contribute to rapidly growing sectors.

FIGURE 6
LIVERPOOL CITY REGION LOW CARBON SECTOR OCCUPATION PROFILE

Source: ONS APS (2012)

[19] UKCES (2010)
[20] Innovas (2009)

Stiebel-Eltron

Stiebel-Eltron is a German owned company manufacturing and supplying heat pumps, solar thermal and solar PV globally. The company has a base in Wirral serving the UK market. The company recruits experienced plumbers and heating and ventilation engineers and provides training on-site in heat pump technology. As their products are new to the UK market specific product training is unavailable which creates a high demand for experienced technicians. Stiebel-Eltron offers training to staff both to raise skill levels and also ensure the high quality of its product installation and after sales technical support. The company expects that as the market in the UK matures then plumbing and heating ventilation air conditioning (HVAC) vocational training will start to reflect the importance of heat pump technology as a core competence area for employees in the sector as has happened in Germany where the technology is more established.

Source: www.stiebel-eltron.co.uk

Employers expect recruits to largely come from existing trades and through vocational training programmes

Key Qualification Levels

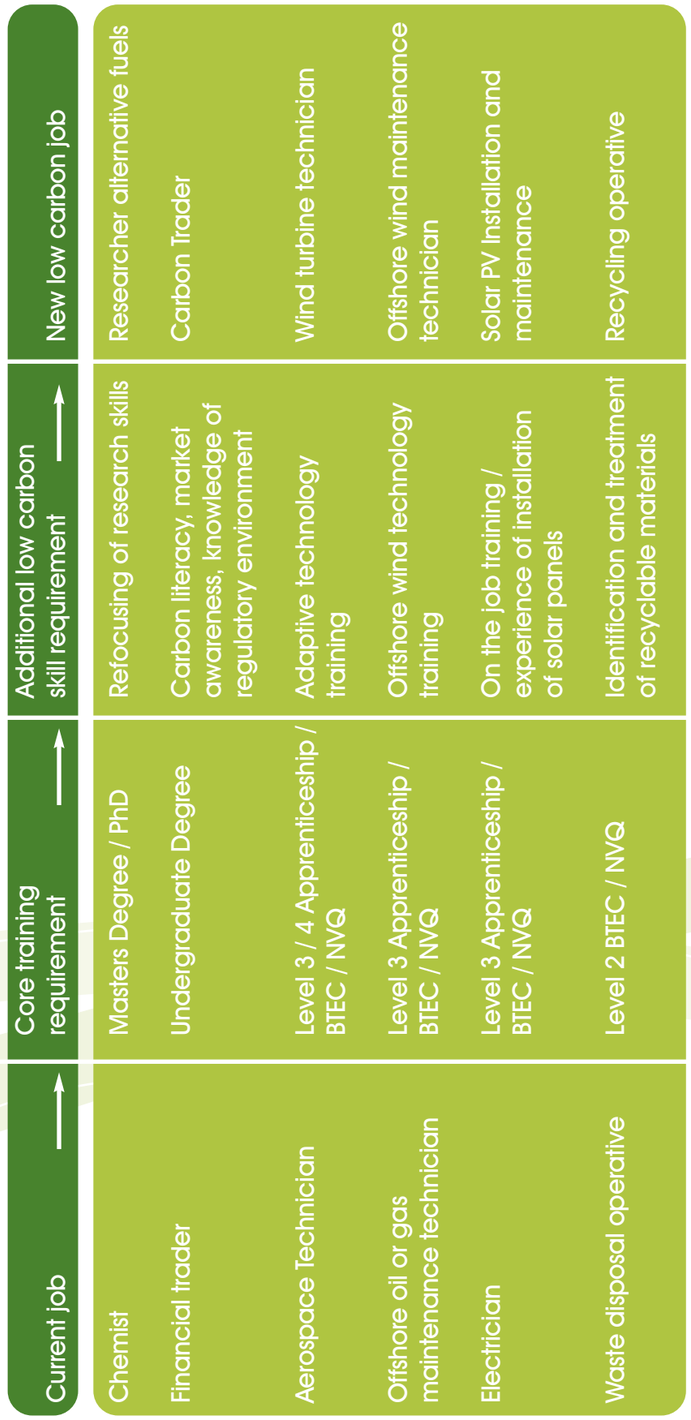
Central to the requirement of employers in the Low Carbon sector is good underpinning skills and qualifications in science and technological disciplines combined with solid practical experience gained in a range of sectoral settings in energy, manufacturing, construction and logistics / marine occupations. National studies with Low Carbon businesses suggest that rather than demanding a new range of qualification frameworks that **employers expect recruits to largely come from existing trades and through vocational training programmes[21] suggesting an iterative adaptation of skills as Low Carbon markets become more established.** This is not to say that there are not skills shortage areas with employers indicating hard to fill vacancies in higher skill occupations[22] and in generic enterprise and management skills that are evident across all sectors of the UK economy.

Figure 7 opposite provides an illustration of jobs that with conversion training in new concepts could be relevant to Low Carbon sector employment. This is intended to underline the relevance of existing core skills and potential application of existing qualifications to Low Carbon occupations. While considering this adaptive model, it is also important to recognise and reduce the labour market pressure that is potentially created during transition periods. Studies[23] have highlighted the potential for 'negative spill over effects' were critical skills are demanded by more than one sector. In these conditions employers in different sectors can be adversely affected when the total number of prospective employees is insufficient to meet short-term demand.

This also highlights **a key challenge for employers and providers to co-produce short course training and technical competences that can be made available flexibly to reflect demand.** Were possible these should be new or existing units of qualifications that have been accredited and could be co-ordinated within a City Region Low Carbon skills framework. This would have the benefit of providing a menu of competence based provision to augment core skill area while also contributing to a wider programme of Low Carbon focused training.

[21] See Bird and Lawton (2009)
[22] UKCES (2010)
[23] See Jagger et al (2012)

FIGURE 7
CONVERSION TO LOW CARBON SKILLS - ILLUSTRATIVE EXAMPLES



Source: BIS (2012)

Supply of Skills

The Low Carbon sector is dependent on the supply of employees with a good standard of education and skills developed either through vocational training in craft and technical occupations or as graduates with science and engineering qualifications. While the requirements of Low Carbon businesses are diverse, there is a consistent requirement for formal training for both new entrants and members of the existing workforce. **As the sector is relatively new, positive attitudes and entrepreneurship are also attributes that are important to employers.** As good practice in workforce planning employers should aim to establish a ratio of trainees to existing workforce numbers or contracts: for example in engineering this could be one apprentice for every 10 skilled engineers and many housing associations work on the basis of 1 trainee per £1 million contract value (or variations of).

The dynamic nature of the sector demands significant input from employers in the provision of workplace training in specific Low Carbon products and processes. A number of key employers in the Liverpool City Region have developed bespoke training facilities, often with the support of training providers, to meet their specific skill demands within a rapidly changing market place; building upon core skill sets in areas such as plumbing, electrical maintenance, construction and mechanical engineering. These provide workforce development opportunities to adapt the skills of employees to reflect the demands of new markets and also as top-up training to augment structured learning delivered in learning institutions.

As the sector is relatively new, positive attitudes and entrepreneurship are also attributes that are important to employers

The dynamic nature of the sector demands significant input from employers in the provision of workplace training in specific Low Carbon products and processes

This approach reflects UK Government policy which is encouraging public / private co-investment in the skills system and greater employer leadership in the design and the delivery of training. It also reflects the capacity being developed in the Liverpool City Region in the adoption of the Employer Ownership of Skills[24] programme and the establishment of the UK's first Skills for Growth Bank[25].

Skills for Growth Bank

The Skills for Growth Bank is an employer-led mutual backed by the Liverpool City Region Local Enterprise Partnership. It supports business in the Liverpool City Region with funding for training to invest in the skills their workplaces need to grow, enabling them to boost their productivity. It can part fund a wide range of training, from individual courses to workplace-wide comprehensive training plans. Based on a typical grant award, funding of up to 60% of the costs of the training could be made, with the remaining 40% paid for by the employer co-investor.

Further Information can be found on www.skillsforgrowthbank.org.uk

[24] See www.ukces.org.uk/employerownership

[25] See www.skillsforgrowthbank.org.uk

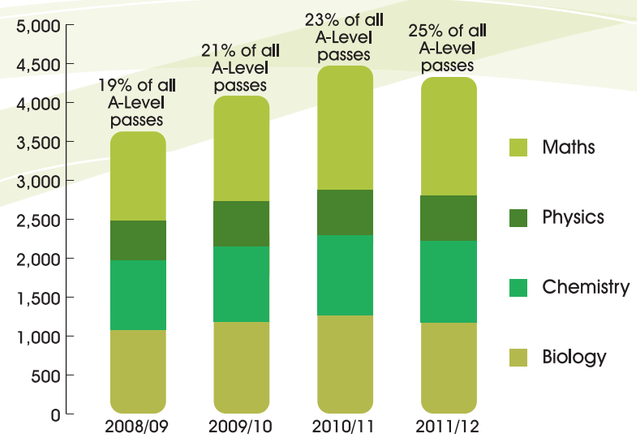
The Liverpool City Region has a large and diverse labour market with some 980,326 residents of working age, 41,180 business units and 574,188 jobs. While the City Region has a lower proportion of adults with qualifications compared to English averages, this gap has narrowed since 2007. There has been particular improvement in the number of young people gaining 5+ A*- C grade GCSEs. **The City Region faces particular challenges in technical and higher level skills with a shortfall of some 71,400 additional qualifications at NVQ level 3+ and 82,700 at NVQ level 4+ required to match the national average.** This challenge is magnified among older workers who in general have a lower level of qualification attainment than younger counterparts[26].

STEM Skills

Scientific and technical skills form the core requirement for a majority of employees within the Low Carbon sector where there exists an acute demand for entrants with qualifications in STEM subject areas[27]. Nationally, government has prioritised the take-up and achievement in STEM subjects as vital to the UK's economic competitiveness[28]. Workforce development for Low Carbon requires both strong performance in science and mathematics at GCSE and BTEC level 2 as a route into technical Apprenticeships and into higher level study. Data for Liverpool City Region indicates rising participation at A-Level in the Liverpool City Region as can be seen in Figure 8 below.

In 2011/12 around 4,380 pupils in the Liverpool City Region achieved science or maths A-Levels. This equates to almost one in four of all A-Level achievements in the year - a rate that has increased annually since 2008/9. While 2% lower than the England average, the gap has closed over recent years. Figure 8 shows A-Level maths to be most popular subject among STEM learners with physics being the least popular. This reflects national participation trends and **a need for schools and colleges to encourage learners with an aptitude for physics to continue to study it by demonstrating the range of potential careers in science and engineering available to those with physics qualifications.**

FIGURE 8
STEM SUBJECT A-LEVEL ACHIEVEMENTS, LIVERPOOL CITY REGION



Source: DfE AS/A Level Results 2008/09 - 2011/12

[26] Data from Liverpool City Region Skills for Growth Annual Report 2013

[27] UKCES (2010)

[28] UKCES (2010)

MerseySTEM

MerseySTEM manage the STEM Ambassador Programme and schools STEM Advisory Programme in Liverpool City Region. These programmes are funded by the Department of Business, Innovation and Skills (via national organisation STEMNET) in recognition of the vital nature of STEM skills to the UK's future economic success.

The STEM Ambassador Programme enables anyone with Science, Technology, Engineering or Maths (STEM) skills to volunteer their time and expertise to inspire young people and demonstrate the possibilities of STEM subjects and careers. MerseySTEM recruit and train the volunteer Ambassadors and support the work of schools in organising events such as school careers days, STEM Clubs, curriculum support and exciting careers talks. Specific examples include:

- Robot Challenge Days - using Vex Robotic kits, teams of students from different schools build Vex Protobot with support from STEM Ambassadors, from engineering & manufacturing backgrounds. The robots are pitted against each other in a Robot Wars style competition. The event enables students to understand a variety of design, science and engineering principles but also encourages teamwork, leadership and problem-solving skills.
- Engineering Your Future - MerseySTEM, on behalf of the Institute of Mechanical Engineering, organise five workshops run by companies representing different areas of engineering and also a market-place careers fair. MerseySTEM organise for local sixth form students to attend the event and at the 2012 event, students from 26 local schools/colleges were in attendance.
- STEM Clubs - bringing real-world context to student activities. For example 'Chopping Bikes' held with Rainhill High School - rebuilding scrapped bicycles to create new improved models - with the support of Veolia and STEM Ambassadors from Mexichem Fluor in Runcorn and Liverpool Community College.
- Curriculum Support - STEM Ambassadors from United Molasses & Storage worked with Maghull High School to develop their design and technology curriculum and provide a computer aided design product brief for pupils.

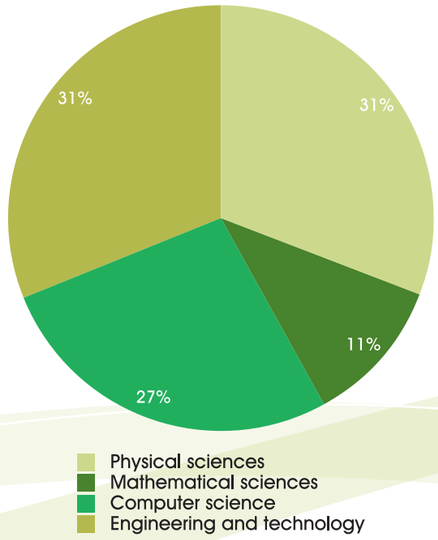
For further information go to: www.merseystem.co.uk or www.stemnet.org.uk

This rising profile of participation in learning science and technology is also reflected in the increased take up of STEM related subjects by Liverpool City Region residents. UK Data from HESA shows an 11% growth in the number of City Region residents studying STEM subjects between 2008 and 2012[29]. As can be seen during 2011/12 participation by 7,039 learners was spread across STEM disciplines. Just under one third of students (31%) were enrolled in physical sciences which includes chemistry, physics and other materials sciences with a similar number studying mechanical and electrical engineering and technology. Over one quarter of students are enrolled in computer sciences including software engineering and artificial intelligence and a further 11% in mathematical sciences and operational research. **Students studying across the UK who have a home address in the City Region are an important economic resource and should be a key target for employers to attract back to the City Region on completion of their studies.**

[29] Higher Education Statistical Agency, (2012)

Students studying across the UK who have a home address in the City Region are an important economic resource and should be a key target for employers to attract back to the City Region on completion of their studies

FIGURE 9
STEM-RELATED SUBJECTS AT HIGHER EDUCATION, LIVERPOOL CITY REGION RESIDENTS 2011/12



Source: HESA (2012)

Among the universities located within and serving the City Region there are some 41,000 students studying for undergraduate and postgraduate qualifications in science and technology subjects. Figure 10 shows student numbers for all science and technology disciplines by institution.

FIGURE 10
SCIENCE AND TECHNOLOGY STUDENTS AT UNIVERSITIES SERVING THE CITY REGION

Higher education institution	Student numbers
University of Chester	7,018
Edge Hill University	7,719
Liverpool Hope University	1,222
Liverpool John Moores University	12,316
Liverpool Institute for the Performing Arts	82
University of Liverpool	12,663
Total	**41,020**

Source: HESA (2012)

Across these six higher education institutions there are some 9,827 students studying for undergraduate and postgraduate qualifications in subjects directly related to the Low Carbon sector in 2011/12. An analysis of this provision is shown in Figure 11 and includes 1,115 students in geological and physical geographical sciences, 2,831 in computer sciences, 1,076 in electronic engineering and 263 in maritime technology. There are 101,000 students studying these science disciplines at universities in the wider North West region[30] within travelling distance to the Liverpool City Region.

Liverpool University and Liverpool John Moores University are the two largest institutions providing Low Carbon skills in the City Region. See Appendix 7 for a full list of related courses offered within the Liverpool City Region. Combined they have nearly 8,000 students or 80% of the student population of universities serving the City Region in physical sciences, engineering and technology. Liverpool John Moores University offers a specialism of undergraduate, postgraduate and professional training in marine technologies.

[30] HESA data 2012 for the universities of Lancaster, Central Lancashire, Bolton, Manchester, Manchester Metropolitan, Salford and Keele

Logistics Offshore and Marine Research Institute

Liverpool John Moores University is a world leading maritime university delivering education, training, and research and development to the maritime, offshore and transport sectors. Research projects undertaken by the University's Logistics Offshore and Marine Research Institute have contributed to the modernisation and productivity of the marine industries. The InTraDE project for example has helped to improve the efficiency of port and terminal operations, developing specialist automation, and new techniques for optimising traffic flow, which have reduced space and energy consumption.

Projects in logistics have optimised transport networks to reduce energy and emissions and improve resilience to external uncertainties, and research in safety and reliability has contributed to the development of decision support systems which have improved the quality of decision making helping improve the safety of offshore systems and for example reduce marine pollution.

The Liverpool Maritime Academy delivers bachelor, Masters programmes and training for maritime professionals. The Academy is equipped with the ship handling simulation facilities, which are amongst the most advanced in the world. It has the only facility in the UK with a 360-degree field-of-view visual system. The flexibility of the system has enabled it to undertake specialist projects for port developers and offshore operators for example it has assessed the impact of proposed river terminal extensions and harbour facilities on port operations, and of offshore installations on navigation.

Businesses in the Low Carbon sector operate within international markets, supply chains and also for the highest skilled jobs within global labour markets. An adequate supply of skilled personnel for energy efficiency, green engineering and green construction has been identified by the International Labour Organisation as a central condition to realise a transition to a Low Carbon economy[31]. The **role of universities as centres for research and training for Low Carbon sector skills is vital to meet the needs of businesses and to deepen the capacity of the labour market within the City Region.**

At the higher skills level, there is an increasing blending of skills. Evidence from consultation within the Low Carbon sector suggests at higher level skills people enter the sector predominately with an engineering or science background. Over time their skills become more hybrid e.g. a chemical engineer learning automotive engineering skills. **To respond to this market dynamic higher level skills providers need to be able to mix and match their provision and make greater use of short courses and modular study** (some of which is already taking place).

[31] ILO (2012)

Liverpool University

New MSc in Nuclear Power Engineering

This new MSc has been designed to exploit existing and new appointments in nuclear science and engineering which will utilise the unique facilities for nuclear research provided by access to the NNL Central Laboratories at Sellafield, the Dalton Cumbrian Facility and the National Tsing Hua University research reactor in Taiwan.

The aim of the MSc in Nuclear Power Engineering is:

a. to provide a systematic understanding of nuclear power engineering;

b. to provide a comprehensive and broad overview of contemporary issues and applications associated with nuclear power engineering;

c. to prepare students to become professionals in the global nuclear industry; and

d. to develop the abilities of students to work independently and in teams to research, design, implement and execute creative solutions to engineering problems.

Source: www.liv.ac.uk/study/postgraduate/taught/nuclear-power-engineering-msc/overview/

FIGURE 11
STUDENTS AT HIGHER EDUCATION INSTITUTIONS SERVING THE LIVERPOOL CITY REGION 2011/12 - BY LOW CARBON SUBJECT AREA*

	Chester	Edge Hill	Liverpool Hope	Liverpool JMU	LIPA	Liverpool University	Total
Chemistry		8	92	134		467	701
Physics and Materials Science		8				382	390
Physical Geographical Sciences	199	199		168		549	1,115
Mathematics and Statistics	159	68	25	109		801	1,162
Computer Science	352	424	191	1,167		697	2,831
Electronic Engineering	47			420	82	527	1,076
Production and Mfr Engineering	56			133		108	297
Civil Engineering				418		342	760
Mechanical Engineering				367		307	674
Maritime Technology				263			263
General Engineering				318		243	561
Total	**813**	**707**	**308**	**3,497**	**82**	**4,423**	**9,830**

Source: HESA 2012

*NB the above figures include international as well as EU 'home' students

Training Provision - Low Carbon

Vocational training provides the primary route into craft and technical careers in the Low Carbon sector. **Within the Liverpool City Region there is substantial and well established capability to deliver training in construction, engineering and maritime skills.** Technical capacity is also matched by an awareness of the importance of employability skills and entrepreneurship to businesses recruiting new employees. Discussions with providers in the City Region have identified a number of areas of good practice and preparations to respond to the demands of Low Carbon employers. **However, feedback indicates employer demand has been lower than anticipated** which is consistent with the general finding that businesses are adapting the skills of existing staff rather than initiating training programmes for new staff or recruitment of pre-trained staff. A list of qualifications supporting the sector can be found on Appendix 1.

Provider Examples of Good Practice

University Technical College (UTC) Liverpool Engineering & Logistics

UTC Liverpool Engineering & Logistics is led by the City of Liverpool College, Liverpool John Moores University and international employers including Laing O'Rourke, Peel Ports and Arup.

The UTC will open September 2014 has been developed as a unique response to the strategic landscape of the city and wider city region, providing a curriculum that has been developed in conjunction with employers both to meet the needs of the regeneration efforts underway and to tackle the skills gap.

Young people will have the opportunity to gain a greater awareness of employers needs in environmental technologies, maritime, logistics and engineering sectors needed to support Liverpool's strategy for regeneration and development. The UTC will provide a different type of educational experience to students following a technically-oriented course of study which includes traditional GCSE's and will benefit from:

- Employer-led student projects
- Work experience placements
- Guest employer lectures
- Specialist employer advice on training and equipment

It will provide academic and vocational training linked to ongoing employer based activity in the Low Carbon sector. UTC Liverpool will provide a series of pathways into Low Carbon careers available within the City Region. A key stakeholder underlined the significance of the UTC in stating:

> "we recognise that young people should understand about their environment and be aware of what Low Carbon technologies are currently available. They must also be actively involved in developing new technologies for the future and the UTC will provide this opportunity for them."
>
> Ian Forster, Regional Manager, Cofely GDF Suez

www.utcliverpool.co.uk/Default.aspx

Hugh Baird College

Industry partnership with Wetherby Building Services

Hugh Baird College's Construction department have developed a partnership with Wetherby Building Services to support and deliver the Diploma in Insulation and Building Treatments, which includes the application of external wall insulation. This is a level 2 qualification and forms part of an Apprenticeship framework.

The partnership has included college staff training at Wetherby Building Services and raw materials being provided for students to gain experience.

www.hughbaird.ac.uk/Course/diploma-in-insulation-and-building-treatments-external-wall-insulation-level-2

Absolute Training Solutions Ltd

Fenestration Industry partnership with Liverpool based companies Total Glass Ltd and Bootle Glass Company Limited

'Absolute Training Solutions Ltd is a specialist training provider within the glass sector and have recently completed Fenestration based QCF qualifications with two local glass companies. This included their first ever female Apprentice as part of their commitment to widen participation and target under-represented groups within the fenestration industry. Both Total Glass and Bootle Glass Company Limited recognise the importance of a highly trained workforce and have fully supported their Apprentices and experienced workers through the onsite assessments and training delivered by Absolute Training Solutions Ltd.

The qualifications completed by staff form part of the government's 'Green Deal' initiative, enabling both Total Glass and Bootle Glass to work towards becoming a recognised Green Deal approved installer. Both companies are committed to installing Energy Efficient Windows and through investments in staff training this commitment will enable the companies to offer energy-saving improvements to both homes and businesses across the North-West.'

Absolute Training Solutions Ltd can offer specialist training and National Vocational Qualifications (NVQs) in the following areas:

- Fenestration Installation Level 2
- Fenestration Installation and Surveying Level 3
- Production of Glass Supporting Fabrications Level 2
- Production of Glass Supporting Fabrications Level 3
- Glazing Level 2
- Glazing Level 3
- Glass Processing Level 2
- Glass Processing Level 3
- Installing Domestic Fascias, Soffits and Bargeboards Level 2

Liverpool University

Centre for Global Eco-Innovation

Liverpool University's School of Environmental Science encompasses two departments (Department of Earth, Ocean and Ecological Sciences and Department of Geography and Planning) and offers a wide range of programmes focusing on the study of Planet Earth.

The University also houses the Centre for Global Eco-Innovation in partnership with Lancaster University and an international commercialisation consultancy, Inventya. The Centre is a £9.8 million project part-funded by European Regional Development Fund (ERDF) to provide Research & Development expertise to Small Medium Enterprises in the North West to bolster the region's economy in key export markets and drive forward improvements in green technology and service.

Inventra can support businesses in the North West who are:

- Looking for ways to make money from their technology
- Seeking new international markets
- Looking for ways to commercialise an idea
- Need assistance with Research and development
- Got a problem to solve
- Need additional resources to determine how to access a market

Further information can be found on www.cgeinnovation.org/

The Construction Industry Training Board (CITB)

The Shared Apprenticeship Scheme

The Shared Apprenticeship Scheme allows employers to support and benefit from apprentices, even if they are unable to offer them a long-term placement. It also allows apprentices to complete a full Apprenticeship programme by working with a number of different employers, to gain the skill sets they require to become qualified.

It has been set up to help employers who want to support the development of skills while working on regional contracts, but are not in a position to offer a full term Apprenticeship, and who wish to support training the future workforce.

The Scheme is being rolled out by CITB following successful pilots in Lancashire, Merseyside and Wales. Ten schemes are being developed, which will see 500 extra apprentices joining the UK's construction industry workforce every year.

Source: www.citb.co.uk/

Wirral Metropolitan College

Part time study In Environmental Management (NEBOSH)

The college offer environmental management courses that employees can study on a day release or evening basis. These have been offered for a number of years in response to demand from large employers in industry. The course supports staff responsible for managing environmental issues as part of their work, particularly existing health and safety or facilities managers. The course is available at Level 3 certificate (7 weeks part time) and the Level 6 Diploma.

The qualification meets the academic requirements to apply for Associate membership (AIEMA) of the Institute of Environmental Management and Assessment. This qualification is also accepted by the International Institute of Risk and Safety Management (IIRSM) as meeting the academic requirements for Associate membership (AIIRSM). The qualification includes a work based project and the assessing of environmental management systems with reference to UK legislation.

Waste management training

The college is also able to offer bespoke training in waste management, accredited or non-accredited to fit around the needs of the organisation. Courses can be delivered in a 1 day session to full weeks or part time delivery either in college or the workplace dependant on the employers needs.

Liverpool John Moores University

Maritime Operations MSc course initiative

This dynamic, contemporary programme is designed to meet the ever changing needs of the maritime industry. It takes a strategic perspective of the industry with particular emphasis placed on the management of ports, shipping operations, maritime law, maritime safety and environmental protection. The programme will furnish students with the skills required to secure positions at the highest level within this ultra-competitive worldwide industry.

The course includes a number of Industrial visits and would typically include: Port of Liverpool, ship visit, insurance underwriters (usually in London), P & I Club and IMO. There are also a number of specialist industry speakers invited throughout the year in conjunction with professional bodies and institutions.

CNS Learning Ltd

Supporting Thexton to diversify into External wall installation

CNS delivers qualifications to apprentices and experienced workers in training and assessment for External Wall Installers. Thexton, a multi faceted construction company have recently diversified into external wall installation and CNS has worked with the company in up-skilling their existing workforce and Apprenticeship recruitment and training.

CNS helped Thextons access wage grants (4 have been funded by Wirral Apprenticeships) as well as holding the recruitment days at their premises. The programme has been designed to be flexible to work around weather conditions and meet Thextons needs, delivering 4 weeks training upfront so that the apprentices were contributing straight away to the organisation. Apprentices then attend further blocks of training when the weather is too bad to install Solid Wall Insulation. Experienced existing workers qualified via the On Site Assessment and Training route, working with a team of assessors carry out assessments and observations on their work sites.

The impact of this project is demonstrated on www.cutcarbon.info/news/2013/my-turnover-doubled-thanks-to-green-skills-training-reveals-canny-thextons-boss.aspx?lang=en

Southport College

Renewable Energy Training

The Southport College Energy Training Centre is part of the National Skills Academy and offers a series of short courses designed to give the skills and qualifications needed to work in the field of Renewable Technologies. The Energy Training Centre Accredited courses offered are:

- Award in Environmental Technology Systems Awareness
- Award in the Installation/Maintenance of Solar Thermal Systems
- Award in the Installation/Maintenance of Solar Photovoltaic Systems
- Award in the Installation/Maintenance of Heat Pump Systems
- Award in the Installation/Maintenance of Water Recycling Systems
- Green Deal Assessor Award

Vocational Training - Apprenticeships

Apprenticeships provide an important route into the Low Carbon sector and have been designed to reflect the skills demands of employers. Courses have a minimum duration of 1 year and are available from Level 2 through to Level 6. In order to quantify the level of Apprenticeship take up for the sector Skills Funding Agency (SFA) data has been taken from the Construction, Planning and Built Environment and the Engineering and Manufacturing Technology Apprenticeships as a proxy for Low Carbon. While these are not exclusive routes into employment in Low Carbon sectors they provide a representative picture of recent trends in starts and achievements.

Apprenticeships are available at three levels - intermediate at Level 2, advanced at Level 3 and higher Apprenticeships at Level 4. Nationally emphasis is being given to increasing the numbers of advanced and higher level Apprenticeships and improving the progression routes for learner between levels. For example, SEMTA, which is the sector skills council for the advanced manufacturing and engineering sector has recently introduced a new higher Apprenticeship framework. This includes seven pathways covering a wide range of job roles in the sector. This provides pathways relevant to the Low Carbon sector covering aerospace; nuclear; mechanical; electrical / electronics; automotive; maintenance; and wind turbines. This framework is available at Level 4 with embedded pathways to Level 5 / 6 qualifications and will enable Apprentices to work towards the professional standard of Incorporated Engineer status[32].

In addition United Utilities have an aspiration to become energy neutral and are exploring many innovative technologies from around the world to achieve this. Some of these are being developed in conjunction with LJMU.

Data for the Liverpool City Region indicates that there has been growth in both the number of starts and achievements in Apprenticeship frameworks related to the Low Carbon sector. Over the period 2008 - 2012 with an additional 1,210 starts in 2012 compared to 2008. This is reflected in the level of achievement in Apprenticeships feeding the Low Carbon sector, as illustrated in Figure 12.

Smart Metering - British Gas Apprenticeships

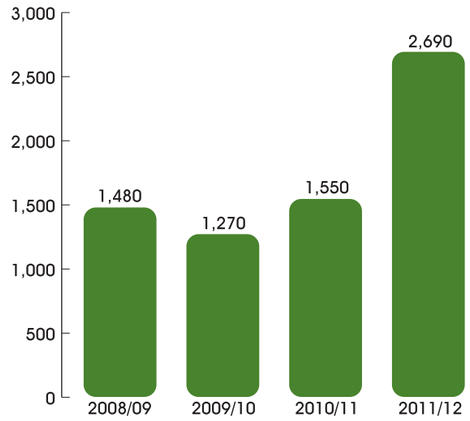
Utilities companies including gas, water and electricity are developing significant roll out programmes for smart metering, either directly or through their supply chain.

The volume of work is substantial and there will be opportunities in both providing training to the workforce as well as through direct employment. This direct employment will be in terms of installation, product innovation and service industry jobs encouraging consumer behaviour change to adopt smart metering to make savings on utilities bills.

British Gas is at the forefront of progressing smart metering and is recruiting enthusiastic, customer focused Apprentices to help customers understand and transform how they use their energy in the future. The successful Apprentices will carry out meter installations, maintenance and repairs and associated meter work. They are required to work in customers' homes, including outdoors dependant on where the meter is situated. Apprentices will receive excellent technical training, which includes the City & Guilds Level 2 QCF Diploma in Smart Metering Dual Fuel and hands on field experience gained with a qualified mentor.

[32] Framework available: www.afo.sscalliance.org/frameworkslibrary/index.cfm?id=FR01602&back

FIGURE 12
APPRENTICESHIP ACHIEVEMENTS FOR LOW CARBON RELEVANT FRAMEWORKS 2008-12
LIVERPOOL CITY REGION



Source: BIS First Statistical Release (2013)

Myerscough College Apprenticeship in Sustainable Waste Management

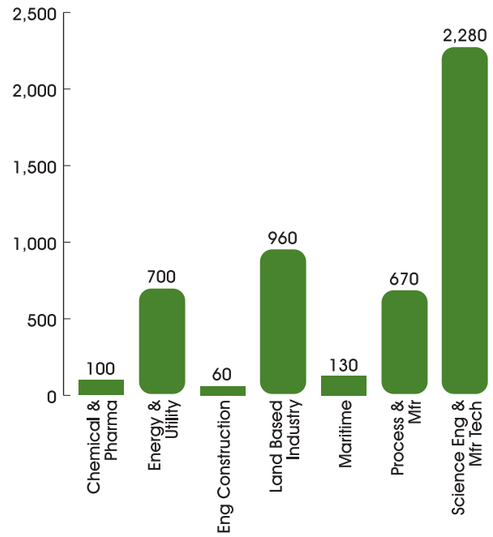
Myerscough College offer Sustainable Waste Management Apprenticeships for several organisations including Halton Borough Council.

The Apprenticeship consists of training in a variety of skills including Manual Handling and Refuse Collection Vehicle Operator Training and includes NVQ Level 2 Certificate for Sustainable Waste Management Operatives and a City & Guilds Level 2 Certificate in Principles of Sustainable Resource Management qualifications. These will give apprentices professional level knowledge in key aspects of their job in frontline waste operations including recycling and waste management technology, health and safety, and dealing with hazardous waste.

Vocational Training - Further Education

As with Apprenticeships there are no specific sector programmes for Low Carbon, with training linked to the core trades and specialist skills demanded by occupations across the sector. The SFA Data Services First Statistical Release for 2010/11 shows that there were 4,900 achievements in sector skills frameworks feeding the Low Carbon sector. Figure 13 below shows the number of achievements across the skills areas identified as relevant to Low Carbon.

FIGURE 13
ACHIEVEMENTS BY LOW CARBON RELEVANT TRAINING, LIVERPOOL CITY REGION 2010/11



Source:BIS First Statistical Release (2013)

Science Engineering and Manufacturing Technology is the largest curriculum area within Low Carbon relevant sectors of training, constituting nearly half of all achievements within this group of courses. This includes a range of engineering and manufacturing activity working in automotive, metal fabrication, electrical equipment, marine maintenance and mechanical engineering. Apprenticeships can form the core of business skills planning, as with Cammell Laird where nearly 10% of its workforce is apprentices in key trades including mechanical engineering, pipe fitting and welding fabrication[33].

[33] See Cammell Laird website - www.clbh.co.uk/careers/training

Maritime and Engineering College North West

The College offers Advanced Apprenticeships in Engineering that provide training and assessment to learners that have placements in engineering companies. Apprentices work towards a Level 3 qualification in engineering maintenance, fabrication and welding or mechanical manufacturing engineering. Integrated into the training are key skills in the application of number, communication IT and working with others. Based full-time in a company apprentices have day release to attend the College.

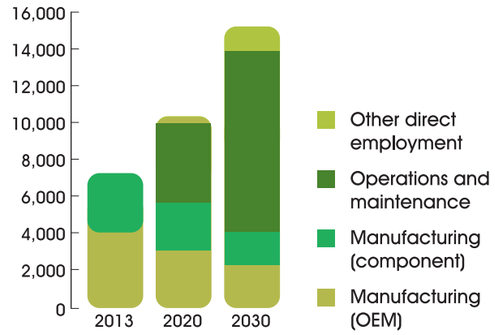
www.mecnw.co.uk

A key skills challenge, as indicated previously is the age of the existing workforce in Low Carbon sectors with indications that expanding demand and the current age profile will exacerbate skills shortages in the future. Additionally, there are concerns for example in the wind energy sector to raise the skills of existing employees[34]. This is a factor of slow adaptation and upgrading of existing skills sets for workers transferring into the industry and also reflective of changing patterns of demand as the Low Carbon practices become established. The EWEA report indicates that over the period 2013 - 2030 skills demand will substantially shift from the manufacture of wind energy technology to the operation and maintenance of wind technology.

Over the period 2013 - 2030 skills demand will substantially shift from the manufacture of wind energy technology to the operation and maintenance of wind technology

Accordingly, this creates a major capacity gap to fill the anticipated additional 10,000 operation and maintenance jobs in Europe forecast for 2030.

FIGURE 14
CHANGING DEMAND FOR SKILLS WITHIN THE WIND ENERGY SECTOR



Source: European Wind Energy Technology Platform (2013: 12)

The SFA data indicates that workplace training constitutes 35% of all training delivered for Low Carbon relevant sectors and that a majority of provision for all sectors, except Process and Manufacturing by trainees age 19+. With growing entrance into Apprenticeship programmes and a significant scale of workplace based training this is a positive indication of skills investment into Low Carbon.

There is extensive provision within the Liverpool City Region offering training in the construction trades around upgrading existing properties (retrofit). All construction training now includes an element of low carbon training and providers are now offering up-skilling opportunities for existing trades people.

[34] European Wind Energy Technology Platform (2013)

The City of Liverpool College

Green Energy Centre
The City of Liverpool College have invested in the development of a £250,000 bespoke green training centre in the Vauxhall Road site, which features a full-size 'green indoor house' to deliver the latest skills training to the industry's new and existing workforce. This supports the delivery of a wide range of Environmental Technology/Low Carbon provision including industry recognised qualifications for electricians, plumbers and heating engineers in sustainable technology, from installing solar panels to heat pumps and water recycling system as well as short courses in Installation & Maintenance of Heat Pumps Systems, Solar Photovoltaic Systems, Solar Thermal Hot Water Systems, Water Harvesting and Environmental Technology Systems Awareness. The college have also ensured that all tutors have received training in the latest technologies in order to keep up-to-date with industry.

"The growth in the sustainable sector is a huge opportunity for this region. Our training centre, which is one of the largest in the UK, will be able to equip workers and businesses with the skills they need to ensure our region will be the leader in the field of green technology."
(Elaine Bowker, Principal and Chief Executive at The City of Liverpool College)

"The training centre, with the life-size house, gives students a real feel of the practicalities of installing green technology, even to the extent that they can learn what it's like to install full size solar panels at height, on the roof of a house."
(Justin Smith, Assistant Principal, Technical and Enterprise at The City of Liverpool College)

"Came back to brush up my skills and was surprised how good the kit and workshops are. Trainer was spot on with the knowledge too."
(John, NVQ Level 3 Heating & Ventilation student)

The National Skills Academy in Environmental Technologies have approved 12 local providers within the region who are able to offer training through the recently launched Renewable Heat Incentive training voucher scheme (October 2013) see Appendix 2. These include:

- Blackpool & the Fylde College (online training is now available through this centre)
- Combined Harvesters Ltd
- Hugh Baird College
- Inteb Sustainability Ltd
- Knowsley Community College
- Liverpool John Moores University
- North West Training Council
- St Helens College
- Southport College
- The City of Liverpool College
- West Cheshire College
- Wirral Metropolitan College

Centres of offshore renewable engineering (CORE)

In 2012, the Liverpool City Region was named as one of the Governments designated centres of offshore renewable engineering (CORE). Notably each of the other 5 COREs, all situated on the East Coast, have Off-shore Survival Training centres and this is a significant gap for the City Region. Therefore Wirral have a proposed ambition for an Off-shore Survival Training Centre to be set up in order to:

- Build the skills and qualification capacity for Offshore Wind Sector: Local industry feedback has identified that as there is no offshore survival training facility available locally, the cost and affordability of offshore training for businesses and local people is exacerbated and for some unreachable owing to increased transport and accommodation costs. An additional barrier relating to the availability and promptness of training owing to over subscription/ demand has also been identified by local businesses.
- Provide a bespoke testing environment for R&D: Local businesses and industry specialists have identified that the maritime sector struggles to accommodate research and development requirements in developing new products that require intensive testing, e.g. marine safety equipment.

Low Carbon Careers Education and Recruitment Support

Reflecting the diversity of occupations and skills found within the Low Carbon sector, careers information is provided from a number of sources. The National Skills Academies (NSA) produce materials for aspiring entrants to the sector as well as information for existing employers and employees - a list of web addresses for NSAs relevant to Low Carbon is provided in Appendix 3. An example of careers materials is produced by the NSA for Environmental Technology[35] who provides a summary route guide - emphasising Apprenticeships - into Low Carbon careers. Careers materials are also provided by Renewable UK on jobs in the wind and marine sectors[36] and by Crown Estates who focus specifically on the wind energy sector[37].

While there is value in a number of Sector Skills Councils (SSC) identifying their skill areas with Low Carbon, the provision of careers information becomes fragmented and fails either to provide a coherent picture of opportunities in the sector or to make links between functional work areas that are represented by different SSC. This presents an opportunity to build upon existing City Region activity, to create careers materials that more fully represent the diversity of career pathways available within the sector - linked to specific employer activity and training programmes.

It is important for schools and employers to work together to promote and educate young people about sustainability and the huge range of career opportunities in this sector, an example of good practice in this area is found in Veolia, who have set up 2 discovery centres within the region.

[35] See www.nsaet.org.uk/files/4313/6180/8285/Low_carbon_career_routes_Final.pdf.pdf
[36] See www.renewableuk.com/en/careers
[37] See www.thecrownestate.co.uk/media/212025/career_in_offshore_wind_brochure.pdf

Veolia Waste Management - Recycling Discovery Centre open for Schools visits

Veolia Environmental Services is dedicated to changing perceptions of waste within Merseyside. Their waste education programme aims to raise awareness of waste solutions and promote action to reduce, reuse and recycle.

Veolia have two Education Centres in Merseyside that offer schools the opportunity to see state-of-the-art recycling in action and delve into the world of waste! Offering an interactive experience which uses the very latest technology to inspire and educate all schools and community groups.

The Centres are accredited by 'Learning Outside the Classroom' for the range of interactive activities available, and the opportunities for 'learning through play'. Many of the topics covered during sessions are part of the eco-schools framework and there are endless cross-curricular links which can be explored during visits.

Veolia actively work with schools and community groups to tailor visits to your needs. Whether it's an introduction to recycling, an in-depth science lesson or guidance for an eco-council, Veolia can provide a fun and educational day out for all. Typical activities at the Recycling Discovery Centre include:

Primary Schools - Guidance for eco-councils, Litter workshops, Waste Free Packed Lunch challenge, Inter-school eco-summits, WasteWise activities, Recycling Computer Games, Interactive whiteboard activities, 3Rs workshops, Green Screen and video camera and drama performances.

Secondary Schools - Explore the waste hierarchy and discuss global, national and local responsibilities, Understand the human impacts on the environment, Explore renewable and non-renewable energy sources, Contextualise maths in a business environment, Interactive group work and discussion groups exploring waste solutions for sustainable development.

Higher Education Courses - BTEC Environment and Countryside, Geography, Environmental Science, Developing Environmental Awareness, Architecture, PGCE and Teacher Training.

Community Groups - Information and discussions about recycling at a global and local level. Veolia welcome all community groups for a guided tour of the recycling facility.

There two Recycling Discovery Centres in Merseyside based in Gillmoss and Bidston.

Source: www.veoliaenvironmentalservices.co.uk/Merseyside-and-Halton/Facilities/Recycling-Discovery-Centres/

There are a number of online resources that can develop and support individuals further understanding of the opportunities within this sector: These include:

- Liverpool City Region Jobs for Tomorrow Careers Resourses, found on www.connexionslive.com/YoungPeople/JobsandCareers/JobsForTomorrow/GreenEconomy.aspx
- National Careers Service, found on https://nationalcareersservice.direct.gov.uk/Pages/Home.aspx
- The National Skills Academy in Environmental Technologies, found on www.nsaet.org.uk/career-routes/careers-options/
- Low carbon career routes information sheet, found on www.nsaet.org.uk/files/9913/4460/4993/Low_carbon_career_routes_Final.pdf.pdf
- Cut the Carbon, Develop Skills Grow Business, found on www.cutcarbon.info/training/green-deal-upskilling-programme.aspx?lang=en
- CITB, found on www.citb.co.uk/careers-in-construction/
- Summitt Skills careers map, found on www.summitskills.org.uk/careers/343
- Asset Skills Careers Guides, found on www.assetskills.org/CareersandTraining/CareersHome.aspx
- Lantra Career pathways in Environmental Conservation, found on www.lantra.co.uk/careers/career-pathways.aspx
- National Skills Academy in Power, found on www.thinkpowersector.co.uk/learn_about_power/
- National Skills Academy for Nuclear, found on https://www.nuclear.nsacademy.co.uk/system/files/NSA%20Nuclear%20Plan%202013-2015.pdf
- The Institute of Environmental Management and Assessment (IEMA) Environment Careers Advice portal, found on www.iema.net/access-environment-careers-advice

Current and Future Opportunities

Few other locations in the UK or Europe have the natural potential and low carbon business capability of the Liverpool City Region.
With strengths in offshore wind, marine tidal energy, retro-fitting, bi-product hydrogen, waste management and recycling, water treatment and energy management - the mix of capability is second to none[38].

The Liverpool City Region has a major opportunity to consolidate and build upon existing capacity and labour market expertise to grow the Low Carbon sector. Achieving this will be influenced by a range of market based factors including building a skills pool able to meet the current and future demand of employers. The following section provides an indication of the current requirements for labour and skills focusing on anticipated demand which reflects known medium-term investments and indications from business on forthcoming vacancies.

> Few other locations in the UK or Europe have the natural potential and low carbon business capability of the Liverpool City Region

Managing Demand

Employers with labour and skill requirements address their needs through two primary routes. Firstly, they reorganise and deploy existing staff onto new or additional tasks. This may entail providing staff with informal training or support through mentoring and supervision by colleagues. Addressing labour and skill needs informally is potentially the most cost effective response for employers, and may be attractive particularly where there is some uncertainty about whether new contracts, markets or areas of work continue into the future. This can be a very creative exercise for employers to help them to understand the capacity and skills of staff and may uncover additional value for the business through its labour force. Where workers are redeployed within a company in response to contract opportunities this may appear in aggregate as 'jobless growth'. Thus in employment terms may be seen to have a negligible impact on the economy, however can serve to increase the productivity and the GVA of firms and create a wider benefit to the competitiveness of sectors. From an external perspective much of this action may be invisible but may **create a demand from employers for advice and support on issues such as retraining of staff, backfilling of redeployed posts and upgrading the skills of employees that may have taken on additional supervisory or line management responsibilities.**

[38] Liverpool City Region Growth Plan & Strategic Economic Plan 2014

Fusion21 - Low Carbon Employer Pool in the housing and construction sector

This service was established by Fusion21 to support local companies and organisations to invest in local labour, contribute to training outcomes and reduce worklessness. The Employer Pool is a social enterprise recruitment agency matching skilled unemployed people with businesses in the housing and construction sector and providing access to training in employer demanded low carbon skills. The Employer Pool helps businesses to deal with the risks associated with taking on new staff or trainees within a market context of short-term contracts typical for housing energy efficiency improvements. The service aims to raise the skills and work readiness of residents of the City Region and contribute to the availability of skills for the low carbon economy.

Source: www.employerpool.co.uk/home/

The second route for employers to respond to demand is by taking on additional staff either to fill a specific vacancy or a trainee position that may assist across a number of jobs. The recruitment practices of businesses vary depending on the experience and culture within a business sector and also in relation to level and type of job available. Employer practices will be conditioned by a range of factors including the number of posts to be filled, the skill level sought and knowledge of local supply. **High skilled jobs may be recruited from a national or sometimes international market catchment and be advertised through specialist press, employment agencies or professional networks or specialist websites such as www.greenjobsonline.co.uk.** Intermediate or lower skilled posts may be advertised through press, word of mouth, Jobcentre Plus and via websites and social media outlets. Employers, particularly where they consider there to be a shortage of skills, such as Low Carbon, may use all of these routes simultaneously to try and get the best response. This makes identifying the level of demand for particular skills or sectors a challenge beyond identifying key trends in recent employment levels. Figure 15 highlights key issues affecting recruitment to Low Carbon occupations.

Stobart

Biomass Deal - Widnes Hub

Stobart Biomass division have secured a 15 year £75m deal for its biomass division to supply 115,000 tonnes of recycled wood each year to the new Evermore power station plant which is to be constructed in Derry/Londonderry by summer 2015.

The group launched its biomass division in 2010 and it is now a processor, supplier and transporter of biomass fuels. Stobart Biomass employs around 300 staff and has plans for its own biomass plant alongside its transport depot and multi-modal hub based in Widnes.

> "Stobart Biomass is seeing increased demand for its range of products across the UK and is pleased to support Evermore with this key development in Derry/Londonderry.
>
> "Stobart Biomass has an extensive pipeline of opportunities. We look forward to helping plant developers and funders to bring those opportunities to fruition and growing our own biomass business."
>
> Andrew Tinkler,
> Stobart Chief Executive

Source: Liverpool Daily Post, 2013

FIGURE 15
KEY ISSUES IMPACTING ON RECRUITMENT TO LOW CARBON OCCUPATIONS

Level / Job Type	Job Title	Key Issue
Level 5+ Directors and senior managers, advanced scientists and engineers	Production Managers Design Engineers Geologists Mechanical Engineers Aeronautical Engineers Civil Engineers Process Engineers	High skilled jobs are relatively few in number but have a disproportionate impact on both business performance and decisions by firms to locate in particular areas. Supply affected by profile and success of the sector in LCR
Level 4 Graduate scientists, engineers and professionally qualified staff	Process Engineers Chemical scientists Power Engineers Software Developers Quality Control Managers	Reported as skills shortage area with growing demand linked to new contract opportunities in LCR. Businesses competing nationally for the best skills and looking to create graduate entry routes into occupations where there are supply problems
Level 3 Technical administrative and skilled trades in construction and engineering	Engineering technicians Welding trades Electricians Plumbers Marine staff Quality technicians	Growing levels of unmet demand reported as the sector expands through additional orders, with supply constrained due to ageing workforce and need to adapt skills of existing employees to meet the need of Low Carbon businesses
Level 1 - 2 Operatives in manufacturing construction and logistics plus supporting basic administration	Mfr Process Operatives Metal Workers Fitters and Installers Plant and Machine Ops Drivers and Warehousing Water and Waste Ops	This is not currently identified as a supply issue by employers with capacity across a range of sectors. Ageing workforce is an issue addressed through creation of trainee and entry level positions

Source: HESA 2012

Anticipated Demand

The following section provides an overview of anticipated demand for labour and skills in the Low Carbon sector. This is set within a context of **sales growth in Low Carbon and Environmental Goods and Services of 3.8% in 2012/13 and forecast growth of 4.4% in 2014/15**[39]. The sector contrasts with wider economic conditions in the UK with the Office for Budget Responsibility indicating growth of 0.6% in 2013 and 1.8% in 2014[40] for the national economy. For the Liverpool City Region the prospect of major infrastructural investment and market opportunities will be important in shaping labour market demand and realising the full growth potential indicated in sector forecasts.

Liverpool City Region: Sustainable Energy Solutions

Over the next five years, LCR will see substantial investment across the energy sector. The Liverpool City Region LEP's Action Plan for Low Carbon provides more depth to these investments. Off-shore wind investment, waste-to-energy plants in some of the area's largest manufacturers, and research required for a Mersey Tidal scheme creates a powerful supply chain for research and technology application. This is in addition to the general market demand to lower energy costs and become more sustainable. Investment in sustainable energy solutions is strongly backed by the local manufacturing sector, with the identified first steps to focus on local energy generation, capture skills and competencies in power management, and invest in local energy infrastructure.

Source: Making It, 2013

In addition to the Liverpool Local Enterprise Partnership (LEP)[41] there are a number of associations across the region that are focusing on how to increase/ stimulate demand and identify skills needs of the sector including the North West Retrofit Roadshow[42] and the North West Skills for Growth Forum coordinated by CITB[43].

There is a diverse range of businesses in the sector both manufacturing products and/or providing sales, technical support and professional service functions located in the City Region area. The numbers of employers against the 24 sub sectors included in the BIS definition of Low Carbon and Environmental Services sector is detailed in Appendix 4.

Energy Workshop, Low Carbon Liverpool, July 2013

Drivers of Demand identified by ARUP

- Alexandra Dock 150MWe biomass plant, application awaited by PINS under the NSIP planning regime
- Stobart Park/3MG 20MWe Combined Heat and Power (CHP) plant recently approved by Halton
- 10.6MWe EfW CHP in St Helens application under consideration
- Pre-application and Environmental Impact Assessment (EIA) Screening for solar parks in Sefton (20MW) and St Helens (5MW)
- Pre-application and EIA Screening for 3.3MWe biomass CHP in St Helens
- Knowsley Industrial Park heat networks - OJEU for technical advisor

Source: ARUP, 2013

39 BIS / kMatrix data for LCR (2013)
40 OBR (2013)
41 www.liverpoollep.org/priorities/low_carbon_economy.aspx
42 www.retrofit-roadshow.co.uk/locations/Journey-so-far-/retrofit-north-west-liverpool-3-september-2013/
43 www.linkedin.com/groups/North-West-Skills-Growth-Forum-4484571/about

In order to examine anticipated demand for employment two case studies of key sub sectors are provided for renewable energy - construction of offshore wind farms and subsequent operation and maintenance requirements; and energy efficiency - housing retrofit and installation of insulation and energy micro-generation systems.

Renewable Energy - Wind Power

The Liverpool City Region area is a key national location for the manufacturing and servicing of off-shore wind power facilities. The City Region is one of six national Centres for Offshore Renewable Engineering (CORE) tasked with promoting the UK to foreign investors in renewable energy and also supporting innovation and business growth amongst local firms. **The City Region is the primary base for Irish Sea operations and benefits from major companies including ABB, Siemens, DONG Energy, Maersk, Bibby, Jaguar Land Rover, UTC, and Unilever. Additionally, Cammell Laird has the largest heavy fabrication, marine engineering and maintenance base port facilities on the UK's west coast**[44]. These companies alongside the increasing prominence of the City Region as a location for renewable energy business activity underpin the potential for future sector growth.

Business in the City Region have benefited from major contracts for the fabrication of wind turbines and ongoing maintenance of facilities. This includes the €2 billion Gwynt y Mor facility located in Liverpool Bay which when completed will have 160 turbines in operation[45]. Existing and approved wind farms on the North Wales Coast and Liverpool Bay are estimated to create over 3,000 jobs across both construction and operational phases - see Figure 16. Indications are that the scale of construction and maintenance contracts will continue to increase over the medium term creating additional demand for skilled labour. The development of offshore sites also creates additional demand for specialist sub surface technical services including hydro-graphic surveyors and geotechnical engineers for mapping of ocean bed sites and specialist divers able to support construction work and undertake technical inspections. As the scale of the wind power sector expands in the City Region there will be increasing demand for specialist marine skills.

Wirral's Offshore Wind Investment Regional Growth Fund (RGF) programme

Wirral's successful award of £5million RGF will enable investment into the offshore renewable energy sector of some £25m leading to the creation of 500+ jobs. The fund will be used to support projects in the offshore renewable sector, creating new private sector growth, increasing productivity and addressing the balance between public and private sector employment. These aims will be delivered through key themes:

- Infrastructure Improvements to the facilities at Cammell Laird to capture engineering, fabrication, operations and maintenance opportunities in the offshore renewable energy sector. This will accelerate investment to enable contracts to be secured from developers that would otherwise potentially go to businesses elsewhere in Europe
- Marine Supplier Park to create an initial 25,000 sq ft of bespoke business space to meet employer demand within the sector and attract inward investment within the offshore renewable energy market and to enable diversification and the growth of local suppliers
- Targeted Financial Assistance for businesses to diversify into the offshore renewable energy sector to grow and increase employment opportunities, and reduce barriers and accelerate private investment into the growth in the supply chain.

[44] Source: UKTI (2012) - Building Offshore Wind in England

[45] Source: www.rwe.com/web/cms/en/1202906/rwe-innogy/sites/wind-offshore/under-construction/gwynt-y-mr/

Cammell Laird - centre of global engineering excellence, serving the offshore renewables, civil nuclear, engineering and maritime sectors

RWE npower renewables are contracted with Cammell Laird in Birkenhead to support the construction of Gwynt y Môr, one of the largest offshore wind farms in construction in Europe and involves over a million pounds of steel fabrication work. Cammell Laird will also be bidding for work in the Round 3 wind farm projects for the Irish Sea.

To help service this and other work, Cammell Laird now have 64 Apprentices in the business, with a focus on ensuring its workforce has transferable engineering skills. The Company work in partnership with specialist training provider Maritime and Engineering College North West (MECNW), which is situated next to the yard and is one of the premier locations in Britain for maritime engineering training.

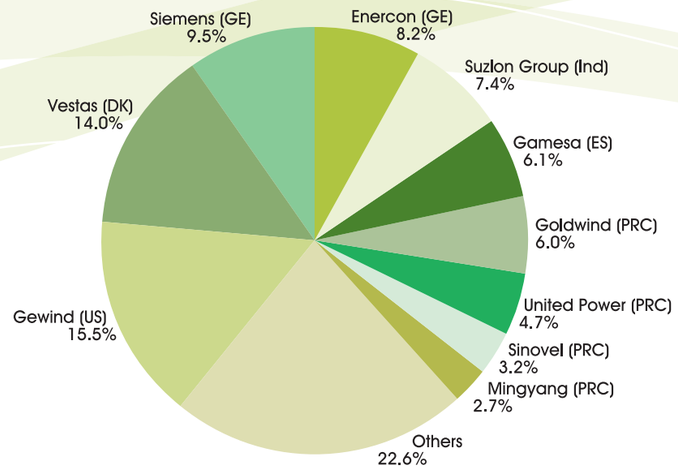
FIGURE 16
ESTIMATED JOB CREATION FROM OFFSHORE WIND FARMS - LIVERPOOL BAY AND NORTH WALES COAST

Wind farms	MW *	Jobs **
Walney 1	184	392
Walney 2	184	392
Ormonde	150	320
Barrow	90	192
Burbo Bank	90	192
Gwynt y Mor	576	1,227
North Hoyle	60	128
Rhyl Flats	90	192
Total	**1,424**	**3,035**

Source: * Jobs per MW from Crown Estate 2013 ** Job creation rate from McNeil et al 2013

While there are some new skill requirements for the wind power sector a **majority of employer demand is for high quality craft and technical skills in metal fabrication, electronic and mechanical engineering and marine based operations.** In common with other sub-sectors within Low Carbon core skills can be found in the traditional industrial and maritime sectors located in the City Region. The key challenge is to define the additional competences required by employers, in the context of functional change in employer requirements - from installation to operation and maintenance - and feed these into the planning arrangement of training providers.

FIGURE 16a
TOP 10 SUPPLIERS (GLOBAL) IN 2012



Source: BTM Consult - A part of Navigat - March 13

The top wind turbine manufacturers are based in America, Europe (specifically Denmark and Germany), India and China Figure 16a shows the main global suppliers in 2012.

It will be increasingly valuable for individual's to have the ability to converse and follow technical foreign languages in the appropriate low carbon content. For example, on technical foreign language skills, knowledge of the main component parts of a wind turbine in the language of the main supplier companies would be very beneficial.

Figure 17 provides an illustration of traditional skills areas and their application to the wind power sector focusing on three principle functional areas of heavy engineering fabrication, the construction and installation of wind turbines and the ongoing operation and maintenance of wind power. This aims to show the additional skills needed to adapt established trades and occupations to the Low Carbon sector. This assumes qualifications in core occupations and a willingness to adapt and augment to new sectoral activity.

While there is not a linear relationship between the expectations of employers and the volume of jobs demand in the labour market, trends can be observed from national occupational data combined with key market indicators. Data has been assembled for renewable energy - wind power - based on the occupational analysis above and set out in Figure 18. This indicates the diversity of occupational areas relevant to the wind power sub sector and while there has in aggregate been a small overall reduction in employment this masks significant variation employment levels for some occupations over the period 2008 to 2012.

There are 32 occupational groups identified as being relevant to the Low Carbon wind power sector, of these 10 occupations (shown in green) have grown over the 2008 - 2012 period. These posts fall within engineering, technician, precision metal workers and electrical fitter occupations. While this data does not exclusively relate to employment within Low Carbon, the areas of growth are consistent with the intelligence gathered during the Skills for Growth Agreement consultation process.

- **Engineering occupations** - rising demand is reported by employers seeking staff for the assembly and ongoing installation of wind farms. This includes both qualified engineering staff and skilled technicians with experience of precision metal work and instrumentation.

Employer demand is for high quality craft and technical skills in metal fabrication, electronic and mechanical engineering and marine based operations

- **Electrical and mechanical maintenance fitters** - medium term priority to meet the need for personnel with strong diagnostic skills to maintain power installations and networks.

- **Ship personnel** - linked to the expanding wind farm market there is increasing demand for skilled workboat and service vessel skippers and crew. Local consultation within the sector indicates that recent demand has resulted in a requirement of around 1,000 additional nationally each year.

FIGURE 17
CORE AND ADDITIONAL SKILL COMPETENCY AREA FOR WIND POWER

Skills areas	Additional skills required	Low carbon work area
Fabrication Aeronautical design Control systems engineering Electrical engineer Mechanical fitters Welding	Transferable skills from heavy manufacturing and ship building. Specific training in turbine design and manufacture and technical roles such as use of high voltage cables for offshore installations and high specification welding.	• Assembly of wind turbines • Design of electrical systems • Production of gearing mechanisms • Quality control
Construction and Installation Civil engineering Surveying Construction project mgr Electrical technician Rig and crane operatives	Transferable skills from the oil and gas industry and from civil engineering. Core additional skills required include health and safety and working at heights offshore. Specific technical training in marine engineering.	• Seabed foundations for turbines • Installation of electricity cables • Offshore project mgt • Connection to electrical substations
Maintenance Electrical engineer Mechanical technician Systems performance operative Ship crew	Transferable skills from manufacturing, chemical and energy industries and from within port and marine industries. Technical training in monitoring of wind turbine performance, problem solving and repair.	• Performance and monitoring engineer • Turbine technician • Skipper wind farm vessel • Mechanical engineer

Source: Adapted from Crown Estate (2010)

Workboats/Wind Farm Transport Vessels

Multi-purpose vessels are used in support of Offshore wind farm construction in the region and other marine civil engineering and subsea projects. Typical of the type of work undertaken could encompass:

- Anchor handling
- Towage and handling of transport barges
- Towage and handling of rock barges
- Dredging support
- Transfer fuel and freshwater to other vessels
- Transfer of cargo and equipment, with vessels' own crane
- Personnel transfers
- Plough dredging & bed levelling
- SBM Buoy work
- Tanker hose handling
- Use as a dive platform
- Hydrographic survey
- Subsea equipment deployment

These services provide support to:

- Dredging and reclamation projects
- Pipe and cable laying operations
- Offshore production platforms
- Salvage operations
- Marine civil engineering and construction projects
- Offshore wind farm construction

We may also see an increased demand for diving ability around off shore wind farm installation which will benefit from the proposed off shore survival training centre and other industries who are involved in that maritime sector.

FIGURE 18
EMPLOYMENT TRENDS BY OCCUPATION LIVERPOOL CITY REGION - RENEWABLE ENERGY

Occupation	Employment 2012	2008-2012 Change (%)	Trend Demand
Production Mgrs in Manufacturing	3,869	-27.9	
Production Mgrs in Mining and Energy	*	N/A	
Physical Scientists	*	N/A	
Civil Engineers	368	-51.4	
Mechanical engineers	1,722	12.6	
Electrical Engineers	384	-79.1	
Electronics Engineers	1,036	N/A	
Design and Development Engineers	253	-78.6	
Production and Process Engineers	576	-29.1	
Engineering Professionals	1,132	-55.5	
Electrical and Electronic Technicians	638	-37.9	
Engineering Technicians	1,232	61.7	
Building Civil Engineering Technicians	628	N/A	
Quality Assurance Technicians	534	-37.0	
Planning Process Production Tech'ns	885	27.9	
Ship and Hovercraft Officers	710	101.7	
Sheet Metal Workers	578	-14.5	
Metal Plate Workers and Riveters	*	N/A	
Welding Trades	2,015	132.4	
Pipe Fitters	*	N/A	
Metal Machining Setters Operators	244	-72.2	
Tool Makers and Tool Fitters	358	-15.0	
Metal Working and Maintenance Fitters	5,239	16.8	
Precision Instrument Makers / Repair	714	N/A	
Aircraft Maintenance Trades	1,100	248.1	
Boat and Ship Builders and Repairers	*	N/A	
Electricians and Electrical Fitters	6,237	50.3	
Skilled Metal and Electrical Trades Supr	1,830	8.0	
Metal Making and Treating Process Ops	-	N/A	
Metal Working and Machine Ops	1,336	11.9	
Crane Drivers	*	N/A	
Elementary Process and Plant Ops	1,921	-15.6	
Total	**35,539**	**-3.9**	

Key Decrease Increase

Source: ONS APS Data (2012) - Special Run

Linked to renewable energy generation is the development and reinforcement of the infrastructure required to deliver this energy to either a local grid or to the national grid. Significant investment is required by the district network operator. Investment plans typically cover an 8 year period which allows local employment opportunities to be realised within the supply chain. In addition energy centres and other innovative ideas are developing that seek to manage peak time network loads. These again provide employment opportunities, both in developing products and in their installation.

There is also the potential for new district heating schemes and combined heat and power schemes within the LCR, driven by the carbon saving agenda. Again this provides employment opportunities, both in developing technology and in their installation.

Energy Efficiency - Housing Retrofit

The Green Deal programme is established and home improvements are also being commissioned by local authorities and housing associations. Indications from local consultation are that installation skills will provide the bulk of new demand for skills for staff carrying out external and internal wall insulation.

Liverpool City Council on behalf of the Liverpool City Region have established an OJEU compliant framework of four major contractors / energy companies as a channel to accelerate the delivery of Energy Company Obligation (ECO)/Energy Efficiency funding opportunities. The framework will provide a robust delivery service which will minimise the cost to market for ECO obligated parties and thereby maximise investment within the City and the City Region. Successful organisations will be assisted to deliver either funded installations or funding only to deliver on their carbon savings targets and affordable warmth targets. Works ordered through the framework will specifically target improvements to the creation of local jobs, improvements in local supply chain and the development of local training services.

REECH Initiatives

REECH (Renewables and Energy Efficiency in Community Housing) is a European Regional Development Fund (ERDF) project aimed at improving energy efficiency in some of the most deprived communities in Merseyside and Halton. Working with housing providers throughout Merseyside and Halton, and managed by Sefton Council, REECH will refurbish over 2,000 homes with a range of measures to make them more energy efficient at a cost of £15 million. This work is known as retrofitting. The aim is that the increased demand for green technologies will provide new business opportunities for local suppliers and contractors working in the green energy/low carbon sector.

Over the lifetime of the initiative over 2,000 homes will receive refurbishment works, 12,000 tonnes of carbon dioxide will be saved and over £9,500,000 of private sector funding will be used. The REECH Initiative has developed a programme of complementary activity to wrap around the REECH retrofit programme in order to gain the greatest level of impact on the local economy. The main areas of activity are supply chain/local business opportunities, employment & skills, community engagement/ behavioural change, sustainability and evaluation and dissemination.

Continued

Continued

Housing Projects:

Four Acre Green, St Helens

Helena Housing has installed a range of energy efficiency measures in 449 properties in Four Acre Green, St Helens. The houses, built between 1966 and 1974, are a mix of traditional and system built construction.

The properties have received external wall insulation, innovative combination boilers, air tightness measures, voltage optimisation and LED lighting.

The total programme costs are approximately £3,385,800, with funding from ERDF, through the REECH Initiative, and CESP (Community Energy Saving Programme), through British Gas. Smart meters are also being installed in a number of homes across the estate.

Stockbridge Village, Knowsley

Villages Housing Association has delivered 2 phases of energy improvement work in Stockbridge Village. In phase 1 608 low-rise properties have had external wall insulation, top up of existing loft insulation and replacement central heating with A rated boilers (this replaces fan warm air partial heating systems). Residents also received a tailored Home Energy Advice Pack.

The total programme costs were approximately £4 million. The funding is from ERDF through the REECH Initiative and CESP through British Gas. This work forms part of a much wider estate regeneration scheme delivered by Knowsley MBC in partnership with Villages.

Phase 2 saw 1 tower block and 44 low-rise properties improved. The tower block had external wall insulation and draft-proofing measures installed. The low-rise properties received the same measures as phase 1.

To compliment the physical work Villages have launched the Energy Monitor Loan Scheme and Energy Advice Surgery. The monitors can be borrowed for up to 3 months. The advice surgery provides additional information on how to save energy and how to get improved energy tariffs. The information provided at the surgery is tailored to meet residents individual requirements.

Regenda Ltd

Regenda will shortly be on site on schemes in Liverpool and St Helens. In the Clock Face area of St Helens 17 homes will have external wall insulation fitted to the rear of the properties and internal wall insulation installed at the front. The properties will also have mechanical heat recovery ventilation (MHRV) and voltage optimisers installed.

In Liverpool 27 homes will have internal wall insulation installed. Again MHRV and voltage optimisers will also be installed. Some of these homes are all listed and in conservation areas so they present particular challenges when installing energy saving technologies.

The original estimates for work included for a minimum of 5000 houses treated up until March 2015 with an aspiration for 20,000 properties by 2017, a potential investment of £20 million. Proposed national changes to energy policy are likely to mean that these targets will have to be delivered more slowly and over a longer period.

Changes in national funding criteria for the Feed in Tariff (FIT) and ECO do create uncertainty within the market, though it is anticipated that most measures will progress albeit at a slower pace. For example solar PV feed in tariff changes did halt the market in 2012 though as the international market continues to develop and the capital cost of equipment continues to fall growth in installation of photovoltaic cells is once again improving with a current return on investment time of around 5-7 years.

The market will be further accelerated by the establishment of the Viridis group, a City Region partnership of the LCR Local Authorities and Registered Providers to share best practice and expert information to maximise local economic investment.

The core skills required for installation of energy efficient and electricity generation measures in domestic and commercial premises are found largely in existing construction trades. Figure 19 identifies 'traditional' skill areas and their application, with training, to Low Carbon work tasks. For energy efficient installation Low Carbon competences include skills that enable individuals to meet quality standards for national programmes such as PAS 2030 (see Appendix 5). Based on discussions with training providers and construction firms in the City Region for an experienced plasterer it would take up to 10 weeks to train to undertake internal and external wall insulation. For new entrants to the sector NVQ and Apprenticeship frameworks are available for traditional skill areas that increasingly include construction and maintenance techniques for Low Carbon materials and processes.

In addition to **adaptive craft skills, industry reports have indicated a shortage in supervisory and project management skills for the energy efficiency sector.** This reflects both regulatory requirements to comply with standards and quality of installation and, given the large scale retrofit contracts becoming available, personnel and project management skills. Increasingly for SMEs it will be important that staff multi-skill and are able to deal with 'whole-house' energy efficiency improvements and are able to provide energy efficiency advice[46].

Thextons Construction firm diversify into Cavity Wall Installation

Construction boss Simon Thexton says retraining his workforce in external wall insulation (EWI) to win green work has sent his bottom line soaring to about £8 million turnover this year - now he's urging other businesses to follow suit.

Business is booming thanks to staff gaining the right skills and qualifications to win contracts under the Energy Company Obligation (ECO), which works alongside the Green Deal. He says small and medium-sized businesses with "the bottle" to grasp the green skills nettle are in pole position to win ECO-funded work with local authorities and housing associations that need to make buildings energy efficient.

"If you're prepared to invest in the training and legwork that goes with complying with PAS 2030 you'll end up with a workforce that can take on these jobs, the reward for that is you'll have walls to work on in front of you and we are now actively talking to housing associations in relation to taking on the EWI contract main contract wise, without the need for a main contractor above us"

The focus on green skills training means Thextons is aiming to make the lucrative leap from subcontractor to main contractor.

Source: www.cutcarbon.info/news/2013/my-turnover-doubled-thanks-to-green-skills-training-reveals-canny-thextons-boss.aspx?lang=en

FIGURE 19
CORE AND ADDITIONAL SKILL COMPETENCY AREAS FOR ENERGY EFFICIENCY

Skill areas	Additional skills required	Low carbon work area
Insulation Plasterer / Dryliner Bricklaying Carpentry / Joinery Glazing	Transferable skills from construction trades. Additional training in rendering and finishing and use of new materials for insulation.	• Internal and External Wall Insulation • Cavity Wall Insulation • Loft Insulation
Heat Management / Micro-generation Plumbing HVAC Trades	Transferable skills from plumbing and associated trades. Additional skills in installation of solar units and working at heights. Additionally knowledge for giving home energy advice.	• Installation of solar thermal units • Installation of energy efficient boiler / heating systems
Micro-generation Electrician / Electrical Installation	Transferable skills from electrical trades. Additional skills in installation of PV units and working at heights. Additionally knowledge for giving home energy advice.	• Installation of PV units • Installation of home energy monitoring and control systems

[46] See Energy Efficiency Partnership for Homes (2010) Household Energy Efficiency Skills Review

Merseyside Fire and Rescue Service achieves 23% carbon reduction with retrofits

A programme to overhaul Merseyside Fire and Rescue Service's 31 fire stations and support buildings with a low carbon retrofit has reduced their emissions of carbon dioxide by 23% over the past five years and resulted in a saving of £117,000 in gas and electricity a year.

Their fire stations and support buildings, used by 1,200 employees, are a mixture of buildings dating from the 1940s to the present day. Their Building stock includes fire stations, which vary in size from 1-2 appliance sites to larger 3-4 appliance sites, a workshop, the headquarters, a training and development academy and the mobilising and communications centre, which accepts and processes emergency calls. Some of these buildings were so old, tired and inefficient that they required a major refurbishment in order to decrease the ever mounting maintenance costs and improve their functionality.

In the public sector raising funds for energy efficiency projects is very difficult and requires compliance with strict financial regulations. Merseyside Fire and Rescue Service, therefore, sought a Salix Local Authority Environmental Fund from the Carbon Trust were the loan for each energy saving project is repaid over a period of up to 5 years using the savings made from their energy bills.

To date Merseyside Fire and Rescue Service have spent £480,000 on retrofitting their entire building stock. The low carbon retrofit entailed five main areas of work:

- A Trend building management system was installed so that heating of all stations could be remotely controlled.
- The existing heating and hot water systems were improved with the installation of burner controls, high efficiency combi boilers and Andrews water heaters. As the central heating and hot water systems operate separately the heating is now switched off for 3-4 months over the summer in order to increase savings even further.
- Lofts and pipe lines were insulated.
- Energy efficient lighting replaced the internal and external halogen lights.
- Voltage Optimisation Units (step down transformers) were also fitted to reduce the voltage supplied to half of the building stock, which was being wasted unnecessarily as heat through lighting and computers. This alone resulted in 10% of electricity savings.

Other refurbishments were aimed at improving the usability of the buildings for deployment, staff and community users. The previously unwelcoming buildings were refurbished, washing facilities were improved, study rooms re-modelled, flooring replaced and new appliance bay doors fitted.

As a result of this major retrofitting programme Merseyside Fire and Rescue Service are saving £117,000 in gas and electricity per year, with a tremendous carbon saving of 23% of CO2 emissions per year (from a 2007 baseline) over the past five years of their Carbon Management Plan.

Source: www.retrofit-roadshow.co.uk/news/case-studies/ merseyside-fire-and-rescue-service-achieves-23-carbon-reduction-with-retrofits/

[47] See https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/renewable-heat-incentive-rhi

The volume of demand for these occupational areas is difficult to estimate given variation in market conditions and the changing requirements of regulation. However, indications are that there is an increasing recognition of the PAS 2030 standard (see Appendix 5) for installation of energy efficiency measures which is expected to increase the demand for training and competency assessment among SMEs and self-employed construction workers. Major contracts for retrofitting of private and social housing are anticipated in the Liverpool City Region and Northwest during 2013/14 which will impact on labour demand for PAS 2030 registered trades people. However, the scale of impact will depend on the extent to which local contractors are able to compete with national firms using roving staffing arrangements.

The Government has announced that it will extend the Renewable Heat Incentive from business to domestic energy users from spring 2014[47]. Energy users will receive payments for use of renewable energy sources including heat pumps, geothermal and solar thermal. This is expected to increase the demand for skilled technicians and installation engineers with plumbing, electrical and HVAC experience. The launch of the Renewable Heat Incentive training voucher scheme (October 2013) should support companies wishing to diversify into this area (see Appendix 2).

Additionally, effective planning and installation of equipment requires architectural skills to calculate heat usage and to ensure the most efficient location of heat sources within 'whole-house' energy management systems. This is a new area of activity that employers indicate requires staff to extend competences.

The LCR Save Energy Advice Line is a local free phone number (0800 043 0151, Mon to Fri 9am-5pm) run by Energy Projects Plus and bought into by the 6 LCR local authority boroughs. The advice line provides free impartial advice to residents on energy efficiency around the home, renewable energy and information about the latest grants and discounts available.

Increase the demand for skilled technicians and installation engineers with plumbing, electrical and HVAC experience

Energy Saving Trust

Formed in 1992, Energy Saving Trust is a social enterprise with a charitable Foundation.

Through their partnerships they offer impartial advice to communities and households on how to reduce carbon emissions, use water more sustainably and save money on energy bills.

They work with governments, local authorities, third sector organisations and businesses.

Their activities include:

- delivering or managing government programmes
- testing low-carbon technology
- certification and assurance for businesses and consumer goods
- developing models and tools

Major contracts for retrofitting of private and social housing are anticipated in the Liverpool City Region and Northwest during 2013/14 which will impact on labour demand for PAS 2030 registered trades people

Figure 20 shows employment numbers by occupation for employment areas relevant to energy efficiency. The distribution of occupations reflects the strong craft basis for employers delivering energy efficiency improvements in domestic and commercial properties. Over the period 2008 - 2012 the level of employment shown in this ONS data has fallen by over 2,300 or 6.9%. This overall pattern reflects broader trends in the construction industry which has experienced significant reductions in housing construction, maintenance and repair over the period of the recession[48].

There are however, a number of areas of growth that relate specifically to the demands articulated by employers in the Low Carbon sector. While these occupations do not exclusively relate to the installation of energy efficiency improvements, growth in demand does indicate potential supply pressure should the demand from Low Carbon and the wider construction sector increase in the medium term. **For example the growth in electricians, plumbers and ventilation engineers may continue, despite the reduced demand expected from the installation of micro-generation, in response to funding for the installation of heat pumps and heat management systems.** Employers also indicate areas of oversupply for example in plastering which has seen a 17.4% drop in employment. **Intelligence from contractors indicates that plasterers are training to qualify for internal and external wall insulation in the absence of contract opportunities in plastering.** This reduces demand for traditional plasterers in the short term and shifts emphasis to short courses in insulation skills.

Intelligence from contractors indicates that plasterers are training to qualify for internal and external wall insulation in the absence of contract opportunities in plastering

FIGURE 20
EMPLOYMENT TRENDS BY OCCUPATION LIVERPOOL CITY REGION - ENERGY EFFICIENCY

Occupation	Employment 2012	2008-2012 Change (%)	Trend Demand
Production Mgrs and Directors in Construction	1,884	-38.1	
Building and Civil Engineering Technicians	628	N/A	
Quality Assurance Technicians	534	-37.0	
Air-conditioning and Refrigeration Engineers	*	N/A	
Construction and building trade supervisors	270	-78.8	
Skilled metal and electronic trades supervisors	1,830	8.0	
Electricians and Electrical Fitters	6,237	50.3	
Bricklayers and Masons	765	-61.6	
Roofers, Roof Tilers and Slaters	2,213	23.1	
Plumbing Heating and Ventilation Engineers	4,163	27.1	
Carpenters and Joiners	4,839	-18.2	
Glaziers, window fabricators and fitters	1,195	40.4	
Other Building and Construction Trades	3,361	-31.1	
Plasterers	1,034	-17.4	
Elementary construction occupations	1,879	-13.1	
Total	**30,832**	**-6.9**	

Key Decrease Increase

Source: ONS APS Data (2012) - Special Run for LCR. Key: * Number suppressed due to low sample size

[48] See Construction Skills and Experian (2012)

Environmental Sustainability

Other areas of demand may come from organisations who wish to work in a greener way and meet their own environmental impact targets. Larger organisations in particular have invested in expertise to monitor their environmental impact and carbon emissions; which has led to a growing need to ensure the whole workforce is engaged in the green agenda in order to meet their targets. These are often advertised as Sustainability Managers or Co-ordinators who have studied Environmental Sciences in University, however the responsibility can also come under the remit of Estates, Facilities or Procurement Managers within some organisations and therefore it is essential that they have the opportunity to undertake CPD in this area. From October 2013, UK legislation changes mean that all quoted companies have to measure and report greenhouse gas (GHG) emissions.

Furthermore manufacturing businesses are actively exploring low carbon initiatives in relation to energy consumption and greater efficiency. There is a strong focus on optimising manufacturing/chemical processes and transport networks and therefore there is a need for all employers to have a good understanding of LEAN manufacturing and sustainable consumption and production.

The Carbon Trust have produced a report which reviews environmental targets being set by companies in the FTSE 100 and highlights best practice by identifying exemplars.[49]

The Institute of Environmental Management and Assessment (IEMA) has set the environmental standard for non-environment professionals by joining forces with City and Guilds in developing a suite of courses in recognition of the need for tailored, high-quality environmental training for all workers in any role, (see Appendix 6) these include:

- Working with Environmental Sustainability
- Managing with Environmental Sustainability
- Leading with Environmental Sustainability

See more at www.iema.net/all-jobs-greener#sthash.thftr17G.dpuf

Royal Mail

Environmental impact initiatives

Royal Mail Environment Manager, James Kokiet, put 24 Royal Mail staff through the Working with Environmental Sustainability and Managing with Environmental Sustainability courses during a pilot during November 2012.

"Royal Mail has a huge workforce; if we are able to get even a small proportion to work in a greener way it positively impacts on the environmental targets that I am responsible for.

Since the training we've seen a reduction in energy use matched with an increase in recycling at the plants where our delegates work. I'd categorically say that this training has instilled some extra motivation in those who attended and I can see how they all want to make a difference which is very encouraging".

Source: www.iema.net/node/14321#sthash.lmBcXkph.dpuf

[49] www.carbontrust.com/resources/reports/advice/raising-the-bar-building-sustainable-business-value-environmental-targets

Jaguar Land Rover Sustainability Commitment

Jaguar Land Rover have developed a substainability commitment, encompassing elements of the design engineering and manufacturing of their vehicles:

"At Jaguar, we are striving to achieve a sustainable business approach by balancing our economic, social and environmental responsibilities.

It's an approach to sustainability which focuses on the complete 'lifecycle' of a vehicle, rather than simply looking at traditional measures like fuel consumption or CO2 emissions when the car is being driven. A life cycle approach involves analysing all aspects of the product's creation, use and disposal and then using this data to set specific targets for reducing the environmental impact of each aspect.

For example this would mean using low energy manufacturing processes, using recycled materials and making the car easier to recycle at the end of its life.

To this end, we've invested in the very latest, state-of-the-art lifecycle analysis software that assesses the 'cradle-to-grave' environmental impact of our vehicles - and identifies ways in which we can improve. This single-minded focus on sustainability throughout the vehicle's life has already been demonstrated by the all-new XJ's achievement of ISO 14040 as certified by the UK's Vehicle Certification Agency (VCA). This considers the environmental impact of a car through every stage of its lifecycle. We're proud to have achieved it.

But our focus on sustainability at Jaguar is only becoming more intense. Our Design, Engineering and Manufacturing teams have never worked more closely together, with the single aim of making cars that are both exciting to drive, and easier on the planet.

Our Commitment

- To reduce dependency on fossil fuels and production of man-made CO_2 emissions
- To use fewer natural resources and create less waste
- To enthuse our employees and stakeholders for sustainable business development"

Source: www.jaguar.com/content/global/pdf/sustainability_report

Furthermore the Energy Companies Obligation (ECO) has been introduced in Great Britain which **has led to a demand for a number of warmth advisers or energy home assessors**. ECO operates alongside the Green Deal and places obligations on larger energy suppliers to deliver energy efficiency measures to domestic energy users. Utility companies are also responsible for ensuring that households are environmentally sustainable. Obligated suppliers must achieve carbon and cost savings in respect of three distinct targets:

- 20.9 $MtCO_2$ savings under the carbon emissions reduction obligation (CERO),
- 6.8 $MtCO_2$ savings under the carbon saving community obligation (CSCO); and
- £4.2 billion under the home heating cost reduction obligation (HHCRO).

The targets are divided between obligated suppliers according to a formula proportionate to their share of domestic customers. These targets needed to be achieved by 31 March 2015, however recent changes in Government policy have led to an extension to this deadline.

Environmental consultancy and specialists fields

There remains a need for environmental expertise in the provision of Environmental Impact Assessments for all major planning applications that have a direct impact on the environment. These are produced to ensure that a local planning authority consider the specific impact on the environment when deciding whether to grant planning permission for a project. The Institute of Environmental Management and Assessment (IEMA) have registered a number of organisations on their Environmental Impact Assessment (EIA) Quality Mark that that have made a commitment to excellence in the EIA activities they deliver (see Appendix 6).

Research and Development

An essential area of continued skill demand is specifically around research and development in all low carbon solutions.

One example is Wirral's planned Marine Innovation Campus which will create a centre of excellence and enable the R&D and manufacturing strengths of all stakeholders to focus on innovations in the offshore energy sector. The proposed vision for an Offshore Survival Training Centre will provide a central hub for new product technology testing for the marine sector while serving commercial market demand for a local offshore training facility.

Furthermore the local Universities have developed a range of existing research facilities.

The Nuclear Sector

There are also significant employment opportunities within the nuclear sector which is worth mentioning in this report as plans are in place to rebuild the Wylfa power plant in Anglesey as well as further investments in Sellafield. These will create opportunities for Liverpool City Region construction and manufacturing businesses, which in turn create specific skill requirements to meet the nuclear industry standards. These include skills that are required by the growth industries in the region such as high integrity welders who are needed in wind turbine production and ship building and maintenance.

The nuclear sector spans electricity generation, new build including nuclear manufacturing and construction, uranium enrichment, fuel production, decommissioning and waste management.

The sector has an interesting structure being dominated by a few major Site Licence Companies (SLCs) e.g. Sellafield and Magnox, and major Operators such as EDF Energy, however, it is supported by an extensive supply chain which is growing rapidly with the expansion of the nuclear programme. With the value of the new nuclear build programme forecast to be £60 billion, in addition to the already accelerating decommissioning programme (£3bn/yr), the nuclear industry is on the cusp of a renaissance.

It is vital that the UK responds now to this opportunity in order to safeguard and grow jobs within the UK and remain competitive internationally in terms of skills, expertise and innovation. To enable this to happen, companies firstly need to understand what level of skills and experience exists in their business and their contractors; to train up their employees with the right skills to deliver their future business objectives. With nearly a third of the Nuclear Sector workforce based in the Northwest of England there will be opportunities for business and individuals within the Liverpool City Region. Particular opportunities will present themselves in Construction and Manufacturing with key areas of need including but not restricted to; Project Managers, Construction Project and Programme Managers, Steel Fixers, Nuclear Safety Site Supervisors, Control & Instrumentation Technicians/Engineers, Geotechnical Engineers, Environmental Engineers, Design Engineers.

Liverpool University Research Facilities[50]

- **Geomagnetism Laboratory** (Oliver Lodge Laboratory) has state-of-the art technology and expertise and a wide scope of research interests in Palaeo-, Geo- and Archaeomagnetism.
- **Marine chemistry** (Nicholson Building). Equipped with a wide range of analytical equipment for spectrophotometry, liquid and gas chromatography, gas chromatography-mass spectrometry and electroanalytical chemistry.
- **Rock deformation Laboratory** (Jane Herdman Building). Research in fault zone permeability structure, earthquake nucleation in faults such as the San Andreas and characterisation of hydrocarbon reservoir fluid flow properties.
- **Research Vessel - R.V. Marisa**. The RV Marisa of Liverpool is a state-of-the-art inshore research vessel certified by the UK Maritime and Coastguard Agency as a Category II workboat. The vessel supports research and teaching at the University of Liverpool, and is available for charter by organisations requiring coastal research capabilities.
- **Seismological Laboratory** (Jane Herdman Building). This has 12 seismic stations comprising of Trillium 120P broadband sensors and Taurus data loggers.
- **Stable isotope Laboratory** (Nicholson Building).
- **Electron Microscopy Laboratory** - EBSD-SEM (Nicholson Building). Offers cutting edge technology and expertise in electron backscatter diffraction (EBSD) and energy dispersive spectroscopy (EDS) in the scanning electron microscope (SEM). EBSD and EDS are applied to numerous different disciplines at the forefront of research. The laboratory comprises a Philips XL30 tungsten filament SEM and a CamScan X500 Crystal Probe field emission gun (FEG) SEM.
- **Cartographic Suite** (Roxby Building & Jane Herdman Building). The Cartographics Design Studio has three full time members of staff and is primarily involved with providing a service to the School of Environmental Sciences, other University departments and external clients, with expertise in Cartography, Graphic Design, Desktop Publishing and Digital Imaging.

All new entrants (construction and manufacturing firms who wish to diversity their customer base) to the Nuclear Industry will also need to understand the Nuclear Fundamentals and a number of programmes to address this gap have been developed by the National Skills Academy for Nuclear, including:

- Triple Bar Existing sites
- Triple Bar Nuclear New Build sites
- Triple Bar Manufacturing
- Human Performance Fundamentals
- Award for Nuclear Industry Awareness

These programmes are either delivered via classroom provision by the Skills Academy network of High Quality Providers https://www.nuclear.nsacademy.co.uk/providers/map or via e-learning through the Nuclear Training Network www.nucleartrainingnetwork.com/

[50] www.liv.ac.uk/earth-ocean-and-ecological-sciences/facilities/

In addition many organisations are up-skilling their workforce in the area of Project Management through the Association of Project Managers suite of courses and qualifications, delivered to the Nuclear Sector by 20/20 Business Insight and Gen II. This suite of programmes was enhanced last year with the introduction of the Higher level Apprenticeship in Project Management, delivered by Blackpool and The Fylde College and Gen II. Further information on the skills requirements of the industry can be found in the National Skills Academy of Nuclear Plan for 2013-15[51].

Waste Management

Waste Management & Remediation activities have been identified as a high productivity sector in the Liverpool City Region. Between 2001 and 2011 productivity growth in the region was higher than recorded nationally in Water Supply, Sewerage, Waste Management & remediation activities[52].

Vacancy Demand

Employer demand can also be articulated through advertised vacancies created by employers within the Liverpool City Region. Online vacancy information on the number of specific 'Green' vacancies advertised in LCR indicate small numbers of demand. However it's worth considering that the number of jobs involving low carbon and sustainability is far greater than indicated by these sources as the low carbon agenda encompasses a wider range of jobs that are not labelled as 'green'. For example and opportunities for experienced trades people working on retrofitting homes in the region may not be advertised as green jobs.

Previous analysis of these vacancies suggests that certain low carbon skills are particularly attractive to employers, eg. contract management (see Appendix 8).

UK Faces Welding Skills Shortage for Nuclear Future

In a bid to end the current shortage of welders in the engineering construction industry, the Engineering Construction Industry Training Board (ECITB) has invested £4m of industry funding into welding training and development.

The £4 million investment comes in support of a consortium of employers who will be involved in the up-coming Nuclear New Build programme. The companies, led by Doosan Babcock, include Alstom Power, Tei Ltd, Shaw Group, PJ Douglas and Babcock International who won a successful bid through the Employer Ownership of Skills pilot securing £4 million of government funding for welding training. This brings the total investment to £8 million.

Martyn Fletcher Director of Operations Support, Doosan Babcock and ECITB Regional Chairman said:

> "High integrity pipe welding is a major skills gap in engineering construction, and has been cited as a specific skills risk to nuclear new build delivery. The employer opportunity pilot has allowed us to secure significant investment to address this risk quickly."

Source: www.ecitb.org.uk/UKFacesWeldingSkillsShortageForNuclearFuture1/

[51] https://www.nuclear.nsacademy.co.uk/system/files/NSA%20Nuclear%20Plan%202013-2015.pdf

[52] Liverpool City Region Growth Plan & Strategic Economic Plan

Conclusions

The Low Carbon Sector encompasses a very wide range of industries, sectors and job roles. The push for greater sustainability and the continued exploration of low carbon alternatives to existing products and services will lead to new skills being demanded across a number of sectors. It is envisaged that the green agenda will impact on many existing roles and lead to the development of new occupations and skills needs.

There will be a demand for experts in all areas of low carbon as well as flexible individuals who are prepared to undertake ongoing learning. For example updating the skills of existing skilled trades people and job roles with small units of learning will help to upgrade older public housing stock to become more sustainable.

There is also the potential for growth in research and development as well as engineering roles to develop new alternative technologies and products, leading to the need for technical specialists to work with the new technologies involved in low carbon.

Offshore wind farm manufacture, installation and maintenance is envisaged to become increasingly important in the region with contracts secured for further developments. This will specifically create greater demand for high integrity welding and fabrication skills, as well as installation and maintenance engineers from companies involved in the contract such as Cammell Laird.

Specialist consultants will continue to be required to advise on the environmental impact of initiatives requiring planning and other regulatory consents.

The push for the development and use of alternative fuels also creates demand for new skills. The opening of the biomass campus at Stobart in Widnes is an example of how this is taking place in practice.

The sector is very much driven by government policy and the need to reduce carbon emissions across all countries and in particular the UK, which has a target of reducing greenhouse gas emissions by 80% by 2050.

The Low carbon sector has been slowly growing, despite the economic climate and changes in public subsidies in this area. Training providers have invested in resources and facilities locally to meet current and future demand and therefore it is essential that businesses utilise these skills opportunities.

There are 3 key areas that that need to be focused on:

- Encouraging providers to offer flexible provision for building the competences of existing employees
- Defining a City Region Low Carbon offer to make it easier for employers and job seekers to understand the full range of provision available in the region
- Building on the skills required for the future by promoting the sector and importance of STEM skills to students as well as skills needs from businesses in the region

Glossary

BIS	Department for Business, Innovation and Skills
CITB	Construction Industry and Training Board
CORE	Centres for Off-shore Renewable Engineering
ECITB	Engineering Construction Industry and Training Board
EWEA	European Wind Energy Association
EWI	External Wall Insulation
FIT	Feed In Tariff
Gemserv	Green Deal oversight body
GHG	Green House Gas
GVA	Gross Value Added
HESA	Higher Education Statistics Agency
HVAC	Heating, Ventilation and Air Conditioning
IEMA	Institute of Environmental Management and Assessment
LCEGS	Low Carbon Environmental Goods and Services Sector
Making it Campaign	Liverpool City Region Local Enterprise Partnership led campaign to promote and further develop the City Region's advanced manufacturing sector
MerseySTEM	Publicly funded contract holder supporting schools and teachers in Liverpool City Region to enhance young peoples STEM skills
NVQ	National Vocational Qualification
PAS 2030	Competence requirements for Green Deal installers and other low carbon work
PV	Photovoltaic's
SEMTA	Sector Skills Council covering engineering, science and technology skills
SSC	Sector Skills Council
STEM	Science, Technology, Engineering and Mathematics
UKCES	United Kingdom Commission for Employment and Skills
LCR	Liverpool City Region
UTC	University Technical College

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Low Carbon
Skills for Growth Agreement

Meeting Employment and Skills Demand with Supply by Agreement

Business involved in this agreement	Partner organisations involved in this agreement

What will the agreement accomplish (please tick at least one)	
We will work together to develop a better understanding of the job opportunities within the Low Carbon sector and inspire the career choices of local people	☐
We will identify STEM Ambassadors from within our organisation and take part in the activities of MerseySTEM	☐
We will support the development of a Schools Hydrogen Challenge for Liverpool City Region	☐
We will work together to clearly explain and publicise the Low Carbon related curriculum of our learning and/or employment programmes to a wider audience	☐
We will work with National Skills Academies and other specialist organisations to ensure training/employment routeways meet the needs of the sector	☐

Other specific objectives (please specify)

Business named in this agreement will undertake the following actions (please specify)

Colleges, providers and partners named in this agreement will undertake the following actions (please specify)

Signatories

Business Signatories: Partner Signatories: Provider Signatories:

Period of Agreement

Date from: _____ Target date: _____

Although Skills for Growth Agreements do not form a legally binding contract they should form a public commitment. To help underpin and publicise this commitment please return completed Agreements to:

Liverpool City Region Employment and Skills Board, c/o City Region Employment and Skills Team, Knowsley Council, PO Box 21, Archway Road, Huyton, Knowsley, Merseyside, L36 9YU

For an electronic version of this template, please go to www.lcrskillsforgrowth.org.uk

Appendices
Appendix 1

List of level 2-4 Low Carbon provision

Environmental Technologies

	Learning Aim	Awarding Body	LARA Link
Level 3 Award in Environmental Technology Systems Awareness (QCF)	600/0701/1	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287080&aimRef=60007011&academicYearID=1112&
Level 3 Award in the Fundamental Principles and Requirements of Environmental Technology Systems (QCF)	600/6377/4	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=323859&aimRef=600%2f6377%2f4&academicYearID=1213&
	600/4282/5	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=311820&aimRef=600%2f4282%2f5&academicYearID=1213&
	600/0665/1	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=286845&aimRef=600%2f0665%2f1&academicYearID=1213&
	600/5715/4	LCL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=324167&aimRef=600%2f5715%2f4&academicYearID=1213&
Level 3 Award in the Installation of Small Scale Solar Photovoltaic Systems (QCF)	600/5696/4	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316933&aimRef=600%2f5696%2f4&academicYearID=1213&
	600/5175/9	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316099&aimRef=600%2f5175%2f9&academicYearID=1213&
	501/1846/8	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=283159&aimRef=50118468&academicYearID=1112&
	600/6363/4	Proqual	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=323863&aimRef=600%2f6363%2f4&academicYearID=1213&
Level 3 Award in the Installation and Maintenance of Small Scale Solar Photovoltaic Systems (QCF)	600/6283/6	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=323860&aimRef=600%2f6283%2f6&academicYearID=1213&
	600/5695/2	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316925&aimRef=600%2f5695%2f2&academicYearID=1213&
	600/5252/1	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316346&aimRef=600%2f5252%2f1&academicYearID=1213&

	Learning Aim	Awarding Body	LARA Link
	600/5775/0	LCL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=324168&aimRef=600%2f5775%2f0&academicYearID=1213&
	600/6256/3	Proqual	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=318199&aimRef=600%2f6256%2f3&academicYearID=1213&
Level 3 Award in the Installation of Solar Thermal Hot Water Systems (QCF)	600/5694/0	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316934&aimRef=600%2f5694%2f0&academicYearID=1213&
	600/5248/X	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316342&aimRef=600%2f5248%2fX&academicYearID=1213&
	600/6385/3	Proqual	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=323994&aimRef=600%2f6385%2f3&academicYearID=1213&
Level 3 Award in the Installation and Maintenance of Solar Thermal Hot Water Systems (QCF)	600/6608/8	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=324550&aimRef=600%2f6608%2f8&academicYearID=1213&
	600/5693/9	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316926&aimRef=600%2f5693%2f9&academicYearID=1213&
	600/5251/X	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316345&aimRef=600%2f5251%2fX&academicYearID=1213&
	501/1640/X	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282838&aimRef=5011640X&academicYearID=1112&
	600/7439/5	LCL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=327883&aimRef=600%2f7439%2f5&academicYearID=1213&
	600/6257/5	Proqual	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=318200&aimRef=600%2f6257%2f5&academicYearID=1213&
Level 3 Award in the Installation of Heat Pumps Systems (Non-refrigerant Circuits) (QCF)	600/5692/7	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316932&aimRef=600%2f5692%2f7&academicYearID=1213&
	600/5249/1	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316343&aimRef=600%2f5249%2f1&academicYearID=1213&
	600/6364/6	Proqual	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=323862&aimRef=600%2f6364%2f6&academicYearID=1213&
Level 3 Award in the Installation and Maintenance of Heat Pumps Systems (Non-refrigerant Circuits) (QCF)	600/6606/4	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=324549&aimRef=600%2f6606%2f4&academicYearID=1213&
	600/5691/5	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316924&aimRef=600%2f5691%2f5&academicYearID=1213&

	Learning Aim	Awarding Body	LARA Link
	600/5253/3	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316347&aimRef=600%2f5253%2f3&academicYearID=1213&
	501/1643/5	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282836&aimRef=50116435&academicYearID=1112&
	600/7730/X	LCL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=328692&aimRef=600%2f7730%2fX&academicYearID=1213&
	600/6258/7	Proqual	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=318198&aimRef=600%2f6258%2f7&academicYearID=1213&
Level 3 Award in the Installation of Water Harvesting and Re-use Systems (QCF)	600/5690/3	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316935&aimRef=600%2f5690%2f3&academicYearID=1213&
	600/5247/8	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316341&aimRef=600%2f5247%2f8&academicYearID=1213&
Level 3 Award in the Installation and Maintenance of Water Harvesting and Re-use Systems (QCF)	600/6282/4	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=323861&aimRef=600%2f6282%2f4&academicYearID=1213&
	600/5689/7	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316927&aimRef=600%2f5689%2f7&academicYearID=1213&
	600/5250/8	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316344&aimRef=600%2f5250%2f8&academicYearID=1213&
	501/1644/7	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282839&aimRef=50116447&academicYearID=1112&
Biomass	tbc	HETAS	
Level 2 NVQ Certificate in Installing Solar Collectors to Roofs: Solar Photovoltaic (QCF)	600/6014/1	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317463&aimRef=600%2f6014%2f1&academicYearID=1213&
Level 2 NVQ Certificate in Installing Solar Collectors to Roofs: Solar Thermal (QCF)	600/6013/X	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317464&aimRef=600%2f6013%2fX&academicYearID=1213&
Level 2 NVQ Diploma for the Installation of Photovoltaic Panels (QCF)	600/1373/4	GQA	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=288982&aimRef=600%2f1373%2f4&academicYearID=1213&

	Learning Aim	Awarding Body	LARA Link
Level 3 NVQ Diploma in Electrotechnical Services (Electrical Maintenance) (QCF)	501/1624/1	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282740&aimRef=501%2f1624%2f1&academicYearID=1213&
	501/1604/6	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282729&aimRef=501%2f1604%2f6&academicYearID=1213&
Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (Buildings, Structures and the Environment) (QCF)	501/2232/0	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=283871&aimRef=501%2f2232%2f0&academicYearID=1213&
	501/1605/8	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282739&aimRef=501%2f1605%2f8&academicYearID=1213&
Level 3 Award in Requirements for Electrical Installation on BS7671: June 2008 (2011) (QCF)	600/3046/X	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=302577&aimRef=600%2f3046%2fX&academicYearID=1213&
	600/3719/2	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=309774&aimRef=600%2f3719%2f2&academicYearID=1213&
	600/5432/3	LCL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=324166&aimRef=600%2f5432%2f3&academicYearID=1213&
Level 2 Diploma in Domestic Heating (QCF)	600/5271/5	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316975&aimRef=600%2f5271%2f5&academicYearID=1213&
	501/2102/9	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=283541&aimRef=501%2f2102%2f9&academicYearID=1213&
	501/1606/X	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282741&aimRef=501%2f1606%2fX&academicYearID=1213&
Level 3 NVQ Diploma in Domestic Heating (QCF)	600/6871/1	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=325782&aimRef=600%2f6871%2f1&academicYearID=1213&
	600/1473/8	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=289255&aimRef=600%2f1473%2f8&academicYearID=1213&
	600/1253/5	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=288239&aimRef=600%2f1253%2f5&academicYearID=1213&
Level 3 NVQ Diploma in Domestic Heating (Gas fired warm air appliances) (EUSGU021)	600/1116/6	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287982&aimRef=600%2f1116%2f6&academicYearID=1213&
	600/1453/2	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=289257&aimRef=600%2f1453%2f2&academicYearID=1213&

	Learning Aim	Awarding Body	LARA Link
Level 3 NVQ Diploma in Domestic Heating (Gas fired water and central heating appliances) (EUSGU022)	600/1117/8	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287983&aimRef=600%2f1117%2f8&academicYearID=1213&
	600/1454/4	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=289256&aimRef=600%2f1454%2f4&academicYearID=1213&
Level 2 NVQ Diploma in Plumbing and Heating (QCF)	600/5270/3	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316976&aimRef=600%2f5270%2f3&academicYearID=1213&
	501/1981/3	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=283402&aimRef=501%2f1981%2f3&academicYearID=1213&
	501/1752/X	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282977&aimRef=501%2f1752%2fX&academicYearID=1213&
Level 3 NVQ Diploma in Domestic Plumbing and Heating (QCF)	600/6863/2	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=325781&aimRef=600%2f6863%2f2&academicYearID=1213&
	600/1122/1	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287986&aimRef=600%2f1122%2f1&academicYearID=1213&
	600/1252/3	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=288246&aimRef=600%2f1252%2f3&academicYearID=1213&
Level 3 NVQ Diploma in Domestic Plumbing and Heating (Gas fired warm air appliances) (EUSGU021)	600/1124/5	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287984&aimRef=600%2f1124%2f5&academicYearID=1213&
	600/1451/9	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=289233&aimRef=600%2f1451%2f9&academicYearID=1213&
Level 3 NVQ Diploma in Domestic Plumbing and Heating (Gas fired water and central heating appliances) (EUSGU022)	600/1134/8	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287985&aimRef=600%2f1134%2f8&academicYearID=1213&
	600/1657/7	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=289293&aimRef=600%2f1657%2f7&academicYearID=1213&
Level 2 NVQ Diploma in Heating and Ventilating Industrial and Commercial Installation (QCF)	600/1806/9	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=289723&aimRef=600%2f1806%2f9&academicYearID=1213&
	501/1622/8	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282619&aimRef=501%2f1622%2f8&academicYearID=1213&
Level 3 NVQ Diploma in Heating & Ventilating - Industrial and Commercial Installation (QCF)	600/1009/5	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287827&aimRef=600%2f1009%2f5&academicYearID=1213&
	600/1163/4	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287987&aimRef=600%2f1163%2f4&academicYearID=1213&

	Learning Aim	Awarding Body	LARA Link
Level 3 Award in the Installation, Commissioning and Safety Aspects of Hot Water Systems for Domestic Use in Accordance With UK Building Regulations (QCF)	600/6159/5	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317887&aimRef=600%2f6159%2f5&academicYearID=1213&
Level 3 Award in Water Supply (Water Fittings) Regulations and Water Byelaws in the UK (QCF)	600/6165/0	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317888&aimRef=600%2f6165%2f0&academicYearID=1213&

Insulation & Fenestration

	Learning Aim	Awarding Body	LARA Link
Level 2 NVQ Certificate in Insulation and Building Treatments (Construction)(QCF)	600/3532/8	CSkills Awards	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=309159&aimRef=600%2f3532%2f8&academicYearID=1213&
	600/8370/0	GQA	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=330420&aimRef=600%2f8370%2f0&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments: Cavity Wall Insulation (QCF)	600/6017/7	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317466&aimRef=600%2f6017%2f7&academicYearID=1213&
	600/3187/6	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=302966&aimRef=600%2f3187%2f6&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments: Loft Insulation (QCF)	600/6023/2	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317690&aimRef=600%2f6023%2f2&academicYearID=1213&
	600/3185/2	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=302968&aimRef=600%2f3185%2f2&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments - External Wall Insulation (Construction) (QCF)	600/3186/4	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=302967&aimRef=600%2f3186%2f4&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments - Internal Insulation (Construction) (QCF)	600/3479/8	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=308819&aimRef=600%2f3479%2f8&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments - Draught-proofing (Construction) (QCF)	600/3480/4	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=308817&aimRef=600%2f3480%2f4&academicYearID=1213&
Level 2 NVQ Certificate in Curtain Wall Installation (QCF)	500/7834/4	GQA	
Level 2 NVQ Diploma in Fenestration Installation (QCF)	500/7825/2	GQA	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=275077&aimRef=500%2f7825%2f2&academicYearID=1213&

	Learning Aim	Awarding Body	LARA Link
Level 3 NVQ Diploma in Fenestration Installation (QCF)	501/1688/5	GQA	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=282972&aimRef=501%2f1688%2f5&academicYearID=1213&
Level 3 NVQ Certificate in Fenestration Surveying (QCF)	501/2109/1	GQA	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=283531&aimRef=501%2f2109%2f1&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments (External Wall Insulation - Boarder) (QCF)	600/6019/0	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317467&aimRef=600%2f6019%2f0&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments (External Wall Insulation - Finisher) (QCF)	600/6020/7	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317687&aimRef=600%2f6020%2f7&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments (Draught proofing) (QCF)	600/6018/9	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317465&aimRef=600%2f6018%2f9&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments (Internal Insulation) (QCF)	600/6022/0	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317689&aimRef=600%2f6022%2f0&academicYearID=1213&
Level 2 NVQ Certificate in Insulation and Building Treatments (Insulate Framed Sections of Buildings) (QCF)	600/6021/9	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317688&aimRef=600%2f6021%2f9&academicYearID=1213&

Green Deal Assessment & Advice

	Learning Aim	Awarding Body	LARA Link
Level 3 Certificate in Domestic Energy Assessment (QCF)	600/5478/5	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316566&aimRef=600%2f5478%2f5&academicYearID=1213&
	600/6063/3	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317641&aimRef=600%2f6063%2f3&academicYearID=1213&
	600/5739/7	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316880&aimRef=600%2f5739%2f7&academicYearID=1213&
	600/5881/X	EDI	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317252&aimRef=600%2f5881%2fX&academicYearID=1213&
Level 3 Certificate in Non Domestic Energy Assessment (QCF)	600/5958/8	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317342&aimRef=600%2f5958%2f8&academicYearID=1213&
	600/6590/4	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=324583&aimRef=600%2f6590%2f4&academicYearID=1213&

	Learning Aim	Awarding Body	LARA Link
Level 4 Diploma in Non Domestic Energy Assessment (QCF)	600/7764/5	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=328709&aimRef=600%2f7764%2f5&academicYearID=1213&
Level 3 Diploma in Domestic Green Deal Advice (QCF)	600/5488/8	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316567&aimRef=600%2f5488%2f8&academicYearID=1213&
	600/6277/0	BPEC	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=323895&aimRef=600%2f6277%2f0&academicYearID=1213&
	600/4934/0	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=315714&aimRef=600%2f4934%2f0&academicYearID=1213&
	600/5124/3	EDI	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=315993&aimRef=600%2f5124%2f3&academicYearID=1213&
Level 4 Diploma in Non Domestic Green Deal Advice (QCF)	600/6025/6	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317665&aimRef=600%2f6025%2f6&academicYearID=1213&
	600/4885/2	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=315591&aimRef=600%2f4885%2f2&academicYearID=1213&
	600/5157/7	EDI	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316110&aimRef=600%2f5157%2f7&academicYearID=1213&
Level 3 Certificate in Domestic On Construction Energy Assessment (QCF)	600/0361/3	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=286274&aimRef=600%2f0361%2f3&academicYearID=1213&

Energy Efficiency

	Learning Aim	Awarding Body	LARA Link
Level 1 Award in Introducing Sustainable Energy Efficiency to Potential Customers	tbc	ABBE	
Level 2 Award in Understanding Sustainable Energy Efficiency (QCF)	600/5865/1	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=317251&aimRef=600%2f5865%2f1&academicYearID=1213&
	600/5493/1	Proqual	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316570&aimRef=600%2f5493%2f1&academicYearID=1213&
Level 2 Certificate in Understanding Sustainable Energy Efficiency (QCF)	600/5495/5	Proqual	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316574&aimRef=600%2f5495%2f5&academicYearID=1213&
Level 2 Award in Energy Efficiency in the Workplace	600/2376/4	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=301639&aimRef=600%2f2376%2f4&academicYearID=1213&

	Learning Aim	Awarding Body	LARA Link
Level 3 Certificate in Understanding Sustainable Energy Efficiency (QCF)	600/0550/6	EdExcel	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=286820&aimRef=600%2f0550%2f6&academicYearID=1213&
	600/5494/3	Proqual	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=316576&aimRef=600%2f5494%2f3&academicYearID=1213&
Level 3 Certificate in Air Conditioning Energy Assessment (QCF)	600/1119/1	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287975&aimRef=600%2f1119%2f1&academicYearID=1213&
Level 4 Diploma in Air Conditioning Energy Assessment (QCF)	600/1399/0	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=288948&aimRef=600%2f1399%2f0&academicYearID=1213&
Level 3 Diploma in Operational Ratings (QCF)	600/7763/3	ABBE	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=328707&aimRef=600%2f7763%2f3&academicYearID=1213&
Level 3 Carbon Management in the Workplace	tbc	EdExcel	

Environmental Sustainability

	Learning Aim	Awarding Body	LARA Link
Level 2 Award in Understanding Sustainable Refurbishment (QCF)	600/3382/4	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=308734&aimRef=600%2f3382%2f4&academicYearID=1213&
Level 1 Award in Environmental Sustainability (QCF)	501/0419/6	Ascentis	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=280915&aimRef=501%2f0419%2f6&academicYearID=1213&
Level 2 Award in Environmental Sustainability (QCF)	501/0420/2	Ascentis	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=280916&aimRef=501%2f0420%2f2&academicYearID=1213&

Other

	Learning Aim	Awarding Body	LARA Link
Quality Management System Training to Achieve MCS Approval	MCS001	MCS	Not applicable
Daikin Altherma: High Temperature Split systems installation and commissioning (Daikin)	DUK-SE18	Daikin	Not applicable
Daikin Altherma: Low and High Temperature Split systems - selection and application including Monobloc (Daikin)	DUK-SE15	Daikin	Not applicable
Daikin Altherma: Low and High Temperature systems - Advanced service and fault finding including Monobloc (Daikin)	DUK-SE17	Daikin	Not applicable
Daikin Altherma: Low Temperature Split systems installation and commissioning including Monobloc (Daikin)	DUK-SE11	Daikin	Not applicable

Units

	Learning Aim	Awarding Body	LARA Link
Level 1 Understand Fundamental Environmental Protection Measures within Building Services Engineering	600/1603/6	ABC Awards	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=289324&aimRef=600%2f1603%2f6&academicYearID=1213&
	600/0986/X	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287656&aimRef=600%2f0986%2fX&academicYearID=1213&
	600/1063/0	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=288022&aimRef=600%2f1063%2f0&academicYearID=1213&
Level 2 Understand Fundamental Environmental Protection Measures within Building Services Engineering	600/1604/8	ABC Awards	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=289323&aimRef=600%2f1604%2f8&academicYearID=1213&
	600/0989/5	City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287718&aimRef=600%2f0989%2f5&academicYearID=1213&
	600/1023/X	EAL	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=287719&aimRef=600%2f1023%2fX&academicYearID=1213&
Level 2 Installing Solar Collectors to Roofs in the Workplace	K/503/2959	EdExcel CSkills	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=313934&aimRef=K%2f503%2f2959&academicYearID=1213&

	Learning Aim	Awarding Body	LARA Link
Level 3 Know the requirements to install, commission and handover small scale solar photovoltaic systems (EAL)	K/602/3138	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=305859&aimRef=K%2f602%2f3138&academicYearID=1213&
	tbc	SQA	
Level 3 Install, commission and handover small scale solar photovoltaic systems (EAL)	K/602/3088	EAL City & Guilds	
	tbc	SQA	
Level 3 Know the requirements to inspect, service and maintain small scale solar photovoltaic systems (EAL)	M/602/3089	EAL City & Guilds	
	tbc	SQA	
Level 3 Inspect, service and maintain small scale solar photovoltaic systems (EAL)	M/602/3092	EAL City & Guilds	
	tbc	SQA	
Level 3 Know the requirements to install, commission and handover solar thermal hot water systems (EAL)	F/602/3100	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=304470&aimRef=F%2f602%2f3100&academicYearID=1213&
	tbc	SQA	
Level 3 Install, commission and handover active solar thermal hot water systems (EAL)	L/602/3102	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=306360&aimRef=L%2f602%2f3102&academicYearID=1213&
	tbc	SQA	
Level 3 Know the requirements to inspect, service and maintain active solar thermal hot water systems (EAL)	Y/602/3104	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=308266&aimRef=Y%2f602%2f3104&academicYearID=1213&
	tbc	SQA	
Level 3 Inspect, service and maintain active solar thermal hot water systems (EAL)	K/602/3107	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=305856&aimRef=K%2f602%2f3107&academicYearID=1213&
		SQA	
Level 3 Know the requirements to install, commission and handover heat pump systems (Non-Refrigerant Circuits) (EAL)	Y/602/3054	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=308263&aimRef=Y%2f602%2f3054&academicYearID=1213&
	tbc	SQA	
Level 3 Install, commission and handover heat pumps (Non-Refrigerant Circuits) (EAL)	D/602/3072	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=303996&aimRef=D%2f602%2f3072&academicYearID=1213&
	tbc	SQA	
Level 3 Know the requirements to inspect, service and maintain heat pump system installations (Non-Refrigerant Circuits) (EAL)	F/602/3078	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=304468&aimRef=F%2f602%2f3078&academicYearID=1213&
	tbc	SQA	

	Learning Aim	Awarding Body	LARA Link
Level 3 Inspect, service and maintain heat pump installations (Non-Refrigerant Circuits) (EAL)	L/602/3083	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=306358&aimRef=L%2f602%2f3083&academicYearID=1213&
	tbc	SQA	
Level 3 Know the requirements to install, commission and handover rainwater harvesting and greywater reuse systems (EAL)	T/602/3109	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=307794&aimRef=T%2f602%2f3109&academicYearID=1213&
	tbc	SQA	
Level 3 Install, commission and handover rainwater harvesting and greywater reuse systems (EAL)	K/602/3110	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=305857&aimRef=K%2f602%2f3110&academicYearID=1213&
	tbc	SQA	
Level 3 Know the requirements to inspect, service and maintain rainwater harvesting and greywater reuse systems (EAL)	M/602/3111	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=306815&aimRef=M%2f602%2f3111&academicYearID=1213&
	tbc	SQA	
Level 3 Inspect, service and maintain rainwater harvesting and greywater reuse systems (EAL)	A/602/3130	EAL City & Guilds	https://gateway.imservices.org.uk/sites/lara/Pages/aimKeyDetails.aspx?LAId=303512&aimRef=A%2f602%2f3130&academicYearID=1213&
	tbc	SQA	

Source: www.nsaet.org.uk, (2013)

Appendix 2

Renewable Heat Incentive (RHI) Training voucher scheme

The training voucher scheme has been launched by government to help industry install renewable heating systems. What does this mean for plumbing/heating and ventilating engineers and how will it work?

Cross-skilling support

There is £250,000 of funding to support installers who are already qualified in heating and/or plumbing and can go on to up-skill and obtain qualifications in heat based renewable technologies.

Funding is available through training vouchers for qualifications in the installation and maintenance of the following technologies:

- solar thermal
- heat pumps
- biomass

The vouchers are valued at 75% of the cost of the training, up-to a maximum of £500 per voucher, enabling up to 500 training vouchers to be issued. Vouchers will be limited to five per company and will be issued to the applicant, you will then be allowed to redeem your voucher on a qualifying accredited course of your choosing.

Apprenticeship support

A further £250,000 of funding is available to support apprentices to include renewables in their Apprenticeship programme. Again from the following heat based renewable technologies:

- solar thermal
- heat pumps
- biomass

The funding will be available to support apprentices who have already selected a particular renewable technology to complete their Apprenticeship programme but wish to add additional technologies.

The scheme will also support those apprentices who have selected a 'conventional' fuel on which to complete their Apprenticeship programme (such as oil or gas) and who wish to take up one or more renewable technology in addition to the conventional fuel.

Where you can train...

The National Skills Academy for Environmental Technologies delivers accredited training in environmental technologies across the UK (see www.nsaet.org.uk/contact-us/). We offer to accompany our courses a full selection of quality learner manuals and handy pocket guides (see www.nsaet.org.uk/shop/).

Or, if you and your colleagues prefer not to miss too much time from work we also offer different training options, via assessment only, top-up or a full training programme - which can be delivered via our online materials. Visit the online courses on www.nsa-elearning.org.uk/.

What's next?

To register your interest in obtaining your RHI vouchers please visit: www.rhitraining.co.uk/.

Appendix 3

Sector Skills Councils and National Skills Academies Relevant to Low Carbon

Sector Skills Council	Industrial Coverage
Asset Skills	Property, planning, facilities management, housing, cleaning and parking
Construction skills	Construction
Cogent	Chemical and pharmaceutical, oil, gas, nuclear, petroleum and polymers
ECITB	Engineering construction
Energy and utility skills	Gas, power, waste management and water
GoSkills	Passenger transport
Lantra	Environment and land based industries
Proskills	Building Products, Coatings, Extractive and Mineral Processing, Furniture, Furnishings and Interiors, Glass and Glazing, Glazed Ceramics, Paper and Pulp and Printing
Semta	Science, Engineering and Manufacturing Technologies
Skills for Logistics	Freight Logistics and Wholesaling Industry
Skillfast-UK	Fashion and Textiles
SummitSkills	Building Services Engineering

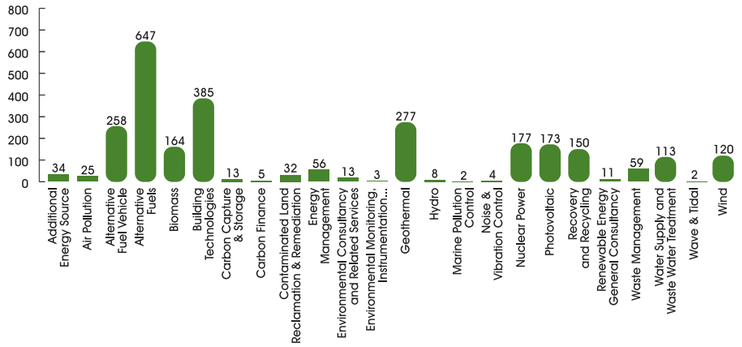
National Skills Academy	Location	Web Address	Contact Email
Construction	Kings Lynn	www.cskills.org/nsacademy/	Contact via website
Manufacturing	Watford	www.nsa-m.co.uk/	enquiries@nsa-m.co.uk
Nuclear	Cockermouth (HQ)	www.nuclear.nsacademy.co.uk/head-office	c.hall@nuclear.nsacademy.co.uk
Materials Production and Supply	Abingdon	http://mps-academy.co.uk	info@mps-academy.co.uk
Power	Solihull	www.power.nsacademy.co.uk	enquiries@power.nsacademy.co.uk
Environmental Technologies	Milton Keynes (HQ)	www.nsaet.org.uk	enquiries@nsaet.org.uk
Logistics	Milton Keynes	www.nsal.org.uk	info@nsal.org.uk

Source: Skills Funding Agency, (2013) - http://skillsfundingagency.bis.gov.uk/employers/growth-innovation-fund/national-skills-academies/

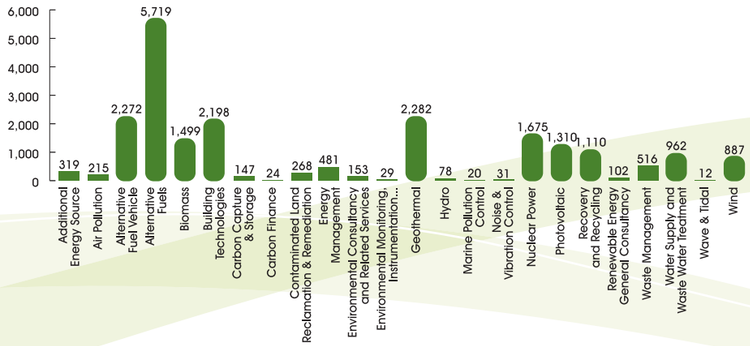
Appendix 4

Summary of LCEGS Sector, Liverpool City Region - Key Data

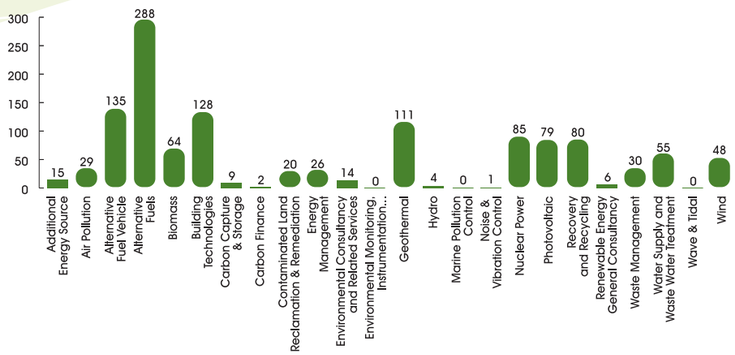
Sales £m



Employment



Companies



Source: Source: BIS (2012)

Appendix 5

PAS 2030 Qualifications, competence and green deal work

The Green Deal could create a significant amount of work across Britain for builders who are skilled-up and ready. The document that sets out the competence requirements for Green Deal installers is PAS 2030. This document lists all of the 'improvement measures' (the jobs) and provides details of the competence that you need to get cracking. PAS 2030 is not just for Green Deal, either. If you have PAS 2030 competence under your belt you're ready to take on a load of eco-friendly work if clients come calling. This page provides details of qualifications that are relevant to PAS 2030 competence requirements.

Please note: a qualification is not the only route to demonstrating competence in accordance with PAS 2030. Refer to PAS 2030 for further details.

The work: **Cavity wall insulation**
The qualification: Derived from National Occupational Standard Unit COSVR641 + 450
Where to find it in PAS 2030: Edition 1 Annex H. Edition 2 Annex B1
Where to get the training: CITB

The work: **Loft insulation**
The qualification: Derived from National Occupational Standard Unit COSVR641 + 451
Where to find it in PAS 2030: Edition 1 Annex I. Edition 2 Annex B9
Where to get the training: CITB

The work: **Pitched roof insulation**
The qualification: Derived from National Occupational Standard Unit COSVR641 + 451
Where to find it in PAS 2030: Edition 1 Annex J. Edition 2 Annex B10
Where to get the training: CITB

The work: **Flat roof insulation**
The qualification: Derived from National Occupational Standard Unit COSVR641 + 451
Where to find it in PAS 2030: Edition 1 Annex K. Edition 2 Annex B5
Where to get the training: CITB

The work: **Internal wall insulation**
The qualification: Derived from National Occupational Standard Units COSVR641 + 645 + 644
Where to find it in PAS 2030: Edition 1 Annex L. Edition 2 Annex B8
Where to get the training: CITB

The work: **External wall insulation**
The qualification: Derived from National Occupational Standard Units COSVR641 + 448 + 449
Where to find it in PAS 2030: Edition 1 Annex M. Edition 2 Annex B4
Where to get the training: CITB

The work: **Hybrid wall insulation**
The qualification: Derived from National Occupational Standard Units COSVR641 + 645 + 448 + 449 + 644
Where to find it in PAS 2030: Edition 1 Annex N. Edition 2 Annex B7
Where to get the training: CITB

The work: **Draught proofing**
The qualification: Derived from National Occupational Standard Unit COSVR641 + 452
Where to find it in PAS 2030: Edition 1 Annex O. Edition 2 Annex B2
Where to get the training: CITB

The work: **Floor insulation**
The qualification: Derived from National Occupational Standard Unit COSVR641 + 645
Where to find it in PAS 2030: Edition 1 Annex P. Edition 2 Annex B6
Where to get the training: CITB

The work: **Heating systems insulation (pipes/cylinders)**
The qualification: Derived from National Occupational Standard Unit COSVR641 + 322
Where to find it in PAS 2030:Edition 1 Annex Q. Edition 2 Annex C5
Where to get the training: SummitSkills

The work: **Condensing boilers (natural gas-fired and liquefied petroleum gas-fired)**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex A
Where to get the training: SummitSkills

The work: **Condensing boilers (oil-fired)**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex B
Where to get the training: SummitSkills

The work: **Heating controls**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex C
Where to get the training: SummitSkills

The work: **Under floor heating**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex D
Where to get the training: SummitSkills

The work: **Flue gas recovery devices**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex E
Where to get the training: SummitSkills

The work: **Gas fired warm air heating systems**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex F
Where to get the training: SummitSkills

The work: **Electric storage heater**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex G
Where to get the training: SummitSkills

The work: **Energy efficient glazing and doors**
The qualification: GQA Level 2 NVQ/SVQ Diploma in Fenestration Installations (QCF)
Where to find it in PAS 2030: Annex R
Where to get the training: Proskills

The work: **Lighting fittings**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex S
Where to get the training: SummitSkills

The work: **Lighting controls**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex T
Where to get the training: SummitSkills

The work: **Ground and air source heat pumps**
The qualification: Achievement of the relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex U
Where to get the training: SummitSkills

The work: **Solar thermal**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex V
Where to get the training: SummitSkills

The work: **Solar PV**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex W
Where to get the training: SummitSkills

The work: **Biomass boilers**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex X
Where to get the training: SummitSkills

The work: **Micro-combined heat and power (CHP)**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex Y
Where to get the training: SummitSkills

The work: **Micro and small-scale wind turbine systems**
The qualification: Relevant QCF/SCQF qualifications/qualification units defined in the Common Minimum Technical Competence.
Where to find it in PAS 2030: Annex Z
Where to get the training: SummitSkills

Source: www.cutcarbon.info/training/qualifications,-competence-and-green-deal-work.aspx, (2013)

Appendix 6

Institute of Environmental Management and Assessment (IEMA) EIA Quality Mark Register

The following organisations are registered to the Environmental Impact Assessment (EIA) Quality Mark having made a commitment to excellence in the EIA activities they deliver. IEMA reviews each registrant's compliance to the EIA Quality Mark Commitments on an ongoing basis to ensure the registrants listed below maintain high standards both now and in the future. Found on www.iema.net/eia-quality-mark

Adams Hendry Consulting Ltd	www.adamshendry.co.uk/
AECOM	www.aecom.com/
AMEC Environment & Infrastructure UK	www.amec.com/ukenvironment
Arup	www.arup.com,
Ash Design & Assessment Ltd	www.ashdesignassessment.com
Atkins	www.atkinsglobal.com/
Bidwells	www.bidwells.co.uk/eia
Black & Veatch	www.bvl.bv.com/
Campbell Reith	www.campbellreith.com/
Cascade Consulting	www.cascadeconsulting.co.uk/
Chris Blandford Associates Ltd	www.cba.uk.net/
David Lock Associates	www.davidlock.com
Dulas Ltd	www.dulas.org.uk/
Environ UK Ltd	www.environcorp.com/
Environment Agency - National Environmental Assessment Service (NEAS)	www.environment-agency.gov.uk/jobs/115248.aspx
ERM	www.erm.com/
Halcrow Group Ltd	www.halcrow.com/
Hyder Consulting	www.hyderconsulting.com
Jacobs Engineering UK Ltd	www.jacobs.com/
LDA Design	www.lda-design.co.uk/
LUC	www.landuse.co.uk/
Mott MacDonald Limited	www.mottmac.com
Mouchel	www.mouchel.com/
MWH (UK) Ltd	www.mwhglobal.com/
Nathaniel Lichfield & Partners	www.nlpplanning.com
Nexus Planning	www.nexusplanning.co.uk
Nicholas Pearson Associates	www.npaconsult.co.uk/
NJL Consulting	www.njlconsulting.co.uk/
Parsons Brinckerhoff	www.pbworld.co.uk/
Pegasus Group	www.pegasuspg.co.uk/
Peter Brett Associates LLP	www.peterbrett.com/
Royal Haskoning	www.royalhaskoning.com/
RPS Group Ltd	www.rpsplc.co.uk/
RSK Group Plc	www.rsk.co.uk/
Savills	www.savills.co.uk/services/planning-and development/planning/sustainability-and-environment/environmental-consultancy.aspx.
SKM Enviros	www.skmenviros.com/
SLR Consulting	www.slrconsulting.com/
Spawforths	www.spawforths.co.uk
Temple Group Ltd	www.templegroup.co.uk/
TEP	www.tep.uk.com/
Terence O'Rourke	www.torltd.co.uk/
The Landmark Practice (TLP)	www.thelandmarkpractice.com/
TNEI Services Ltd	www.tnei.co.uk
Turley Associates	www.turleyassociates.co.uk/
URS Infrastructure and Environment UK Limited	www.ursglobal.com/
Wardell Armstrong LLP	www.wardell-armstrong.com/
Waterman Energy, Environment and Design Ltd	www.watermangroup.com/
WSP Environment & Energy	www.wspgroup.com/
WYG Group Ltd	www.wyg.com/
Xodus Group Ltd	www.xodusgroup.com

See more at www.iema.net/eia-quality-mark-registrants#sthash.UmFNXPoy.dpuf, (2013)

Appendix 7

Higher Education Provision relating to low carbon in the Liverpool City Region

University of Liverpool

Applied Geographical Information Science MSc
Conservation and Resource Management MRes
Conservation and Resource Management MSc
Energy and Power Systems MSc(Eng) (FT)
Environment and Climate Change MSc
Environment and Planning BA (Hons)
Urban Regeneration and Planning BA (Hons)
Town and Regional Planning MPlan (RTPI Accredited)
Master of Civic Design (Royal Town Planning Institute Accredited)
MA Town and Regional Planning
Environmental Assessment and Management MSc
Environmental Science MSc
Environmental Sciences BSc
Environmental Sciences MSc
Geography and Archaeology BA (Joint Hons)
Geology & Physical Geography BSc
Geology & Physical Geography MESci
Geology BSc (Hons)
Geology MESci (Hons)
Geology (North America) MESci (Hons)
Geophysics (North America) MESci (Hons)
Geophysics (Geology) BSc (Hons)
Geophysics (Physics) BSc (Hons)
Geology and Geophysics MESci (Hons)
Geology and Physical Geography BSc (Hons)
Geology and Physical Geography MESci (Hons)
Ocean Sciences BSc (Hons)
Ocean Sciences MOSci
Mathematics with Ocean and Climate Sciences BSc (Hons)
Oceans, Climate and Physical Geography BSc (Hons)
Marine Biology with Oceanography BSc (Hons)
Ecology and Environment BSc (Hons)
Marine Biology BSc (Hons)
Marine Biology with Oceanography BSc (Hons)
Ecology and Environment MEcol (Hons)
Marine Biology MMarBiol (Hons)
MSc Conservation & Resource Management
MRes Conservation & Resource Management
MSc Marine Planning & Management
Geography BA (Hons)
Geography BSc (Hons)
Geography BSc (Hons) (4 year route including a Foundation Year at Carmel College)
Environmental Science BSc (Hons)
Globalisation and Development MA
Marine Planning and Management MA
Oceans, Climate and Physical Geography BSc (Hons)
Population Studies MA
Research Methodology MA
Research methods in Globalisation and Development MA
Research Methods in Population Studies MA
Urban Regeneration and Management MSc

Feeder Courses:

Engineering:

Advanced Engineering Materials - MSc (Eng)
Advanced Manufacturing Systems and Technology - MSc (Eng)
Advanced Mechanical Engineering - MSc (Eng)
Aerospace Engineering BEng (Hons)
Aerospace Engineering MEng (Hons)
Aerospace Engineering with Pilot Studies BEng (Hons)
Aerospace Engineering with Pilot Studies MEng (Hons)
Civil and Environmental Engineering - MSc (Eng)
Civil and Structural Engineering MEng (Hons)
Civil Engineering BEng (Hons)
Civil Engineering MEng (Hons)
Engineering BEng (Hons)
Engineering MEng (Hons)
Industrial Design BEng
Industrial Design MEng
Mechanical and Materials Engineering BEng (Hons)
Mechanical and Materials Engineering MEng (Hons)
Mechanical Engineering BEng (Hons)
Mechanical Engineering MEng (Hons)
Mechanical Engineering with Business BEng (Hons)
Mechanical Engineering with Business MEng (Hons)
Product Design and Management - MSc (Eng)
Simulation in Aerospace Engineering - MSc (Eng)
Sustainable Structural Engineering - MSc (Eng)

Electrical Engineering and Electronics

Avionic Systems BEng (Hons)
Avionic Systems MEng (Hons)
Avionic Systems with Pilot Studies BEng (Hons)
Avionic Systems with Pilot Studies MEng (Hons)
Avionic Systems with Pilot Studies with Year in Industry BEng (Hons)
Avionic Systems with Year in Industry BEng (Hons)
Computer Science and Electronic Engineering BEng (Hons)
Computer Science and Electronic Engineering MEng (Hons)
Computer Science and Electronic Engineering with Year in Industry BEng (Hons)
Electrical Engineering and Electronics BEng (Hons)
Electrical Engineering and Electronics MEng (Hons)
Electrical Engineering and Electronics with a Year in Industry BEng (Hons)
Electrical Engineering and Electronics with a Year in Industry MEng (Hons)
Electrical Engineering BEng (Hons)
Electrical Engineering with Year in Industry BEng (Hons)
Electronic and Communication Engineering BEng (Hons)
Electronic and Communication Engineering MEng (Hons)
Electronic and Communication Engineering with Year in Industry BEng (Hons)
Electronics BEng (Hons)
Electronics MEng (Hons)
Electronics with Year in Industry BEng (Hons)
Engineering Foundation BEng (Hons) (4 year route including a Foundation Year at Carmel College)
Mechatronics and Robotic Systems BEng (Hons)
Mechatronics and Robotic Systems MEng (Hons)
Mechatronics and Robotic Systems with Year in Industry BEng (Hons)
Mechatronics and Robotic Systems with Year in Industry MEng (Hons)
Medical Electronics and Instrumentation BEng (Hons)
Medical Electronics and Instrumentation MEng (Hons)
Information and Intelligence Engineering MSc (Eng) (FT)
Microelectronic Systems MSc (Eng) (FT/PT)
Microelectronic Systems and Telecommunications MSc (Eng) (FT/PT)

Computer Science

Artificial Intelligence BSc (Hons)
Artificial Intelligence with a Year in Industry BSc (Hons)
Computer Information Systems BSc (Hons)
Computer Information Systems BSc (Hons) (Foundation) (4 year route with Carmel College)
Computer Information Systems with a Year in Industry BSc (Hons)
Computer Science BSc (Hons)
Computer Science BSc (Hons) (Foundation) (4 year route with Carmel College)
Computer Science MEng (Hons)
Computer Science with a Year in Industry BSc (Hons)

Computing with a Year in Industry BSc (Hons)

eFinance BSc (Hons)

Electronic Commerce Computing BSc (Hons)

Electronic Commerce Computing with a Year in Industry BSc (Hons)

Internet Computing BSc (Hons)

Internet Computing with a Year in Industry BSc (Hons)

Software Development BSc (Hons)

Software Development with a Year in Industry BSc (Hons)

Energy and Nuclear related

Energy and Power Systems MSc(Eng) (FT)

Nuclear Power Engineering (NEW) MSc

Nuclear Science and Technology MSc

Radiometrics: Instrumentation and Modelling MSc

Liverpool John Moores University

Feeder Courses

BA (Hons) Architecture

BA (Hons) Spatial Design

BEng (Hons) Automotive Engineering

BEng (Hons) Building Services Engineering

BEng (Hons) Civil Engineering

BEng (Hons) Electrical and Electronic Engineering

BEng (Hons) Industrial Electronics and Control Engineering

BEng / BSc Extended Engineering and Technology with Foundation year

Beng Architectural Engineering

BSc (Hons) Applied Chemical and Pharmaceutical Sciences

BSc (Hons) Architectural Technology

BSc (Hons) Biochemistry

BSc (Hons) Biomedical Science

BSc (Hons) Building Services Engineering Project Management

BSc (Hons) Building Surveying

BSc (Hons) Construction Management

BSc (Hons) Environmental Health

BSc (Hons)Extended Natural Sciences with Foundation Year

BSc (Hons) Wildlife Conservation

HNC Civil Engineering

HNC Construction and Property

MEng (Hons) Automotive Engineering

MEng (Hons)Building Services Engineering

MEng (Hons)Civil Engineering

MEng (Hons) Electrical and Electronic Engineering

MEng Architectural Engineering

Mphys Astrophysics

Hope University

Computer Science (MSc)/Computer Science (Mobile Computing) MSc

Computer Science (subject to validation)

Environmental Management (MSc)

Environmental Science BSc (Hons)

Appendix 8

Specialist Skills requested within Green jobs advertised online between Jan 13 - Dec 13 within the Liverpool City Region

Skill	Job Openings
Contract Management	94
Energy Efficiency	78
Inspection	69
Renewable Energy	67
ISO 14001 Standards	62
Javascript	58
Energy Conservation	57
Business Development	56
Surveys	56
ISO 9001 Standards	56
Repair	55
Environmental Management	53
Cleaning	48
Environmental Health	47
Environmental Protection	47
Cold Calling	46
Electrical Engineering	45
Chemistry	45
Boilers	44
Mechanical Engineering	44
Procurement	43
Telecommunications	42
Insulation	42
Environmental Science	40
Direct Sales	40
Product Sale And Delivery	38
Purchasing	36
Biomass	35
Building Effective Relationships With Customers / Co-Workers	35

Skill	Job Openings
Environmental Regulations	34
Sales Management	33
Water Treatment	33
Calibration	30
Plumbing	28
Waste Reduction	27
Solar Sales	27
Autocad	25
Biology	25
Energy Consumption	25
Scheme	24
Electrical Design	24
Accounting	23
Mathematics	23
Report Writing	22
Appointment Setting	22
Supplier Management	22
Operations Management	21
Process Engineering	21
CAD/ Draughting	21
Record Keeping	21
Energy Saving Products	20
Energy Services	20
Environmental Policy	19
Decision Making	19
Civil Engineering	19
Power Generation	19
Sustainability	19
Workshops	18
Carbon Reduction	18

Skill	Job Openings
Validation	18
Physics	18
Concise	18
Geology	18
Cooking	17
Mechanical Design	17
Good Manufacturing Practises (gmp)	17
Engineering Projects	17
Psychology	16
Scheduling	16
Optimisation	16
Natural Gas	16
Machinery	15
First Aid	15
Energy Assessment	15
Facilities Management	14
Computational Fluid Dynamics	14
Risk Assessment	14
Solar Panels	14
Energy Engineering	14
Scada	14
Energy Management	14
Music	13
Economics	13
Mentoring	13
Food Safety	13
Direct Marketing	13
Nuclear Energy	13
Biodiesel	13
Internal Auditing	13

Source: Labour Insight, 2013

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Liverpool City Region
Employment and
Skills Board

Liverpool City Region
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