
Low Carbon Economy Action Plan

Delivering Economic Growth

2011-2015



Liverpool City Region can provide component supply chain for Irish Sea Wind farm developments worth £15bn

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Low Carbon Economy Committee Members

Liverpool City Region Low Carbon Economy Committee is a private sector led group established to drive forward the low carbon economy to deliver business growth and job creation.



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Executive Summary

Only a decade ago, renewable energy was considered by many a marginal activity, making little impact on a UK economy that had enjoyed decades of plentiful coal, oil and gas supplies to fuel our economic growth – indeed the term “Low Carbon Economy” had not entered common usage.

How the world has changed in the last 10 years, as our understanding and evidence base of the climate change impacts of global carbon emissions has grown, and our carbon fuel supplies are depleting. We are now in the midst of a revolution, a transition to a Low Carbon economy in the UK and across the world. Governments and major corporations are recognising this through treaties, legislation, targets and incentives, to stimulate the move to renewable energy.

The impacts on how we generate, distribute and consume energy are profound.

Our lives are set to change irrevocably – and many are changing already. How we, as an economic community, respond to the opportunities this change brings will determine how successful we are for many years to come.

This is an extraordinary economic opportunity and one which Liverpool City Region has many of the natural, built and business assets to capture, whether it is through the ways that energy is generated, such as offshore wind, biomass power stations and micro-generation schemes; the way it is distributed through smart grids and meters, or the way it is consumed and preserved through retrofitting schemes and heat networks, this change offers investment, business growth and job opportunities.

Following the Stern Review on the Economics of Climate Change in 2006 and the consequent “Mini Stern” report for Liverpool City Region in 2009, it was estimated that approximately 7,000 jobs could be created in Liverpool City Region’s low carbon economy by 2015.

Our latest estimates are based on published reports, research and consultation with industry and reflect the rapid development of opportunities in the low carbon economy. We now forecast that nearly 12,000 new jobs can be created in our low carbon economy over the next 5 years.



This Action Plan sets out that potential in detail, identifying the priorities and the actions necessary to achieve it. Offshore Wind Energy, Microgeneration, Smart Grid and Retrofitting in particular offer substantial job creation opportunities building upon our key assets, capabilities and businesses. Already an estimated 8,700 people are employed in Liverpool City Region in a diverse range of low carbon sub sectors in hundreds of businesses.

From fabrication, to electrical engineering, commissioning to construction and from financing new joint ventures to collaboration of new and existing brands, employment opportunities will be created right across Liverpool City Region.

This will draw on our existing skills and business base and significantly extend it through diversification and up-skilling.

These opportunities will be realised through the prioritised, collaborative approach embodied in this Action plan, driven forward by the Low Carbon Economy Committee and Panel.

LOW CARBON ECONOMY COMMITTEE



Generating energy from alternative sources offers employment growth potential

The Concept

CLIMATE CHANGE TARGETS

The Stern Review on the Economics of Climate Change was published in 2006 by HM Treasury. It concluded that:

“The scientific evidence is overwhelming - climate change presents very serious global risks, and it demands an urgent global response.”

This review was the first that identified and costed climate change as an economic problem.

A suite of climate change legislation has been introduced at an EU and UK level in response to mounting evidence and concerns over global warming. The Climate Change Bill became law on 26 November 2008. The Climate Change Act sets out a framework for moving the UK to a low carbon economy.

The Act provides legally binding targets for greenhouse gas emission reductions, through action in the UK and abroad, of at least 26% to 32% by 2020 against a 1990 baseline, and reductions in CO₂ emissions of at least 80% by 2050 against the same baseline. A more ambitious target reduction of 42% by 2020 has since been established for the UK.

Achieving these targets will require substantial changes both in the structure and organisation of economic activity and society's ways of working.

LOW CARBON BUSINESS OPPORTUNITIES

Economic and business opportunities are arising at a significant pace from the radical changes that need to be made to technology, methods of production and forms of consumption to become a low carbon economy. The challenge for businesses and economies, including Liverpool City Region, is in being ready to capture and realise these opportunities.

The Low Carbon Economy for Liverpool City Region centres on the four key areas of energy, networks, transport and buildings. These areas show the greatest growth potential for Liverpool City Region and relate to existing strengths and expertise.

The Energy and Environmental Technologies and Services sector (EETS) are companies who supply goods and services that have an application that is used to enhance the environment. The transition to a low carbon economy will generate significant opportunity both in the EETS sector and more widely in construction, fabrication, installation and maintenance associated with changes in the ways that energy is generated, distributed, used and conserved.

There is a wide range of estimates of the future opportunities in the EETS sector globally and for the UK. Recent research for the UK Government suggests that currently there are 370,000 people employed in the EETS sector and employment could increase by anything between 50% and 100% by 2015.

370,000

People currently employed in the UK's Energy and Environmental Technologies and Services sector



Manufacturing sector can identify new opportunities in Liverpool City Region's Low Carbon Economy

Creating a low carbon economy in Liverpool City Region – Why?

The global transition to a low carbon economy offers a great opportunity to generate new investment, business growth and jobs.

Liverpool City Region has existing physical and natural assets and business capabilities and whilst currently a modest employment base, it offers significant potential in key elements of the Low Carbon economy.

CURRENT POSITION

It is estimated there are about 400 companies in the Energy and Environmental Technologies and Services sector in Liverpool City Region with total employment of 8,700 (1.5% of Liverpool City Region total). This industry generates annual sales of £1 billion and Gross Value Added (GVA) of £435 million in our economy (2.4% of Liverpool City Region total).

This however excludes companies in the construction, fabrication, mechanical, electrical and civil engineering sectors which are currently or have the potential to be involved in low carbon building development and installations, vehicle manufacture, wind turbine installation and the professional services associated with these activities.

400
Companies in the Energy and Environmental Technologies and Services sector in Liverpool City Region

Currently, the key low carbon activities in Liverpool City Region are:

- Environmental consultancy with a number of large multi-disciplinary consulting firms and a range of smaller specialists;
- Energy management including specialists in insulation, glazing, lighting, controls and Heating, Ventilation and Air Conditioning (HVAC);
- Renewable energy, especially in the marine sector, including suppliers of products, fabrications and specialist services to the offshore wind energy market (e.g. corrosion protection, port facilities and supply boats);
- Waste management and recycling, including some of the major waste management firms, specialists in key sectors and recycling firms in areas such as plastics, glass and composting;
- Water & wastewater treatment including fabrication companies and specialists in filtration and chemical treatment.

To achieve significant growth in the low carbon economy require focus on the components of the sector where Liverpool City Region either currently or potentially has key assets and capabilities, competitive advantage and a distinctive value proposition including a compelling brand for investors to bring finance and resources to make this happen.

The development of key elements of a thriving low carbon economy requires an educated and skilled talent pool to support the growth and adaptation of existing and new entrant companies. The parallel development of Liverpool City Region's Knowledge Economy will address the requirement for informed, innovative and skilled individuals and companies.

The universities, research institutions and specialist training centres are engaged with creating content and services to support all aspects of low carbon activity. In a similar fashion, companies involved in low carbon projects are entering into collaborative partnerships with knowledge providers to enhance their product offer and ensure they remain at the cutting edge of a rapidly evolving sector.

(1) Regeneris Consulting 'The Economic Impact of EU and UK Climate Change Legislation on Liverpool City Region' 2009

“Liverpool City Region offers a prime opportunity for wind energy manufacture, supply chain and marine logistics operations”

Arup consulting engineers

OFFSHORE WIND

The UK is the largest offshore wind energy market in the world. The Department of Energy and Climate Change (DECC) has outlined the scale of the business opportunity created by the three rounds of offshore wind development so far announced for UK territorial waters.

Over £100bn² will be invested to fully build out the awarded development zones around the coast of the UK, of which approximately £18bn³ will be spent in the Irish Sea zone. The Irish Sea zone alone will involve the manufacture, assembly, installation, operation and maintenance of up to 1000 large turbines, each generating at least 3.5 megawatts.

Potential for job creation nationally has been estimated at 140,000 over the next 10 years - a scale not unlike that of the oil and gas industry boom of the 1970s and 1980s.

Further developments in the Irish territorial waters and across Europe will extend the opportunities for businesses in this sector to a 20 year time horizon.

The scale of this market opportunity is well beyond the industry's current capacity and significant investment in new facilities, plant and skills will be required to deliver the contracts, creating opportunities for developers, manufacturers and an extensive supply chain.

ONSHORE WIND

Onshore wind turbines have become a familiar site across the UK over the past 10 years. Although not universally popular, onshore wind is still projected to expand nationally by a further 25% from 2008 levels by 2020⁴. This growth will mainly come from large scale upland and in-fill schemes in Scotland and the North of England as it is a much lower cost source of renewable energy than deep water offshore wind installation.

The key challenge to achieving this impact is the identification of sites that are acceptable to local communities, which is becoming increasingly difficult.

MICROGENERATION

"Microgeneration" describes the application of small scale renewable energy generation installations, such as solar panels and small wind turbines into residential and commercial premises to reduce their energy consumption from the National Grid and, where feasible, to feed the energy generated into the grid.

Of all the low carbon sectors, Microgeneration offers the most significant and immediate opportunities for job creation.

It also offers the potential for an immediate impact on GVA. In 2004 there were approximately 82,000 microgeneration installations in the UK. Yet a study commissioned by the Department of Trade and Industry (DTI)⁴ suggested that by 2050, microgeneration could provide 30-40% of the UK's electricity needs with Combined Heat and Power (CHP) leading the way, followed by micro-wind and solar Photovoltaics (PV).

Government incentives for renewable microgeneration schemes are coming into place, including a guaranteed, attractive Feed in Tariff (FiT) for installations to April 2012 and Renewable Heat Incentive (RHI). These will work alongside legislation and agreements such as the CRC (Carbon Reduction Commitment) that require builders and building owners to follow the Code for Sustainable Homes and Building Research Establishment Environmental Assessment Methodology (BREEAM) standards.

The installation and subsequent operation and maintenance requirements will generate a huge increase in new jobs, and the upskilling of existing trades people.

BIOMASS AND ENERGY FROM WASTE

In 2008, biomass, provided the largest contribution of 43.1% in total generation of electricity from renewables (21,597GWh). This figure included imported fuel stock and co-firing in coal-fired power stations.

Biomass is the UK's largest green energy resource.

The nation's biomass resource potential is at an estimated 20 million tons per annum. By 2020, the UK could witness commercialization of cogeneration (i.e. Combining Heat and Power) using biomass.

Biomass and Energy from Waste (EfW) schemes are becoming more attractive to Local Authorities as landfill space runs out and disposal costs increase. Also, Biomass - fired district heating could provide the lowest cost means of achieving Coded for Sustainable Homes Level 6 (zero carbon).

Waste disposal authorities nationally, including Merseyside Waste Disposal Authority (MWDA), have increasing targets and incentives to reduce landfill - and Energy from Waste presents an opportunity to achieve this.

New technologies such as pyrolysis, gasification and anaerobic digestion can also attract significant subsidies if used to generate electricity.



Liverpool City Region can be a major logistics centre for imported biomass

NUCLEAR

A recent assessment¹ estimated that the global civil nuclear market is currently worth around £30bn per year split between new build, decommissioning and new reactors. The UK Office for Nuclear Development (OND) expect between 8 and 10 new reactors to be built by 2025 representing a market opportunity of approximately £24 - £30bn in the UK.

In 2008 the civil nuclear manufacturing supply chain employed over 33,000 people. The nuclear new build programme will generate significant orders for major components and construction and installation. Similarly, the decommissioning programme creates major opportunities in hazardous waste sectors and site remediation.

TIDAL

According to the Sustainable Development Commission² tidal range generation could contribute around 13% of Britain's electricity supply. The Carbon Trust estimates that the UK has around 50% of Europe's practical tidal energy resource and 15% of the global tidal resource. Independent growth forecasts suggest that the sector could grow by over 5% annually up to 2015³.

Employment would be generated in the construction and development of these schemes, whilst employment to operate and maintain the completed installation is modest.

(1) Renewable UK / Douglas Westwood 'UK Offshore Wind: Building and Industry' 2010

(2) DECC 'A Prevailing Wind - Advancing UK Offshore Wind Deployment 2009'

(3) Arup 'Liverpool City Region Offshore Wind Energy Study 2010'

(4) BERR 'Our Energy Challenge' 2006

(1) NAMTEC 'The Supply Chain for a UK New Build Programme 2009'

(2) Sustainable Development Commission 'Tidal Power in the UK' 2007'

(3) Carbon Trust 'Future Marine Energy' 2009

SMART GRID

The development of a Smart Grid will require new technologies to be trialed in the areas of power, control, communications and IT. It will also require an increased level of engagement with those that use the electricity network providing potential opportunities for new market participants. The roll out of smart meters to every property in the UK is due to commence in 2012 and a similar timetable is in place for the roll out of electric vehicle charging infrastructure. These developments will generate significant manufacturing requirements and installation. Installation is labour intensive as is the training in areas such as data acquisition and security.

Transmission companies have put forward plans for investment of £4.7 billion by 2020 for refurbishment and expansion of their UK networks.

Ofgem has also made £500 million available over five years from April 2010 for larger scale trials and the Toxteth area has been identified as an area to conduct a Smart Grid trial.

This investment in innovative network technology will be a catalyst for developing UK expertise in the technical, economic and behavioural outcomes of smart grids in practice. UK trials are critical to ensuring that UK business reaps the growing global market potential of smart grid technologies and systems.

The Government is also supporting complementary developments in a number of areas, including the £30 million Plugged-in Places framework to support the building of recharging infrastructure for electric vehicles.

The Government has committed to the roll out of smart meters for both electricity and gas in all homes and most small businesses by the end of 2020.

£8.6 billion will be spent in replacing some 47 million gas and electricity meters, which are expected to deliver total benefits of £14.6 billion over the next 20 years.

The installation of these new meters alone will create thousands of jobs across the UK.

HEAT NETWORKS

Heat networks promote locally provided low carbon, competitive and smarter energy choices utilising the Government Feed in Tariff to generate revenues from electricity produced by eligible technologies.

The Department for Energy and Climate Change (DECC) have assessed³ that the maximum national potential for District Heat Networks may be in the range of 3.3 to 7.9 million households and 15.6m to 26.3 m square metres of non domestic floor space. This corresponds to an additional share for the district heating in the heat mix of between 6% and 14%. The assessment also confirmed that there is sufficient power generation capacity within a radius of 15km of major conurbations to deliver the required heat for community-scale schemes.

DECC is currently developing the Renewable Heat Incentive aimed at encouraging the use of renewable and low carbon heat sources. Heat maps of major sub regions have been commissioned by the Government.

The viability of Combined Heat and Power (CHP) or district heating schemes is dependent on the density of heat demand thus favoring densely packed urban areas such as those found in over half Liverpool City Region.

LOW EMISSION VEHICLES

The Automotive Sector is hugely important to the UK, directly employing 180,000 people in over 3,300 unique automotive businesses and equating to 6% of the entire UK manufacturing workforce.

Meeting the UK's longer-term climate goals will require the almost complete decarbonisation of road transport. The Government has announced provision of over £400 million to support measures designed to promote uptake of a next-generation of ultra-low emission vehicle technologies. Electric, plug-in hybrid, and hydrogen fuelled vehicles can all help to reduce emissions from road vehicles.

The UK Government is providing £10m for the accelerated deployment of electric vehicle charging infrastructure through the Plugged in Places initiative. This complements the £20m for infrastructure, £140m for research, development and demonstration under the Technology Strategy Board's Low Carbon Vehicle Innovation Platform and £230m for consumer initiatives such as a £5,000 per vehicle subsidy for electric hybrids.

BUILDING RESEARCH / NEW BUILD

In 2007 the Government announced an ambition¹ for all new homes to be zero carbon by 2015 followed by all new non domestic buildings be zero carbon by 2019. The target improvement rates for all new homes are:

- 2010 25% improvement
- 2013 44% improvement
- 2016 Zero Carbon Homes

The Government is also investing up to £6m to construct 60 low carbon affordable homes built with innovative insulating materials.



Affordable homes to be built with innovative insulating materials

RETROFITTING

The UK housing market is responsible for 24 per cent of the country's Carbon Dioxide (CO₂) emissions and 80 per cent of existing homes will still be standing in 2050. The country's least efficient properties date back to before 1920. These currently make up 15 per cent of UK homes but actually account for 23 per cent of total notional CO₂ emissions. A similar situation exists in the commercial sector.

Retrofitting is a process of super-insulating older properties, It combines strategies of energy conservation, air sealing, moisture management, controlled ventilation, and insulation so that dramatic energy savings are achieved alongside optimal building performance.

The Green Deal is part of the Government's efforts to meet tough UK carbon reduction targets. Improved energy efficiency is likely to reduce fuel poverty, increase local construction employment and reduce emissions.

Up to 34,000 jobs could be created in the UK by installing and maintaining whole house packages of energy efficiency improvements.

The development of a Liverpool City Region labour pool skilled in the techniques required for retrofitting will provide job opportunities for both installers and those training and accrediting them.

Both domestic and commercial property owners will benefit most directly from retrofitting through significantly reduced energy consumption. This cost reduction frees up money to be spent in other areas of the economy.

⁽¹⁾ OFGEM 'Sustainable Energy Networks for 2020' 2010

⁽²⁾ DECC 'Smarter Grids – The Opportunity' 2009

⁽³⁾ DECC 'The Potential and Costs of District Heating Networks' 2009

⁽¹⁾ DCLG 'Building a Greener Future' 2007

⁽²⁾ DBIS 'UK Low Carbon Transition Plan' 2010



Irish Sea Off Shore Wind Farms have the potential to create 3,000 jobs

Existing assets & capabilities

OFFSHORE WIND

There are existing offshore windfarms in Liverpool Bay and along the North Wales Coast (Burbo Bank, Rhyl Flats and North Hoyle) developed in Rounds 1 and 2 of the UK's wind development programme. Development work is underway on an extension to Burbo Bank and a new windfarm at Gwynt y Môr off the North Wales coast.

These developments will be dwarfed by the Round 3 scheme to be developed in deeper Irish Sea waters, construction of which is due to start in 2014/15. Whilst, thus far, no turbines have been assembled in Liverpool City Region, a substantial operation and maintenance infrastructure has been established.

Liverpool City Region is well placed to take advantage of this emerging market. It has a number of key assets and capabilities necessary for the offshore wind industry including:-

- Deep water port facilities close to the offshore wind farm development zones

- Over 150 hectares of prime quayside development sites
- Expertise in ship building, fabrication, manufacturing and engineering
- Highly developed transport and logistics infrastructure
- A deep pool of talent from one of the UK's largest catchment populations

ONSHORE WIND

Coastal parts of Liverpool City Region have a good quality wind resource. Onshore wind turbines have been erected along the Mersey especially focused around the Port of Liverpool where two arrays at Alexandra Dock and Seaforth provide 13.6MW of installed capacity. However, at present, Liverpool City Region only supplies 2% of the north west UK's on-shore wind capacity. The biggest challenge for potential wind installation developers is the lack of unconstrained development sites.

Offshore Wind Energy - Key sites and facilities



Existing assets can collectively service the needs of the off shore wind industry

“A tidal power scheme in the Mersey Estuary is an ambitious but attainable goal”

Anthony Hatton, Development Director, Peel Energy

MICROGENERATION

Registered Social landlords (RSLs) in Liverpool City Region are actively looking at options for installing microgeneration technologies. Those eligible for Feed in Tariffs (FiT's) now, such as solar PV and small wind, and solar thermal and heat pumps, when the Renewable Heat Incentive (RHI) comes into effect from June 2011, will progress as planned.

There is a significant potential in solar Photo Voltaics (PV) generally in the domestic retrofit sector, as well as a large increase in interest and installations in the commercial solar PV and small wind area. Some of the region's commercial businesses and property owners are looking at ground or roof-mounted solar farms, and small scale wind farms.

Major energy companies, such as EON, together with specialist environmental technology companies such as Eco Environments and Stiebel Eltron are active and building capacity in Liverpool City Region to take advantage of these opportunities.

BIOMASS AND ENERGY FROM WASTE

Liverpool City Region has around 100 process industry sites that could potentially use biomass for heating and power generation.

Using biomass would enable them to reduce CO2 emissions and meet legislative targets (e.g. EU Emissions Trading Scheme (ETS) and Climate Change Agreements).

Liverpool City Region has potential fuel supplies from local woodlands, local authority arboricultural activity, waste wood (e.g. from demolition), food industry waste & commerce in addition to residual domestic waste.

Biomass-fired district heating could be lowest cost means of achieving Code for Sustainable Homes Level 6 (zero carbon).

Biomass feedstock production could provide new job and economic development opportunities for the rural areas of Liverpool City Region.

The Mersey ports are in a strong position to act as a logistics centre for imported biomass alongside port power developments.

A large scale EfW plant (100MW) is in development at Ineos Chlor (Runcorn) for residual domestic waste and a large scale (150MW) biomass port power project is planned at Alexandra Dock.

Approx 200,000 tonnes per year of biomass is being imported through Liverpool for Fiddlers Ferry Power Station. Planning permission has been granted for a gasification plant at Knowsley and an Anaerobic Digestion (AD) plant at Garston treating commercial waste.

NUCLEAR

The North West is the UK's largest hub for the civil nuclear industry with major sites in Cumbria, Lancashire and Cheshire. It also hosts some of the world's leading nuclear research capabilities in its universities and research centres.

The Health and Safety Executive's Nuclear Installations Inspectorate (NII) is based in Bootle and employs over 300 staff, 60 % of whom are qualified to degree level or above. The Nuclear Physics Group at the University of Liverpool is a leading research hub and is based at the STFC (Science and Technology Funding Council) facility within the Daresbury Nuclear Physics Laboratory. The Laboratory employs around 300 full-time staff.

A number of Liverpool City Region companies have major contracts in the new build, waste and transport and decommissioning supply chains that will benefit from growth.

TIDAL

A major study is being led by Peel Energy to assess the technical and consenting feasibility, and commercial viability of tidal power scheme options for the Mersey Estuary.

The aim is to identify a preferred scheme by the end of March 2011 and if feasible and viable to progress this scheme through further development into the consenting process. If progressed, this would be the most advanced tidal range scheme in the UK.

There is world renowned expertise at Liverpool University and National Oceanography Centre and local expertise in supporting the deployment and maintenance of marine technologies. There is potential to establish Liverpool City Region as a leading location for the assessment and development of tidal energy schemes.

SMART GRID

Scottish Power Energy Networks are the electricity network operator for Liverpool City Region and have the potential to lead bids to undertake trials and projects using Ofgem's £500M Low Carbon Network Fund.

This fund is designed to help the UK Distribution Network Operators (DNO) understand how they can provide security of supply, value for money, and as the UK moves towards a low carbon economy the DNO's establish the role they will play in facilitating the low carbon and energy saving initiatives that are underway to tackle climate change.

Scottish Power Energy Networks are keen to undertake a suitable trial in Liverpool City Region and would be keen to help facilitate a collaboration with organisations planning an imminent rollout of low carbon technologies such as smart metering, electric vehicle charging infrastructure, micro-generation or consumer information systems.

Smart Grid technologies have the potential to be rolled out to business parks, hospitals and universities across Liverpool City Region.

There are direct knowledge and technology transfer opportunities from the work undertaken in Liverpool City Region. Smart Grid can act as a catalyst for inward investment in energy generation, distribution and management technologies and the proposed trial has already attracted significant interest nationally and internationally.

Liverpool City Region Smart Grid trial zones



Yellow: Liverpool City Region's Smart Grid trial zone
Red: Potential Smart Grid expansion areas

“We see the UK market as a must for Stiebel Eltron. Our ability and desire to invest here has been helped enormously by the support we have received in Liverpool City Region.”

Dr Ulrich Stiebel, Owner, Stiebel Eltron GmbH.

HEAT NETWORKS

Significant private heat networks are situated in the Port of Liverpool, University of Liverpool, Liverpool John Moores University, Royal Liverpool Hospital and Pilkington's Greengate complex centred on Combined Heat and Power (CHP) plants. A number of Housing Trusts are considering community based schemes for new build developments.

E.ON are also involved in a number of Energy Supply Companies (ESCo) projects where the ESCo builds the community energy centre that generates heat, hot water and electricity through its own Combined Heat and Power units and supplementary boilers. Renewable micro-generation technologies can be added to further help meet low carbon targets.

LOW EMISSION VEHICLES

Liverpool City Region is in the centre of a region with significant world class vehicle manufacture and assembly expertise. This is coupled with specific centres of excellence within the supply chain, SME community and academic base including unique fuel cell technology at ACAL Energy; in depth research capability at Daresbury; innovative solutions to hydrogen, electrical storage and materials research at Liverpool University; novel materials research at Liverpool John Moores University and the UK's only chlor alkali source of H2 at Ineos Chlor.

There is also the capability to implement the supporting infrastructure required for the transition to low emission vehicles particularly for battery and Hydrogen/electric vehicles.

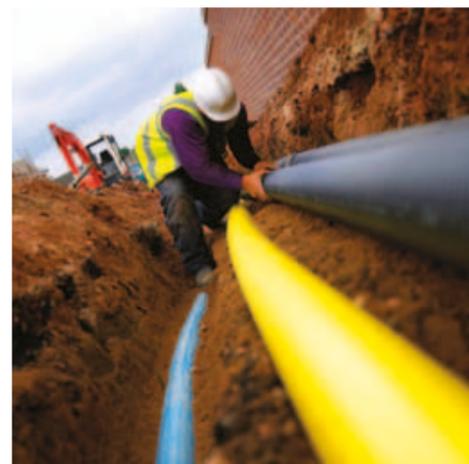
A dense urban population and highly developed infrastructure make the the economics of mass roll out more favourable. In addition Merseytravel, Liverpool City Region's Integrated Transport Authority is at the forefront of low carbon transport provision and infrastructure development and has led coordinated bids in initiatives such as Plugged In Places.

BUILDING RESEARCH / NEW BUILD

Liverpool City Region has strengths in upgrading existing housing and commercial buildings through its Registered Social Landlords and commercial property developers. It also has a nationally significant sector in areas such as glazing and insulation including research and development facilities for Pilkington and Knauf in St Helens. Flamco has developed a major centre to demonstrate low carbon building technologies at its centre, also in St Helens.

There is an existing centre to demonstrate new building technology and techniques run by the Building Research Establishment (BRE) at Garston near Watford. This centre is focused on new build properties. The potential to establish a Building Research Establishment (BRE) centre in Liverpool City Region specifically focused on retrofitting technologies and techniques will be explored.

A Liverpool City Region focused support network of companies who produce such technologies could be created to offer advice and supply chain options. An integrated energy master plan is under consideration for the Knowledge Quarter.



Liverpool is trialling the UK's largest Smart Grid energy saving technology

RETROFITTING

There are 150,000 dwellings in the social rented sector in Liverpool City Region. While significant efforts have and are being made to improve their energy efficiency, huge opportunities remain in this sector.

Knowsley MBC have leveraged millions of pounds from Centrica through the CESP programme to retrofit 1,200 households in Stockbridge Village with efficiency measures such as wall cladding and air source heat pumps. This public and private partnership is now recognised nationally by DECC as a national best practice case study.

Some Registered Social Landlords (RSLs) are taking action on energy efficiency programmes including demonstration projects to Passiv Haus and Code 6 standards. These demonstration programmes are at the cutting edge of building performance and efficiency whilst maintaining quality of occupancy. Centered on emerging technology and practices each demonstration scheme is expensive but as the technologies are mainstreamed economies of scale will make mass roll out feasible.

There are similar levels of opportunity for retrofit to commercial and industrial building stock, centred on insulation, lighting, heating and ventilation and building controls.

There are opportunities to draw additional investment funds from national sources into Liverpool City Region and the North West European Regional Development Fund (ERDF) Programme (2007-2013) has made ERDF funding available for energy improvements to social housing. Liverpool City Region now has a Green Energy Training Centre in Wirral hosted by Stiebel Eltron that provides up-skilling capacity.

In December 2010 agreement was reached with the National Sector Skills Council and Summit Skills to launch a hub of the National Skills Academy for Environmental Technologies in Liverpool. The hub is a consortium of 9 training providers in Liverpool City Region and surrounding areas and is led by Liverpool Community College. The hub will deliver focused vocational training centred on private sector skill requirements.

Funding has been secured by Liverpool City Region's Environment and Waste Board through DCLG's Climate Skills Fund. This is being used to develop models for public sector organisations to develop Special Purpose Vehicles and Multiple Utility Supply Companies (MUSCO's). These methods of delivering project financing will be key to the successful roll-out of low carbon projects that involve both the public and private sector such as Smart Grid.

“We are delighted to be delivering an innovative solution that will make a positive contribution to climate change, reduce fuel bills and increase people's comfort in their own home”

Martin Gladwin, Head of Asset Management, Plus Dane Group

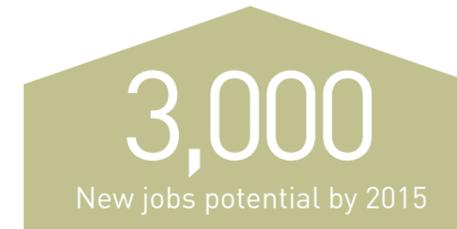


Short term job growth can be achieved through development of Low Carbon energy infrastructure

Where growth will come from

Analysis of each sub sector's potential for employment growth, underpinned by published documents and research, identifies the following opportunities:

OFFSHORE WIND



Establish a substantial offshore wind manufacturing, installation, operating and maintenance centre in Liverpool City Region that serves the proposed £18bn Irish Sea installations and wider UK and global offshore installations.

Make full use of Liverpool City Region's natural and built assets, skills, capabilities and supply chain working collaboratively to grow businesses, create new jobs and increase GVA.

Early job potential will come from Round 1 operation and maintenance, assembly and installation of Round 1 and 2 extensions and survey studies and site preparation for Round 3. Mid term (from 2014) potential will come from Round 2 operations and maintenance plus assembly and installation of Round 3.

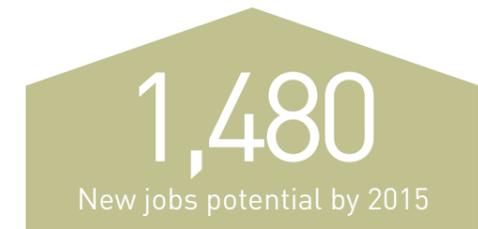
ONSHORE WIND



Liverpool City Region partners commissioned Arup in February 2010 to review Liverpool City Region's capacity for renewable energy including onshore wind and to recommend suitable locations for development that meets political, technical and commercial criteria.

The report identified a number of locations across Liverpool City Region that are commercially and technically suitable for the development of wind turbines, however, it recognized the political sensitivities presented by onshore wind.

MICROGENERATION



Stimulate the market to achieve a mass roll out of microgeneration technologies in Liverpool City Region, securing the maximum local content in this roll-out to residential and commercial buildings, creating local jobs and stimulating business and GVA growth.

Establish Liverpool City Region as a microgeneration knowledge and development centre.

Short term job growth is to be generated around installation. Installers can be trained and accredited within a matter of months and most products can be bought off the shelf.

BIOMASS AND ENERGY FROM WASTE



Develop a significant and viable biomass and Energy from Waste sector including next generation technologies such as Anaerobic Digestion in Liverpool City Region.

A number of new biomass and energy from waste plants will be constructed in the next five years providing construction jobs and then operation and maintenance posts. The feedstock, whether biomass or solid waste, needs to be moved to site hence requiring a logistics system that also creates jobs.

NUCLEAR

1,040

New jobs potential by 2015

Ensure Liverpool City Region achieves its potential to secure a significant stake in the civil nuclear sector, particularly in relation to health and safety, inspection, and fabrication associated with decommissioning of existing facilities and new build across the UK.

Development work, including research and inspection, on civil nuclear projects is already underway. In the medium term, from 2014 a number of new power stations will be constructed using a modular multi-site format similar to that developed for offshore wind.

TIDAL

260

New jobs potential by 2015

Deliver the Mersey Tidal Power scheme, subject to due process, and ensure that the economic benefits of the scheme are maximized, establishing Liverpool City Region as a leading location in the UK and EU for the assessment, development and deployment of tidal energy schemes.

The development of the Mersey Tidal Power scheme is employing a significant number of technical consultants and research positions. Once a scheme has been approved a significant level of construction jobs will be created followed by a small number of operation and maintenance staff.

SMART GRID

1,200

New jobs potential by 2015

Liverpool City Region to be recognised as an international centre for Smart Grid technology and implementation, attracting significant investment in research, development, manufacture & installation leading to jobs and GVA growth.

The development of Smart Grid will require a level of technical expertise with an electrical engineering and data expertise. The roll out of smart meters to every property in the UK is due to commence in 2012 and will generate significant manufacturing requirements and installation. Installation is labour intensive as will the subsequent training in use and data acquisition and security. A similar timetable is in place for the roll out of electric vehicle charging infrastructure.

HEAT NETWORK

450

New jobs potential by 2015

Develop a technically secure and commercially viable heat network across Liverpool City Region integrating community combined heat and power from low carbon sources. Opportunities to install heat networks are usually during major urban regeneration or new build operations. A number of districts in Liverpool City Region are expected to undergo this scale of work in the next five years. Pipe laying and connections between properties are labour intensive.

LOW EMISSION VEHICLES

700

New jobs potential by 2015

Support existing manufacturing centres and supply chains to create jobs and wealth in their implementation of the transition to low carbon vehicle usage.

Providing a Liverpool City Region test bed in collaboration with the supply chain for electric power train, energy storage, new materials and alternative fuels, to capitalise on existing assets in the chemicals and automotive sectors.

Short term jobs in this sector centre on research and development both at manufacturer and supply chain level. Mid-term opportunities from 2012 will focus on supplying manufacturers both in the UK and the rest of Europe as low emission vehicles become a core product from mainstream automotive companies.

BUILDING RESEARCH / NEW BUILD

690

New jobs potential by 2015

Develop a Liverpool City Region centre of excellence to showcase responses from construction and building supply chain companies to existing and planned building standards.

Create partnership opportunities to integrate new commercial and residential build into wider community-based energy systems such as district heating and localised grids.

The tightening of building regulations and standards in the short term (2011 – 2012) will stimulate demand for building services and products to meet the standards as the property market recovers.

RETROFITTING

1,540

New jobs potential by 2015

Create a critical mass of projects to retrofit existing properties with energy efficient and microgeneration products and develop the supply chain to support this leading to the creating of significant numbers of local jobs.

Retrofitting energy efficiency measures and small-scale generation is already a maturing market as Government regulation and grants support property owners to upgrade their stock. Jobs in this sector come from supply chain opportunities, design and installation. Some installation requires a relatively low skill level and hence a significant workforce can be created over a short period of time. The Green Deal will add further impetus once it is fully established from 2012.

SUSTAINABLE CITIES

Develop a 5 year plan with E.ON, Scottish Power and local supply chain to develop a Sustainable Cities solution for Liverpool City Region with the ultimate objective of being one of Europe's first Smart City Regions led by communities working with public, private and their sector bodies. The Sustainable Cities Partnership is envisioned to include all Liverpool City Region, key stakeholders including the six local authorities, registered social landlords, third sector energy and fuel poverty organisations, utilities and community representatives.

The Sustainable Cities Partnership will deliver accelerated reductions in fuel poverty demographics, increased green jobs generated from an increase in locally stimulated Low Carbon projects and ultimately a solution culminating in the Green Deal for Liverpool City Region.



Global industries are examining options to develop The Low Carbon Economy in Liverpool City Region

Actions to meet the targets

THE STRATEGIC PLAN

The long-term strategic activities planned have the potential to transform the energy generation, networks, vehicle and building

sectors across Liverpool City Region, contributing to the creation of a low carbon economy.

ACTIVITIES	ESTIMATED DELIVERY DATE	ESTIMATED COST (IF KNOWN)	ECONOMIC BENEFITS TO 2015
Round 2 and Round 3 Irish Sea offshore wind projects (Dong / RWE / Centrica)	2012 - 2026	£18bn	3,000 jobs
Significant scale roll-out of microgeneration technologies (PV / wind)	2012	£100m	1,480 jobs
Port based biomass power stations and Energy from Waste plants	2018	£600m	940 jobs
Develop nuclear supply chain activities and nuclear inspection and audit	2015	£50m	1,040 jobs
Mersey Estuary Tidal Energy Power plant	2020	£3bn	260 jobs
Smart Grid rollout into communities and private wire networks	2015	£300m	1,200 jobs
Develop a technically secure and commercially viable heat network	2020	TBC	450 jobs
Develop sustainable supply chain to support low emission vehicles production	2020	TBC	700 jobs
Support the development of low carbon building stock through supply chain activity	2020	£3bn	2,230 jobs

PRIORITISATION OF ACTIVITY

The fundamental driver for the development of a low carbon economy for Liverpool City Region is the ability of the sector to generate and grow sustainable, high value businesses, inward investment and jobs across Liverpool City Region.

Prioritisation of activity has been based on 4 key factors:-

- Economic growth (business activity, new businesses, inward investment and jobs)
- Ease of implementation (time, legislative compliance and project delivery)
- Costs to implement
- Carbon impact

The diagram overleaf sets out the assessment matrix and the resulting prioritization model developed by the Low Carbon Committee.

Whilst projects that have the ability to create the highest level of economic growth, especially jobs, in the short and medium term must be given the highest priority it is important to consider projects that are distinctive to Liverpool City Region and have longer term potential. These projects such as marine energy and smart grid, have the ability to create employment in the short term in the knowledge economy sector as they are at a research and development phase ahead of full-scale deployment.



Liverpool City Region's port assets offer integrated supply chain solutions for the offshore wind sector

PRIORITISATION CRITERIA

The key factors considered in determining priority areas are each represented in the diagram as follows:

X axis - Benefits to region

Y axis - Ease of implementation

○ Costs to implement (larger = more expensive)

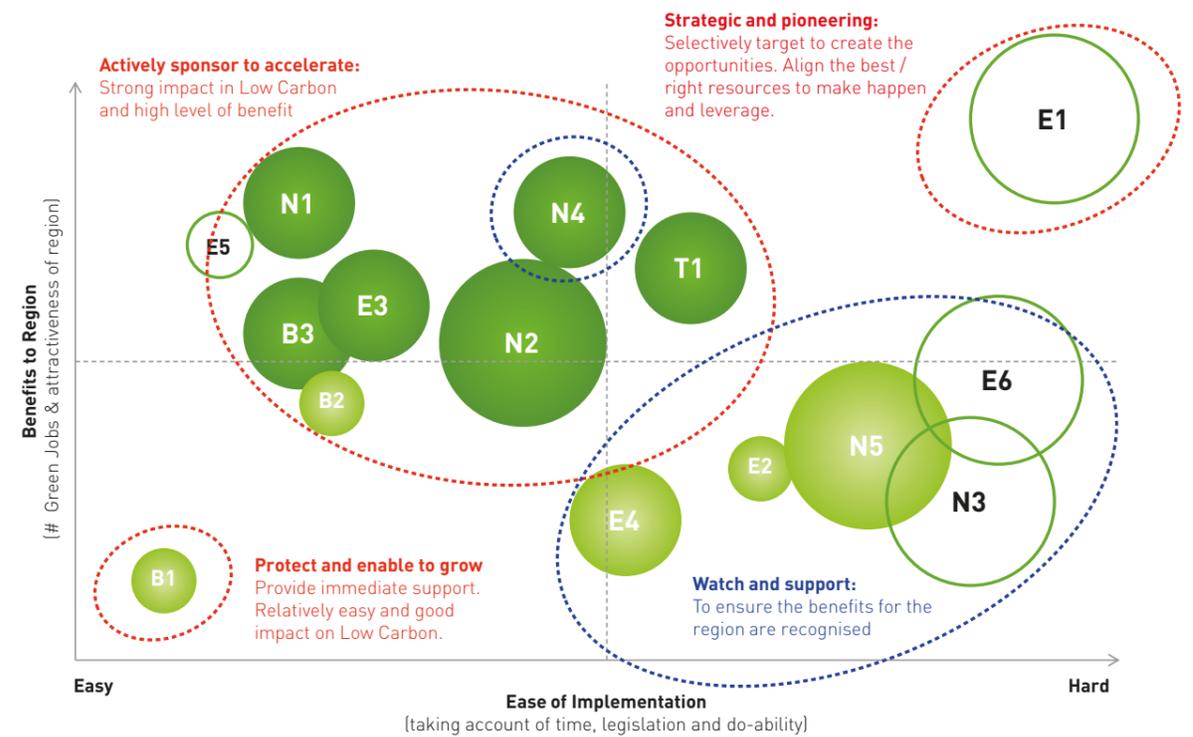
● Local low carbon impact (green = most impact)

Each component of the low carbon economy is shown assessed against these criteria.

Four clusters of activity emerge:

- Strategic and pioneering
- Actively sponsor to accelerate
- Protect and enable to grow
- Watch and support

This prioritisation is reflected in the operational plan that follows.



ENERGY	NETWORKS	TRANSPORT	BUILDINGS
E1. Offshore Wind	N1. Smart Grid	T1. Low Emission Vehicles and Alternative Fuels	B1. Building Research and Development
E2. Onshore Wind	N2. Heat Networks		B2. New Build
E3. Microgeneration	N3. Carbon Capture and Storage		B3. Retro Fitting
E4. Biomass/Energy from Waste	N4. Rail Electrification		
E5. Nuclear	N5. High Speed Rail		
E6. Tidal			

THE OPERATIONAL PLAN 2011/12		
Supporting the Strategic Plan is the development and implementation of a Low Carbon Economy Operational Plan setting out the relative short term activities undertaken by TMP and the Low Carbon		Economy Committee and its partners that will directly and indirectly contribute to the longer term aims to create jobs and grow the Liverpool City Region's economy.
OFFSHORE WIND		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Ensure that Liverpool City Region fully meets its potential to be the principal West Coast offshore wind hub for manufacturing, assembly installation and maintenance	Raise the profile of Liverpool City Region's offshore wind credentials to the national and international market through collaborative working	Profile raised through collaborative approach at 5 events / conferences
	Present a compelling business case and technical specification to Irish Sea zone developers collaboratively with stakeholders	Present detailed and tailored proposition to 3 major developers
	Map the current and potential offshore wind supply chain in Liverpool City Region and beyond and assist them to take advantage of contracting opportunities	Work with partners to produce an authoritative directory/database and capacity audit of suppliers
	Secure investment interests, visits and investment in Liverpool City Region through key asset holders	Secure 10 investment visits, 5 projects and 2 completed investments
ONSHORE WIND		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Ensure that Liverpool City Region fully explores the potential for onshore wind turbine developments and supports the development of a viable wind supply chain cluster in conjunction with offshore wind opportunities	Help develop working relationship and dialogue between onshore wind developers and Liverpool City Region planning authorities	Develop onshore wind information material for key stakeholders and supply chain
	Promote opportunities to supply chain and create linkages with onshore wind industry	Hold supply chain event for potential suppliers inc microgeneration
MICROGENERATION		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Ensure that Liverpool City Region takes maximum advantage of the Feed In Tariff structure to embed a large-scale rollout of microgen technologies involving local suppliers and workforce	Work with leading energy companies and microgeneration technology suppliers to identify commercial and residential installation opportunities	Integrated PV offer for social housing and commercial buildings
	Identify suitable funding mechanisms and business case processes	Funding models identified and successfully applied
	Assist local installation companies with training and funding requirements	10 companies assisted
	Strengthen partnerships between universities and R&D facilities and local companies	Create 3 partnership arrangements

BIOMASS AND ENERGY FROM WASTE (EfW)		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Developing large-scale biomass power plants and small scale district heating schemes	Support RES to deliver the Alexandra Dock project as a best practice exemplar	RES Scheme progresses successfully
	Ensuring that the maximum level of low carbon energy is extracted from Liverpool City Region's solid waste streams	Identify suitable development locations for biomass-fired district heating schemes
	Work with Liverpool City Region authorities to ensure that the most appropriate energy from waste solutions are secured	5 Sites identified and agreed with Authorities
	Work with the Mersey Forest on supply chain initiatives in rural parts of Liverpool City Region	Agree EfW solutions with Local Authorities and MWDA
		Biomass and EfW Supply chain workshop for Liverpool City Region companies
NUCLEAR		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Developing supply chain opportunities for existing Liverpool City Region companies	Work with Liverpool City Region companies to introduce them to potential partners / investors	Develop Nuclear supply chain directory with partners
	Strengthen the National Nuclear Inspectorate's presence	Work with National Nuclear Inspectorate to support and develop the potential of Liverpool City Region
	Ensure Liverpool City Region universities and R&D centres gain further nuclear investment	Market Liverpool City Region's advantages to potential investors and supply chain opportunities
		Ensure overlap with the offshore wind sector is identified and exploited
		Meetings with HSE to discuss potential for Liverpool City Region
		Promote nuclear credentials to key investors
		Marketing collateral shared with offshore wind
TIDAL		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Further development of the Mersey Tidal Power project and ensure that associated supply chain opportunities are taken by Liverpool City Region companies and institutions	Effectively communicate options and proposals for the scheme in readiness for a planning application expected in 2012	Public information delivered and Preferred Project Option agreed
	Support proposals for a Marine Energy Research Centre and any subsequent funding bid	Harness the resources of the NW Tidal Energy Group to promote tidal power in the UK and support the Mersey scheme.

SMART GRID		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Embed and build on the existing Smart Grid trials and make Liverpool City Region the primary destination for Smart Grid and Smart Meter development in the UK	Create a Smart Grid development strategy for Liverpool City Region	Liverpool City Region Smart Grid development strategy
	Submit strong Low Carbon Network Fund bids to OFGEM in the period up to 2015	Tier 1 project completed and LCNF bids submitted
	Fully integrate relevant university, hospital and research faculties into the Smart Grid team	Integration achieved
	Secure private sector partners into Smart Grid programme	20 potential technology partner companies engaged
	Promote partnerships between Liverpool City Region and other Smart Grid trial locations for knowledge transfer	Formal partnerships agreed with two non UK trial sites
HEAT NETWORKS		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Develop an integrated multi-user heat network in a Liverpool City Region location and use this to develop supply chain activity	Identify potential opportunities created by urban renewal and new build opportunities to develop a district heat network	5 opportunities identified
	Develop a complementary combined heat and power project based on opportunities highlighted in Liverpool City Region Renewable Energy Capacity Study	One new integrated district heating network trial in Liverpool City Region
	Work with property developers to create a viable contract framework for the provision of community heat projects	Meetings held between developers and energy companies to assess project options
LOW EMISSION VEHICLES		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
To ensure that Liverpool City Region vehicle manufacturers and their existing supply chains and research facilities are at the forefront of low emission vehicle design and manufacturing	Develop a clear understanding of Jaguar Land Rover and Vauxhall's strategies for low emission vehicles	Liverpool City Region LEV Strategy
	Working with NW Automotive Alliance to map existing and potential supply chain companies in alternative fuels and propulsion systems	Mapping completed
	Ensure that Liverpool City Region universities and research centres are aligned to manufacturer's strategies and Government support programmes	Liverpool City Region bid for Electric Vehicle charging infrastructure funding and Liverpool City Region Hydrogen Highway bid developed
	Identify crossover technologies on fuel cells and batteries that have static applications to support Smart Grid and renewable generation	Crossover technology review completed

BUILDING RESEARCH/NEW BUILD		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Ensure that new build commercial and residential schemes make maximum use of low carbon technologies in building fabric and operation in a cost effective manner	Identify existing residential and commercial projects for Building Research Establishment (BRE) suitability and create a BRE centre proposal with developers / RSLs / universities and building supply chain companies	Liverpool City Region Low Carbon Building list
		BRE centre proposal
RETROFITTING		
SPECIFIC FOCUS	ACTIONS	DELIVERABLES (2011/12)
Ensure that new build commercial and residential schemes make maximum use of low carbon technologies in building fabric and operation in a cost effective manner	Identify residential and business communities that would benefit from whole area upgrades on their utility networks and building stock	Liverpool City Region retrofitting capacity review completed
		Liverpool City Region EETS company directory delivered
		Meet the suppliers event for developers and EETS companies
		Commercial rationale agreed and promoted
Create centres of excellence for retrofitting of low carbon technologies to residential properties and commercial buildings	Identify Liverpool City Region companies involved in the Energy and Environmental Technologies Sector (EETS) by sub sector	
		Funding packages promoted
	Assess the viability of creating local MUSCO's (Multiple Utility Supply Companies) to deliver energy, heat and data services through streamlined networks	
	Develop the commercial rationale for large scale retrofitting programmes including value for money propositions and supply chain opportunities	
	Create dynamic and robust funding packages for retrofitting schemes	

Appendix 1:

Glossary of Terms

BIOMASS

Biomass is anything derived from plant or animal matter and includes agricultural, forestry wastes/residues and energy crops. It can be used for fuel directly by burning or extraction of combustible oils.

CARBON CAPTURE

Removal of CO₂ from fossil fuels either before or after combustion. In the latter the CO₂ is extracted from the fluegas.

CARBON CREDITS

A credit or permit arising from a greenhouse gas emissions reduction scheme, such as emissions trading.

CARBON EMISSIONS TRADING

A scheme in which greenhouse gas emissions are controlled by scheme/carbon trading setting a cap on total emissions and allowing the market sector(s) to reach an economically balanced response via trading of emissions allowances. Allowances are allocated initially, perhaps through a free distribution or through an auction, and the total allocation is adjusted (capped) periodically.

CARBON STORAGE

The long-term storage of carbon or CO₂ in the forests, soils, ocean, or underground in depleted oil and gas reservoirs, coal seams, and saline aquifers. Also referred to as engineered carbon sequestration. Carbon Capture and Storage can be referred to as CCS.

CCGT

Combined cycle gas turbine - a gas fired electricity generation plant.

CLIMATE CHANGE AGREEMENT

An agreement between the Government and a business user, whereby a reduced rate of Climate Change Levy is payable in return for a commitment by the user to achieve certain pre-determined targets for energy usage or carbon emissions.

CLIMATE CHANGE LEVY (CCL)

A levy applied to the energy use of all non-domestic sectors. Subject to certain exemptions and reductions to encourage energy efficiency.

DISTRIBUTED GENERATION

Electricity generation usually on a relatively small scale that is connected to the distribution networks rather than directly to the national transmission systems.

DISTRIBUTION NETWORK OPERATORS

Companies that are responsible for operating the networks that Operators (DNOs) connect electricity consumers to the national transmission system and provide interconnection with embedded generation.

FUEL CELLS

Fuel cells produce electricity from hydrogen and air, with water as the only emission. Potential applications include stationary power generation, transport (replacing the internal combustion engine) and portable power (replacing batteries in mobile phones).

MICRO-CHP

CHP but in very small scale, typically below 5kW electrical output, applications (eg in the residential and commercial sectors). It is likely to operate in place of a domestic central heating boiler.

MWH MEGA WATT HOUR

one thousand kWh. A 1 MW power-generating unit running for 1 hour produces 1 MWh of electrical energy.

PHOTOVOLTAICS (PV)

The direct conversion of solar radiation into electricity by the interaction of light with the electrons in a semiconductor device or cell.

RENEWABLES OBLIGATION

The obligation placed on licensed electricity suppliers to deliver a specified amount of their electricity from eligible renewable sources.

RENEWABLES OBLIGATION CERTIFICATES

Eligible renewable generators receive Renewable Obligation Certificate (ROC) Certificates (ROCs) for each MWh of electricity generated. These certificates can then be sold to suppliers. In order to fulfil their obligation, suppliers can either present enough certificates to cover the required percentage of their output, or they can pay a 'buyout' price of £30 per MWh for any shortfall. All proceeds from buyout payments are recycled to suppliers in proportion to the number of ROCs they present.

OFGEM

Office of Gas and Electricity Markets (OFGEM) is the statutory regulation body for the UK energy consumer, generation and distribution industries.

DECC

The Department for Energy and Climate Change (DECC) is the Government department with primary responsibility for energy and climate change policy and delivery. The current Secretary of State at DECC is Chris Huhne MP.

Appendix 2: Low Carbon Economy Committee and Panel Members

LOW CARBON ECONOMY COMMITTEE:

Amanda Lyne Low Carbon Economy Committee Chair ACAL Energy Ltd	David Morgan Low Carbon Economy Committee Deputy Chair E.ON	Howard Matthews Sign Lights Ltd
Garry Banks Arup	Neil Lazenbury Ernst and Young LLP	Ian Roberts Flamco UK Ltd
Anthony Hatton Peel Energy	David Hunt Eco Environments Ltd	Jan Rowley Liverpool City Council
		Kevin Adderley Wirral Council

LOW CARBON ECONOMY PANEL:

The Low Carbon Economy Panel supports the work of the Committee to drive forward the low carbon economy to deliver business growth and job creation.

Bob Pratley ACC Liverpool	Bart Schmeink Merseyrail	Greg Doran Barclays Corporate PLC
Doug Bannister Consultant	Steve Parry Neptune Developments Ltd	Mark Powell Veolia Environmental Services UK Ltd
John Leake Daresbury SIC	Andrew Dutton Peel Airports Ltd	Neil Sturmey Grant Thornton UK LLP
Maria Scarlett Centrica Renewable Energy Ltd	Erika Rushton Plus Dane Group	Peter Moore Viridis Energie Consultants LLP
Trine Hoffmann Sorensen Dong Energy	Prof Andrew Willmott Proudman Oceanographic Laboratory	William Chambers Enviro Solution Ltd
Richard Sandford RWE Innogy GmbH	Peter Madigan Renewable UK	Pat Broster Groundwork Merseyside
John Sinclair EA Technology Consulting Ltd	George Kirk Scottish Power	Keith Naughton HM Prison Service
Stuart Thompson EA Technology Ventures Ltd	Philip Spick Shop Direct Group Ltd	Dr Peter North University of Liverpool
Bill Chandler Hill Dickinson LLP	Mark McManus Stiebel Eltron UK Ltd	Jon Barrett Liverpool John Moores University
Chris Tane Ineos Chlor Vinyts Ltd	Nick Quarrell T-Systems Ltd	Mohammed Ahmad Liverpool Vision
Phil Wolstencroft Jaguar Land Rover	Bretta Davies Street Legal Group	Karon Brownbill Skills Funding Agency
Martin Mellor Langtree Group	Nick Hopwood The Environment Agency	Alan Stillwell Merseytravel
Garry Felgate Orion Innovations LLP	Dr Peter Cook SOG Ltd	Carl Beer Merseyside Waste Disposal Authority
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Jack Stopforth Liverpool Chamber of Commerce	Nick Storer Envirolink	Dick Tregear Halton Borough Council
Chris Bliss Liverpool One	Mark Evans EWA Ltd	Nick Kavanagh Liverpool City Council
Gary Murphy Heptron Ltd	Johanna Doyle RES Group	Andy Wallis Sefton Borough Council
Jim Teasdale Mersey Maritime	John Syvret Cammell Laird Ltd	Bob Hepworth St Helens Borough Council
		Maurice Gubbins Knowsley Borough Council

TMP

The Mersey Partnership is a private company (limited by guarantee) which was established by private sector organisations in Liverpool City Region in 1992. It is Liverpool City Region's leading membership organisation, representing a unique alliance of over 550 businesses and organisations committed to the economic growth of the region, who pool resources and make financial contributions to a wide range of business activities.

Members include major companies such as Jaguar Land Rover, Shop Direct Group, Ernst & Young, Scottish Power, E.ON, Pilkington and Peel Group, alongside innovative SMEs such as Mando Group, Amion Consulting, Merepark Developments and Stiebel Eltron.

The Mersey Partnership, its Members and Partners, seek to stimulate business growth and job creation in Liverpool City Region by driving forward the key business sectors of the economy. These are SuperPort; Low Carbon Economy; Visitor Economy; Knowledge Economy.

The Mersey Partnership has a strong track record in the successful delivery of economic growth programmes working in partnership with the private sector. It has developed, with partners, a Panel and Committee for each of these key sectors, comprising leading private sector businesses, to drive forward their economic growth potential.

For more information about the Low Carbon Economy contact:
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To find out more about joining TMP email:
membership@liverpoolcityregion.co.uk

ENVIRONMENT

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IMAGES

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