The Lancashire Climate Change Strategy

2009 - 2020

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FOREWORD

By Dr John Collins,
Chair of the Lancashire Climate Change Partnership

Evidence from a wide range of sources means that a majority of scientists feels justified in warning that climate change is the greatest threat facing us today. So when I was asked to chair the Lancashire Climate Change Partnership, I was pleased to take up the challenge of steering the development of the first Lancashire Climate Change Strategy.

A changing climate presents many challenges and opportunities. It will be impossible for one group to address all of these and it is therefore essential that groups come together in partnership to share information, ideas and best practice and develop joint strategies. We need initiative and commitment across the board.

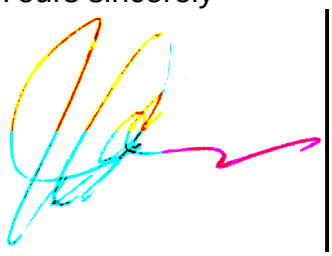
The focus of the Lancashire Climate Change Strategy is on actions that are best delivered on a Lancashire scale. It recognises that climate change strategies and actions will also be developed on a local and regional Northwest level and it hopes to complement these.

Many of you will have taken the opportunity to comment on earlier drafts and contributed to the development of the Lancashire Climate Change Strategy and associated key actions. Thank you for your contributions which make this a stronger strategy.

The key challenge now will be to take the ambitions and actions from this strategy and translate them into action within Lancashire. We would like you to join us in making this a reality.

Finally, the UK Climate Change Committee has recently recommended further tightening of the UK's carbon reduction targets in 2020. They suggest increasing the 2020 target from 30% to 34% (and to 42% if a global deal is achieved). There is also a suggestion that a wider basket of greenhouse gases will be included. Over the next 12 months the Lancashire Climate Change Partnership will explore how it can best respond to this new challenge.

Yours sincerely



Dr John Collins
Chair of Lancashire Climate Change Partnership
Environment Agency North Area Manager

INTRODUCTION

Why does Lancashire need a climate change strategy?
The climate is changing. Lancashire has to respond to the challenges and opportunities this is causing. In the coming years and decades it is predicted that temperatures will rise, winter rainfall will increase whilst summer rainfall decreases and heat waves, droughts, storms and floods become more frequent and more severe. This will have a major impact on the people, landscapes and businesses of Lancashire.

The UK Government acknowledges that there is no longer any real debate over the fact that climate change is happening and that man-made emissions are the main cause. The Climate Change Act was granted Royal Assent in Parliament on 26 November 2008, this is the world's first long term legally binding framework to tackle the dangers of climate change. The Climate Change Act 2008[1] now commits the UK to meeting its 80% carbon reduction targets by 2050 and more generally places a duty on the Government to assess the risk to the UK from the impacts of climate change.

The 2006 Local Government White Paper 'Strong and Prosperous Communities' places a new duty on local authorities to "*lead their community and their local partners on climate change* " and also "*gives local government new opportunities to drive local action on climate change mitigation and adaptation through...coordinating innovative partnerships which can deliver real changes"*.

Working together across Lancashire to develop and deliver a climate change strategy
In response to the duty placed on local authorities to lead and drive local action on climate change, the Lancashire Leaders asked all the local authorities in Lancashire, including the two unitary authorities of Blackburn with Darwen and Blackpool, together with the Environment Agency, to work in partnership to prepare a climate change strategy for Lancashire.

The Lancashire Climate Change Partnership was established in recognition that all sectors have a significant contribution to make in reducing carbon dioxide emissions and in responding to the impacts of a changing climate. It is essential that local organisations work in partnership, and with regional, national and international organisations to share information, ideas, best practice and develop strategies and actions.

The Partnership consists of representatives from each of the 15 local authorities and from other key organisations from the public, private, community and voluntary sector. A full list of partners is available at Appendix One.

[1] http://www.defra.gov.uk/environment/climatechange/uk/legislation/docs.htm

The Strategy

The Lancashire Climate Change Strategy sets out the Partnership's long-term vision that Lancashire is "*low carbon and well adapted by 2020*". Development has largely been informed by a recent regional study on the potential carbon dioxide savings achievable in the Northwest[2] (see Appendix Two for details).

As a result the Strategy is underpinned by data which identifies the carbon savings needed to achieve the 2020 targets, the savings we can expect to achieve in Lancashire from existing national and local measures, what the gap is, and where opportunities for further savings may lie. Carbon Dioxide (CO_2) emissions from the four key sectors have been considered in this process:

- Domestic
- Transport
- Business & Public Sector
- Land Use

These sectors are in line with the breakdown used in the DEFRA regional inventories[3], and reflect the approach taken in structuring the Strategy.

The Strategy also covers our key objectives for adapting to climate change and the key 'tools' that will help us deliver; strategic planning, raising awareness and education.

The Strategy is accompanied by supporting actions which identify how we are working towards this Vision. The Supporting Actions document highlights the measures and good practice that already exist in Lancashire, but also serves to identify where there are current gaps in delivery, either by sector or area, and/or where gaps may emerge in the coming years. This activity plan will be refreshed annually.

The key message is that there is already a lot of current activity and measures taking place in Lancashire, though these need to be strengthened and stepped up to ensure we meet our vision.

[2] Assessment of Potential Carbon Savings Achievable in the North West Region by 2020, prepared for 4NW by URS Corporation Ltd, 28 November 2008.

[3] http://www.defra.gov.uk/environment/statistics/globatmos/galocalghg.htm

CLIMATE CHANGE

Climate refers to the average weather experienced over a long period. This includes temperature, wind and rainfall patterns. The climate of the Earth is not static, and has changed many times in response to a variety of natural causes.

The Greenhouse Effect

Our planet is surrounded by a blanket of gases. This blanket keeps the surface of the earth warm and enables it to sustain life. This process is known as the "greenhouse effect", so called because it works in much the same way as a garden greenhouse - by trapping heat from the sun. Here's what happens: Energy from the sun enters our atmosphere, passing through the blanket of gases that surround the earth. As it reaches the Earth's surface, much of the sun's energy is absorbed by our planet's land, water and biosphere. Some of this energy is radiated back into space. The rest of the energy is trapped in our atmosphere - and this is known as the "greenhouse effect".

Why is the Climate Changing?

Greenhouse gases occur naturally in the atmosphere, trapping heat that originates from the sun, but then radiates back from the Earth. Without the natural greenhouse effect the Earth would be over 30 degrees Celsius cooler and uninhabitable.

However, there is now overwhelming scientific evidence that human activity is upsetting this natural balance, causing a so-called enhanced greenhouse effect. As humans emit more carbon dioxide and other greenhouse gases (such as methane and nitrous oxide) into the atmosphere the greenhouse effect becomes stronger, causing the earth's climate to change unnaturally. The 2007 United Nations Intergovernmental Panel on Climate Change Fourth Assessment Report[4] is unequivocal about the threat of climate change and the direct link between human behaviour and average temperature increases.

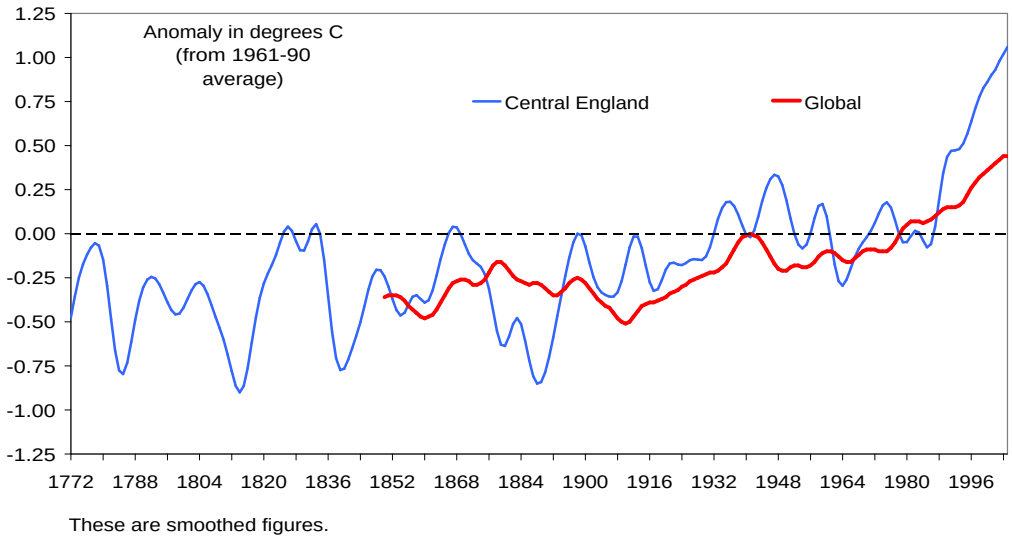
This report has been agreed by the governments of over 100 countries and by over 2,000 leading scientists. The burning of fossil fuels and land deforestation has altered the balance of sources and sinks of greenhouse gases. This has resulted in rises in the atmospheric levels of greenhouse gases, and resulting increases in atmospheric and surface ocean temperatures.

Since 1860, twenty out of the twenty-one hottest years have occurred within the last 25 years; and globally 2005 was the hottest year ever recorded. The UK has not been immune. Records from July 2006 show the August 2003 heat-wave to be the hottest on record, with many UK people dying prematurely as a result. Across Europe, 32,000 people died because of the

[4] http://www.ipcc.ch/ipccreports/ar4-syr.htm

heatwave. The latest climate models suggest that the summer of 2003 will be the norm in Europe by the 2040s.

Figure 1 Global and Central England surface temperature anomalies 1772-2006



Source: Met Office, Hadley Centre for Climate Prediction and Research

Over the past century global temperatures have risen by some 0.7°C on average. The 2006 extended summer period was the warmest on the long standing Central England Temperature (CET) record. This dates back to 1659 and May to September 2006 was warmer than any equivalent period since then. The 2006 period included the warmest month ever, July, and a record temperature for September. Studies of this trend show that it is statistically significant and that most of the observed warming, since the middle of the twentieth century, was very likely caused by human activities. The IPCC's Third Assessment Report concluded that global temperatures will rise by a further 1.4 to 5.8° C by the end of the 21st century.

During the 20th century, the annual mean central England temperature warmed by about 1° C. The 1990s were exceptionally warm in central England by historical standards, about 0.6° C warmer than the 1961-1990 average.

What is Lancashire's contribution to a changing climate?

In 2005[5], total CO_2 emissions in Lancashire were estimated at 12.7 million tonnes or 8.7 tonnes per person per year (DEFRA[6]), this is 21% of the North West total or 2.4% of the UK total. Lancashire's emissions were less than that

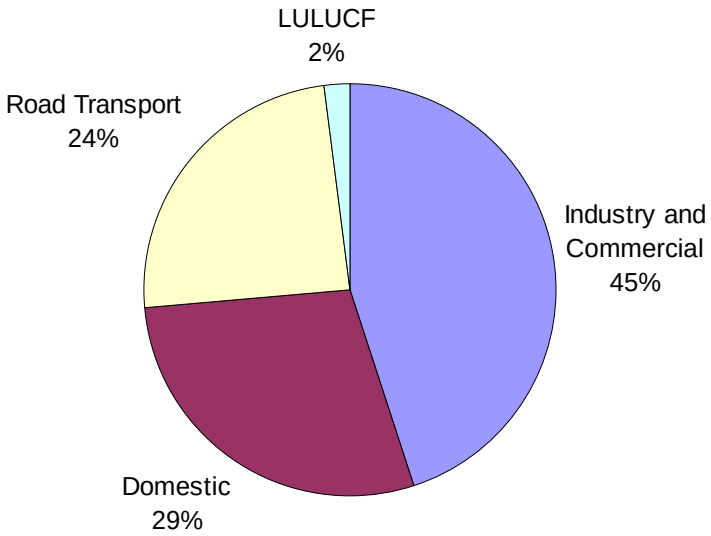
[5] Data for 2006 is now available, but for the purposes of the Strategy we will continue to use 2005 as the baseline in line with the national performance framework and other regional studies.

[6] Local and Regional CO_2 estimates for 2005 (DEFRA, September 2008)
Excludes emissions from shipping, aviation, military transport (air & water) and exports.
Population figures are mid year estimates for 2005.

of Greater Manchester and Merseyside but above that of Cumbria and Cheshire.

Overall, 45% of Lancashire emissions are attributable to industrial, commercial and public sector sources, 29% to the domestic sector, 24% to road transport and a small residual of 2% to land use, land use change and forestry (LULUCF), as shown in figure 2.

Figure 2 Source of carbon dioxide emissions from Lancashire in 2005

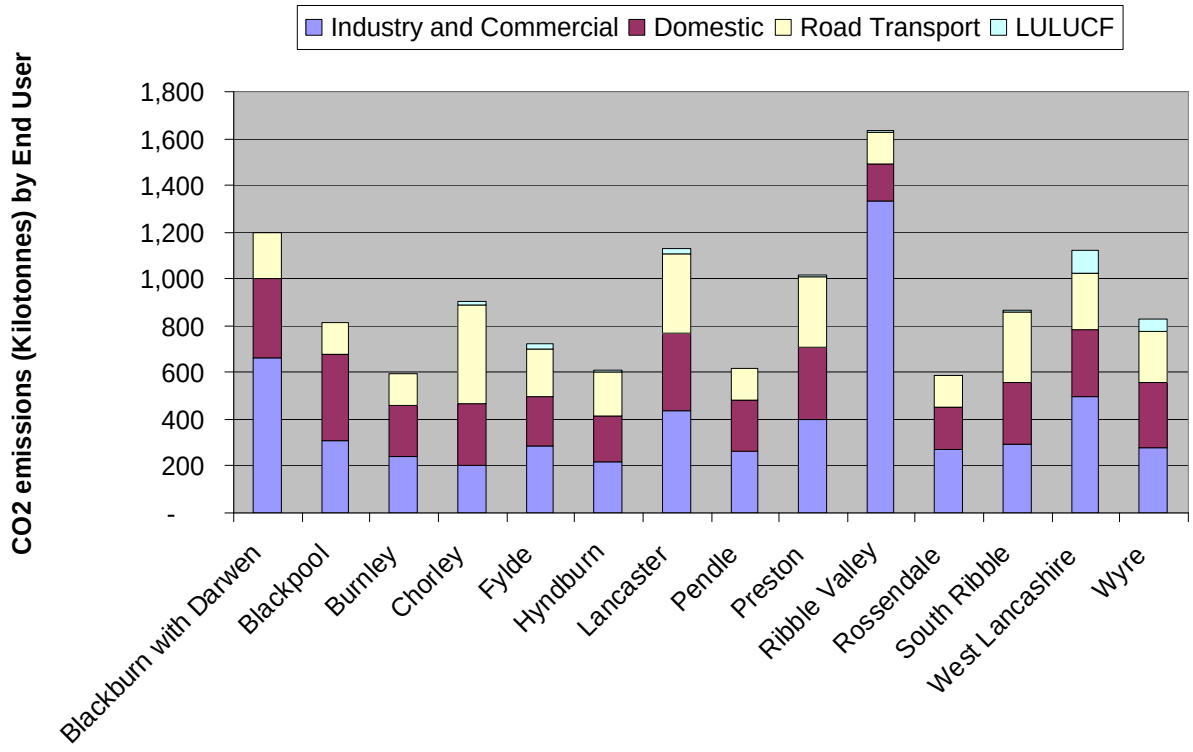


Source: DEFRA, Local and Regional CO_2 estimates for 2005 (September 2008)

Rates of emissions can exhibit wide variation due to differences in population numbers, the local economy and geography. Across Lancashire, total CO_2 emissions range from a low of 589 kilotonnes[7] (kt) in Rossendale, with similar amounts in neighbouring Burnley, Hyndburn and Pendle to as much as 1,632kt in Ribble Valley as displayed in figures 3 and 4.

[7] 1 kilotonne = 1,000 tonnes

Figure 3 CO_2 Emissions: Lancashire Districts & Unitaries, 2005



Source: DEFRA, Local and Regional CO_2 estimates for 2005 (September 2008)

The industrial and commercial sector accounts for 45% of Lancashire's total carbon dioxide emissions, the equivalent of 3.9 tonnes per head. However the presence of certain high-energy using industries like refineries, glass and other non-metallic mineral sectors, which are concentrated in a few areas, can have a very large local impact. Within Lancashire the share of emissions attributable to industry and commerce is highest in those districts where production industry continues to have a disproportionate representation. These shares are particularly high in Blackburn and especially in Ribble Valley where per capita emissions for the sector rise to nearly 23.2 tonnes (against a Lancashire sector average of 3.9 tonnes) and accounts for more than 80% of all the district's CO_2 emissions. A single major energy user would appear to be largely responsible for this outturn. At the other extreme, industrial and commercial emissions in Chorley are estimated at around 1.9 tonnes per capita.

CO_2 emissions vary least between areas within the domestic sector (emissions from energy consumption by private individuals in and around the home, not including activities carried out elsewhere, such as personal travel), with the average person in Lancashire contributing about 2.5 tonnes of CO_2. This is the equivalent to each person having a CO_2 footprint of 33 times his or her own body weight each year.

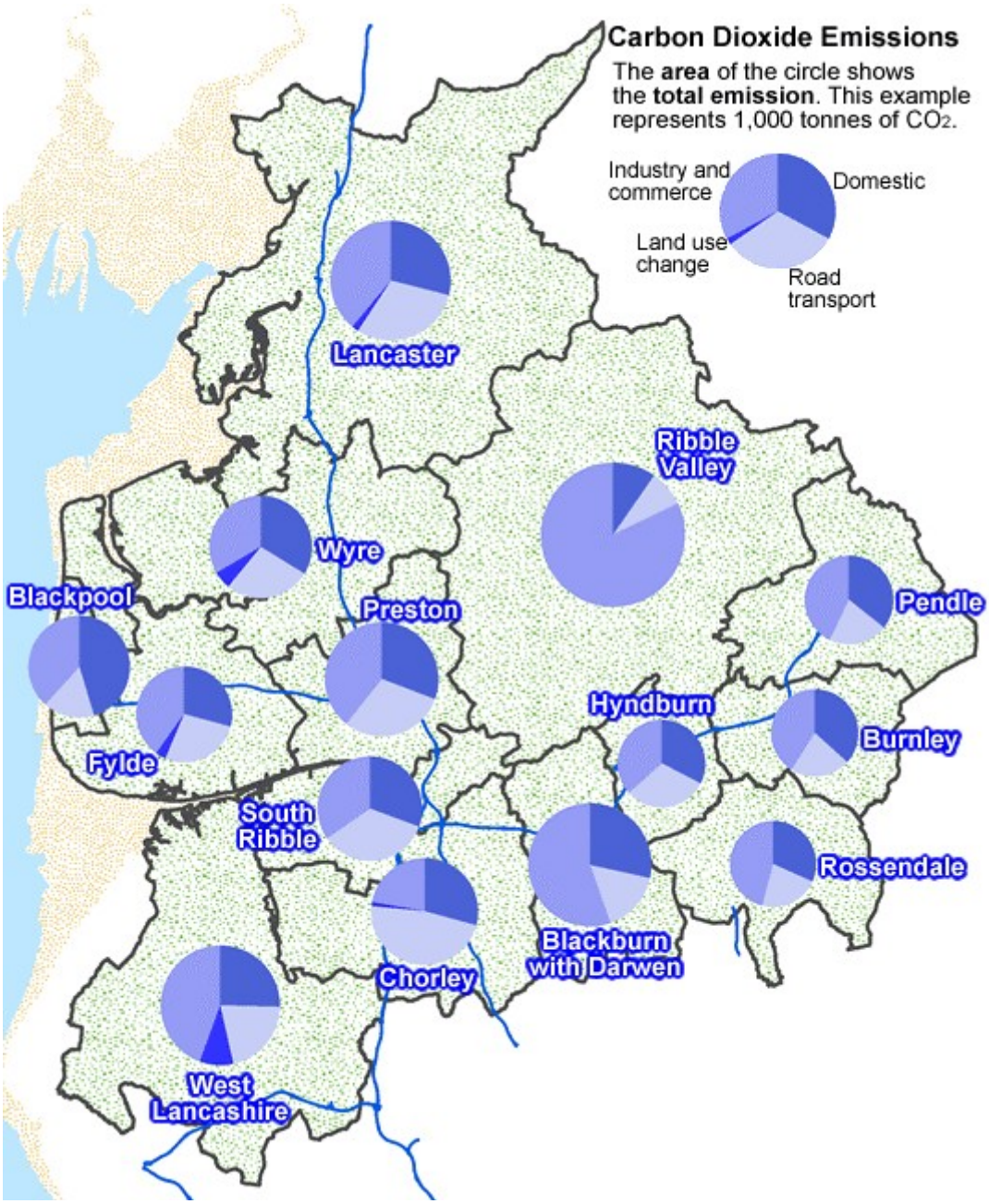
Across Lancashire, domestic carbon dioxide emissions range from a high of 2.8 tonnes per capita in Fylde and Ribble Valley to just 2.3 tonnes per capita in Lancaster. Emissions can be influenced by the fuel types used; the type and condition of the housing stock the average temperature, average household size, type of household; and income and preferences of its

occupiers. As a general guide, larger urban areas tend to have lower carbon dioxide emissions per head than more rural districts.

Road transport emissions include freight and passenger transport, both private and for business purposes. In Lancashire the sector accounts for 24% of all CO_2 emissions, compared with 26% of UK emissions. The estimates are, however, made on the basis of the distribution of traffic, therefore some of the emissions within an authority represent through traffic, or part of trips into or out of the area whether by residents or non-residents. In some authorities this can be particularly significant and may, for example, provide part of the explanation for above-average per capita road transport emissions in Chorley at the heart of the Lancashire motorway network.

Land use, land use change and forestry are the final sector considered in the CO_2 estimates. This is very much a minor or residual category. Because it can act as a sink, removing carbon from the atmosphere, as well as a source of carbon emissions, the measure takes account of both CO_2 emissions and removals. Within Lancashire the sector is responsible for 348kt of emissions balanced by removals of 104kt resulting in a net emission of just 244kt or 1.9% of total emissions.

<u>Figure 4</u> Carbon Dioxide Total Emissions by Local Authority and Sector, 2005



Source DEFRA - Emissions of Carbon Dioxide for Local Authority Areas, 2005 (September 2008). Map from Lancashire profile.

What impacts will a changing climate have in Lancashire?

Climate is defined as an average of the weather over a 30-year period - whilst weather is what is happening at a specific time and place. The climate is predicted to be hotter and drier in summer, warmer and wetter in winter. But this doesn't mean we won't get any cool wet summer weather. More unpredictable and extreme weather is also likely

Figures 5 to 7 display the climate change scenarios predicted for the North West for the 2020's, 2050's and 2080's. The climate change scenarios provide alternative descriptions of how the climate might evolve over the course of this century taking account of uncertainty about future trends and behaviour – such as population growth, socio-economic development and technological progress – and how these might influence future global emissions of greenhouse gases.

The scenarios range from '*high emissions'* - a result of economic growth with intensive use of fossil fuels to '*low emissions'* - increased economic, social and environmental sustainability with cleaner energy technologies.

Scenarios will be updated accordingly as more accurate and revised predictions for Lancashire become available in Spring 2009

Figure 5 North West England change in annual daily temperature

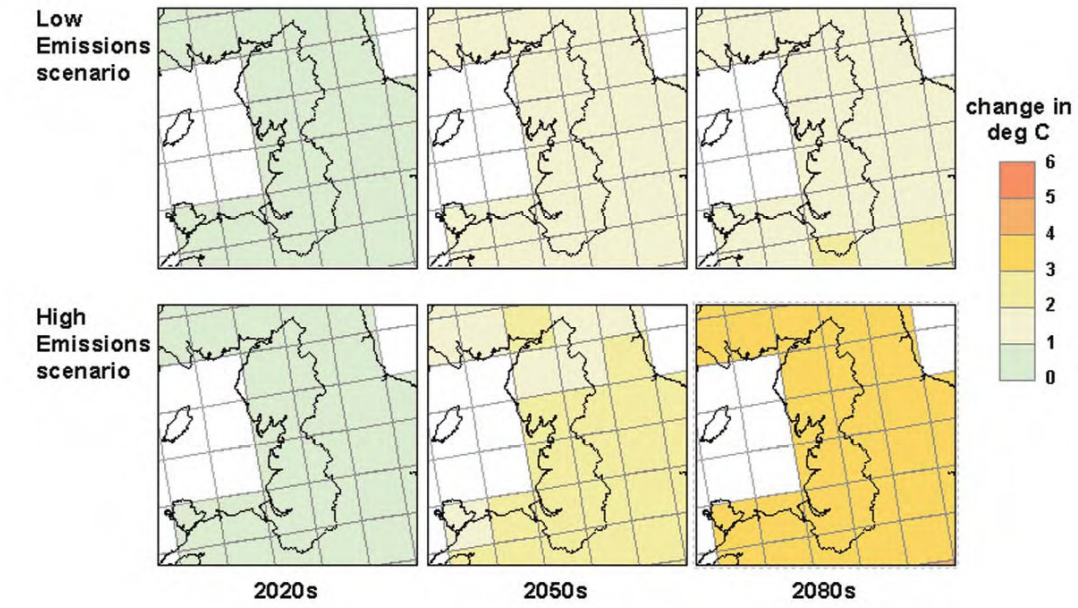


Figure 6 North West England percentage change in summer precipitation

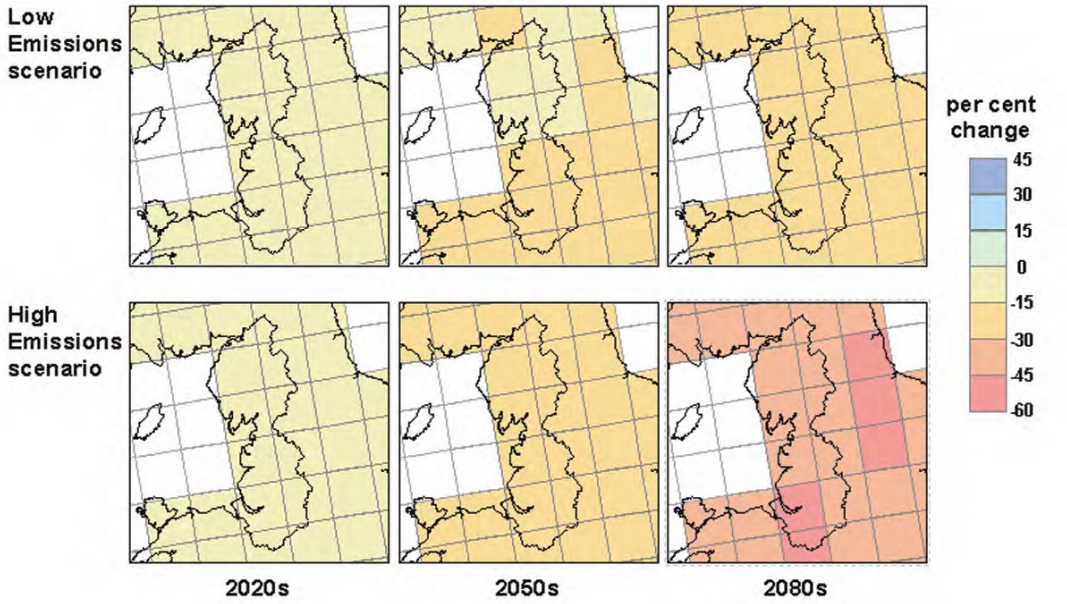
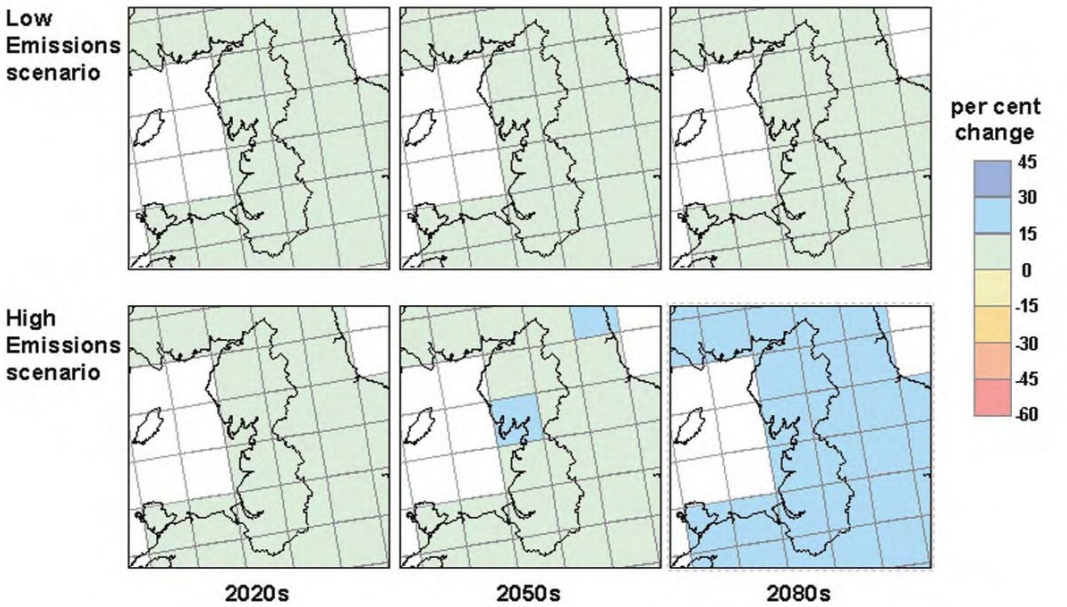


Figure 7 North West England percentage change in winter precipitation



Source figures 5 to 7: UKCIPO2 Climate Change Scenarios (funded by Defra, produced by Tyndall and Hadley Centres UKCIP)

How is the weather already changing?
We have evidence of how the weather is already changing in the North West[8]. It includes:

- 0.4^{o}C rise in annual mean temperature at Manchester Airport between 1988 and 1997 (compared to the 1961-1990, 30 year average);
- 20% decrease in summer rainfall over the last century.
- Increased high intensity rainfall since the 1960s.
- Seasonal rainfall varying by as much as 15% from the average in the last 30 years.
- Sea level rise at Liverpool of around 6cm in the last 50 years.
- Increased flooding of some of the regions major rivers in the last few decades.

Adapting to Climate Change

There is a time delay in the climate system, so the increased concentrations of greenhouse gases as a result of the emissions that have already occurred will ensure that most of the climate changes over the next 20-40 years are inevitable whatever happens with global emissions.

We all depend upon the local infrastructure. We need a high level of confidence in its resilience to extreme weather and a gradually warming climate. Recent events, however, have raised awareness of the threat climate change poses to road and rail networks, electricity, gas and water supplies, sewerage, telecommunications and IT systems.

Potential risks to the county include damage to roads and other infrastructure in moss land areas. The peaty soils contract as they dry out, causing subsidence and other damage to road surfaces. Summers are predicted to get increasingly hot and dry so this is more likely. Heatwaves can cause significant health problems, particularly in elderly and vulnerable sections of the community. Rainfall intensity is also predicted to increase, which will increase the risk of flooding.

The coast of Lancashire is extensive and the economic, social and environmental implications of climate change on this fragile landscape are considerable. The implications of climate change on the fishing and cockling industries should be assessed, as should the implications on the marine environment and coastal structure. There are consequences of sea level rise and a need to understand coastal realignment.

We need to assess the likelihood of additional and more extreme weather events and to develop solutions to meet their impact on our public infrastructure and buildings. The more information we have the better equipped we will be to take action. We therefore need to establish a more accurate picture of the conditions that Lancashire will face in the future.

There are many potential actions that will help reduce vulnerability to climate change risks. In the first instance many of these involve developing a greater

[8] Climate Change in the Northwest and its impacts: A Summary Document, Sustainability Northwest, March 2005

understanding of the risk and putting in place management plans to deal with it. In other cases there may be physical improvements required to buildings and other infrastructure to ensure that it is resilient to increasingly unpredictable weather conditions.

In addition to the many risks, climate change could also bring benefits for some businesses, communities and individuals. These may include an increasing demand for tourism in the county, and a reduced need for winter heating in milder weather. Without a clear understanding of the conditions that are likely these opportunities will not be realised. These actions are explored in greater detail in the adaptation chapter.

CLIMATE CHANGE POLICY

As it affects and is affected by such a wide range of factors, there are a large number of different policy initiatives about climate change at international, national, regional and local levels. The following section aims to summarise the main policies which influence activity in Lancashire.

International Policy

The current international agreement on reducing greenhouse gas emissions is the Kyoto Protocol. Industrialised economies have caps on their greenhouse gas emissions, and the UK's commitments are a 12.5% reduction on 1990 levels by 2012. Now, with the first commitment period of the Kyoto Protocol due to end in 2012, the world is again looking to the UN and the United Nations Framework Convention on Climate Change (UNFCCC) as the forum to agree a new framework that will take us beyond 2012. At the UN Bali Climate Change Conference in December 2007 agreement was reached to launch negotiations for a global and comprehensive agreement, to be concluded in 2009 at the UN Climate Change Conference in Copenhagen.

Through the "Climate action and renewable energy package" the European Union is committed to reducing its overall emissions to at least 20% below 1990 levels by 2020, and is ready to scale up this reduction to 30% under a new global climate change agreement when other developed countries make comparable efforts. It has also set itself the target of increasing the share of renewables in energy use to 20% by 2020.

There are a wide range of different policies to help achieve these goals. Most significant of these is the EU Emissions Trading Scheme (EU ETS) which regulates emissions from the most energy intensive industries. Other policies tackle specific areas including the Energy Performance of Buildings Directive.

National Policy

The Climate Change Bill was granted Royal Assent in Parliament on 26 November 2008, this is the world's first long term legally binding framework to tackle the dangers of climate change. The Climate Change Act 2008[9] now commits the UK to meeting its 80% carbon reduction targets by 2050 and more generally places a duty on the Government to assess the risk to the UK from the impacts of climate change. The key aims underpinning the Act are to improve carbon management and help the transition towards a low carbon economy in the UK; and to demonstrate strong UK leadership internationally**.**

The 2006 UK Climate Change Programme is the UK's key strategy for its work on tackling climate change. It sets out the policies and measures which the UK is using to cut its emissions of greenhouse gases. It also explains how the UK plans to adapt to the impacts of climate change.
The Climate Change and Sustainable Energy Act 2006 sets out a duty for local authorities to have regard to climate change when exercising their functions

[9] http://www.defra.gov.uk/environment/climatechange/uk/legislation/docs.htm

The Local Government White Paper 'Strong and Prosperous Communities' places a duty on local authorities to "*lead their community and their local partners on climate change* " and also "*gives local government new opportunities to drive local action on climate change mitigation and adaptation through...coordinating innovative partnerships which can deliver real changes*".

In addition to specific policy on climate change there is a wide variety of additional policy, strategy and recommendations that has an impact on our response to climate change. This includes the Home Energy Conservation Act (HECA) which places a duty on housing authorities to tackle energy efficiency in homes, planning policy statements on sustainability and flood risk and transport policy.

The Stern Review on the Economics of Climate Change[10], which reported to the Treasury in 2007, concluded that the costs of stabilising the climate are significant but manageable; delay would be dangerous and much more costly.

Regional Policy

The Regional Spatial Strategy (RSS) for North West England[11] provides a framework for development and investment in the region over the next fifteen to twenty years and is part of the statutory development plan for every local authority in the North West, setting clear policy guidance for Local Planning Authorities preparing their Local Development Documents. Reducing emissions and adapting to climate change is identified as an urgent regional priority and a number of policies are set out to address the issue.

The Northwest Regional Economic Strategy sets out a 'low carbon' economy as a fundamental aim, with the development of a climate change action plan set out as a 'transformational' activity of the highest importance. As a result the Northwest Climate Change and Energy Action Plan, accompanied by the North West Sustainable Energy Strategy, have been produced.

The Northwest Action Plan aims to stimulate and measure the progress of the region towards a low carbon economy, preparing it for the challenges of a changing climate and future energy demands, whilst protecting and enhancing the quality of life and rich environment. The implementation phase started in January 2007, however, it is recognised that complementary actions are needed both nationally and locally if the vision for the region is to be achieved.

Local Policy

Lancashire's Economic Strategy is designed to improve the economic competitiveness and performance of the economy by developing its key economic assets and opportunities within a clearly defined spatial framework. The Strategy is currently undergoing an assessment of the impacts of climate change on the Lancashire economy.

[10] http://www.occ.gov.uk/activities/stern.htm

The draft Lancashire Green Infrastructure Strategy is the first such strategy in the North West and sets a vision which seeks to realise increases in the quantity, quality, utility and functionality of Green Infrastructure[12]. Adapting to and mitigating the effects of climate change is one of the strategic objectives for green infrastructure growth in Lancashire, the Strategy then sets out some key interventions including maintaining peat bog resources, greening town and city centres and planting new woodlands.

Local Development Documents are prepared by all Planning Authorities in Lancashire and must be in general conformity with the Regional Spatial Strategy; all planning applications are considered against these documents. There are also three Local Transport Plans in Lancashire, one each in the unitary areas of Blackburn with Darwen and Blackpool and one covering the Lancashire County Council area.

All local authorities are expected to have a sustainable community strategy, developed and agreed with its local strategic partnership (LSP)[13]. The purpose of a sustainable community strategy is to set the overall strategic direction and long-term vision for the economic, social and environmental wellbeing of a local area. There are 15 sustainable community strategies in Lancashire containing climate change or environmental objectives.

Additionally, local authorities and other partners have introduced a wide range of policies which include actions on climate change. These include environment strategies, climate change strategies, policies to tackle energy use from their own operations and flagship projects. Examples of policies, programmes and other activities in Lancashire are included in Table 1.

Table 1 Examples of strategy, policy and programmes in Lancashire

Organisation	**Strategy/Policy/Programme**
Blackburn with Darwen	Carbon management plan Blackburn with Darwen Design Guide (supplementary planning document, part of the local development framework)
Blackpool	Carbon management plan
Burnley	Sustainability Action Plan Carbon management plan
Chorley Council	Sustainable resources development plan document Energy management plan
Chorley LSP	Climate Change Strategy
Fylde	FLoWE (Fylde Low waste and Energy)

[12] The network of natural environmental components and green and blue spaces that lies within Lancashire's cities, towns and villages.
[13] LSP's are multi-agency partnerships which bring together at a local level the different parts of the public, private, community & voluntary sectors within a local authority boundary.

	Sustainable Community Strategy draft Sustainable Energy Strategy and Action Plan
Hyndburn	Shocking waste campaign
Lancaster City Council	Agenda for action (sustainability partnership strategy)
Lancashire County Council	Community Climate Change Programme Carbon management plan
Lancashire Economic Partnership	Impacts of climate change on the Lancashire economy.
Lancashire Fire and Rescue Service	Study of the emergency response implications of climate change Carbon Management Plan
Lancashire Partnership	Ambition Lancashire
Pendle and Burnley councils	Pendle and Burnley home energy strategy 2008-11
Preston	GreenSpace Fund
Ribble Valley	Community Strategy Current Overview & Scrutiny investigation into climate change
Rossendale	Environment Strategy
South Ribble	Sustainability Strategy
West Lancashire	Climate Change Strategy and Action Plan for West Lancashire District Council
Wyre	Climate Change Strategy and Action Plan

Comprehensive Area Assessment

The new performance framework for local authorities and partnerships was outlined in the Local Government White Paper "*Strong and Prosperous Communities*". The Framework identifies a new, reduced, single set of national indicators, the only indicators against which local authorities' performance, alone or in partnership, will be reported to central government.

For the first time this national indicator set includes a range of measures on climate change in terms of emissions and adaptation. These are:

NI185 - CO_2 reduction from local authority operations

NI186 - Per capita reduction in CO_2 emissions in the LA area

NI187 - Tackling fuel poverty - % of people receiving income based benefits living in homes with a low energy efficiency rating

NI188 - Planning to adapt to climate change

From April 2009 all local authorities will have to report on performance against each of these indicators as part of the Comprehensive Area Assessment.

Local Area Agreements (LAAs)

Local Area Agreements (LAAs) are made between central government and local areas across the country. They set out improvement targets to be achieved over a three-year period, based on priorities identified in each area's sustainable community strategy.

For the current three-year LAA cycle (2008-2011) each area was required to select up to 35 indicators from the complete national indicator set (as identified in the new performance framework) which appropriately reflect the priorities of the local area and on which to set improvement targets.

Lancashire is covered by three Local Area Agreements[14], all of which include targets for at least one of the four climate change indicators. Blackburn with Darwen has included NI 185 & NI 187, Blackpool has included NI 186 and the Lancashire LAA contains NI 186, NI 187 and NI 188.

Actions taken and progress towards the targets will be monitored through the relevant Local Strategic Partnership (Blackburn with Darwen Local Strategic Partnership, Blackpool Strategic Partnership and the Lancashire Partnership) and reported to Government Office North West and central government.

While the Lancashire Climate Change Strategy is a long-term Strategy, setting out Lancashire's vision by 2020, the activity plan will be reviewed and refreshed on an annual basis, allowing it to form the delivery plan for NI186. This also enables Blackpool and Lancashire to work together on LAA delivery plans for CO_2 reduction.

[14] As unitary authorities, Blackburn with Darwen and Blackpool have their own Local Area Agreements. All other areas are covered by the Lancashire agreement.

OUR VISION

"A LOW CARBON AND WELL ADAPTED LANCASHIRE BY 2020"

This vision explains the changes we would like to see in Lancashire by 2020. Carbon dioxide emissions will be reduced. The changed climate will bring challenges and opportunities, and Lancashire will be ready for these.

Strong communications and high levels of awareness ensure that Lancashire's communities, businesses and organisations understand the value of energy and the nature of expected climate changes. They are convinced of the need for action, are actively playing their part and know where to find support.

In 2020 Lancashire will have reduced its emissions of CO_2 by at least 30% relative to 1990[15]

Domestic Energy

There is increased awareness and understanding of the cost and benefits of energy amongst households.

Domestic buildings are appropriately heated and insulated and fuel poverty has been eliminated.

There is an increased use of micro energy generation at the point of use (e.g. biomass, combined heat and power, micro solar, wind and heat pumps).

Transport

There is a safe, reliable and efficient transport network, particularly to places of work, shopping, leisure and other facilities. Public transport, car sharing, walking and cycling are the preferred choice. Road congestion is reduced and health is improved.

Expansion of sustainable procurement, improved local services and increased use of IT has reduced the need for travel.

Economic Development and Business

Lancashire's economy is strong, vibrant, competitive and low carbon.

Lancashire's environmental technology sector has expanded in response to market demand.

[15] For detailed information on this target please refer to the next section on establishing carbon reduction targets for Lancashire

Business is aware of the opportunities of global climate change and is acting upon it.

The increased use of low carbon technologies in buildings and processes has grown the market for these products and services.

Lancashire has developed a strong low carbon energy generation and supply chain and research and development (R&D) base. The region has also developed a skilled workforce for installation and R&D in energy generation technologies.

The potential for carbon capture technologies and off-setting of unavoidable emissions has been explored and implemented where feasible.

The potential for new energy generation has been explored, planned and implementation begun where feasible.

All public buildings have appropriate insulation and efficient heating systems.

Publicly funded developments set new standards in energy efficient design, construction and use.

The Natural Environment

Environmental organisations, farmers and land managers consider the changing climate when managing their land. They have plans in place to limit the impact of climate change and help species adapt.

The role of the natural environment in the sequestration of Carbon is recognised.

Adaptation

There is a greater understanding of vulnerability to extreme weather and this informs planning by businesses, organisations and individuals.

Infrastructure and services are resilient to a range of extreme weather, including storms, heatwaves and drought.

Low-lying areas have plans in place to deal with sea rises, flooding and storms.

Development is carried out in a way that does not increase flood risk and is able to deal with severe flood events

CARBON DIOXIDE REDUCTION TARGETS

The UK has passed legislation which introduces the world's first long term legally binding framework to tackle the dangers of climate change. The Climate Change Act received Royal Assent in November 2008.

The Act sets legally binding targets for the UK to reduce carbon dioxide emissions by at least 80% by 2050, and 26% by 2020, against a 1990 baseline.

The Climate Change Committee (CCC) has been established under the Climate Change Act as an independent body to advise the Government on setting carbon budgets, and to report to Parliament on the progress made in reducing greenhouse gas emissions.

Regional CO_2 reduction targets are also being developed through the North West Climate Change Action Plan[16] .

Carbon Reduction Targets for Lancashire

Research into regional emissions projections and targets[17] propose that "it is appropriate that all sub-regions should seek to achieve parity with the regional emissions reduction targets".

As regional targets have not yet been established headline reduction targets for Lancashire have been set in line with national targets *currently* outlined in the Climate Change Act.

A 30% reduction on 1990 levels by 2020

The Climate Change Committee has recently made its first recommendations urging the Government to commit unilaterally to reducing emissions of all greenhouse gases (GHGs) in the UK by at least 34% in 2020 relative to 1990 levels (21% relative to 2005). This should be increased to 42% relative to 1990 (31% relative to 2005) once a global deal to reduce emissions is achieved. *Building a Low-Carbon Economy*[18]*,* the CCC's first report, sets out the analysis underpinning these recommendations.

It is important that the Lancashire Climate Change Strategy reflects national policy, however the speed at which the climate change agenda is progressing

[16] Rising to the Challenge, A Climate Change Action Plan for England's Northwest 2007-09, NWDA, November 2006
[17] North West Emissions Inventory, AEA Energy & Environment, July 2008
[18] http://www.theccc.org.uk/reports/

within the UK means that it is becoming increasingly challenging to be completely up to date with the latest developments.

These new recommendations make two key changes, the increase in 2020 reduction targets and the inclusion of all greenhouse gases, rather than focussing solely on carbon dioxide. These changes will require further research to fully understand the implications for Lancashire's reduction targets.

The Lancashire Climate Change Partnership will monitor the Government's response to the Committee's recommendations and carry out research into the implications of including all greenhouse gases within future reduction targets. The Strategy will then be reviewed accordingly.

Where Are We Now?

Lancashire played a key role in a recent regional study on the potential CO_2 savings achievable in the North West.[19] This estimated that Lancashire can expect to make average savings of 2,812.9 $ktCO_2$/Year by 2020 from existing and planned national and regional measures (as identified in the following sections). This is a 27% reduction on the 1990 baseline[20].

To achieve a 30% Lancashire needs to be making savings of 3,237.7 $ktCO_2$/year.

National polices are expected to be the major contributor to this saving, making up 92% of the expected savings (2,582 ktCO2/Year), with most coming from delivery of the EU Emission Trading Scheme (EU ETS), highlighted in Figures 8 and 9.

Figure 8 Expected CO_2 savings by 2020 from existing measures

[19] Assessment of Potential Carbon Savings Achievable in the North West Region by 2020, prepared for 4NW by URS Corporation Ltd, 28 November 2008. See Appendix Two for further details.

[20] Derived using North West Emissions Inventory projections for 1990 and 2020: (projected 2020 - expected savings from existing measures) / 1990 baseline.

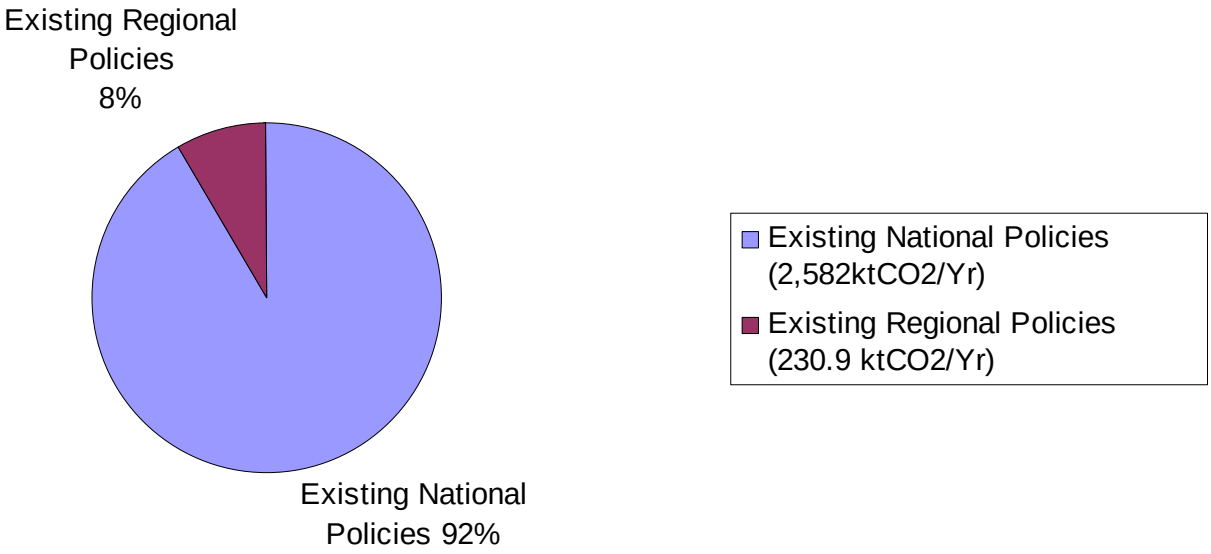
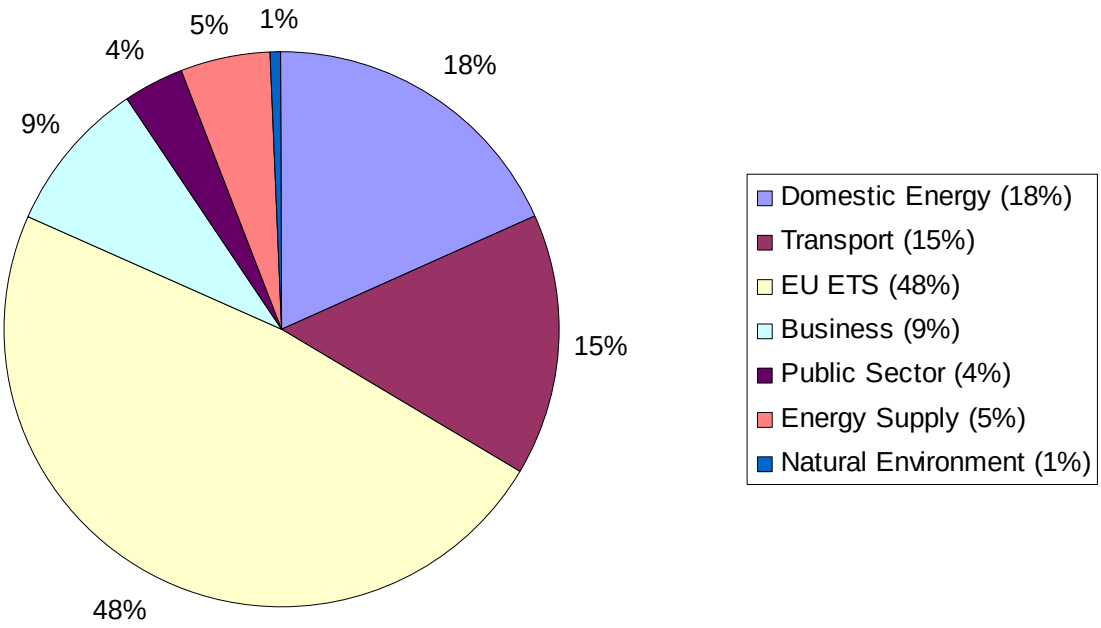


Figure 9 Expected CO_2 savings by 2020 from existing measures by sector



These existing and planned national and regional polices, explained further in the following sections, are expected to deliver a large proportion (27%) of the 30% reduction target. However, it cannot simply be assumed that these expected savings will be achieved.

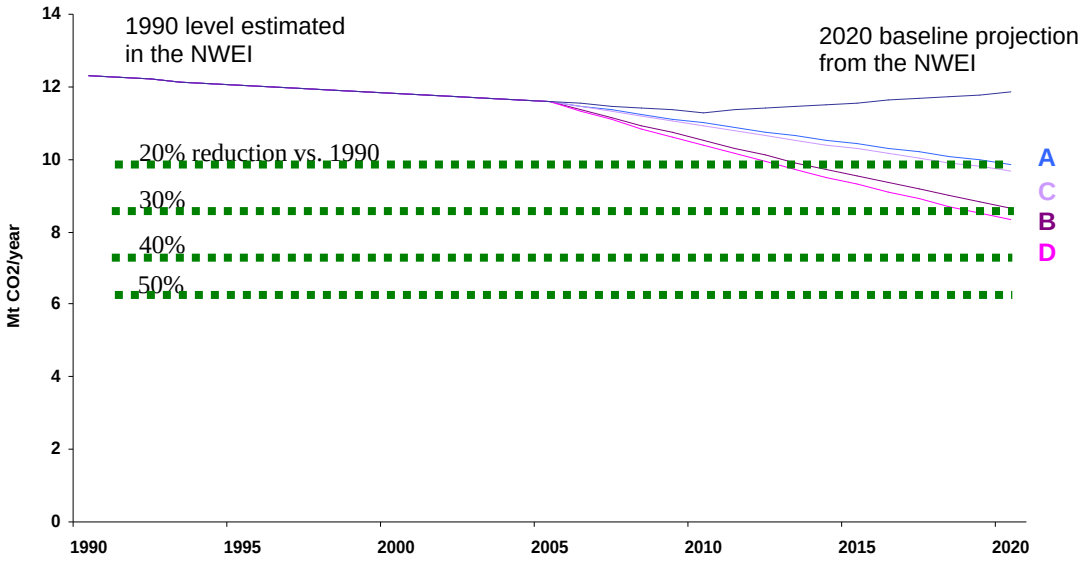
Nearly 50% of the expected saving is attributed to implementation of the EU ETS, a mandatory scheme for large industrial emitters, which we have little control over locally, and, for example, Combined Heat and Power (CHP) is

expected to deliver 87 $ktCO_2$/year which could be seen as a little ambitious given the limited current installed capacity in Lancashire.

The Partnership will have to work to ensure existing projects and activity to support national policy is implemented as fully as possible to ensure we meet the expected 27%.

Having said that, there is also scope for these existing measures to deliver higher savings than presented provided enough resources are dedicated to the policy and/or the strength of measure is enhanced, as demonstrated in Figure 10.

Figure 10 CO_2 trajectories and impact of existing measures by 2020



A Low impact of national policy measures
B High impact of national policy measures
C Low impact of national policy measures and existing regional measures
D High impact of national policy measures and existing regional measures

Source: Assessment of Potential Carbon Savings Achievable in the North West Region by 2020, prepared for 4NW by URS Corporation Ltd, 28 November 2008

As highlighted in Figure 10, it is essential to have clear plans in place to implement existing national policies and to maximise the impact of existing measures taking place in Lancashire to exceed the upper end of savings calculated.

The key priorities for Lancashire are to:

1. Maximise CO_2 savings from the implementation of existing national policies.

2. Maximise CO_2 savings from existing Lancashire measures through improving policies and strategies, the availability of resources and extending the scope of some projects.

3. Implement additional measures focusing on those areas where there is greatest scope for CO_2 savings, once the potential of existing measures has been enhanced.

CO_2 Reduction targets in Local Area Agreement

A new national performance indicator on carbon emissions has been introduced as part of the new Local Government Performance Framework. The indicator, "Per capita reduction in CO_2 emissions in the LA area" (National Indicator N186) is measured by a subset of the emissions in the DEFRA dataset, focusing on those emissions that can be influenced by actions of local authorities and local partnerships. For example, emissions from ETS installations, diesel railways and motorways are excluded, as are land use, land use change and forestry emissions. This specifically produced dataset has been used to form the baseline and improvement targets for NI186 and will be used for monitoring emissions in the local authority area for the purposes of the national indicator.

The Local Area Agreements (LAAs) for Blackpool and Lancashire both contain CO_2 reduction targets for 2008-11. While the delivery plan for this Strategy will contribute to delivery of these targets, performance will be monitored independently of this Strategy by the Blackpool Strategic Partnership and the Lancashire Partnership.

DOMESTIC EMISSIONS

Domestic Energy

Objectives

Reduce greenhouse gas emissions resulting from the use of energy in homes, by improving energy efficiency, minimising waste and exploiting renewable sources of energy.

Why

29% of Lancashire's carbon dioxide emissions come from domestic homes. Energy is central to our everyday lives. We take it for granted that electricity is available to light and heat our homes, to power our fridges, televisions and computers. Poorly insulated buildings and poor control of heating, ventilation, air conditioning and lighting is all wasted energy and many of our appliances are less energy efficient than they could be.

In 2005 the average Lancashire resident contributed about 2.5 tonnes of CO_2 per year, the equivalent of 33 times their own body weight, from domestic emissions alone. A comparison of emissions data for 2005 and 2006 shows domestic emissions have increased in all local authority areas in Lancashire, except for Blackburn with Darwen (which remained constant). All other sectors in Lancashire experienced decreases in emissions.

Improving energy efficiency and reducing fuel poverty[21] have been key aspects of local authority housing improvement and regeneration programmes for a number of years now. The government is committed to eliminating fuel poverty by 2016[22], and considers local authorities as central to driving forward this challenge.

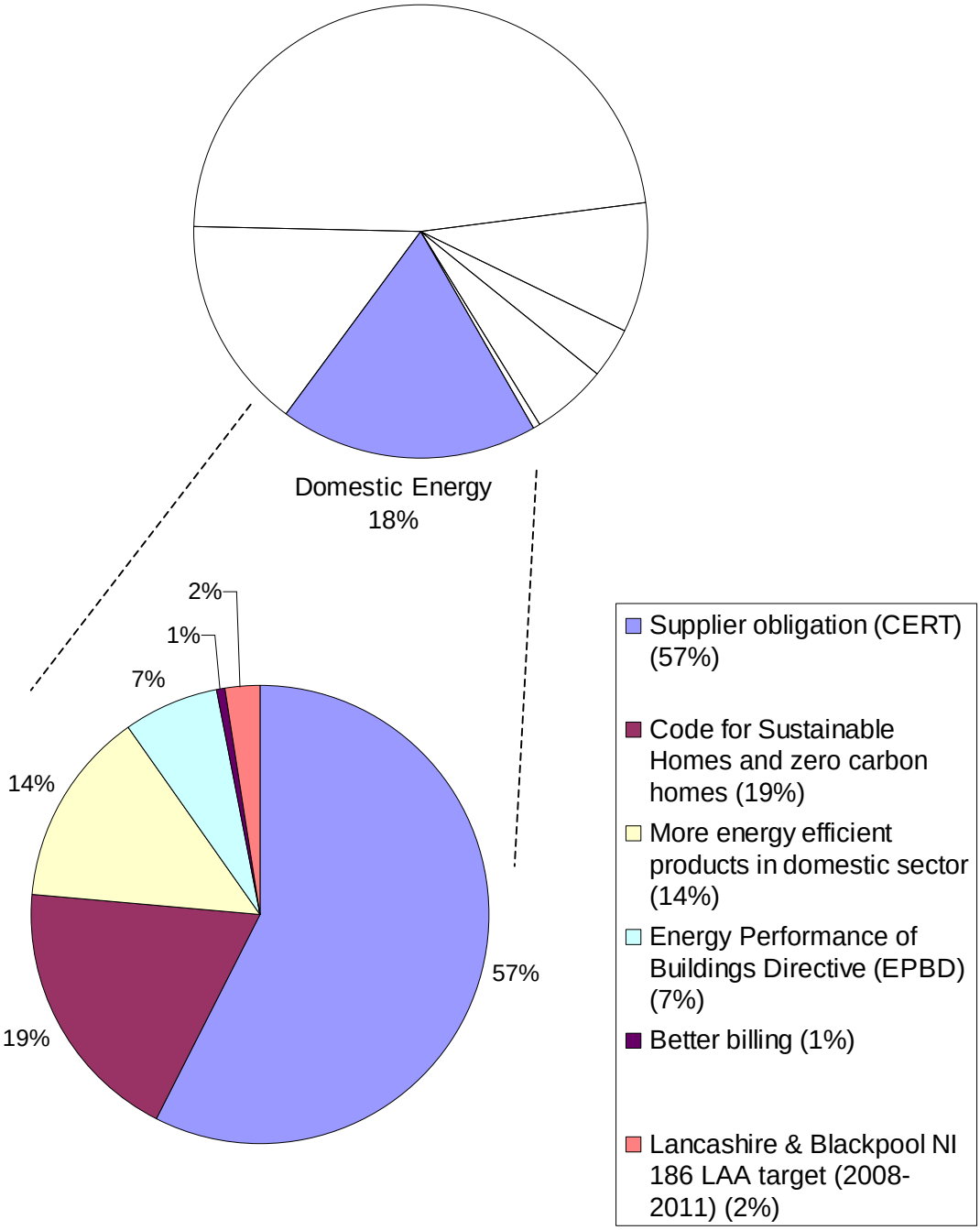
Future Savings from Existing Measures (by 2020)

There is a wide range of national policy identified in the Energy White Paper (2007) to tackle domestic energy use and carbon dioxide emissions. This activity is expected to achieve savings of 503 $ktCO_2$/year in Lancashire. A large proportion of this is from supplier obligation, an obligation on household energy suppliers to promote reductions in carbon emissions in the household sector. The current three-year phase of the energy supplier obligation is the Carbon Emissions Reduction Target (CERT), this and successor phases are expected to deliver 296 $ktCO_2$/year in Lancashire.

[21] A household is considered to be in Fuel Poverty if more than 10% of income needs to be spent on fuel costs to maintain an adequate level of comfort.
[22] The UK Fuel Poverty Strategy, 2001 & Fuel Poverty in England: The Government's Plan for Action, 2004

The Blackpool and Lancashire Local Area Agreements (2008-2011) are expected to make an additional saving of 12.3 ktCO_2/year though delivery of NI186 targets in the domestic sector.[23] Together these existing measures make up 18% of all expected savings by 2020.

<u>Figure 11</u> CO_2 savings expected by 2020 from existing domestic measures



[23] Only the CO_2 savings that are expected to be additional to national policy implementation have been taken into account.

Table 2 CO_2 savings expected by 2020 from existing domestic measures

Activity	Average expected savings in Lancashire $ktCO_2$/year
NATIONAL	
Supplier obligation (CERT)	296
Code for Sustainable Homes and zero carbon homes	97
More energy efficient products in domestic sector	72
Energy Performance of Buildings Directive (EPBD)	34
Better billing	4
Total	**503**
LANCASHIRE	
Domestic portion of Lancashire & Blackpool NI186 LAA target (2008-2011)	**12.3**
TOTAL EXPECTED SAVINGS	**515.3 $ktCO_2$/year**

While quantified CO_2 savings cannot be identified from many existing activities at the sub-regional level, there are many local level activities ongoing in Lancashire contributing to the delivery of the existing measures identified above.

CASE STUDY

Burnley Borough Council has run the CRISP insulation scheme since 1997. Since 2004, this has been a part of the Switch onto Savings scheme. £525 is available for loft and cavity wall insulation for over 60's, or families with children under 5 living in a SureStart area. The scheme has systematically been working through each ward on a street-by-street basis. The scheme also makes referrals for Warm Front and utility funded discount insulation schemes.

Pendle Borough Council residents can take advantage of utility funded discount insulation schemes through local surveyors/installers. A small amount of PCT funding has also been secured to provide free insulation for small homes (FISH) where older people or young children live, since their health is most greatly affected by excess cold and damp & mould. The PHEW scheme (Pendle's Heat, Efficiency and Warmth scheme) provides at least £300 towards the cost of replacing or installing an energy efficient boiler and upgraded heating controls. A higher level of assistance (starting Jan 2009) will enable additional assistance to be given for low income households in receipt of means-tested benefits

Wyre Borough Council won National Energy Action support (funded by DEFRA) to ensure the incorporation of nationally recognised affordable

warmth and energy saving best practice into its Private Sector Housing Renewal Policy. The Policy now includes a range of local authority grant assistance supporting domestic energy efficiency improvements including: a Wyred for Energy Grant for the residents of park homes, a Promoting Home Energy Efficiency and Warmth Grant (PHEEW Grant) for residents over 60 or with a disability living in homes rated between Council Tax bands A to D, a Private Landlord Energy Grant and area based Eon Heatstreets initiatives.

Opportunities for Additional Savings

A number of areas have been identified within the domestic sector where there are opportunities to make additional savings, these include improving the energy efficiency of houses' fabric, making improvements to heating and the installation of green roofs (the installation of vegetation on roofs reduces the need for space heating and air-conditioning). Additional savings can also be made from the installation of microgeneration in both new and existing homes.

Adapting to Climate Change

In addition to action to reduce emissions, preparations for a changed climate will be needed, some from individual households. Details of these can be found in the adaptation chapter.

Domestic Waste

Objectives

Minimise waste through careful purchasing and disposal.

Reduce greenhouse gas emissions through better waste management, including waste minimisation and increased recycling.

Why

A product's life-cycle begins when the base materials are extracted and stretches through manufacture, construction, transportation, maintenance and use through to the product's ultimate disposal. Greenhouse gases can be produced at every stage. Resource efficiency is about getting the most out of finite resources and minimising waste, and the climate change benefits are clear.

Effective waste management also has a key role in reducing greenhouse gas production. Waste decomposes, releasing the powerful greenhouse gas methane into the atmosphere.

The major greenhouse gas emissions associated with waste management is in the form of methane (CH_4). The URS study did not consider waste "given the negligible impact on *direct* CO2 emissions" the focus of the Study is on CO_2 emissions in accordance with the earlier definition of the UK carbon reduction target (in the draft Climate Change Bill).

However, the targets in the Lancashire Waste Strategy will have important savings of methane emissions. The Strategy has a target to recycle and compost 60% of municipal waste by 2020.

It is possible to translate emissions in greenhouse gases other than CO_2 to CO_2 equivalents. In 2005/6, 823,538 tonnes of waste were disposed of, 533,554 tonnes of this went to landfill[24]. This emitted 146,727 tonnes of CO_2 (e)

[24] Defra Municipal Waste Management Statistics

TRANSPORT

Objectives

Develop and maintain an integrated, efficient and sustainable transport system.

Increase the use of public transport, walking and cycling.

Promote the use of more efficient vehicles and alternative transport fuels, including sustainable bio-fuels.

Why

Transport is central to our lives and the transport sector, including air travel, now produces more than a quarter of all the UK's carbon dioxide emissions. Transport is not only a major source of emissions; it is also where nationally emissions are growing the fastest.

Road Transport accounts for 24% of carbon dioxide emissions in Lancashire (compared with 26% across the UK) and also affects quality of life in other ways such as delays caused by congestion and reduced air quality. Road transport emissions include freight and passenger transport, both private and for business purposes. The estimates are, however, made on the basis of the distribution of traffic, therefore some of the emissions within an authority represent through traffic, or part of trips into or out of the area, whether by residents or non-residents. In some authorities this can be particularly significant and may, for example, provide part of the explanation for above-average per capita road transport emissions in Chorley (4.1 tonnes) at the heart of the Lancashire motorway network. Road transport emissions fall to just 0.9 tonnes per head in Blackpool.

Although reducing the impact of air travel must be considered, it is not addressed in detail in this strategy. Air travel is a rapidly growing source of emissions. However, these are not currently included in the calculations of national and local emissions.

Climate change is predicted to increase flooding on roads, rail and runways and cause potential damage to their foundations. Flooding increases the likelihood of landslips in railway cuttings and road embankments. Warmer, drier summers increase disruption to road, rail and air transport from melting and buckling of surfaces and damage to infrastructure from subsidence.

Future Savings from Existing Measures (by 2020)

Existing national policies are expected to provide the bulk of carbon savings in the transport sector by 2020, with 66% coming from the successor to EU voluntary agreements on new car fuel efficiency (expected 2009) and 26% from the Renewable Transport Fuel Obligation (RTFO). The remainder of savings is expected from delivery of the Blackburn with Darwen, Blackpool and Lancashire Local Transport Plans.

The European Union has a voluntary agreement with the European Automobile Manufacturers Association to reduce CO_2 emissions from new passenger cars to an average of 120g/km by 2008. This is unlikely to be met, and negotiations to develop a more comprehensive agreement are ongoing[25].

The European Union has a target that 5.75% of transport fuels should come from biological sources. The British government's RTFO requires 5% of the fuel sold at the pump by 2013/14 to be biofuel. This has been reduced from the same target in 2010 to ensure that there was sufficient time to address the wider sustainability concerns surrounding biofuel use.

Carbon dioxide savings from delivery of the Blackpool and Lancashire NI186 Local Area Agreement (2008-2011) targets have not been factored into the transport sector, as it was felt that savings would not be additional to those achieved through the Local Transport Plans.

25 www.dft.gov.uk/consultations/archive/2006/reducingnewcarco2emissions/reducingnewcarco2emissionswh1748

Figure 12 CO_2 **savings expected by 2020 from existing transport measures**

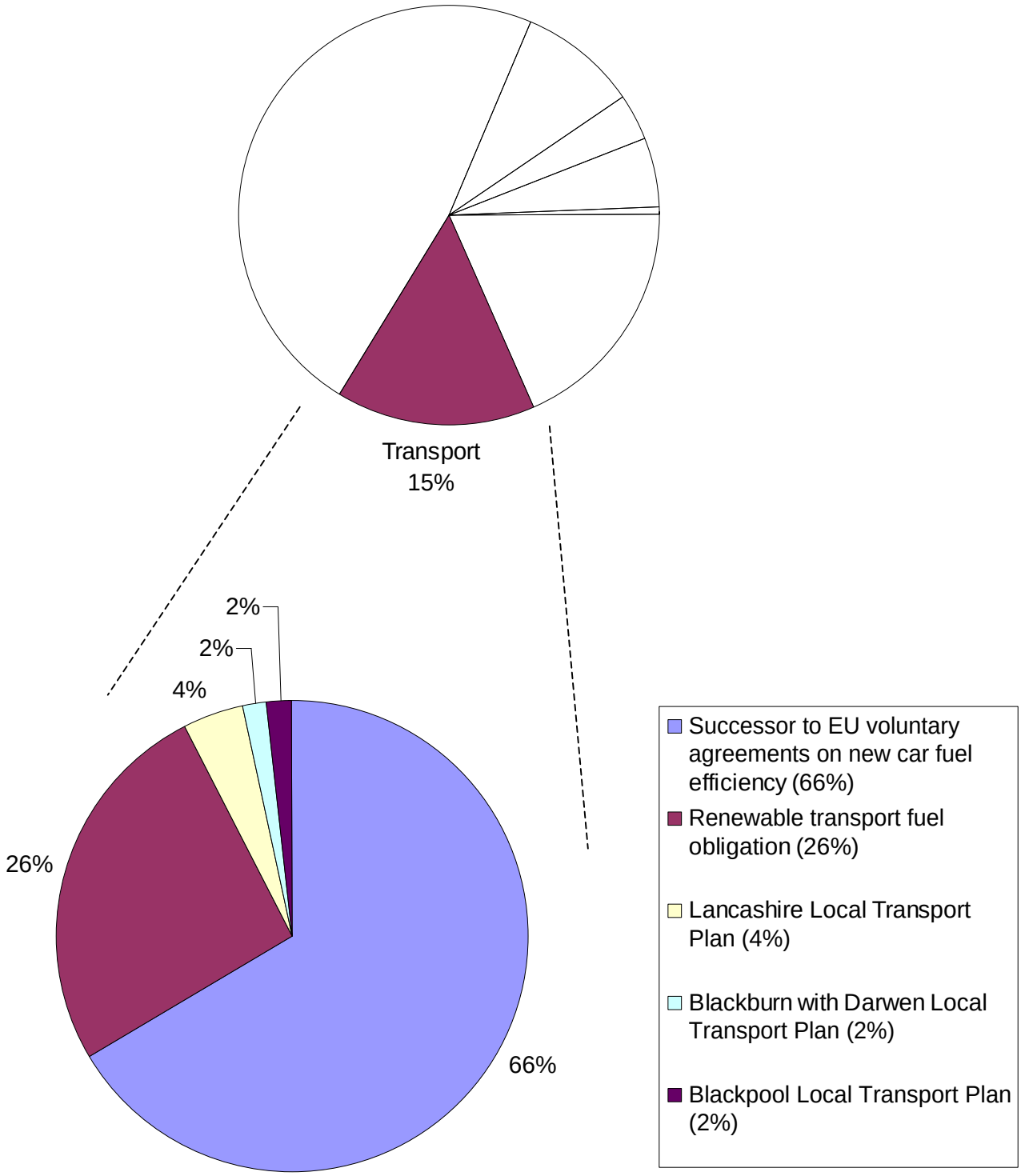


Table 3 CO_2 savings expected by 2020 from existing transport measures

Activity	Average expected savings in Lancashire ktCO2/year
NATIONAL	
Successor to EU voluntary agreements on new car fuel efficiency, expected 2009	286
Renewable Transport Fuel Obligation (RTFO)	113
Total	**399**
LANCASHIRE	
Lancashire Local Transport Plan	18
Blackburn with Darwen Local Transport Plan	7
Blackpool Local Transport Plan	7
Total	**32**
TOTAL EXPECTED SAVINGS	**431 $ktCO_2$/year**

CASE STUDY

Personalised Travel Planning, CIVITAS (Lancashire County Council, Lancaster City Council, Preston City Council & South Ribble Borough Council) and Cycle Demonstration Town (Lancaster City Council)

In the largest Personalised Travel Planning exercise in the country, 25,000 households in Lancaster and Morecambe and another 25,000 in Preston and South Ribble have been approached. Results indicate that participating households have reduced their car journeys by 12%. The exercise complements both the Cycling Demonstration Town project in Lancaster and the Civitas sustainable transport project in Preston and South Ribble.

Local Transport Plan 2006/07 to 2010/11
Draft Mid Term Report 2008

Opportunities for Additional Savings

Research[26] suggests that a wide variety of additional measures could achieve 237 $ktCO_2$ savings per year in the transport sector in Lancashire. Over half of

[26] Assessment of Potential Carbon Savings Achievable in the North West Region by 2020, prepared for 4NW by URS Corporation Ltd, 28 November 2008. See Appendix Two for further details.

these possible savings are from “soft” measures encouraging better travel habits and "eco-driving".

As with all activity it will be important to ensure that resources are allocated in the most cost effective way. With two cycle demonstration towns within the sub-region it will be important to quantify the relative impacts of improvements to cycle infrastructure compared with travel planning and other promotion of cycle transport.

Adapting to Climate Change

In addition to action to reduce emissions, preparations for a changed climate will be needed to ensure the resilience of transport infrastructure. Details of these can be found in the adaptation chapter

ECONOMIC DEVELOPMENT & BUSINESS

Objectives

Encourage a sustainable and competitive Lancashire economy that will measure, mitigate and reduce its contribution to climate change, through energy and resource efficiency actions.

Support the growth of the emerging environmental technology sector.

Create an informed, skilled and environmentally responsible work force and work place able to compete in an emerging and diverse 'environmental economy'.

Ensure that future economic plans ensure a low carbon economy.

Why

The Stern Review on the Economics of Climate Change estimates that the overall risks and costs of climate change will be equivalent to losing at least 5% global GDP each year, now and forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more. In contrast the cost of action to reduce green house gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year.

The Stern Review also recognises a £30 billion opportunity for British businesses to profit over the next 10 years as we adapt to threats of climate change. These opportunities exist primarily for businesses in the environmental technology sector, such as waste management, renewable energy, pollution control and energy efficiency. The impact of Stern's projections on the Lancashire economy will be focussed on the sub-region's major industrial and employment sectors.

As climate change becomes increasingly central to UK policy-making decisions, the need for economic development to be achieved in an environmentally sustainable way becomes even more critical. In particular, economic development programmes must be designed in such a way that they do not increase the pressure on the environment or increase greenhouse gas emissions. Likewise, it is crucial that the trajectory of the sub-region's plans for economic development does not place it at greater vulnerability to the impacts of climate change in future.

The Lancashire Economic Strategy is currently undergoing an assessment of the impacts of climate change on the Lancashire economy. This has highlighted that some of Lancashire's economic programmes are potentially in conflict with the overarching climate change objectives for the sub-region. Others are more closely aligned with clear synergies, while some will present business opportunities that could help the economic development of the sub-

region. Further details on the climate change challenges for the Lancashire economy are outlined at Appendix Three.

Food supply is also a key sector. Nationally emissions from the sector are estimated at a minimum of13% of emissions. Potential to reduce emissions by up to 70% has been identified at a national level and there are likely to be significant impacts from climate change on the agricultural industry and the products that it can supply. [27]

Future Savings from Existing Measures (by 2020)

Through existing national policies and local activity in Lancashire, such as the ENWORKS Resource Efficiency Programme, the business sector is expected to deliver 57% of carbon savings by 2020, with the EU Emissions Trading scheme (EU ETS) the main contributor.

As in the transport sector, carbon dioxide savings from delivery of the Blackpool and Lancashire NI186 Local Area Agreement (2008-2011) targets have not been factored into the business sector, as it was felt that savings would not be additional to those achieved through the existing local measures.

[27] Cooking up a storm, Food Climate Research Network www.fcrn.org.uk/frcnPubs/publications/PDFs/CuaS_web.pdf.

Figure 13 CO_2 savings expected by 2020 from existing business energy efficiency measures

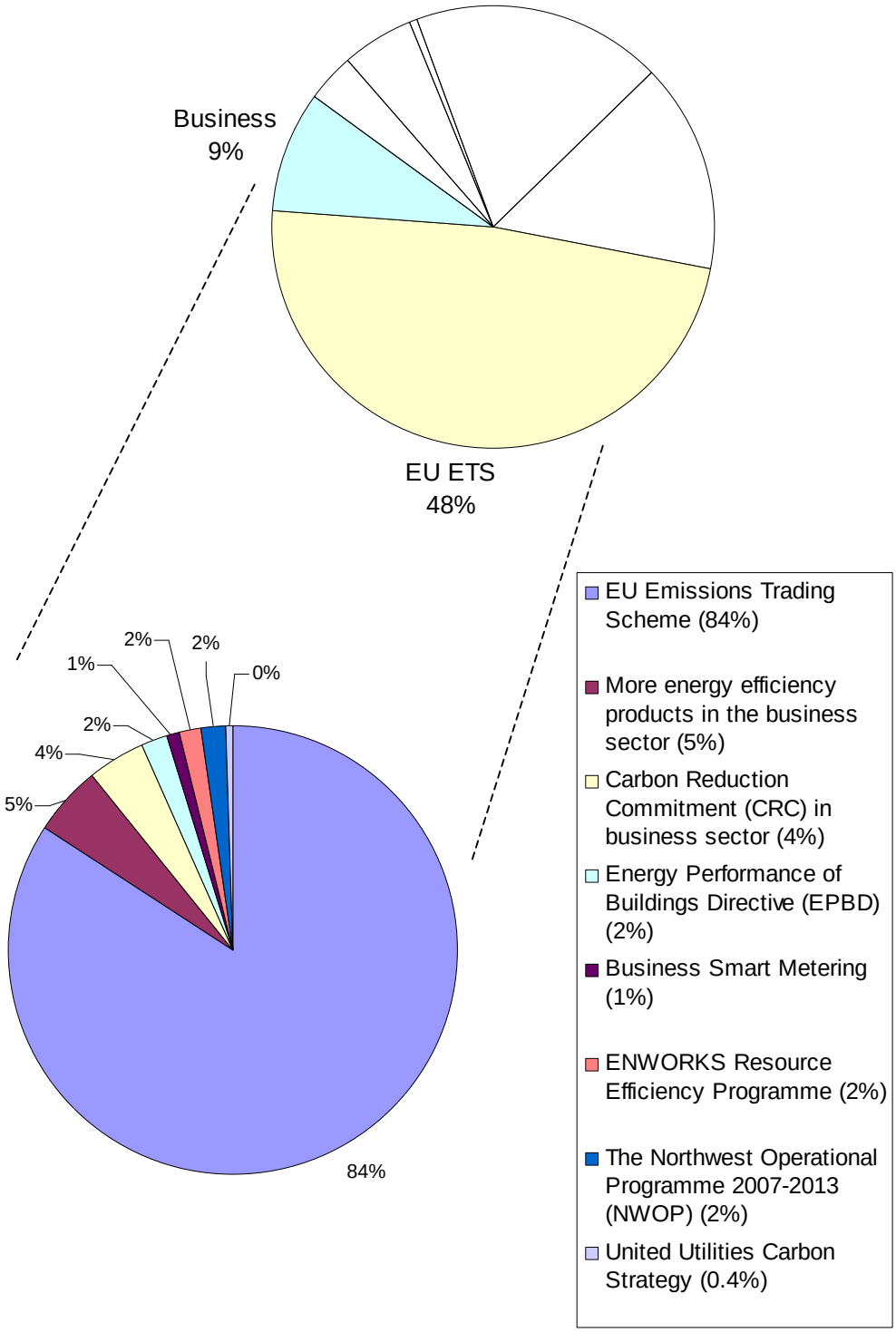


Table 4 CO_2 savings expected by 2020 from existing business energy efficiency measures

Activity	Average expected savings in Lancashire ktCO2/year
NATIONAL	
EU Emissions Trading Scheme	1,347
More energy efficiency products in the business sector	80
Carbon Reduction Commitment (CRC) in business sector	68
Energy Performance of Buildings Directive (EPBD)	30
Business Smart Metering	13
Total	**1,538**
LANCASHIRE	
The Northwest Operational Programme 2007-2013 (NWOP)	30
ENWORKS Resource Efficiency Programme	26
United Utilities Carbon Strategy	7
Total	**63**
TOTAL EXPECTED SAVINGS	**1,601 ktCO2/year**

CASE STUDY – ENWORKS Resource Efficiency Programme

The project directs energy and time in to supporting local businesses and to provide them with the skills to implement resource efficiency opportunities, providing a flexible programme of support, including, training, resource efficiency audits, waste brokerage, on site support and signposting to specialists.

Through the Programme, BSN Medical has introduced process changes that have resulted in environmental and cost benefits. A change in product packaging has reduced volumes being used saving £27,000 per annum. Workforce development has enabled renewals and repairs to be carried out in-house saving £29,000 per annum. All packaging coming into the company is now either reused or recycled and the Switch Off campaign has indirectly reduced CO_2 emissions by 53 tonnes per annum.

Overall, the Resource Efficiency programme has resulted in cost savings of £1,688,617 from 177 businesses. These businesses have identified the support received to have assisted them to safeguard sales of over £30 million and generate nearly £8 million in increased sales. This equates to 66 new jobs and 512 safeguarded.

Opportunities for Additional Savings

A review of the synergies and conflicts between the Lancashire Climate Change Strategy and the Lancashire Economic Strategy has been undertaken. This study is summarised in Appendix Three.

Adapting to Climate Change

In addition to action to reduce emissions, preparations for a changed climate will be needed, some from individual businesses. Details of these can be found in the adaptation chapter.

THE PUBLIC SECTOR

Objectives

All public organisations to monitor and minimise their energy use.

More efficient use of resources and more environmentally-aware procurement, including of infrastructure.

Why

Savings achieved from the public sector are included within the Industry and Commercial sector for the purposes of DEFRA data monitoring, however, this is seen as a key sector where savings can be achieved, contributing 4% of the expected savings. As many key members of the Partnership are from the public sector it is important that they are working to improve their own performance as an example to the businesses and people of Lancashire.

Investment in energy efficiency throughout the public sector will bring significant benefits and cost savings. Many partners are already benefiting from support programmes such as the Carbon Trust's Carbon Management Programme and the Energy Saving Trust's One to One Programme.

Procurement decisions can have a major impact on the environment, both locally and globally. Products and services can cause damage to the environment and public health, ranging from the extraction of raw materials and the manufacturing of goods, to their distribution, use and eventual disposal. By using sustainable procurement these impacts can be reduced.

Sustainable procurement means combining the best economic solution with environmental and social criteria. It is therefore about purchasing goods and services that have the most beneficial environmental, social and economic impact. It should consider not only the source of materials, but also their longevity in the work place and eventual disposal.

Sustainable procurement can have a number of benefits. These include:

- Improved resource efficiency, achieved by a ‘doing more with less’ approach (the best environmental option is to procure less).
- A reduction in waste by procuring items with a greater longevity. This decreases the environmental and financial costs associated with waste disposal.
- If the lifecycle costs of the product are considered, environmental procurement can allow you to save money and protect the environment at the same time.
- An improved corporate image can be achieved.
- Supporting and creating new markets that will allow the development of alternative products and services in an environmentally responsible manner.

Future Savings from Existing Measures (by 2020)

Figure 14 CO_2 savings expected by 2020 from existing public sector measures

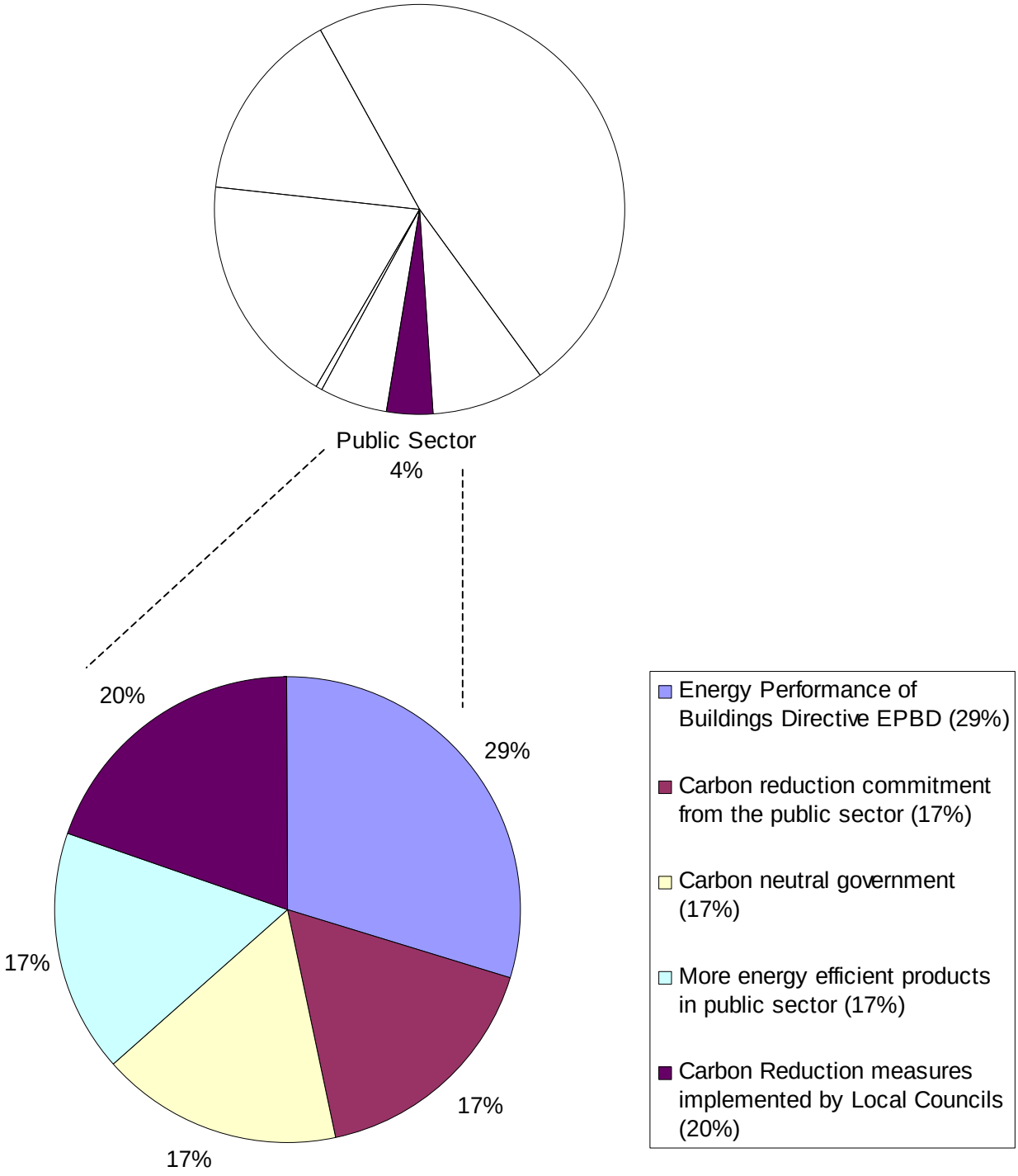


Table 5 CO_2 savings expected by 2020 from existing public sector measures

Activity	Average expected savings in Lancashire ktCO2/year
NATIONAL	
Energy Performance of Buildings Directive (EPBD)	30
Carbon reduction commitment from the public sector	17
Carbon neutral government	17
More energy efficient products in public sector	17
Total	**81**
LANCASHIRE	
Carbon reduction measures implemented by Local Councils	**20**
TOTAL EXPECTED SAVINGS	**101 ktCO2/year**

CASE STUDY

Blackburn with Darwen Borough Council – Carbon Management Plan
As the first step towards their response to climate change, Blackburn with Darwen Borough Council has taken part in the Carbon Trust's Carbon Management Programme producing a detailed 'Carbon Management Plan' (CMP) in an effort to control energy consumption and reduce carbon emissions.

In 2006/07 Blackburn with Darwen Borough Council's carbon emissions amounted to 26,233 tonnes of CO_2. Emissions were calculated for the Council's buildings, street lights, fleet vehicles and business travel. As part of the CMP, they have made a commitment to reduce these emissions by 25% (6,500 tonnes of CO_2) by 2013, against the 2006/07 baseline.

Opportunities for Additional Savings

Research suggests that if all remaining councils were to implement carbon management plans a further 18 $ktCO_2$/year could be saved. However, it needs to be recognised that most public sector partners in Lancashire are already implementing carbon reduction measures in some way but it has not been possible to quantify savings at this stage as they are not part of one of the formal management schemes.

Adapting to Climate Change

In addition to action to reduce emissions, preparations for a changed climate will be needed to ensure resilience of services and infrastructure. The public sector needs to take the lead on this. Details can be found in the adaptation chapter.

ENERGY SUPPLY

Objectives

Actively promote decentralised energy production and medium and large scale renewable energy generation.

Why

Renewable energy is generated from the flows of energy that occur naturally and continuously in the environment. In the UK these include wind (both on and offshore), the sun (using solar panels), water (including conventional hydro-electricity and developing tidal stream and wave technologies) and biomass fuels (energy crops that are replaced). These are not exhaustible resources like coal, oil and gas, and as they are not fossil fuels their production and use do not make net positive CO_2 emissions. However consideration and value also needs to be given to the importance of natural countryside when developing new energy sources, particularly in the case of wind turbines where balanced decisions need to be taken. Delivery of renewable energy technology will be driven by planning policy set out by the North West Regional Spatial Strategy (RSS) and by commercial factors.

The RSS sets out targets for renewable energy in line with the North West Sustainable Energy Strategy. By 2010 at least 10% (rising to at least 15% by 2015 and 20% by 2020) of the electricity which is supplied within the region should be provided from renewable energy sources.

Indicative capacity targets are set out for Lancashire at 239MW (Megawatts) by 2010, 297.4MW by 2015 and 344.4MW by 2020. Current (2007/08) installed generating capacity for renewable electricity and heat schemes in Lancashire is 137.2MW[28].

The Towards Broad Areas for Renewable Energy Development[29] report has sought to establish a baseline understanding of the region's renewable energy generation potential and highlights a number of issues for consideration by regional stakeholders. The report concludes that the "*North West region faces a considerable challenge if it is to meet the current renewable energy targets in the RSS.*" If targets are to be met a step change will be required in the region's approach to the deployment of renewable technologies, involving planners, developers and local communities. However, the report also

[28] Derived from Ofgem statistics (December 2007) and information from Lancashire County Council

[29] Towards Broad Areas for Renewable Energy Development, prepared for 4NW by Ove Arup & Partners, July 2008

identifies that the region has the potential to generate considerably more renewable energy than it currently does.

Microgeneration schemes, in the form of solar water heating, combined heat and power units, PV, micro wind and ground source heat pumps are being installed at domestic and commercial properties across Lancashire. These bring benefits to individual householders and small businesses and can offset the overall demand for grid-connected electricity (and gas where applicable). However, the upfront installation cost of these systems is currently very high when compared to equivalent conventional systems. Unlike technologies currently included within the Renewables Obligation there is no standard monitoring framework in place for microgeneration, making it difficult to report conclusively on the number of installed schemes.

A recent BERR study[30], states that for microgeneration to play a serious role in the UK's energy mix and in meeting CO_2 reduction targets, these technologies must achieve widespread penetration within the UK population – with uptake measured in the hundreds of thousands or millions. The fate of microgeneration therefore depends strongly on the interplay between technology development and consumer priorities. Combined Heat and Power (CHP) is expected to be the dominant microgeneration technology.

In the lead up to 2020, Lancashire's contribution to electricity from nuclear will decline as a result of decommissioning of Heysham 1, planned for 2014 (Heysham 2 will be operational until 2022). At the moment there are no clear plans for the future development of nuclear activity and it appears unlikely that increased nuclear supply will be available to the sub-region before 2020. Although the potential impact of future development of nuclear activity should be acknowledged, it is unlikely to have an impact in the lifetime of this Strategy (prior to 2020) and so has not been considered.

The challenge is to ensure that the replacement energy supply replacing this will be low carbon rather than increase the use of fossil fuels.

Future Savings from Existing Measures (by 2020)

Energy supply is expected to contribute 5% of the quantified expected carbon savings by 2020 through the implementation of the Renewables Obligation, which requires licensed electricity suppliers to source a percentage of the electricity they supply from renewable sources, and increased use of Combined Heat & Power (CHP).

[30] The Growth Potential for microgeneration in England, Wales and Scotland, Element Energy, June 2008

Figure 15 CO_2 **savings expected by 2020 from existing energy measures**

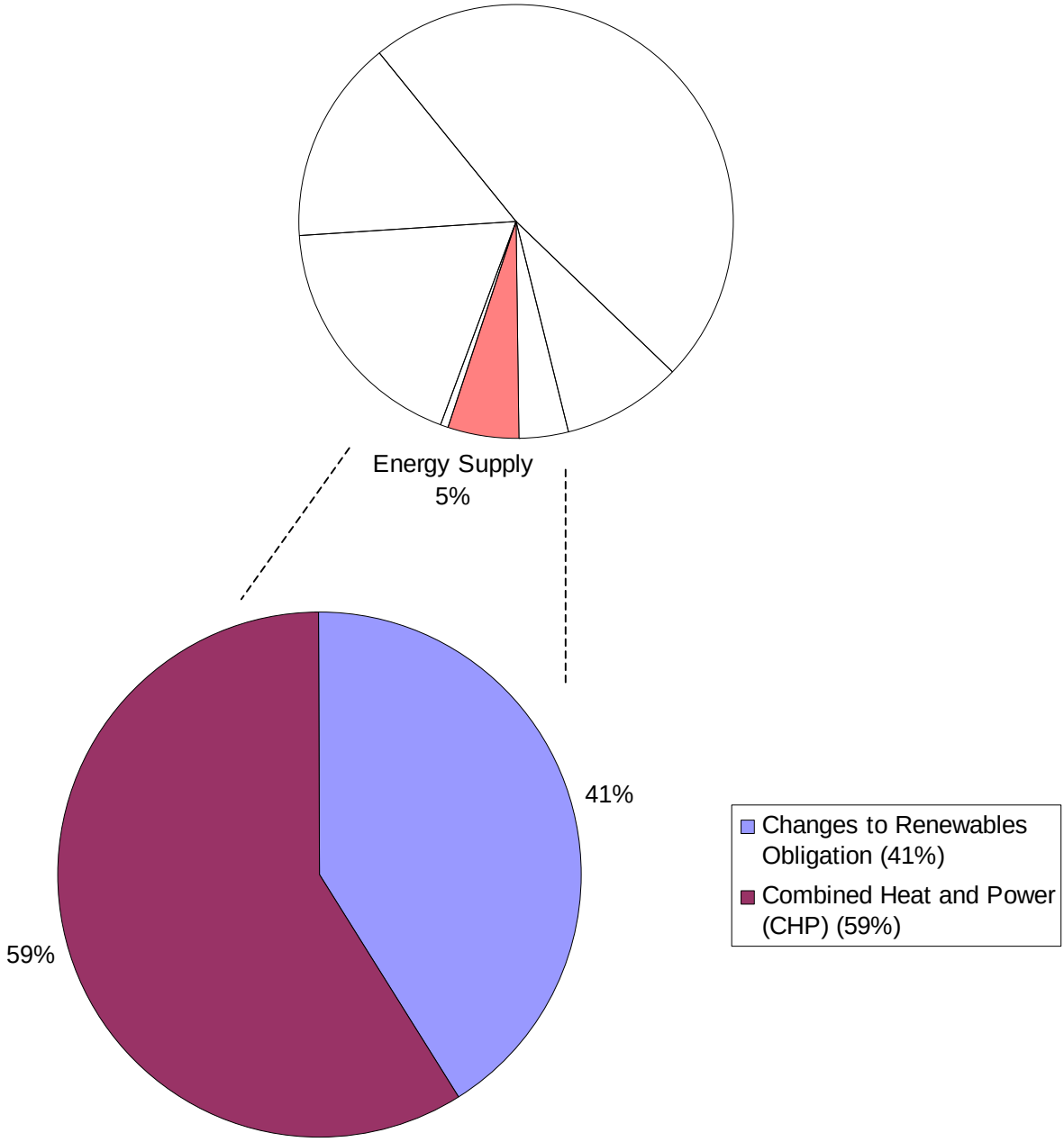


Table 6 CO_2 savings expected by 2020 from existing energy measures

Activity	Average expected savings in Lancashire $ktCO_2$/year
NATIONAL	
Changes to Renewables Obligation	**61**
LANCASHIRE	
Combined Heat & Power (CHP)	**87**
TOTAL EXPECTED SAVINGS	**148 $ktCO_2$/year**

CASE STUDY

Blackpool Promenade Wind Turbines

Blackpool is exploiting its high wind speeds on the Promenade to generate green electricity for the Illuminations and other Council buildings. The Illuminations use nearly a million KWh of electricity and emit around 420 tonnes of CO_2 a year. A third wind turbine was installed in May near the Sandcastle Waterworld to add to the two 6kW turbines outside the Solaris Centre. There is now 36KW of wind turbines generated electricity on the Prom providing 7% of the Illuminations energy requirement. The new Blackpool Enterprise Centre just behind the Prom has two roof mounted wind turbines and plans for more turbines along the front are being discussed.

Adapting to climate change

In addition to action to reduce emissions, preparations for a changed climate will be needed to ensure that infrastructure is resilient. More detail can be found in the adaptation chapter

NATURAL ENVIRONMENT AND LAND USE

Objectives

Make the most of Lancashire's superb environmental assets and ensure that the climate change mitigation and adaptation functions of Lancashire's green infrastructure are maximised to deliver economic, environmental and social benefits.

Support the development of mechanisms to reduce greenhouse gas emissions through the sustainable management of Lancashire's woodlands.

Manage Lancashire's upland and lowland peat lands to sequester carbon and prevent its release.

Identify what the impacts of climate change on biodiversity will be in Lancashire and support the uptake of practical adaptation measures.

Why

Lancashire is a biologically rich and diverse county with nationally and internationally important species, habitats and landscapes, including 2 Areas of Outstanding Natural Beauty. It is very green – almost 90% of the land area is rural undeveloped land. The opportunity exists, through the strategic planning and development of green infrastructure to increase the environmental, social and economic benefits of our green spaces – in urban and rural areas and in using green infrastructure to connect the two. A strategic approach to green infrastructure is necessary to maximise its contribution to climate change as well as the many other benefits it can deliver (such as habitat improvements, opportunities for healthy lifestyles, sustainable transport and enhanced settings for developments and inward investment). Living landscapes will deliver better ecosystem services such as flood protection, aquifer recharge, soil conservation, nutrient recycling and absorption of carbon dioxide.

The natural environment has an important role in reducing climate change by sequestering carbon dioxide. Moorland peat is the single largest biological carbon reserve in the UK, and Lancashire has a significant proportion of the nation's moorland. UK peat stores around 3 billion tonnes of carbon, more than is stored in the forests of Britain and France combined. Conversely, it has been estimated that drying peat releases as much carbon into the atmosphere each year as the entire transportation system of the UK.

During the last two centuries, moorlands have been drained in an attempt to lower the water table, dry the land and make it more productive. This has significantly degraded areas of Lancashire's moorland with serious consequences: reduced capacity to capture and store carbon; moorland fires because of dry conditions; reduced capacity to moderate flooding; loss of biodiversity and a poor countryside access experience. Effective and active

management of areas of peat will be necessary to ensure that it is sequestering rather than releasing carbon.

Effective management of woodland can provide biofuel to heat homes and other buildings. This will need to be balanced with the other benefits of woodland for biodiversity, recreation and carbon sequestration. There will be a need for careful research into the most effective management of our woodland environment. Carbon is also sequestered in soils and care needs to be taken to minimise losses through soil erosion.

Rising temperatures, changing rainfall patterns and other aspects of climate change are starting to have an impact on biodiversity in England and globally. These changes present a threat to biodiversity conservation although there may also be some positive impacts. Because every species responds to climate in its own way, the impacts of climate change are likely to be complex. British wildlife is already showing very clear signs of changing as a result, in respect of lifecycle timing, distribution, community composition and species interactions. There is a need to move to more landscape scale approaches to managing habitats to encourage and enable the movement of species as the climate changes. Changes in the marine environment, and in particular sea level rise, could have a major impact on the county's coastline.

Management of water resources is likely to become more challenging with a changed climate. Drier hotter summers will reduce the availability of water alongside increasing demand for irrigation, conversely more intense winter rainfall will increase the likelihood of flooding. Ensuring that there are high quality water resources, both for human use and for biodiversity will be essential.

Land use, and changes in land use can be responsible for both carbon dioxide emissions and absorption. In Lancashire, emissions from land were 244 $ktCO_2$ in 2005. Much of this has resulted from the drainage of lowland peat for agricultural use, particularly in West Lancashire.[31]

[31] DEFRA 2005 Experimental Statistics on Carbon Dioxide Emissions at Local Authority and Regional Level – Mapping Carbon Emissions and Removals for the Land Use, Land Use Change and Forestry (LULUCF) Sector

Future Savings from Existing Measures (by 2020)

Activities such as tree planting, better moorland management and rewetting of peat bogs will provide savings. Although the savings from this sector are relatively small, the potential for significant releases of carbon from peat means activity is still significant.

<u>Figure 16</u> CO_2savings expected by 2020 from existing natural environment measures

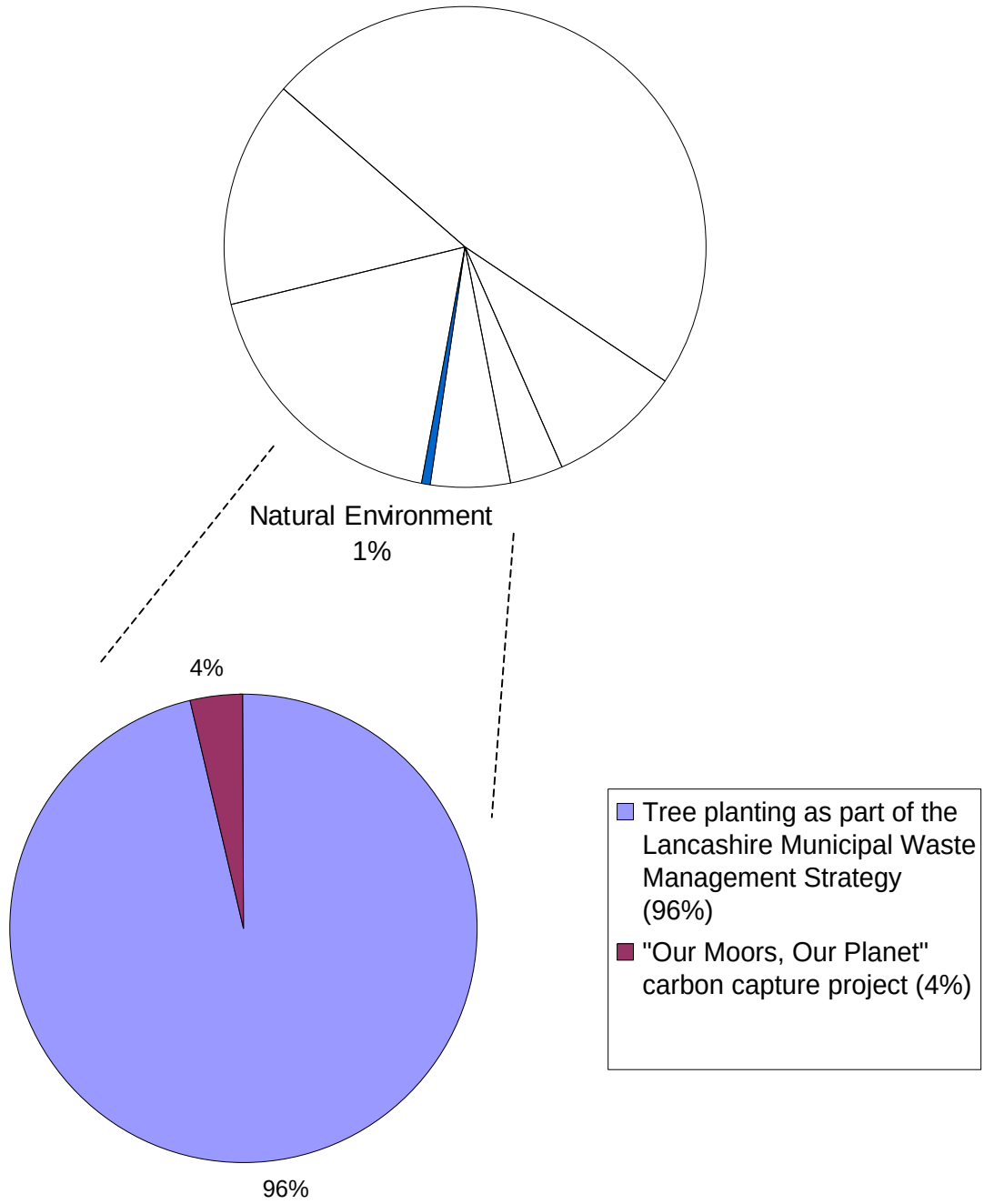


Table 7 CO_2 savings expected by 2020 from existing natural environment measures

Activity	Average expected savings in Lancashire $ktCO_2$/year
LANCASHIRE	
Tree planting as part of Lancashire Municipal Waste Management Strategy	16
Our Moors Our Planet carbon capture project	0.6
TOTAL EXPECTED SAVINGS	**16.6 $ktCO_2$/year**

CASE STUDY

West Pennine Moors Moorland Re-wetting Pilots
The West Pennine Moors Partnership has piloted moorland re-wetting techniques, blocking grips on Darwen Moor during 2007, with further work to be completed in 2008. In addition, United Utilities have carried some limited grip-blocking on Anglezarke Moor in Chorley during 2006. Both pilots, funded by the Environment Agency, have helped project partners to estimate the likely success of this and any future moorland re-wetting work within the West Pennine Moors and other peatlands in Lancashire.

Sustainable Catchment Management Programme
The Sustainable Catchment Management Programme (SCaMP), which has been developed by United Utilities in association with the RSPB, aims to apply an integrated approach to catchment management within two key areas of the company's land: Forest of Bowland in Lancashire and the Peak District in Derbyshire. As part of this programme, 30km of moorland grips have been blocked helping to restore and re-wet large areas of moorland. United Utilities are seeking to extend this approach to areas within their Central Catchment (including much of the West Pennine Moors and South Pennines of Lancashire).

Opportunities for Additional Savings

Extending the Our Moors Our Planet scheme could sequester an additional 8 $KtCO_2$/year and increased tree planting could sequester an additional 188 $ktCO_2$/year[32]. Lack of effective management of peat will result in carbon emissions.

Adapting to Climate Change

In addition to action to reduce emissions, preparations for a changed climate will be needed. Some of the county's biodiversity and landscapes (particularly coastal and upland areas) will be vulnerable to changes in climate. The

[32] Assessment of Potential Carbon Savings Achievable in the North West Region by 2020, prepared for 4NW by URS Corporation Ltd, 28 November 2008. See Appendix Two for further details.

natural environment will also provide a key resource for increasing our resilience to more extreme weather. Activities such as increased tree planting in urban areas will help moderate temperature extremes. Further information is provided in the adaptation chapter.

ADAPTING TO CLIMATE CHANGE

Objectives

Reduce the risks to people, public health and public services associated with climate change and extreme weather events.

Ensure development and critical infrastructure is resilient to flooding and other climate change impacts and the risk of these impacts are managed effectively.

Reduce the vulnerability of business and agriculture to climate risks and ensure they have the ability to respond in a timely manner.

Realise the economic development opportunities associated with developing adaptation capacity in Lancashire.

Support practical measures to allow Lancashire's biodiversity to adapt to climate impacts.

Inform public about what climate change will mean, and how to adapt to a changed climate.

Why

There are significant time delays in how the climate responds to changes in carbon dioxide emissions. The UK Climate Impacts Programme (UKCIP) scenarios detailed earlier in this study demonstrate that changes over the next few years are inevitable. Recent years have seen increased awareness of the vulnerability of the people and infrastructure of the county to extreme weather events including flooding, drought and heatwaves. It is therefore important that we prepare for the expected changes.

Existing Activity

Many organisations are already assessing the risks that extreme weather events will pose to their operations. There is an increasing amount of national guidance for this activity, and in July 2008 the Government published "Adapting to Climate Change in England: a framework for action". There is technical support from UKCIP, who is due to release their updated climate predictions in spring 2009.

The Lancashire Resilience Forum is responsible, under the Civil Contingencies Act 2004, for preparing the community risk register. The Forum includes the emergency services, local authorities and the Environment Agency. Weather related risks identified include forest or moorland fires, drought, flooding (tidal, fluvial and flash), storms, heatwaves and low temperatures and heavy snow. Of these only one (low temperatures and heavy snow) is not predicted to become more likely as climate changes. These plans are crucial to respond to impacts, although there will also be a need to build resilience to these. This may include drains with larger capacities, increased shading of urban areas for cooling in hot weather and changes to increase the wind resistance of roof tiles.

Planning to adapt to climate change has been identified as one of the priorities in the Lancashire Local Area Agreement. Work is ongoing to ensure that all organisations have begun to prepare for the risks of climate change. The first step is to ensure that the vulnerabilities to the current climate and weather extremes are monitored and assessed through the use of local studies such as LCLIPs (Local Climate Impact Profiles). Lancashire County Council has undertaken an initial LCLIP study and has plans in place to develop this work with particular vulnerable services. There is also work underway to test the LCLIP process with district services in a pilot project with Chorley. The information obtained through this will then be used to support work in assessing future risks associated with climate change through the use of the UKCP Climate Change Scenarios in 2009. Lancashire is also developing a toolkit to support services in the process of identifying, assessing and implementing appropriate adaptation actions in response to risks identified. Once completed, this approach would be rolled out to all partners as required. The initial aim is a comprehensive, prioritised risk assessment for local services by 2011.

The Environment Agency is working on the development of Catchment Flood Management Plans for the rivers within the county. All plans for Lancashire were signed-off in October 2008. Shoreline management plans are the equivalent plans for coastal flooding through the county. These plans are also currently under review/development.

CASE STUDY

The Emergency Response Implications of Climate Change on Lancashire Fire and Rescue Service

A changing climate will have major implications for the emergency services. Hotter, drier summers increase the likelihood of grass and moorland fires. Lancashire Fire and Rescue service have completed a study of the potential impacts of climate change on their activities.

CASE STUDY

Cleveleys Coastal Defence Improvement and Promenade Enhancement Scheme

This scheme aims to protect the people of Cleveleys from coastal flooding whilst enhancing and sustaining a vibrant seaside resort.

Key benefits are

- Over 8,700 properties and 219 industrial units protected to a 1 in 200 year standard
- A promenade experience to provide intrigue, education and participation.
- 150 jobs created during the construction phase
- A key part of the regeneration and sustainability of Cleveleys

The scheme has been developed by Wyre Borough Council with funding from the Northwest Development Agency, the Environment Agency and the Department for Environment, Food and Rural Affairs.

CASE STUDY

White Moss Business Park Sustainable Urban Drainage System, West Lancashire
Surface water run off from the business park and future developments in the area is managed by initially flowing into a reed bed which then discharges to a linear network of pools. This helps mitigate the risk of surface water flooding.

Opportunities for Additional Activity

UKCP scenarios will help us get a better understanding of the predicted climate of the county in future years. Reviewing this understanding, and sharing the results with a wide audience will be a priority.

At present much of the activity to prepare for climate change is being undertaken by public sector organisations and utility companies. There will be an increasing need for individual households and businesses to also prepare. This will require good communications about the likely impacts, including promotion of the Environment Agency's flood warning systems. In addition water conservation measures will help ensure resilience to drought.

Contribution to Targets

This theme will enable us to prepare for the effects of a changed climate on the county.

AWARENESS RAISING, EDUCATION AND PLANNING

To ensure that we achieve our targets, partners will need to use a range of tools. Many of these will support the implementation of measures described in the themed chapters, and so will not necessarily bring additional reductions in emissions that can be allocated to them. However, the predicted reductions probably will not happen without the support from the activities in this section.

Awareness Raising and Education

Objectives

Support the people of Lancashire to make informed choices about climate friendly behaviour.

Support Lancashire Businesses to make informed choices about climate friendly behaviour.

Develop programmes to help pupils and teachers explore and understand climate change.

Encourage strong community participation in climate solutions.

Why

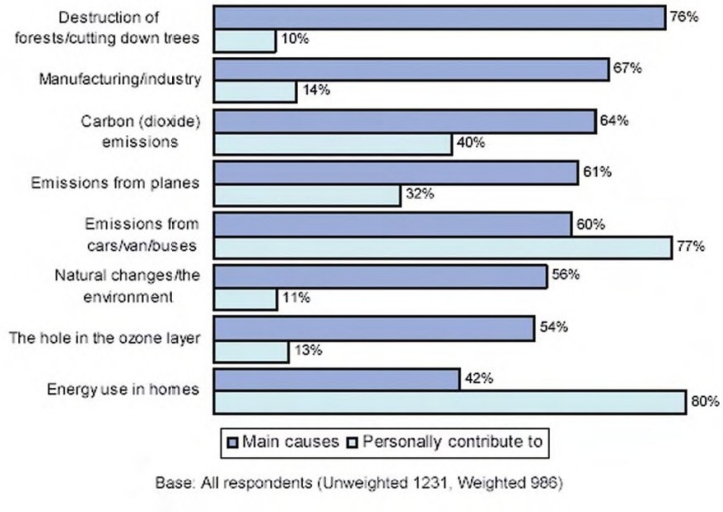
Climate Change will affect everyone in Lancashire, and is affected by everyone's actions. Clear communication to all groups will be essential to maximise the impact of other actions.

As detailed in figure 17, the results of a *Life in Lancashire* survey in May 2007 demonstrate a clear willingness on the part of the public to support actions to tackle climate change. However, there was less understanding of which actions will have the biggest impact on climate change. This situation is similar to national and regional surveys. In particular, there are many more people who suggested that air travel was a major source of emissions than home energy use. Although emissions from air travel are rising rapidly, they account for a much smaller proportion of emissions than energy use in the home.

An additional barrier to changing behaviour is the limited impact of individual action on a global problem. One of the best ways to overcome this is to encourage groups of people to take action, and to publicise this.

Figure 17 Life in Lancashire W18 – The Environment and Climate Change, 2007

Specifically what do you think are the main causes of climate change? Which of the following do you think you personally contribute to?



Existing Measures

There are a wide range of projects and activities across the county which are encouraging action on climate change. These include education programmes in schools, displays about low energy light bulbs in libraries and other information centres, stalls at a wide variety of events and small grants for community projects to tackle climate change. Several of these projects are targeting changes in behaviour by groups rather than individuals which should help to overcome some of the barriers to change.

CASE STUDY

Gulu Carbon Compensation Scheme

Climate change has big impacts on communities in the developing world, despite their very low emissions. Building on a long term relationship with Gulu in Northern Uganda the Carbon Compensation scheme will enable Lancashire businesses, organisations and residents to contribute to projects in Gulu which allow increased adaptation to the threat of climate change. The initial phase of the project is supported by Lancashire County Council. Projects include:

- Community integrated wetland conservation and management
- Biodiesel demonstration
- Smallholder timber plantations
- Bee keeping
- Agro-forestry and organic farming
- Integrated solid waste management

More information is available at www.lancashire.gov.uk/climatechange

CASE STUDY

GreenSpace Fund
The GreenSpace fund is a framework for attracting private sector finance into parks, open spaces and countryside areas. The charitable fund has been developed by Preston City Council, Lancashire County Council, KPMG and national parks charity GreenSpace.

The aim of the fund is to attract private finance through the corporate, social responsibility agenda to fund improvement projects such as tree planting, wildflower meadow creation and various energy related projects. Companies will be able to fund climate change adaptation projects locally as well as carbon compensation projects. While the GreenSpace Fund is not a carbon off-setting scheme, it will allow companies who generate emissions locally to compensate locally.

The national scheme, which will also enable companies to fund general improvement projects such as play areas etc, is being piloted in Preston with a view to expanding the fund across Lancashire before being launched nationally.

CASE STUDY

Energy Saving Trust Advice Centre
The Lancashire and Cumbria Energy Saving Trust Advice Centre offers free and impartial advice on all aspects of energy efficiency. They attend a wide range of events around the county. To find out if you are eligible for a grant to help you become more energy efficient and save you money on your fuel bills call today on freephone, 0800 512012.

Opportunities for Additional Activity

The wide range of activity does not cover all areas of the county and all target audiences. Climate change is complex, and there are many individual actions which will have a role in tackling it. Identifying the priorities for individual action is not easy and the volume of information and advice, both from local and national sources can be overwhelming. A clear and consistent strategy from local groups would enable limited resources for this work to be prioritised. A sub-group of the partnership has been established to coordinate this and a communications plan is being developed.

Spatial Planning

Objectives

Position new development to minimise the need to travel.

Promote sustainable building design and construction, including new development resilient to a changing climate.

Provide a positive planning framework for renewable energy.

Why

The planning system in the UK is a powerful tool in limiting and adapting to climate change, influencing patterns of behaviour and directing development and the use of land.

National priorities are set out in *Planning Policy Statement 1: Delivering Sustainable Development* which contains policies to reduce energy use, reduce emissions and promote the development of renewable energy resources. It also underlines a fundamental principal of sustainable development of concentrating development within the main urban areas. This reduces the need to travel and encourages the most efficient use of resources. Other requirements include development plans taking climate change impacts into account in the location and design of development (i.e. consideration of flood risk) and to promoting water efficiency and the use of sustainable drainage systems.

Key regional priorities for this are set out in the Regional Spatial Strategy, which then influences the Local Development Frameworks in each part of the county.

The RSS for the Northwest states that reducing emissions and adapting to climate change is an urgent regional priority and sets out a number of policies to address the issue. Its seeks to increase energy efficiency through the implementation of the Code for Sustainable Homes for residential schemes and by encouraging the development of similar standards for other forms of development such as employment and retail uses. In terms of energy production it sets sub-regional targets for a broad range of renewable energy. These are discussed in more detail in the Energy Supply chapter. It also encourages decentralised and on-site renewable energy as part of new development through the use of policies similar to those developed by the London Borough of Merton. This requires a minimum percentage of the final energy use of the buildings to be generated on site.

CASE STUDY

Chorley Council – Sustainable Resources DPD

Since September 2008 Chorley Council has been implementing strict planning controls to reduce carbon emissions and ensure developments are able to withstand climate change.

Developers for new build need to demonstrate the energy efficiency of their designs, that they have taken into account the topography, that the proposal would be able to withstand climate change, that the development would reduce carbon emissions by 10% over existing standards through the use of

low carbon technologies, that provision is made for recycling and that water is managed to reduce surface water and the use of treated water is minimised. In sum new buildings have challenging targets to ensure that residents and businesses will benefit from future proofed developments and at the same time Chorley's emissions are reduced.

Objections were raised by some developers but after two days rigorous debate at a public examination the plan was found to be "sound" by an Independent Planning Inspector. Chorley Council considers that reducing carbon emissions is a priority and makes economic sense. This is also reflected in the fact that Chorley Council and its Strategic Partnership both have their own Climate Change Strategies.

GLOSSARY, ABBREVIATIONS AND FURTHER INFORMATION

4NW	Formerly the NorthWest Regional Assembly (NWRA). The Regional Leaders Forum, has responsibility for housing, planning, transport and economic development www.4NW.org.uk
BERR	Department for Business Enterprise and Regulatory Reform (formerly DTI). www.berr.gov.uk
CAA	Comprehensive Area Assessment An independent assessment of the prospects for local areas and the quality of life for people living there.
CCC	Climate Change Committee An independent body established under the Climate Change Act to advise the Government on setting carbon budgets, and to report to Parliament on the progress made in reducing greenhouse gas emissions. www.theccc.org.uk/
CERT	Carbon Emissions Reduction Target An obligation on energy suppliers to achieve targets for promoting reductions in carbon emissions in the household sector. www.defra.gov.uk/environment/climatechange/uk/household/supplier/cert.htm
CHP	Combined Heat and Power
CRC	Carbon Reduction Commitment A mandatory emissions trading scheme, targeting emissions currently not included in the EU ETS or Climate Change Agreements from the service sector, public sector and other less energy-intensive industries. www.defra.gov.uk/environment/climatechange/uk/business/crc/index.htm
CO_2	Carbon Dioxide
CSH	Code for Sustainable Homes Measures the sustainability of a new home against nine categories of sustainable design. www.communities.gov.uk/planningandbuilding/buildingregulations/legislation/englandwales/codesustainable/
DEFRA	Department for Environment Food and Rural Affairs www.defra.gov.uk
DfT	Department for Transport www.dft.gov.uk
EPBD	Energy Performance of Buildings Directive An EU directive requiring the production of A-G rated energy certificates for all buildings when they are bought, sold, built or rented and displayed in all large public buildings

	www.communities.gov.uk/planningandbuilding/theenvironment/energyperformance/
EST	Energy Saving Trust www.energysavingtrust.org.uk
ESTAC	Energy Saving Trust Advice Centre
EU ETS	The EU Emissions Trading Scheme (EU ETS) is a Europe wide scheme which puts a price on carbon that businesses use and creates a market for carbon. It has been in place since 2005 and is the first scheme of its kind in the world. Large industrial users are covered by the scheme http://www.defra.gov.uk/environment/climatechange/trading/eu/index.htm
Energy White Paper	Sets out the Government's international and domestic energy strategy. www.berr.gov.uk/whatwedo/energy/whitepaper/page39534.html
Fuel Poverty	A household is said to be in fuel poverty if it needs to spend more than 10% of its income on fuel to maintain a satisfactory heating regime (usually 21 degrees for the main living area, and 18 degrees for other occupied rooms). www.berr.gov.uk/whatwedo/energy/fuel%2Dpoverty/
GHG	Greenhouse Gas Some of the energy from the sun is trapped inside our atmosphere as it is reflected back from the earth towards space. This natural process is called the greenhouse effect. The gases which make this happen are known as greenhouse gases. The most important greenhouse gases are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. These are the gases that are covered by the Kyoto Protocol.
Green Infrastructure	"…Green Infrastructure is the region's life support system – the network of natural environmental components and green and blue spaces that lies within and between the North West's cities, towns and villages which provides multiple social, economic and environmental benefits…" *Definition taken from the North West Green Infrastructure Guide*
IPCC	Intergovernmental Panel on Climate Change – Established in 1988 to assess the scientific and technical aspects of climate change. http://www.ipcc.ch
$KtCO_2/Yr$	Kilotonnes of carbon dioxide per year *1 Kilotonne = 1000 tonnes*
Kyoto Protocol	The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997. The international agreement sets binding targets for 37 industrialised countries and the European community for reducing greenhouse gas (GHG) emissions
LAA	Local Area Agreement Sets out the priorities for a local area agreed between central government and a local area www.communities.gov.uk/localgovernment/performanceframeworkpartnerships/localareaagreements/
LDF	Local Development Framework

LSP	Local Strategic Partnership
LTP	Local Transport Plan
LULUCF	land use, land use change and forestry
Lancashire Economic Strategy	Provides a context and framework within which the future development and strengthening of all aspects of the economy of Lancashire will sit. www.lancashire-ep.org.uk/html/strategic_activity/les.php
Lancashire Waste Strategy	The Municipal Waste Management Strategy for Lancashire - *A Greener Strategy for a Greener Future* currently being reviewed to take account of progress and developments that have been made since the strategy was first written www.lancashire.gov.uk/environment/lmwlp/waste/intro.asp
Microgeneration	A diverse set of technologies that have the potential to supply low carbon energy at the point of demand.
Micro wind	Small wind turbines used near the point of demand
$MtCO_2/Yr$	Million tonnes of carbon dioxide per year
NWDA	North West Development Agency Responsible for stimulating the economic growth and regeneration of England's Northwest. www.nwda.gov.uk
NWEI	North West Emissions Inventory
NWOP	Northwest Operational Programme
Northwest Climate Change & Energy Action Plan	Rising to the Challenge, A Climate Change Action Plan for England's Northwest 2007-09, NWDA, November 2006 www.climatechangenorthwest.co.uk/climate-change-action-plan.html
Northwest Regional Economic Strategy	The blueprint for the economic development of England's Northwest www.nwda.co.uk/what-we-do/policy-and-strategy/regional-economic-strategy.aspx
North West Sustainable Energy Strategy	Published by the NWRA in 2006 to reduce the region's energy wastage, improve efficiency, cut greenhouse gas emissions and facilitate the transition to more sustainable forms of energy. www.climatechangenorthwest.co.uk/assets/_files/documents /jun_07/cli__1181140886_North_West_Sustainable_Energy_.pdf
PV	Photo Voltaic cells generate electricity directly from sunlight
RTFO	Renewable Fuel Transport Obligation Requires transport fuel suppliers to ensure that a percentage of their sales in the UK were from a renewable source
Renewables Obligation	Requires licensed electricity suppliers to source a specific and annually increasing percentage of the electricity they supply from renewable sources. The current level is 9.1% for 2008/09 rising to 15.4% by 2015/16.
RSS	Regional Spatial Strategy Sets out planning and transport policy for a region for a 15-20 year

	period. http://www.gos.gov.uk/gonw/Planning/RegionalPlanning/?a=42496
Solar Water Heating	Solar water heating panels use sunlight to heat water, unlike PV which generates electricity
UKCP09	UK Climate Projections 2009 The next package of climate change scenarios for the UK, UKCP09 for short.
UKCIP	UK Climate Impacts Programme http://www.ukcip.org.uk/
UNFCCC	United Nations Framework Convention on Climate Change - The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. http://unfccc.int/2860.php

APPENDIX ONE

The Lancashire Climate Change Partnership:

Blackburn Diocese
Blackburn with Darwen Borough Council
Blackburn Local Strategic Partnership
Blackpool Council
Blackpool Local Strategic Partnership
Burnley Borough Council
Burnley Action Partnership
Businesslink
Central Lancashire PCT
Chorley Council
Chorley Partnership
East Lancashire Chamber of Commerce
East Lancashire PCT
Environment Agency
FLoWE
Forestry Commission
Fylde Borough Council
Fylde Local Strategic Partnership
Groundwork Pennine Lancashire
Hyndburn Borough Council
Hyndburn Local Strategic Partnership
Lancashire Community Futures
Lancashire Constabulary
Lancashire County Council
Lancashire County Developments Ltd
Lancashire Economic Partnership
Lancashire Energy Efficiency Advice Centre
Lancashire Fire and Rescue Service
Lancashire Youth Council
Lancaster City Council
Lancaster Local Strategic Partnership
Met Office NW Regional Advisor
National Energy Action
Natural England
North West Energy Forum
NWDA
Pendle Borough Council
Pendle Local Strategic Partnership
Preston City Council
Preston Strategic Partnership
Prospects Foundation
Ribble Valley Borough Council
Ribble Valley Local Strategic Partnership
Rossendale Borough Council
Rossendale Local Strategic Partnership
South Ribble Borough Council
South Ribble Local Strategic Partnership

The Wildlife Trust for Lancashire, Manchester & N. Merseyside
United Utilities
West Lancashire District Council
West Lancashire Local Strategic Partnership
Wyre Borough Council
Wyre Strategic Partnership

APPENDIX TWO

Assessment of Potential Carbon Dioxide Savings Achievable in the North West Region by 2020

Background to the study
The North West Regional Assembly commissioned URS Corporation Ltd (URS) to undertake a study to assess the range of potential carbon savings that could be achieved by the North West and its five sub-regions by 2020 through existing measures, and identify a framework for further action. The study focuses on CO_2 emissions only, in accordance with the current definition of the UK reduction target (in the Climate Change Bill) and only on direct CO_2 emissions within the region (i.e. emissions produced within the geographical boundaries of the region).

The study covers CO_2 emissions from the four key sectors in line with the breakdown used in the DEFRA regional inventory.

The key stages of the Study were:
- Assessing potential carbon savings from international and national policies
- Assessing potential carbon savings from existing regional and sub-regional measures
- Identifying possible ways of achieving additional carbon savings

The results of the study have been used to inform this Strategy, in terms of identifying what carbon savings are needed to achieve the 2020 targets, the savings we can expect to achieve from existing national and local measures, what the gap is, and where the best opportunities for further savings are.

Further details are available from:
www.climatechangenorthwest.co.uk/assessment-of-potential-carbon-savings.html

Emissions projections for 2020 have been taken from the North West Greenhouse Gas Emissions Inventory, June 2008. Projections have been taken under a 'business as usual" scenario based on extrapolation of current data and trends, including typically measures of economic activity, traffic growth and changes in population.

APPENDIX THREE

Climate Change Challenges for the Lancashire Economy

As climate change becomes increasingly central to UK policy-making decisions, the need for economic development to be achieved in an environmentally sustainable way becomes even more critical. In particular, economic development programmes must be designed in such a way that they do not increase the pressure on the environment or increase GHG emissions. Likewise, it is crucial that the trajectory of the sub-region's plans for economic development does not place it at greater vulnerability to the impacts of climate change in future.

Mitigation

Some of Lancashire's economic programmes, as outlined in the Lancashire Economic Strategy, are potentially in conflict with the overarching climate change objectives for the sub-region. Others are more closely aligned with clear synergies. Some will present business opportunities that could help the economic development of the sub-region. The table below indicates the level of conflict or synergy between Lancashire's economic programmes and climate change objectives.

Key
- Obvious conflicts
- Some reason for concern
- Clear synergies
- No overlap

Objectives from the Climate Change Strategy

Economic Programmes	Domestic Energy Eff.	Transport	Spatial Planning and Energy Generation	Economic Development and Business	Natural Environment	Waste	Coping with CC (Adapting)	Awareness Raising and Education
Commercial Developments (some include housing & leisure)								
Housing Developments								
Transportation Projects								
Advanced Manufacturing								
Tourism & Leisure								
Skills & Education								
Quality of Place								

In relation to **commercial development** there is potential conflict in several areas; in particular increasing emissions may result from developments and their additional energy consumption. However, several of the commercial development projects are designed in such a way as to maintain the green space in the developments and encourage the use of green spaces in urban areas.

Many of Lancashire's planned **housing developments** do very well overall at addressing home-work commute, which will reduce transport emissions. In some, there is potential that planned housing developments (both new build and refurbishments) do not address domestic energy efficiency issues or the need to adapt to climate change. In others, developments are designed in such a way as to preserve and encourage the use of green space.

Some **transport** projects, specifically the expansion of the Blackpool Airport, are definitely in conflict with several of the climate change objectives. Projects such as this are likely to increase GHG emissions and discourage the use of public transportation. However, there are also a number of transport projects that are broadly in agreement with climate change objectives and work to improve public transportation links, reduce journey to work time, and reduce emissions from the transport sector.

The **Aerospace and other advanced manufacturing** sector generally performs well at working with climate change objectives, addressing waste issues, and reducing resource and energy consumption. Although manufacturing is usually an energy-intensive sector, the general trends in Lancashire are toward more high-quality manufacturing which relies on less water and energy consumption.

Tourism developments and facilities need careful consideration because there is a dual issue of how tourist facilities are designed and how they are used. There is potential for increased energy consumption in the actual buildings and facilities used by visitors; in addition, visitor behaviour is often not environmentally-friendly which can result in increased waste generation and energy consumption. Several planned developments are, however, addressing preserving green space and making the most of Lancashire's green infrastructure.

Skills & Education can be an important part of the solution and should be used to raise awareness of climate change issues and develop the environmental education of the population of Lancashire.

Projects that fall into the **Quality of Place** category do well at addressing climate change objectives. However, there are still areas where more could be done to address waste issues, energy consumption of buildings, and raise awareness of climate change issues.

Adaptation

In relation to climate change impacts some of Lancashire's economic programmes are at risk. Although the climate is changing already, many of the impacts of the economic programmes in Lancashire will not be felt for a number of decades. The table below summarises the level of impact likely to be felt by each economic programme against a series of likely climate change impacts.

Key		
		Climate change has negative impact on project, or project increases climate change risk / vulnerability
		Climate change impacts are possible but uncertain or unknown
		Climate change has positive impact on project, or project reduces climate change risk / vulnerability
		No impact / no overlap

Impacts of climate change

	Hotter, Drier summers	More frequent, more intense summer heatwaves	Warmer winters	Wetter winters	Increased risk of flooding	Sea level rise, and increased coastal risk from storm surges	Water: increased risk of supply and quality problems	Behaviour change towards more outdoor lifestyles
Economic Programmes								
Commercial Developments (some include housing & leisure)								
Housing Developments								
Transportation Projects								
Advanced Manufacturing								
Tourism & Leisure								
Skills & Education								
Quality of Place								

The main risks for **commercial and housing developments** centre around impacts on the location and fabric of the building and the services (water, energy) that they require. Developments located on or near flood plains or in the coastal zone face potential for increased flood risk in future. Developments in town centres and away from flood plains are also liable to flooding connected to intense rainfall, flash flooding and surface run-off as drainage capacity is exceeded. It will become increasingly difficult to maintain comfortable internal temperatures (for working, for living, for industrial processes, e.g.). Wetter winters and more extreme weather could place strain on building structures and drainage systems.

Rapid expansion of development could place additional strain on water supplies during prolonged dry periods and droughts: water efficiency measures will be needed. If climate change leads to a tendency towards more outdoor lifestyles, commercial and leisure developments may need to take this into account including outdoor and green spaces in their design.

Benefits from climate change relate to the potential for reduced winter heating bills as winters are warmer, and for reduced levels of disruption, damage and maintenance related to cold-weather (frosts and snow).

In the **transport** sector the greatest risks are related to disruption and damage resulting from flooding and hot weather. Where transport projects are located close to the sea, potential impacts relating to sea-level rise will need to be considered. Warmer winters are likely to mean a reduction in the number of frost days, and therefore potential to reduce the costs of cold-weather maintenance on transport systems and networks.

There are knock-on implications of these risks for other sectors since much of the sub-region's economy is dependent upon transport, either in supply chains or for customers.

High risks from climate change in the **advanced manufacturing sector** are associated with premises and with requirements for water supply. It will become increasingly difficult to maintain correct working temperatures for staff and manufacturing processes, and the cost of cooling systems may increase. Where large volumes of water are required in manufacturing processes, there may be risks during prolonged dry spells and drought – e.g. restrictions on industrial uses. Depending upon the location of premises and plants, increased flood risk and/or sea level rise may be a consideration. Impacts on transport systems could affect supply chains, and where programmes depend upon imported components or products, climate impacts elsewhere around the world could be significant.

The **tourism and leisure** sector potentially have the most to gain from climate change, with hotter drier summers, and the possibility of behaviour change towards outdoor lifestyles leading to new business opportunities. Lancashire has particular attraction for visitors and leisure consumers looking for the combination of city and outdoor space, and this attraction should grow as the UK as a whole looks to build tourism trade alongside climate change.

However, significant risks are linked to possible increases in water availability and quality problems, and given the location of many of these programmes along the coast or in flood plains, risks of flooding and coastal impacts are important. Knock-on effects of climate change to the transport sector and to buildings and development generally are likely.

Quality of Place programmes may face risks related to increased flooding (depending on location), and where programmes are particularly focused on blue spaces, water quality and availability (particularly during hot dry summers) needs to be considered. These programmes may benefit if climate change leads to more outdoor lifestyles.

The delivery of **Skills and Education** programmes will not be affected by climate change (though it could be vulnerable to weather-related disruption). However, because these programmes are looking to build the skills and knowledge base that will benefit the sub-region's economy in the long term, they are an important route to address adaptation capacity building that could prove key to minimising risks and taking advantage of opportunities identified across the economy, in the sectors above. In other words, aspects of these programmes could provide solutions to many of the potential problems that climate change will bring.

Where programmes in this category are also making long-term infrastructure investments (e.g. in the building of new research or education establishments) many of the key risks identified above would apply (to buildings, transport links, etc).

Future-proofing Lancashire's economy

The Lancashire economy is investing in programmes with long-term implications for the sub-region, whether this is through construction of new infrastructure, development of new products and markets, or building up skills in the next generation. This means that while the programmes themselves are delivered in the short term they leave lasting legacies that will exist in a climate changed world. New economic programmes and activity need to assess the future climate that they will operate in and plan accordingly:

- ***build in adaptation measures at the design stage*** when it is cheaper than retrofitting them later on - many adaptation measures bring immediate benefits in building resilience to current climate conditions.

- ***develop options to review and address flood risk***. Other options that may need to be considered are contingency planning, insurance, strengthening flood defences, or even relocation away from sites that are facing unacceptable levels of flood risk.

- ***promote and demonstrate sustainable building techniques*** that will enhance their green credentials and protect them from future climate impacts. Aspects to consider include drainage and flood resilience, temperature control, and resilience to extreme weather.

- ***capitalise on the growing demand for cooling and ventilation techniques*** - there is a potential market opportunity to link the adaptation and mitigation agendas in the production of energy efficient or passive ventilation cooling products.

- supply chain management in the transport sector represents an opportunity to **consider more local sourcing of components and resources in order to reduce risks of disruption**. Additionally transport plans should start to include contingency for extreme weather events, and offer improved links and a range of transport modes. Business continuity plans should take account of the potential for extreme weather disruption to ensure the minimum economic losses under these scenarios.

- **Strengthening research** on climate impacts and adaptation, particularly as they apply to the sub-region, **and enhance opportunities for training** in the kinds of skills that may be needed to address the impacts of climate change. Improved workforce training and awareness can foster innovation and build motivation to improve productivity.

Source: LEP, (Draft) Climate Proofing Study of the Lancashire Economic Strategy, November 2008.