

## Chapter 7

# Climate Change and Low Carbon Economy

- 7.1 Previous chapters in this assessment have predominantly focused on the performance of Derby's economy using a variety of measurable data. Strong economic growth is the ambition of most localities throughout the world, with headline figures such as GVA given the greatest acknowledgement. Most of the world's economies are based around oil – a non renewable and unsustainable source of energy – and Derby's is no different.
- 7.2 This chapter considers key environmental issues and their impact on the economy before considering the opportunities arising from the green economy.

### Climate Change

- 7.3 The scientific evidence is now overwhelming: climate change, driven by greenhouse gases, presents very serious global risks and it demands an urgent global response. If we continue as usual average global temperatures will rise by 2-3 degrees Celsius within the next 50 years or so with devastating results.
- 7.4 If we fail to act in the next decade it will have catastrophic economic and social consequences, including water shortages, lower agricultural productivity, rising sea levels and more frequent and intense extreme weather events. The UK will face particular challenges, most recently described in the 2009 UK Climate Change Projections. This found that extreme weather events will become more common in the UK, that UK sea levels are expected to rise, and that average UK summer temperature is likely to rise by 2.7 degrees Celsius by the 2040s.
- 7.5 As a result of the threat of climate change the Government has committed itself to a range of emission reduction targets including the following:
- To reduce CO<sub>2</sub> emissions, from 1990 levels by 34% by 2020 and by 80% by 2050
  - To produce 15% of our energy needs by 2020 from renewable energy sources
  - Zero carbon buildings – proposal that all new residential buildings are required to be zero carbon by 2016 and non-residential buildings by 2019.

## Challenges for Derby

7.6 The Cleaner Greener Energy Study, published in January 2010, considered ways to reduce the carbon footprint of Derby and the wider HMA. The study identifies industrial groupings and their environmental impact as follows:

- **Industrial Facilities – factories and workshops** – predominantly not conventional factories but high technology workshops, light manufacturing sites, and research laboratories. Their energy consumption is much higher than that of office space due to use of energy intensive appliances and machinery, such as for manufacturing of airplane wings, chemically engineering new pharmaceutical products and drugs.
- **Retail** – also includes wholesale. Large energy consumption for lighting but comparatively low heating requirements.
- **Offices** – variety of office space, open plan, closed plan, naturally ventilated (through windows), mechanically ventilated. Increasingly new office space has air conditioning which can increase electricity consumption considerably.
- **Storage / Warehouses** – companies with large inventory of physical goods and products will need storage space. These are large sheltered areas with energy requirements for lighting and heating.

7.7 A variety of carbon abatement measures are applicable to the business sector. Some are concerned with the building (with little regard to the activities inside), such as efficient boilers and insulation, whilst others are targeted at occupants (with the building being irrelevant) such as efficient equipment.

7.8 The study considers 'carbon management' opportunities for businesses and suggests five interventions that local authorities may use to assist the business community in reducing their environmental impact:

1. Advice provision and campaigns
2. Funding support – grants / loans / subsidies
3. Business partnerships / forums
4. Delivery programmes
5. Establishing special purpose vehicles

7.9 Actions are underway in Derby to reduce carbon emissions. One example is an Energy Efficiency Grant Scheme for Small Businesses, which provides up to £5,000 to local businesses to contribute to emissions reduction measures.

## NI 186 - Per Capita CO<sub>2</sub> reduction in LA Area

7.10 National Indicator 186 measures per capita percentage reduction in carbon dioxide emissions in the Local Authority area using the per capita CO<sub>2</sub> emissions from the 2005 as the baseline year. The performance measure includes the following:

- **Domestic Housing:** All housing in the local authority area, including Arms Length Management Organisation (ALMOs), privately owned and leased housing
- **Business:** Industry and commercial emissions, including public sector, but not those included in the EU Emissions trading scheme (i.e. heavy industries such as iron/steel production and electricity generation)
- **Road Traffic:** All road traffic, (but excluding motorways)

7.11 In 2005, Derby had a baseline of 1,585kt CO<sub>2</sub>. This translates to 7.1t CO<sub>2</sub> per capita.

7.12 The LAA target for Derby is to have total emissions of 1,469kt CO<sub>2</sub> in 2010/11. This translates to 6.4t CO<sub>2</sub> per capita and is a total reduction of 9.4% over three years. The target is to be met by the sectors as follows: Business (43%), Domestic (33%), Transport (24%).

7.13 Performance figures are collated by DEFRA and have a two year time lag. Between 2005 and 2007 Derby reduced its CO<sub>2</sub> per capita by 0.6 tonnes.

Table 7.1 CO<sub>2</sub> Emissions Estimates for 2005-2008

	Year	Per capita - Industry and Commercial	Per capita - Domestic	Per capita - Road Transport	Per capita (kt CO <sub>2</sub> ) - Total
Derby	2005	3.3	2.3	1.8	7.4
	2006	3.2	2.3	1.7	7.1
	2007	2.9	2.2	1.7	6.8
	2008	3.1	2.2	1.6	6.9
National	2005	3.1	2.5	1.8	7.4
	2006	3.1	2.5	1.7	7.4
	2007	3.0	2.4	1.7	7.2
	2008	2.9	2.4	1.7	7.0



- 7.17 Most AQMAs relate to levels of Nitrogen Dioxide, which is mainly associated with road traffic. Target levels are currently exceeded at some locations adjacent to the A52 in Spondon, the inner and outer ring road and Osmaston Road. Monitoring has shown that high levels are typically present up to 8 meters from the roadside, but can extend to 14 meters adjacent to some heavily congested roads.
- 7.18 Air Pollution from Benzene in Spondon has been the subject of detailed assessment by Derby City Council in February 2006. Benzene is emitted from the combustion and distribution of petrol and some industrial processes which store, handle or emit benzene. In recent years the target level for benzene has been exceeded near Acetate Products in Spondon. However, benzene levels have been reducing and Acetate Products has made a commitment to make sure the target level is met in the vicinity of its plant by 2010. As a result, the Council has agreed that there is currently no need for an Air Quality Management Area here.
- 7.19 Programmes to tackle air quality issues in Derby will be enhanced through the latest review of the Local Transport Plan. The current LTP includes measures to:
- reduce vehicle emissions,
  - reduce the traffic impact of new developments,
  - reduce traffic congestion/manage the road network,
  - encourage a shift away from private car use,
  - promote cleaner vehicle technologies, and
  - reduce emissions from non-traffic related sources including domestic, industrial and commercial buildings.
- 7.20 It is estimated that these measures, together with improvements in vehicle engine design and fuel efficiency, will mean that pollution levels across Derby will improve in future years.

## **Water**

- 7.21 The Derby Housing Market area Water Cycle Study, published in January 2010, considers the impact of projected housing growth on the water cycle in the Derby HMA and highlights potential problems that may need addressing in order to achieve this growth sustainably.
- 7.22 Derby is predominantly supplied by Severn Trent Water's East Midlands Water Resource Zone. The East Midlands water resource is significantly constrained with the Environment Agency figures showing that many water resource units are under pressure from demand. Climate change is expected to reduce water resources further. Severn Trent predicts that by 2035 the deployable output will reduce by 38.8 megalitres per day (Ml/d), equivalent to a reduction of 4.4%.

7.23 Forecasted deficits in water supply throughout the housing growth period will need to be managed through water efficiency schemes in order to sustain the increased number of households in the area. The study therefore recommends that all new homes must achieve the Code for Sustainable Homes Level 3 or 4 as a minimum.

## **Flood Risk**

7.24 An important part of responding to climate change is adapting to the more extreme weather events we are likely to experience. One particularly important element of this is adapting to the increased risk of flooding.

7.25 The River Derwent is a natural asset for many parts of Derby, including the city centre, but it does present a significant flood risk. Some parts of the city centre came very close to flooding during 2000 and 2007. The risk is widely acknowledged and the need to address it is recognised with the Council committed to working with the Environment Agency to mitigate against future flood damage. The Lower Derwent Flood Risk Management Strategy has three main components:

- Building new flood defenses back from the river to create a 'Blue Corridor'
- Opening up the two closed arches of 5 Arches Bridge
- Possible up stream land management measures such as increased woodland and restoring peat moorlands.

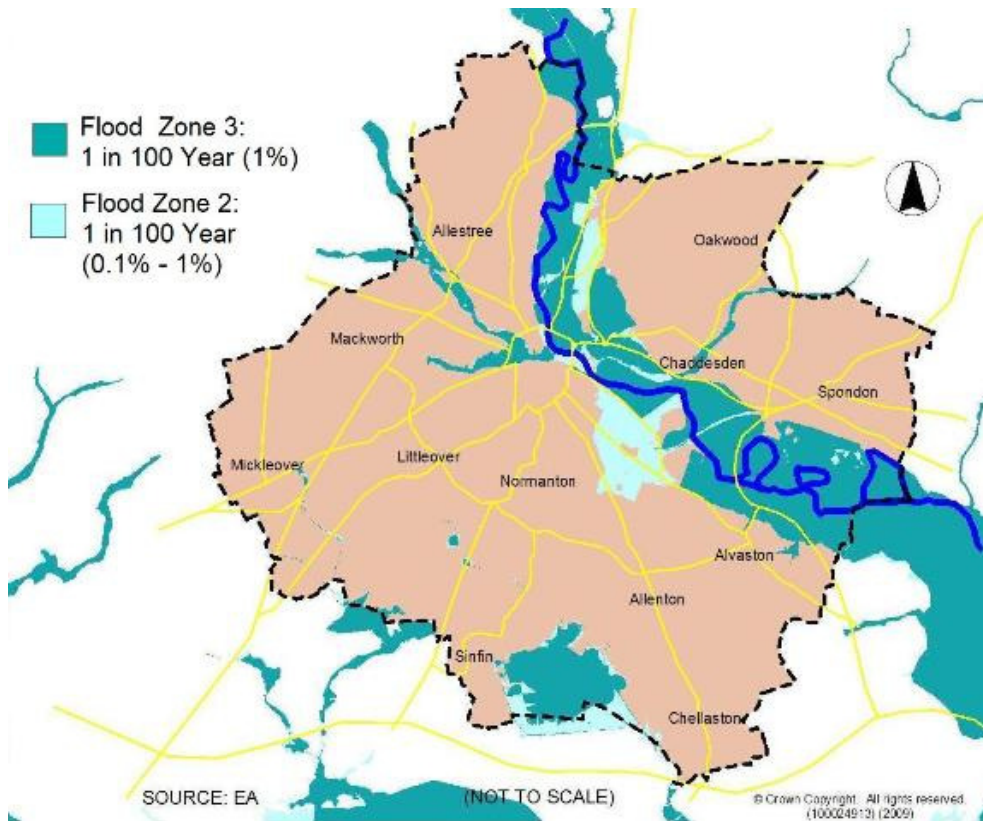
7.26 The **Blue Corridor** is the main part of the strategy and will also be the most difficult to plan and implement. As part of the planning for new defenses the Council is coordinating a masterplan for the general area of the proposed Blue Corridor, due to be complete March 2010. This master planning work has concentrated on an agreed vision and options for flood defense on key sites within the corridor.

7.27 The Regional Flood Risk Appraisal (RFRA) produced in 2006 considers that the main flood risk issues in Derby HMA are:

- The high risk of fluvial flooding from the River Derwent and tributaries in Derby
- Surface water and urban drainage flooding in Derby
- Flood defenses in poor condition
- Rapid run-off from the Peak District upstream of Derby causing flooding in smaller towns and villages
- The extensive floodplain in the Trent Valley south of Derby

7.28 The Environment Agency produces maps showing the degree of risk of flooding for different parts of the city. 20% of the city's land area falls within flood zones 2 and 3, the highest risk categories, as shown in Figure 7.2.

Figure 7.2 Environment Agency Flood Zones



Source: Environment Agency, 2009

### Quality of Place

7.29 The Government published World Class Places in May 2009, highlighting its commitment to improving the places where we live. It makes clear that the way in which places and buildings are designed, planned, developed and maintained matters to us all in many ways.

7.30 The document also makes clear that 'quality of place' is a government priority and is of particular importance to underpin economic recovery post recession. Well designed quality places are essential in order to attract inward investment.

7.31 There are four key elements of quality of place, as follows:

- The range and mix of homes, services and amenities
- Design and upkeep of buildings and spaces
- Provision of green space and green infrastructure
- Treatment of historic buildings and places

7.32 The importance of heritage to local economies has been highlighted by the publication of PPS5: Planning for the Historic Environment, in March 2010.

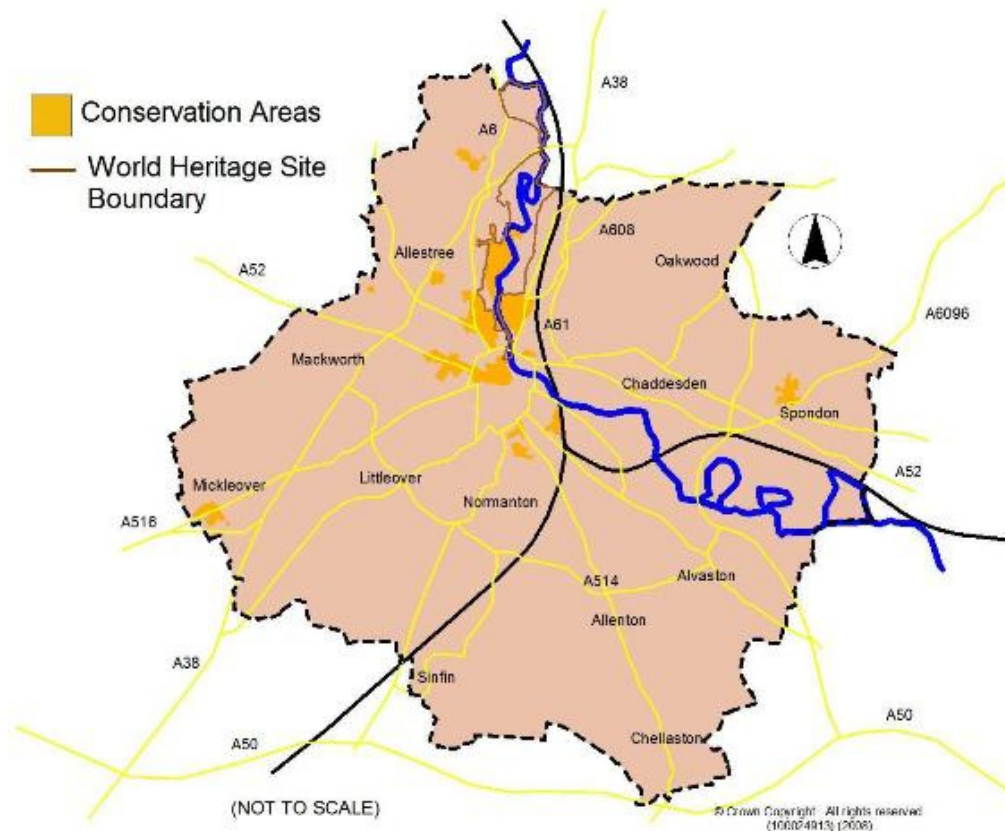
7.33 The 'Contribution of Heritage to the East Midlands Economy' report, produced by English Heritage in 2009, gave evidence that the heritage sector directly employs over 4,000 people in the region. Including associated employment, i.e. that which is visitor spend related together with indirect and induced jobs, it is estimated that the heritage sector supported some 10,000 people. It also made the point that volunteers in the sector also make a significant contribution to the economy with approximately 1,200 people actively involved in running heritage assets across the East Midlands, equating to an economic contribution of between £18.7 million and £26.7 million per annum.

7.34 The built heritage in Derby plays a significant part in the city's economy and includes the following assets:

- 388 statutorily listed buildings; 9 grade I, 40 grade II\* and 339 grade II
- 15 conservation areas
- 3 English Heritage registered Parks/Gardens
- 165 locally listed buildings/artefacts (the list is presently under review)
- 7 Scheduled Ancient Monuments
- 752 entries on the former Sites & Monuments record (now referred to as the Historic Environment Record or HER)
- Part of the Derwent Valley Mills World Heritage Site (DVMWHS)



Figure 7.3 Conservation Areas in Derby



Source: Derby City Council, 2010.

7.35 The City has developed a good track record for conservation. There have been many highly successful conservation projects in the city, both private-sector led schemes managed by the Council and schemes initiated by the City Council itself, including:

- Railway workers cottages, Railway Terrace
- County Courts, St Mary's Gate
- Rykneld Tean Mills
- City Centre Townscape Heritage Initiative (THI) projects
- The Roundhouse project
- Cathedral Quarter Hotel
- Current city centre grant schemes for building enhancement

7.36 All of the above examples show how the historic environment is contributing towards the successful regeneration of the city. There is scope for other heritage assets in the city to make similar levels of contribution.

- 7.37 There are currently no national or local indicators for monitoring the 'health' of local heritage although the Council has adopted two measures in its Corporate Plan - completion of Conservation Area Appraisals and the Local List Review - as local indicators. The Government is looking at options for measuring the quality of place, including the treatment of historic buildings and sites, with a view to introducing national indicators in due course.
- 7.38 There are three local authority museums in Derby city centre, which attracted 154,351 visitors during 2009/10. They directly employ around 79 people and make a significant contribution to the tourism offer and therefore to the visitor economy.

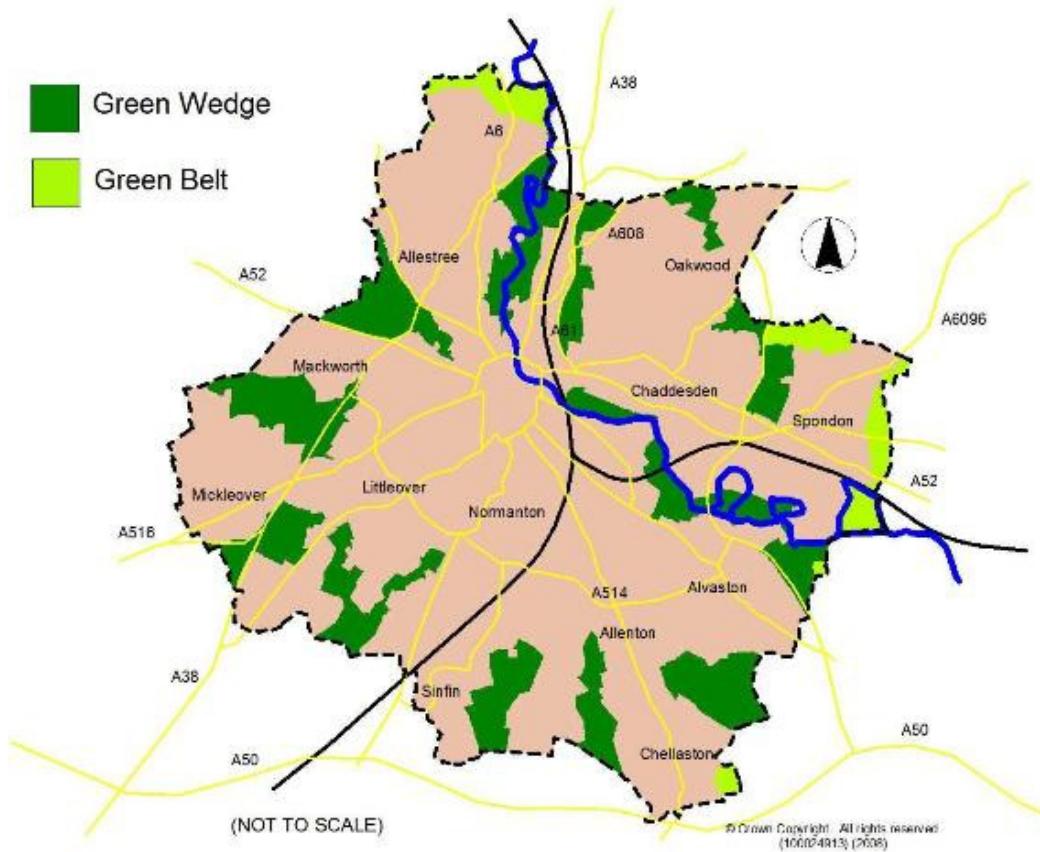
### **Green Infrastructure**

- 7.39 Green infrastructure comprises the networks of multi-functional green space which contribute to the type of high quality natural and built environment desirable to communities and investors.
- 7.40 Green wedges in Derby help to define the boundaries of different areas of the city and enhance the urban environment by providing recreation space. The wedges not only help to minimise the perception of urban sprawl but also provide a sense of place for neighbourhoods.
- 7.41 68% of the city area is built up<sup>1</sup>. Most of the remaining 32% is an important green resource, additional to the smaller areas that remain in the built up areas. Derby has successfully retained a network of green wedges and smaller biological corridors that link the countryside deep into the city, creating opportunities for people to access semi natural green space.

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<sup>1</sup> DCC Core Strategy Sustainability Appraisal

Figure 7.4 Provision of Green Space in Derby



Source: Derby City Council, 2010.

### World Heritage Site

7.42 The Derwent Valley Mills World Heritage Site (DVMWHS) runs from Derby City Centre to Cromford. The Derwent Valley has been described as the 'cradle of the factory system' in view of the highly significant part it played during the industrial revolution. The industrial buildings within the site provided the model for planned factory villages throughout the world. In recognition of its international significance, UNESCO inscribed the Derwent Valley Mills on the World Heritage List in December 2001.

7.43 The Silk Mill, located in the city centre, and the Darley Abbey Mills are the two strategic sites of this corridor in Derby and represent significant assets for the city. For a number of years there has been recognition of the potential of the DVMWHS to be a major economic driver for the city and the wider area. The DVMWHS Economic Development Plan provides the context for how the site can be maximised to achieve its economic potential.

7.44 The Economic Strategy, LDF Core Strategy and the Sustainable Community Strategy will all provide opportunities for the role of built heritage to be engrained into Derby's economic future.

## Environment and Economic Development

- 7.45 Historical data reveals that Derby is showing a steady improvement in CO<sub>2</sub> emission levels. There are similar improvements in the levels of household residual waste (kilograms per head) between 2002/03 and 2006/07. This has been a result of increased recycling and composting performance, with over 90,000 households in the city receiving comprehensive kerbside recycling collections. Alongside this there has been a downturn in the amount of non-recyclable waste produced per household.
- 7.46 The Local Development Framework Core Strategy, being developed alongside this assessment, considers how development can be made more sustainable in terms of being more energy efficient through design, reducing water consumption and including measures to encourage the production of energy from renewable sources.
- 7.47 The Core Strategy Issues and Ideas Paper outlines the importance of considering decentralised energy into all new development. This could contribute to improving sustainability of new developments, reducing reliance on external energy sources thus increasing oil resilience and reducing fuel poverty for vulnerable households in the city.
- 7.48 The main climate change issues identified in the Core Strategy Issues and Ideas paper are:
- Ensuring new development takes place in sustainable locations
  - Reducing energy use and natural resource consumption
  - Setting targets for the use of low carbon, renewable and decentralised energy
  - Supporting reuse, recycling, composting and waste reduction
  - Minimising and mitigating the risk of flooding, including how to address the Environment Agency's Flood Risk Management Strategy
  - Setting targets for the inclusion of sustainable design requirements in new development

## Peak Oil

- 7.49 The long term availability of oil has been the subject of international debate for some years. It is now widely considered that global oil production will 'peak' and go into sustained decline, but exactly when is a matter of uncertainty. This scenario is often referred to as 'Peak Oil'. The UK Energy Research Centre's report, 'Global Oil Depletion' published in 2009, concludes the peak of conventional oil production is "likely" to occur before 2030, and there is a "significant risk" that it will come before 2020. What is certain is that fuel deficits will have extremely far reaching social and economic consequences.

- 7.50 The cost of energy and the degree of energy dependency in modern food production systems are significant determinants of food prices. If projections from the International Energy Agency and others prove correct and oil prices do rebound once the global economy recovers, corresponding effects must be anticipated on food production. A report by the No.10 Strategy Unit in 2008 concluded the “existing patterns of food production are not fit for a low-carbon, more resource-constrained future”.
- 7.51 Dependence on energy from unsustainable and insecure sources of energy is a major risk to business and the local economy. There is a growing need, particularly for high energy use businesses to consider sourcing more sustainable energy.
- 7.52 In order to write and adopt an effective well-targeted energy depletion programme of action there is a requirement to understand the economic impact of peak oil on each business sector operating within the city. Based on the increasing cost-base for business, particularly relating to energy but also related to the needs to adapt to a changing climate.

### **Towards a Low Carbon Economy**

- 7.53 The UK Low Carbon Transition Plan plots how the UK will meet the 34% cut in emissions on 1990 levels by 2020, with the following aims:
- More than 1.2 million people will be in green jobs.
  - 7 million homes will have benefited from whole house makeovers, and more than 1.5 million households will be supported to produce their own clean energy.
  - Around 40% of electricity will be from low-carbon sources, renewables, nuclear and clean coal.
  - We will be importing half the amount of gas that we otherwise would
  - The average new car will emit 40 percent less carbon than now
- 7.54 The challenges resulting from climate change provide opportunity for many sectors of the economy, including at the local level. Remediation and adaptation methods required to improve sustainability of buildings gives rise to potential employment in the construction industry. The potential jobs associated with bringing housing up to standard will also require large scale up-skilling of the construction workforce, which will benefit the sector in the long term.
- 7.55 Derby has long been a supporter of new technology, primarily through its ambition to ‘create, retain and share’ wealth which has led to concerted efforts to focus on the high value sectors. The challenges of

climate change and resource depletion also needs to be seen as a 'new technology' opportunity for Derby. Many firms in the city, such as Rolls Royce, are already world leaders in the development of energy efficient production. There is potential for Derby to use the expertise it has within this field to embed new technology opportunities within other sectors. This can be seen as a real opportunity to shift the focus away from traditional measures of economic performance towards more sustainable benchmarking methods.

7.56 The two main targets for investment in Derby over the coming years are the retail and office sectors. As part of the city's push to create more high quality office space partners are working with central government to highlight what Derby has to offer as a location for government departments, following the Lyon's review. If Derby is to attract such relocations it will have to ensure that proposed office sites have achieved BREAM Excellent standard.

7.57 The government's ambition to require all new homes to be 'zero carbon' by 2016 is outlined in 'Building a Greener Future: Towards Zero Carbon (2007)'. The measures needed to deliver this ambition could have a significant impact on the design of new buildings and could lead to greater demand for onsite energy generation apparatus within Derby and other cities. The Core Strategy continues to explore the requirement for new housing within the principal urban area. A large majority of any future developments will be required to be zero carbon.

7.58 According to the 2009 BERR report 'Low Carbon Goods and Services; An Industry Analysis' there will be 400,000 jobs created in the UK in the renewable energy and low carbon industries by 2017. Other recent announcements of national significance include:

- Siemens announced wind turbine plant in UK - £80m investment 700 jobs
- British Gas to roll out smart meters – 2500 new jobs
- General electric announced wind turbine plant in UK - £99m investment 1900 jobs
- Mitsubishi announced wind turbine plant in UK - £100m investment 1500 jobs
- Clipper announced wind turbine plant in UK