

# **Melton Borough Council**

## **Climate Change Strategy**

Report to support development of Melton  
Borough Council Climate Change Strategy

April 2006

Entec UK Limited



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**Report for**

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# 1. Introduction

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This report has been prepared at the request of Melton Borough Council to help with the development of the Council's first climate change strategy. The report is structured as follows:

- **Section 2** provides some background information on the current scientific evidence for climate change which is then followed in **Section 3** by an assessment of potential impacts, including, where possible, impacts within the borough.
- **Sections 4 and 5** consider measures to help reduce further climate change (mitigation) and measures and actions to adapt to climate change (adaptation) respectively.
- **Section 6** presents some actions that are considered appropriate for Melton Borough Council to include in their climate change strategy and it is envisaged that these and other actions will be implemented where possible through future projects, plans and policies. Key to the adaptation to climate change is the need to keep informed of new scientific developments and of tools, techniques and best practice arising from current research. This report therefore also provides a summary of key information sources to help the council in meeting this objective.

The Strategy and Action Plan in this document will need to be flexible in that better evidence of climate change, its causes, effects and likely changes to social and economic behaviour will certainly be forthcoming over the next few years. Both will need regular, possibly annual, review.



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## 2. Climate Change and its Potential impacts

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### 2.1 Our climate is already changing

According to the Meteorological Office, average global surface temperatures increased by 0.6°C in the 20th century. The ten hottest years on record have all occurred since the beginning of the 1990s. The highest UK temperature ever recorded (38.5°C) occurred in August 2003 in Kent.

UK winters have also been getting wetter, with more heavy downpours. For example, in January 2005, Carlisle experienced widespread flooding with more than 1,900 properties affected. According to the Environment Agency, 15% of the average annual rain fell in 36 hours! Storm force winds gusting to hurricane force caused many trees to fall, widespread road blockages and significant power failures. There was substantial damage to infrastructure and much economic disruption, with early estimates of losses exceeding £450 million.

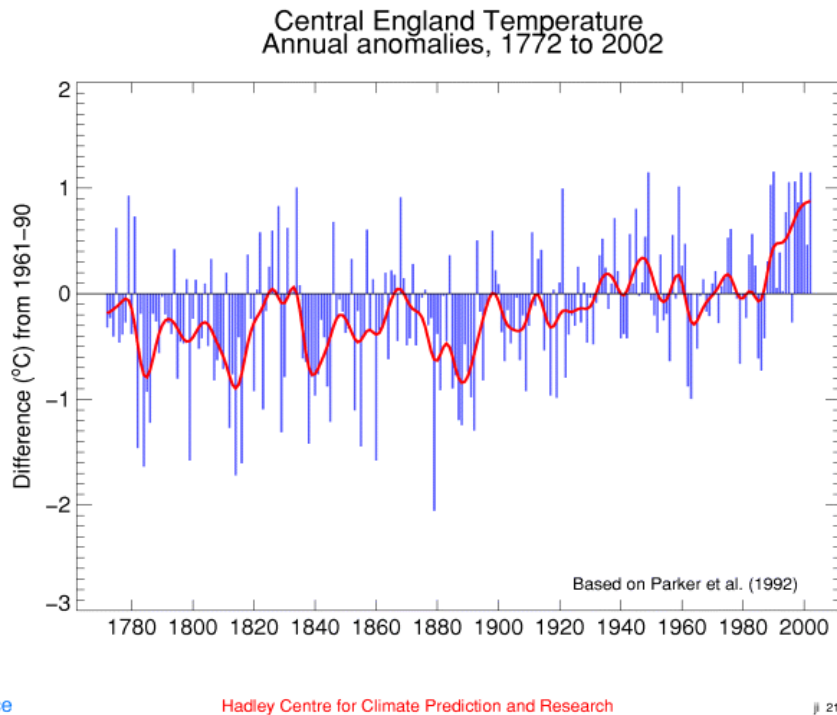
According to a recent report from the Association of British Insurers “Climate change could increase the annual costs of flooding in the UK almost 15 fold by the 2080s under high emissions scenarios”.<sup>1</sup>

Although these events are not direct evidence of climate change, they do help to illustrate the type of climate that we may experience in the future. The Inter-Governmental Panel on Climate Change (IPCC) states that “...most of the warming observed over the last 50 years is likely to have been due to increasing concentrations of greenhouse gases.”

**Figure 2.1** shows a steady rise during the 20<sup>th</sup> century but with a marked increase at the end of the century. Central England Temperature (CET) is representative of a roughly triangular area of the United Kingdom enclosed by Bristol, Manchester and London. The monthly series began in 1659 and, to date, is the longest available instrumental record of temperature in the world. Since 1974 the data have been adjusted by 1-2 tenths °C to allow for urban warming.

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<sup>1</sup> Association of British Insurers (2005), Financial Risks of Climate Change



**Figure 2.1 Central England temperature anomalies 1772 to 2002**

## and will continue to happen

According to the UK Climate Impacts Programme, climate change could lead to the following changes to the UK climate in this century:

- Increased winter and summer temperatures;
- Increased winter precipitation;
- Reduced summer precipitation;
- Increased intensity of rainfall events;
- Increased sunshine;
- Increased frequency of winter storms; and
- Rising sea levels and increased sea storm surges.

UKCIP have produced scenarios for future climate change for 2020, 2050 and 2080, containing varying degrees of these changes.

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## 3. Impacts of climate change within the Borough of Melton

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### 3.1 Climate change data

Data has been collected by UKCIP<sup>2</sup> from a recent update (2002) to a global circulation climate model developed by the Hadley Centre (Met Office) and Tyndall Centre (University of East Anglia). This data provides an estimate of the potential changes in many climate variables under four distinct emission scenarios. Of most interest is the potential change in the spatial and temporal distribution of both temperature and precipitation. The UKCIP data suggests that climate change could include the following adverse effects:

- A risk of less water available for domestic, industrial and agricultural purposes.
- A risk of more extensive and frequent flooding; and
- A risk of increased temperatures, with a greater number of 'hot periods', such as the summer of 2003.

#### 3.1.1 Changes in Temperature

The general picture compared to the average for 1961 to 1990 for the Melton Borough area is for average annual temperature to increase by 0.5 to 1.0°C by the 2020s for all emissions scenarios, except for summer and autumn average temperatures which increase by 1.5°C for the medium-low, medium-high and high emissions scenarios.

Further into the future, the spread of predictions increases. By the 2080s the annual average increase in temperatures is 2.5-3.0°C for the low emissions scenario, increasing to 3.5-4.5°C for the high emissions scenario. Under the high emissions scenario summer temperatures may increase by more than 4.5°C by the 2080s.

#### 3.1.2 Changes in Precipitation

Annual average rainfall shows little change over the whole range of emissions scenarios and time scales. The distribution and intensity of this rainfall, however, may change significantly. Winter rainfall shows increases across all scenarios with time, with the biggest increase of greater than 30% by the 2080s under the high emissions scenario. Summer rainfall shows a corresponding decrease, with the greatest decrease (more than 50%) for the high emissions scenario for the 2080s.

The scenarios also predict an increase in the number of 'deep depressions' passing over the area during winter of up to 40%. The stormiest weather (intense rainfall and high winds) is associated with deep depressions. This would lead to the 'wrong sort of rain' in which the volume of water could overwhelm the drainage system and result in flash floods in fairly small

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<sup>2</sup> UKCIP (2002) UK Climate Impacts Programme

rivers at a localised level rather than the large scale ‘slow’ flooding that occurs in the flood plains of larger rivers. There is, however, greater uncertainty associated with this prediction than for the temperature and precipitation predictions.

### **3.1.3 Other Climate Changes**

The UKCIP02 data also reports on a number of other climate parameters, although in less detail than for the temperature and precipitation predictions. The main highlights by the 2080s are:

- decreases in summer soil moisture content of 20-40% under all emission scenarios;
- increase in overall weather variability between years;
- decrease in cloud cover of up to 15% in summer;
- a decrease in atmospheric moisture content throughout the year;
- reduction in summer relative humidity;
- increase of up to 10% in winter daily wind speed; and
- a 60-90% decrease in snowfall.

## **3.2 Notable Weather Events in the Borough of Melton**

Although not direct evidence of climate change, incidents like the ones reported below are illustrations of what could be expected if climate change continues. Events such as these will affect the people, property and livelihoods in the Borough of Melton.

### **3.2.1 Summer Events**

May Bank Holiday weekend 2000 suffered disruption across the UK following downpours and widespread flooding, being one of the wettest May weekends on record and flood warnings were issued to Melton, amongst others. Heavy rain that weekend not only disrupted residents in the Borough of Melton, but affected tourism.

Summer 2003, noted for the record-breaking temperatures across the UK, also saw Leicestershire experience 39mm of rain in one hour on the 1<sup>st</sup> June, causing flash floods in places.

### **3.2.2 Winter Events**

In February 2005, heavy snowfall and freezing temperatures led to the closure of some schools and postponement of a number of events resulting in widespread disruption in the Borough.

This region of Leicestershire experienced three of the 50 most intense hailstorms on record for Britain, resulting in damage to property from hailstones larger than 20mm diameter.

### **3.2.3 Flooding Events**

During the national rainstorms of Easter 1998 and Christmas 1999, and in 2000 and 2001, serious flooding occurred in the Borough. Flooding was particularly severe in the town centre of Melton Mowbray and Asfordby. Many villages were also affected.

Over time, climate change could have a significant effect on flood risk, as it is expected to cause winters to become wetter and summers to become drier. The insurance industry has warned that premiums could rise as flood prone properties become more difficult to protect, and some properties may be unable to obtain insurance against flood altogether. Climate change effects could mean that extreme weather events such as droughts, floods and storms could become more common. For the East Midlands, the UK Climate Impacts Programme (UKCIP) model predicts that by 2050 there could be up to:

- 13% increase in winter rainfall; and
- 18% decrease in summer rainfall.

For extreme rainfall events, precipitation could increase by 40% in winter months and, whilst overall summer rainfall is expected to decrease, there could be an increased likelihood of more intense summer storms<sup>3</sup>. Due to wetter winters, groundwater levels could increase in winter months, potentially exacerbating groundwater flooding problems in prone areas. PPS 25<sup>4</sup> (Paragraph B9) recommends that there be an allowance for up to a 20% increase in peak river flows by 2050, and up to 30% by 2110 to account for the potential effects of climate change based on current guidance.

Increased storminess and higher peak rainfall values will also cause increases in runoff. Water companies have indicated that, under such scenarios, the current design standard for surface water drainage sewers will need to take climate change into account. PPS 25 (Paragraph B10) recommends that there be an allowance for up to a 10% increase in rainfall intensities by 2050, and up to 15% by 2110 to account for the potential effects of climate change based on current guidance.

### **3.3 The key sectors in the Borough of Melton sensitive to climate change**

The economy in the Borough of Melton has developed on the basis of agriculture and expanded into manufacturing and service markets, notably for local food products. Following the effects of BSE and the outbreak of Foot and Mouth Disease across the UK, employment in the agricultural sector has continued to decline in Melton. However, unemployment across the Borough has continued to fall, with approximately one third of jobs (5,300<sup>5</sup>) in Melton in the manufacturing industry, a fifth in distribution and catering and hospitality, and a further fifth in the public sector. The majority of employment in the Borough is by small and medium enterprises (generally <100 employees).

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<sup>3</sup> *The Potential Impacts of Climate Change in the East Midlands*, Report by Entec UK Ltd for the East Midlands Sustainable Development Round Table, July 2000

<sup>4</sup> *PPS 25 Development and Flood Risk (Consultation Draft)*, Office of the Deputy Prime Minister, December 2005

<sup>5</sup> 2001 employment figures.

Tourism and leisure is one of the most important sectors in the Borough and is thought to contribute around £21<sup>6</sup> million to the local economy. Melton Borough Council seeks to promote tourism and to improve the standard of visitor accommodation in the Borough.

The topography of the Borough is gently undulating with a plateau to the south-east of the Borough, standing some **180 metres** above sea level. The valleys of the Rivers Wreake, Eye, Soar and Devon are most susceptible to flooding, with particularly severe flooding experienced in the centre of Melton Mowbray and Asfordby in recent flood events. Melton Borough Council are working with the Environment Agency on a Strategic Flood Risk Assessment (SFRA) for the Borough and developing and securing flood alleviation measures for these communities.

The sectors and environmental systems that may be sensitive to climate change and the possible impacts of climate change are listed in **Table 3.1**.

**Table 3.1 Sectors sensitive to climate change**

<b>Sector</b>	<b>Potential climate change impact</b>
Public Health	<ul style="list-style-type: none"> <li>• Increased health risk due to heat stress</li> <li>• Increased health risk due to greater flooding episodes</li> <li>• Decreased health risk from reduced cold spells during winter</li> <li>• Arrival of new pests and pathogens</li> </ul>
Water Resources	<ul style="list-style-type: none"> <li>• Increased pressure on water supply as a result of more frequent droughts and dry years</li> <li>• Increased pollution concentrations due to lower river flows</li> <li>• Increased flooding as a result of stormier winters and heavier precipitation events</li> </ul>
Agriculture and Horticulture	<ul style="list-style-type: none"> <li>• Increased temperature creates longer growing seasons</li> <li>• Loss of traditional crops</li> <li>• Potential to grow different crops (e.g. grain maize, sunflowers, soya)</li> <li>• Increased risk of summer drought</li> <li>• Increase in soil erosion</li> <li>• Increased need for irrigation, particularly for horticulture</li> <li>• Risk of heat stress to livestock</li> </ul>
Transport	<ul style="list-style-type: none"> <li>• Reduced road and rail delays in winter due to fewer frosts and snowfalls</li> <li>• Increased flooding of transport infrastructure as a result of higher intensity rainfall</li> <li>• Warmer summers could increase traffic pressure on already busy roads (increased tourism)</li> <li>• Increase in maintenance costs of roads due to hot weather events</li> </ul>
Biodiversity	<ul style="list-style-type: none"> <li>• Low river flows reducing aquatic habitat availability</li> <li>• Lower water tables reducing wetland habitats</li> <li>• Changes in the distribution of climate-sensitive species</li> <li>• Lengthened plant growing seasons</li> </ul>
Financial Services/Insurance	<ul style="list-style-type: none"> <li>• Insurance claims are driven by hot/dry weather-induced subsidence, wind damage, freezing weather, flooding</li> <li>• Increased hot/dry weather, wind speeds and flooding may increase insurance claims</li> </ul>

<sup>6</sup> 1997 figures.

Sector	Potential climate change impact
Built Environment	<ul style="list-style-type: none"> <li>• Insurance sector has the ability to respond to changes in risk by rapidly adjusting premium charges</li> <li>• Increased temperatures and wind speed may affect safety of construction sites</li> <li>• Greater need for 'climate proofing' in building design - ventilation, ability to withstand storms, flood mitigation</li> </ul>
Manufacturing, Services and Retail	<ul style="list-style-type: none"> <li>• Adjustment needed in those processes sensitive to high temperatures and/or requiring significant quantities of water</li> <li>• Greater air conditioning/cooling required for offices/factories/shops to maintain amenable working conditions</li> <li>• Reduction in retail spending in hot weather as people prefer to spend time outdoors</li> </ul>
Leisure and Tourism	<ul style="list-style-type: none"> <li>• Hotter drier summers are likely to increase tourist numbers and spending</li> <li>• Increased length of the 'tourism season' as a result of warmer temperatures</li> </ul>
Cultural Heritage	<ul style="list-style-type: none"> <li>• Impacts on archaeological sites - e.g. exposure/erosion</li> <li>• Changes in valued landscapes (erosion, land use change, biodiversity change)</li> <li>• Impacts on parks/gardens as a result of water shortages/drought</li> <li>• Impacts of changes in tourism numbers and patterns</li> </ul>
Forestry	<ul style="list-style-type: none"> <li>• Increased tree stress/loss from drought</li> <li>• Increased risk of fire damage</li> <li>• Higher growth rates from higher temperatures</li> <li>• Potential for increased pest/pathogen damage</li> <li>• Change in mix of forest species</li> </ul>

## 3.4 Impacts on key service providers

The potential impacts of climate change listed in **Table 3.1** will have an effect on many of the services and organisations in Melton. A few examples of the types of effects are described below.

### 3.4.1 Environmental and Public Health Services

The impacts on environmental and public health such as the increase in the incidents of heat stress and the possible arrival of new pests and pathogens may need to be addressed by the primary care trusts, the hospitals and the health authorities in the Melton area. More sunshine could result in higher incidents of sunburn with a need for public information campaigns about the increased risk.

The 2003 heatwave was linked to the premature death of 22,000 people in Europe for example.

### 3.4.2 The Emergency Services

Hotter and drier summers could lead to an increase in fire risk. Emergency services may see the demand for their services changing, including an increased need to respond to more flooding incidents following extreme rainfall events.

### 3.4.3 Planning

Changes to water resources availability and flooding patterns could also affect strategic planning activities within Melton. The design, location and development of housing and road networks could need adaptation. Plans and policies will need to address climate change. Strategic Environment Assessment (SEA) highlights the need to consider climate change in plans and policies. Melton Borough Council is in the process of developing their Local Development Framework (LDF) with a view to planning for the future development needs of the Borough. These needs are driven by regional plans which have specified a need for an additional 4,200 new dwellings and 125 ha of land for business use in the period 1996 to 2016. Taking into account allocations to date and estimated opportunities for redevelopment of brownfield sites, the Council has estimated a need for approximately 60 ha of greenfield land to meet these needs. This presents an opportunity to plan for sustainable development that is located and designed to reduce flood risk, and takes into account climate change impacts and adaptation.

The Council commissioned a Strategic Flood Risk Assessment (SFRA) of Melton Borough in 2005. The key objective of the Melton SFRA is to inform the LDF with respect to local flood risk issues and the location of future development in Melton Borough. The importance of flood risk and its implications for development has been highlighted above and a climate change assessment is included in this process.

### 3.4.4 Tourism and Leisure

Higher temperatures and increased sunshine could lead to increased demand for tourism and leisure services and facilities in Melton, including water based activities. This could represent an opportunity for service providers but will require appropriate planning. Increased visitor

numbers could also result in increased erosion and pressure on tourist attractions. Wetter winters and more extreme rainfall events could have a detrimental effect on the tourism industry within the Borough.

#### **3.4.5 Biodiversity**

Higher temperatures, increased sunshine and changing rainfall could change patterns of flora and fauna in Melton. Flooding following rainfall events could also present opportunities to replace lost habitats in suitable areas e.g. wetlands.

#### **3.4.6 Transportation**

Disruption to transport systems in higher temperatures and extreme rainfall events could result in the need for increased maintenance, refurbishment or replacement of some infrastructure elements, e.g. drainage.

#### **3.4.7 Waste Management**

An Environment Agency<sup>7</sup> report on the impacts of climate change on waste management identified some of the following potential impacts:

- Increased risk of disruption to supporting infrastructure e.g. road and rail, from increased flooding from surface water, groundwater and drainage systems;
- Increased risk of vermin, odour, dust and litter;
- Changes in site hydrology and temperature affecting landfill degradation rates and leachate production;
- Increased risk of damage to site buildings from storms, in turn leading to increased insurance premiums; and
- Increased health risks to workers from increased sunshine and increased indoor and outdoor temperatures.

#### **3.4.8 Agriculture and Soils**

From the National Soil Resources Institute's national map of soilscapes<sup>8</sup>, soil in Melton is primarily:

- shallow lime-rich soils over chalk or limestone;
- slowly permeable seasonally wet slightly acid base but base-rich loamy and clayey soils; and
- lime-rich loamey and clayey soils with impeded drainage.

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<sup>7</sup> Environment Agency 2003, Potential Impacts of Climate Change on Waste Management

<sup>8</sup> NSRI 2006, Soil Data Gateway ([www.silsoe.cranfield.ac.uk](http://www.silsoe.cranfield.ac.uk))

Soils in the valleys of the Rivers Soar and Wreake are groundwater gleys associated with alluvial deposits.

Soil processes are directly affected by changes in temperature, precipitation and atmospheric CO<sub>2</sub> changes through altering soil ecology and organic matter. In turn, there are effects on soil structure, water regime and plant growth notwithstanding the potential for increased soil erosion due the changes in precipitation rates and amounts. The level of agricultural land use within the Borough of Melton would suggest that the Borough may be affected by the impacts of climate change on soil processes.

Changes in soil ecology and organic matter could have serious implications for agriculture by modifying soil porosity and water retention and availability, soil erosion, nutrient leaching, capacity of soil for nutrient storage and changes to soil fauna, microflora and microbia. Predicted increases in temperature will increase the activity of soil organisms and through the decomposition process, significant releases of CO<sub>2</sub> may be expected and may result in lower organic matter levels in soil. Soils with high clay contents, such as those seen in the Melton area, shrink in dry conditions and swell once wet resulting in cracks and fissures in the soil. The predicted drier summers would increase the frequency and size of crack formation and result in hard soil surfaces and cloddy seed-bed conditions, all of which are detrimental to crop cultivation. With increased winter rain amounts and intensity, these cracks allow more rapid movement of water and can leach soil nutrients, reduce the filtering capacity of soils and increase the pollution of ground and surface waters. The impact of climate change on soil erosion will depend on the frequency and intensity of precipitation, windspeed and direction, soil structure, land cover and slope. Together with the above mentioned changes to soil processes, earlier harvest could expose soils to early autumn storms and increase erosion.

### **3.4.9 Costs of Climate Change**

Research has been undertaken by a number of organisations (e.g. DEFRA, Environment Agency) and the Association of British Insurers into the potential economic costs of climate change. The most recent work by the ABI for example suggested that climate change could increase the annual costs of flooding in the UK almost 15-fold by the 2080s, under high emissions scenarios. Further, the impact of climate change could result in an increase in premiums from the insurance industry.

Climate change could therefore have significant costs for individuals and businesses in the UK. The Environment Agency<sup>9</sup> has estimated that over the next 80 years the cost of engineered flood defences to meet the demands of climate change in England and Wales could be as high as £75 billion.

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<sup>9</sup> Environment Agency 2005, First National Report on Climate Change

## 4. What can be done to help prevent further climate change?

### 4.1 Introduction

**Table 4.1** provides an overview of the Greenhouse Gas (GHG) emissions in Melton Borough. Only the emissions of carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) are significant. There are no point sources of the other four Kyoto greenhouse gases and the single largest source is the emissions from buildings, mostly the use of natural gas for heating.

**Table 4.1 Overview of Annual GHG Emissions in Melton Borough (Source: National Atmospheric Emission Inventory<sup>10</sup>)**

Emission Sector	Tonne, t (as C)	t (as CO <sub>2</sub> )
Energy Production and Transformation	19	70
Commercial, Institutional and Residential Combustion	28,462	104,362
Industrial Combustion	8,669	31,787
Industrial Processes	0	0
Production and Distribution of Fossil Fuels	0	0
Road Transport	25,034	91,791
Other Transport	1,116	4,093
Waste Treatment and Disposal	20	73
Agriculture	910	3,338
Nature	2,041	7,484
<b>Total</b>	<b>66,272</b>	<b>242,999</b>

### 4.2 Possible Actions that could be implemented by Stakeholders within MBC

#### 4.2.1 Industry

The only significant industrial emission source in the Borough of Melton is the Masterfoods pet food factory. This site is included in the European Union Emission Trading Scheme (DEFRA,

<sup>10</sup> NAEI 2003, National Atmospheric Emission Inventory ([www.naei.org.uk](http://www.naei.org.uk))

2001)<sup>11</sup> and as such will be able to benefit from emission reduction measures. The historical annual emissions for the site are approximately 32,000 t CO<sub>2</sub> and the site is also included in the Food and Drink Federation's Climate Change Agreement, under which it will have to meet an energy efficiency target (DEFRA, 2005<sup>12</sup>).

#### 4.2.2 Waste Management

The only other reported sources of emissions in the Borough<sup>13</sup> is the landfill site at Asfordby. The methane release from landfill sites can be captured and used to generate electricity. It is not known if this is occurring at the site. The same type of technology can also be installed at waste water treatment works. The STW) in Melton is operated by Severn Trent who have been proactive in using methane as fuel on their larger sites. However, it is unlikely that the site at Melton would generate enough methane to make this technology viable.

#### 4.2.3 Domestic

In general, households are existing properties where the domestic occupant or tenant cannot alter the building structure. There are however many behaviour patterns and technology decisions which can be made by an occupant of a house.

The mitigation strategy at an energy-aware household would:

- make use of free energy advice from the local Energy Efficiency Advice Centre (EEAC), thus obtaining an energy baseline and recommendations on energy efficiency measures, as well as details of discounted equipment and installers;
- have high levels of insulation in loft, cavity walls and floors and also good pipework insulation throughout the dwelling;
- always switch off lights when not needed and close windows when the heating is on;
- utilise effective heating controls with room thermostats set to 19°, independent automatic timers for heating and domestic hot water and thermostatic radiator valves;
- use double-glazing for windows;
- use draft-proofing for doors and windows that can be opened;
- use a condensing boiler;
- purchase some or all of the electricity supply from renewable sources;
- use energy efficient light bulbs especially for most regularly used lights;

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<sup>11</sup> DEFRA 2001, Umbrella Climate Change Agreement for the Food and Drink Sector ([www.defra.gov.uk](http://www.defra.gov.uk))

<sup>12</sup> DEFRA 2005, Climate Change Agreement ([www.defra.gov.uk](http://www.defra.gov.uk))

<sup>13</sup> Environment Agency 2005, Pollution Inventory

- cycle or walk for local trips rather than drive;
- use public transport for local and long distance journeys; and
- use a modestly sized, fuel efficient car, diesel rather than petrol – with appropriate tail pipe technology e.g. catalytic convertor.

The more ambitious low energy household could take further steps, such as:

- use modern wood fuelled boiler for space and water heating, making use of available grant aid towards capital costs;
- install solar water heating panels on unshaded roof spaces, join local DIY ‘solar club’;
- install solar photovoltaic modules on roof spaces for electricity supply;
- join a local car-share scheme to reduce private car ownership;
- investigate local supply options for bio diesel; and
- use an ultra low carbon car such as petrol/electric hybrid, using available grant aid.

#### 4.2.4 Route Map to 60% CO<sub>2</sub> Reduction

To devise a climate change mitigation plan, a household should begin with an assessment of their current emission baseline. An illustrative example is shown in **Table 4.2** below.

**Table 4.2 Typical Household Carbon Dioxide Emissions**

	Average annual consumption	Carbon Dioxide Emissions [tCO <sub>2</sub> /household/yr]	
		Current levels	60% reduction
Household Electricity	4,000 kWh <sub>e</sub>	1.66	0.66
Household Heating	19,000 kWh <sub>h</sub>	3.69	1.48
Car Transport	17,000 km	3.15	1.26
<b>Total</b>		<b>8.49</b>	<b>3.40</b>

Average annual domestic energy consumption statistics for **Table 4.2** are derived from Housing Energy Efficiency Good Practice Guide 301 (DTI). The average UK car mileage is derived from a Europe-wide study. These figures will differ on a case by case and region by region basis. However, as a general rule households should aim to reduce their annual carbon dioxide emissions from current levels e.g. over eight tonnes, to below four tonnes.

Obviously, to achieve deep cuts in emissions, a twin approach of reducing energy demand plus switching to low carbon energy sources is needed. For example, to reduce electricity related emissions by 60%, a combination of energy efficiency and switching to renewable supply could

be adopted. If the household's electricity demand were reduced by 20% through energy efficiency measures, and half the remaining electricity demand were procured from renewable supplies, the net result would be a 60% cut in CO<sub>2</sub> emissions.

#### 4.2.5 Financial Benefits and Energy Savings

To select a climate change mitigation measure, the practitioner will want to answer some key questions, such as “*How much will this cost me?*”, “*How much money will I save?*”, “*How much carbon dioxide emissions will I save?*”. The following table (Table 4.3) provides some illustrative figures for some of the domestic options discussed above.

**Table 4.3 Financial and mitigation benefits of technologies and techniques**

	Cost £	Financial Payback years	Carbon Dioxide Savings t CO <sub>2</sub> /year
Reduction of annual car journeys by 30% through switch to public transport, walking/cycling, internet shopping etc.	0 (cost of public transport offset by avoided fuel and repair costs)	Instant	0.94
When replacing family vehicle, opt for low carbon (<120gCO <sub>2</sub> /km) model e.g. hybrid, electric or petrol	Up to £2000	Up to 20	0.77 <sup>14</sup>
Cavity Wall insulation	£255	5.5	0.78
Roof insulation(new insulation)	£225	2.5	1.27
Replacement condensing Boiler	£150	6.5	0.35
Full Heatings Control Package	£188	4.5	0.64
Replace 4 lights with energy efficient bulbs	£20	1	0.12
Purchase 1/3 <sup>rd</sup> electricity from 'green' renewable supply	£0 (No changeover fee expected)	Up to about £10 year	0.42
<b>TOTAL</b>	<b>Up to £2,847</b>	<b>-</b>	<b>5.29 i.e. 62% cut</b>

The figures used for domestic energy efficiency measures are based on averages derived from the Cost Benefit Tables within the Best Practice Guide 171: *Domestic Energy Efficiency Primer*<sup>15</sup>. This Guide, along with complementary guides for the domestic sector, was produced by the Building Research Establishment on behalf of Energy Savings Trust.

It can be seen that a 60% reduction in domestic emissions is feasible through a range of measures. In the scenario described above, the most costly element is the purchase of a low

<sup>14</sup> Assuming the 120g CO<sub>2</sub>/km model replaces a 185gCO<sub>2</sub>/km vehicle, this would yield a saving of 211 kgC/yr based on a 30% reduced annual mileage of 11,900 km

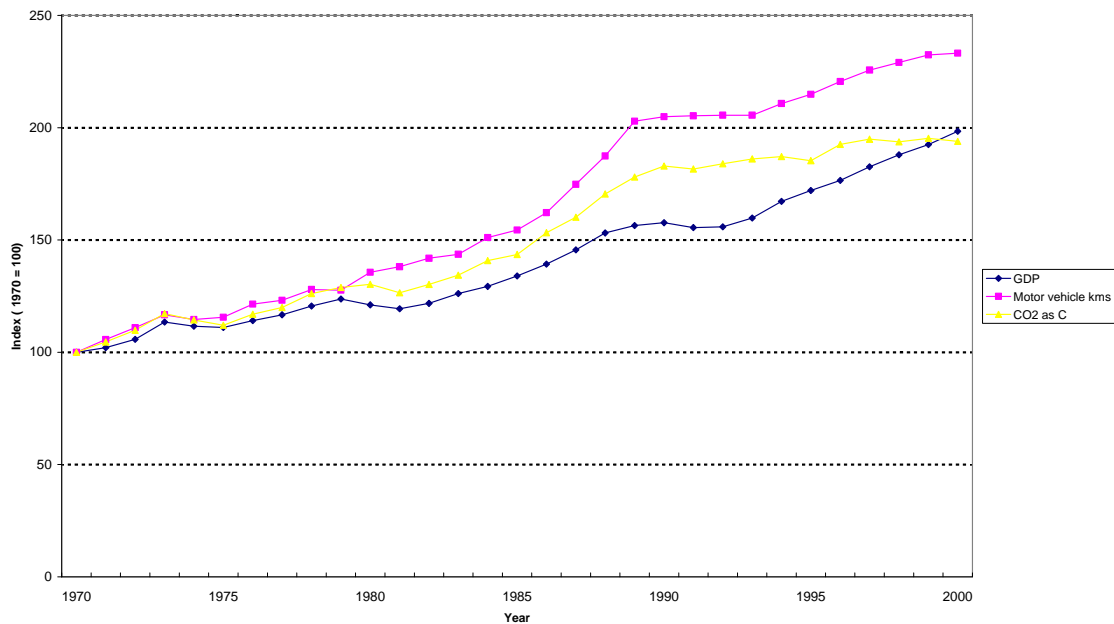
<sup>15</sup> Available from [www.housingenergy.org.uk](http://www.housingenergy.org.uk)

carbon vehicle rather than a standard vehicle, while energy efficiency measures generally pay for themselves within a few years. It is also interesting to note that the quickest and cheapest emission savings in transport are through reduction in car mileage, in other words more savings will be achieved through a switch to public transport and walking/cycling than buying a low energy vehicle.

#### 4.2.6 Transport

The issue of the climate change impact of transport is an issue not just for Melton but for the UK as a whole. The main problem has been that transport use, expressed in terms of kilometres travelled, has been rising faster than economic growth (**Figure 4.1**). The economy has been getting less efficient in transport terms with the main cost of this being fuel. The initiatives to improve fuel efficiency such as voluntary targets from car manufacturers to reduce engine weight have resulted in relative improvements (and corresponding improvements in the emissions of CO<sub>2</sub>) but more recent data indicated the stabilisation in the growth of emissions has been compromised by consumers opting to buy much heavier and less fuel efficient vehicles.

**Figure 4.1 Transport Emissions and Economic Growth**



The inefficient use of transport within the UK economy has had knock on effects in the provision of public transport. The increasing use of vehicles by those who own them has indirectly reduced the availability (both real and perceived) of public transport for those who do not. In a recent report the Office for National Statistics<sup>16</sup> highlighted the perceived difficulty in

<sup>16</sup> Source: Office for National Statistics Published on 12 August 2002

access for car owners when compared to non owners. The issues that lie at the heart of this are complex and any development in policy in this area will have to be handled sensitively.

#### 4.2.7 Agriculture

The Borough of Melton is contained within the East Midlands region. The region has the largest area of agricultural land in the UK and the second highest percentage of arable (**Table 4.4**) This makes the region well placed to benefit from the development of fuel from arable sources particularly of the oil seed crop variety. Melton Borough is particularly well suited as it lies to the SW of the region closer to the main centres of demand such as Birmingham and London.

**Table 4.4 Agricultural Statistics, 2001**

	Agricultural land as a percentage of total land area	Arable land as a percentage of agricultural land	Average yield	
			Wheat 100kg/ha	Barley 100kg/ha
<b>EUR 15</b>	<b>40.4</b>	<b>56.4</b>	<b>60</b>	<b>49</b>
<b>United Kingdom</b>	<b>67.8</b>	<b>39.1</b>	<b>80</b>	<b>56</b>
North East	66.4	35.6	81	62
North West	62.4	24.6	68	49
Yorkshire and the Humber	68.4	58.5	85	64
East Midlands	75.8	73.6	83	60
West Midlands	70.3	54.9	75	60
Eastern	71.4	86.6	82	60
London	7.9	54.2	..	..
South East	57.3	64.1	81	59
South West	72.7	45.3	74	53
Wales	67.0	13.5	73	49
Scotland	67.1	18.6	76	52
Northern Ireland	74.2	18.7	65	39

Source: Eurostat

### 4.3 What actions can be undertaken by Melton BC?

There are a number of actions that the Borough Council can take to help mitigate climate change. The best source of information on these is the work carried out by the Carbon Trust in partnership with local authorities and available on the Trust's web site. There are a great number of actions that can be taken distributed across a range from complex and capital

intensive projects such as the development of a localised infrastructure for renewable fuel through to actions in domestic efficiency of the type described above.

#### **4.3.1 Energy baseline for Council activities**

The first step is for the Council to determine exactly where energy is currently used, for what reason and how much is used. There are a number of established protocols that can be used for undertaking this type of survey. The aim of this is to understand where the most cost effective reduction can be made. The baseline should cover all aspects of council operations and services from office heating and equipment through to waste management and transport. It is expected that a substantial amount of this data are available but may be in a disaggregated form.

#### **4.3.2 Energy efficiency in existing buildings.**

The Council should determine as a priority the energy efficiency of its existing building stock. This should include both its public buildings and its rental stock. The actions that can be taken, as described in the section on domestic buildings above, are many and can have significant positive benefits. Actions in these areas will assist in a number of other policy areas such as fuel poverty. Fuel poverty may in some cases be more accurately regarded as insulation poverty). The retrofitting of insulation, although relatively expensive compared to fitting from new, is very cost effective particularly when the grants available under various Government schemes are taken into account.

#### **4.3.3 Energy efficiency in new buildings**

The Council can have a major role to play in ensuring that new buildings meet high levels of energy efficiency through its planning and development responsibilities. The long lifetime of buildings, some 20 – 100 years, means that even a small degree of under specification against acceptable energy efficiency standards can have significant impacts in the long term. It is important that the Council develop a policy to ensure that its new buildings are of suitable design.

Melton Borough Council are currently addressing energy efficiency in existing and new housing stock through policies specifically covered by the Council Housing Strategy which will contribute to the mitigation objectives proposed by the Climate Change Strategy.

#### **4.3.4 Energy initiatives: finance packages**

The difficulty with many of the actions that can be taken on climate change mitigation is that they require additional finance. Councils, and many other organisations are as often as not controlled by tight budgets and in some cases are not able to engage with mitigation measures regardless of the savings that could be realised. The Carbon Trust operates a specialist finance scheme for local authorities that can be used to fund mitigation actions. The main objective of this fund is described below in **Text Box 1**.

##### **Text Box 1**

LAEF is currently being piloted to provide approximately 10-15 Local Authorities a unique opportunity to make progressive inroads in strategic energy management and thus set higher environmental and efficiency standards. The programme will establish a series of 'invest-to-

save' energy efficiency funds, for use in the LA estate and schools. By installing leading edge instruments, technologies and systems, Local Authorities will not only be improving the environmental quality of their constituencies but will also be stimulating demand in new market sectors.

The Council should investigate this source of finance particularly for its possible application to the more capital intensive projects such as community energy, renewable energy or large scale public building developments.

#### **4.3.5 Renewable energy**

Given the opportunities that are available in the area for biomass based renewable energy, the Council should develop a number of different options for the development of an integrated supply chain. This would require the involvement of local farming, planners and developers and end users. Typical end users may include operators of transport fleets, road stone coating plants or community heating schemes.

#### **4.3.6 Transport**

The mitigation of the climate change impacts of transport is one of the most difficult areas to deal with politically. However, as the graph in Section 4.2.6 above illustrates, it is important that it is tackled as in the long run it has the potential to override the reductions made by all other actions. If it has not already done so the Council should develop a transport plan for its own staff and activities as a matter of priority. The Council should also investigate the use of bio-diesel for its own transport fleet and make its use a condition of transport contracts for waste services for example. The Council may also use its public car parking charging strategy to deter commuter parking. The availability of car parking has a major influence on the means of transport people choose for their journeys within the Borough and car parking charges can be used to encourage the use of alternative modes by discouraging long-term parking for commuters.

The issue of lack of transport and the loss of perceived amenity that it represents to people should be carefully considered. The benefits of cleaner, safer and less congested roads are significant and there are a number of different strategies that can be employed at community level to encourage a change in attitudes. An example of one of these is a voluntary car exclusion zone to a distance of 400 m around schools.

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## 5. How should we adapt and plan for climate change?

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### 5.1 What do we Mean by Adaptation?

Adaptation describes the responses made by stakeholders to the impacts (threats and opportunities) of a changing climate. Within the UK work on adaptation is at an early stage and adaptation strategies vary between different organisations and can take many different forms depending on climate, location, activity, timescale, resources and organisational structure. Adaptation needs to form part of the Melton BC strategy because it is likely that some level of climate change cannot be avoided (as a consequence of past emissions) despite best efforts to mitigate its effects by emission reductions, and because planning for adaptation may be more effective and less costly than adaptation to a crisis event.

In some cases adaptation actions may be undertaken for reasons other than climate adaptation but the aim of this section is to provide a framework to help Melton BC develop its own strategy.

There are broadly two adaptation responses that Melton BC can develop:

- Building Adaptive Capacity – this involves developing the information and organisational conditions that are needed before adaptation actions can be undertaken; and
- Deliver Adaptation Actions – this involves taking actions that will help manage or reduce risks from climate change, or to exploit the opportunities.

### 5.2 Actions to Develop Adaptive Capacity

**Table 5.1** provides examples of building adaptive capacity. These have been used to help develop the adaptation element of the proposed Action Plan provided in Section 6.

**Table 5.1 Examples of Building Adaptive Capacity (Modified from UKCIP, 2005<sup>17</sup>)**

Type	Example of Generic Activity	Case Examples
Research	Regional Scoping Studies	East Midlands Regional Scoping Study
	Technical Impact Assessments	
	Climate Risk Based Appraisals	Water Company Water Resources Plans (e.g. Severn Trent Water)
Data Collection and Monitoring	Phenology	Indicator Studies for Northern Ireland & Wales
	Monitoring Climate Impacts and Learning Lessons	
Awareness Raising	Education and Training	UKCIP Programmes with Local Authorities
	Conferences, Events and Publications	UKCIP Training Workshops
Changing Standards and Developing Policy	Enforcement of Standards	PPG25
	National, Regional and Local Policy and Plans	
Organisational Learning	Training and Staff Development	Severn Trent Water
	Identify Climate Change Champion	ABI
Working in Partnership	Sectoral Partnerships	East Midlands Regional Partnership

### 5.3 Specific Adaptation Actions in Melton BC and Other Stakeholder Functions

In terms of delivering adaptation actions there are four main areas for the strategy:

- Making Changes to Operations and Design – e.g. water efficiency in housing, climate proofing new housing and other assets;
- Exploit New Opportunities – e.g. farmers may be able to plant different crops;
- Contingency Planning – e.g. plans to be updated and tested to respond to potentially more extreme events (flooding and heat stress); and
- Changing Behaviours – e.g. include climate change in policy and plan development.

<sup>17</sup> UKCIP 2005, Measuring Progress – UKCIP Technical Report

Key barriers to adaptation include the issues surrounding uncertainty on climate predictions, lack of specific guidance or standards and the case specific nature of adaptation. **Table 5.2** provides some examples of generic adaptation actions but further work is required in developing adaptive capacity by the Council before these, or other specific actions, could be implemented.

**Table 5.2 Generic Adaptation Actions (Modified from UKCIP, 2003<sup>18</sup>)**

Local Authority Service	Examples of Possible Adaptation Responses
<b>PLANNING</b>	
Forward Planning and Development Control	Ensure planning takes account of future trends in flooding and erosion. Consider range of options for flood management, including promoting appropriate and sustainable defences (with the Environment Agency where appropriate) and locating new development away from areas of highest risk
	Incorporate landscape features to absorb water within developments
	Consider potential water supply / demand issues when siting new development
	Consider how Strategic and Local Plans can accommodate changes in recreational needs
Emergency Planning	Ensure emergency procedures and equipment are updated to meet increased risk  Refer to Business Continuity Planning in light of increased risks and business disruption
<b>HOUSING AND BUILDINGS</b>	
Housing	Plan for preventative and remedial maintenance of existing stock
	Consider restricting development in the floodplain for new housing and instigating a range of flood-proofing measures or sustainable defence measures for existing properties
	Use thermal properties of materials to improve cooling and retrofit energy efficient systems
Management of public buildings	Retrofit or upgrade energy efficient heating and ventilation
	Upgrade weatherproofing systems and manage internal environment
	Consider flood-proofing measures to relocate
Building Control	Consider changes to procedures and inspections to ensure foundations are resilient
	Consider updating procedures to include measures for wetter conditions
	Reduced need for road salting

<sup>18</sup> UKCIP 2003, Local Authorities and Climate Change – How Prepared are you?

Local Authority Service	Examples of Possible Adaptation Responses
<b>ENVIRONMENTAL SERVICES AND AWARENESS</b>	
Greenspace Management	Adapt maintenance schedules and resources to meet change
	Plant trees and shrubs that will tolerate future conditions
	Plan for wildlife corridors to allow natural migration
Watercourse Management	Increase ditch clearing and gully emptying activities to remove blockages
Waste Services	Consider separate collections of kitchen/food waste
	Monitor condition of existing landfill sites. Check design and operation of future sites with regard to climate change
Community Awareness	Proactively raise awareness and provide advice and information
Business Support	Encourage business to adapt to new markets

## 5.4 Keeping Informed of Adaptation Developments

### 5.4.1 National Adaptation Policy Framework

DEFRA are in the process of developing an Adaptation Policy Framework (APF) which has three main objectives:

- Capture the current, national picture of climate change adaptation;
- Undertake an analysis and commentary on these activities; and
- Make an assessment of why adaptation is not occurring in certain areas and what incentives and assistance are required in order to ensure that it is considered in future planning and development.

### 5.4.2 UKCIP and Regional Partnership Networks

Provision of toolkits, methods, case studies and networks for developing adaptive capacity and examples of adaptation actions (e.g. UKCIP have established a Local Authority Network).

In the East Midlands a Regional Partnership has been established through the Regional Assembly with the Environment Agency and activities in 2004 focussed on reforming the partnership, gathering support and developing an action plan.

## 6. Recommended Draft Action Plan

### 6.1 Overview

It has been agreed with Melton Borough Council that the Action Plan will be developed as an internal process but the information provided in this section is intended to help this process. Further internal consultation is needed as there are opportunities to include climate change issues and impact assessment in procurement practices and in the Strategic Environmental Assessment (SEA) process for example. It is also possible that climate change could be included as a standard item on Committee Reports.

### 6.2 Suggested Mitigation Actions

Recommended mitigation actions are included in **Table 6.1**.

**Table 6.1 Recommended Adaptation Actions**

Column Heading	Actions	Tools and Information Sources
Building energy efficiency - existing stock	Establish the baseline for the energy efficiency measures in the existing building stock and develop targets for improvement.	New gas and electricity data from DTI at a district and postcode level will allow prioritisation.  Carbon Trust Local Authority Carbon Management tool kit.  The Energy Saving Trust guidelines for housing providers.
Building energy efficiency - new stock	Establish criteria for new developments that ensure a high degree of mitigation against both climate change and energy dependence.	Use the ODPM's climate change sensitive development checklist. This can be incorporated into supplementary planning document.
Local heat scheme – new developments	Conduct a feasibility study for a local heat scheme possibly derived from coal mine methane sources.	Carbon Trust Local Authority Carbon Finance.  Community Energy grants.
Transport fleet – biofuel	Source a local supply of bio diesel for the council diesel vehicle fleet.  Consider placing long term “ramp up” supply contracts to develop the local bio mass supply chain.	Existing structures and contract systems such as the Greenergy “Field to Forecourt” approach can provide a good template.

Column Heading	Actions	Tools and Information Sources
Transport - council staff car use	Develop a system of mechanisms and incentives aimed at reducing the staffs' use of cars.  Appoint travel plan co-ordinator.	The Energy Saving Trust Transport Guidance.

### 6.3 Suggested Adaptation Actions

Melton Borough Council are in the early stages of development on climate change adaptation and the recommended action plan in **Table 6.2** below is aimed at development of adaptive capacity at this stage. These should be reviewed and updated and Melton Borough Council may wish to consider a formal review of progress and update on new and emerging research relevant to its responsibilities. This should commence with a discussion of priority actions which will help address the specification of the role for the proposed 'climate change champion'.

**Table 6.2 Recommended Adaptation Actions**

Category	Action	Tools and Information Sources
Building Adaptive Capacity	Identify climate change 'champion' and develop specification for role.	
	Include climate change as agenda item on Committee Meetings to help raise profile and awareness.	
	Sign up to Nottingham Declaration.	
	Networking and Organisational Learning.	Network with UKCIP Local Authority User Group via <a href="http://ukcip.org.uk">ukcip.org.uk</a> .  Network with ENABLE.
	Policy and Guidance – apply Climate Change Guidance in SEA process.	UKCIP guidance on climate change and SEA via <a href="http://ukcip.org.uk">ukcip.org.uk</a> .
	Review DEFRA Adaptation Policy Framework and update Action Plan.	Review via DEFRA web site <a href="http://www.defra.gov.uk">www.defra.gov.uk</a> .

### 6.4 Proposals for Keeping Public and Stakeholders Informed

This Strategy represents Melton Borough Council's commitment to tackling the causes and effects of climate change. The Strategy has been prepared in way which helps their key partners develop their own climate change action plans. In particular, MBC will be encouraging other members of the Melton Community Partnership to develop their own plans and we will be raising awareness about climate change in Melton.

MBC will review progress against this Action Plan on an annual basis, letting the public and our partners know of their achievements.

MBC will develop a communication strategy to include regular briefings to ensure that up to date information on climate change impacts and adaptation is disseminated within the Council. This initiative will be aligned with DEFRA proposals for a national climate change communications strategy (DEFRA, 2005<sup>19</sup>).

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<sup>19</sup> DEFRA 2005, Climate Change – Large Scale National Activities



## 7. Information Sources

The following is a list of key information sources to help MBC in the implementation of the strategy. The list is not exhaustive and should be used for guidance only and updated by the plan review process.

Source	Topic Areas	Web Site
UK Climate Impacts Programme (UKCIP)	Research into climate change impacts and adaptation	<a href="http://www.ukcip.org.uk">www.ukcip.org.uk</a>
Energy Savings Trust	Information on energy efficiency	<a href="http://www.est.org.uk">www.est.org.uk</a>
The Carbon Trust	Information on cutting carbon emissions	<a href="http://www.thecarbontrust.co.uk">www.thecarbontrust.co.uk</a>
The Environment Agency	Information on environmental management and research	<a href="http://www.environment-agency.gov.uk">www.environment-agency.gov.uk</a>
DEFRA	Climate Change policy and programmes across the UK	<a href="http://www.defra.gov.uk">www.defra.gov.uk</a>

