

Climate Change Framework for Action in Nottinghamshire

Nottinghamshire Agenda 21

September 2005

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Foreword

Nottinghamshire is a county with a significant heritage in the supply of fossil fuel from our coal mines and energy from our power stations. It is also a county where the threats of a changing climate are very real, not least from flooding along the Trent Valley. It would be fantastic to see Nottinghamshire continue its prominent association with energy, but to see this transformed to a reputation for leading the way to a low carbon future and to adapting successfully to the challenges and opportunities of climate change.

Tony Wilkinson, Chair Nottinghamshire Agenda 21 Forum

Statements of Support

As a committed member of Notts Agenda 21, Nottinghamshire Campaign to Protect Rural England (CPRE) strongly endorses 'Climate Change - a Framework for Action'. It provides a practical, achievable strategy for us all to follow, individually as well as collectively. This will be an indispensable document as we work together for a sustainable future. Congratulations.

Stuart Byfield, Chairman Nottinghamshire CPRE

There is clear evidence to suggest that Climate Change is happening now and that its effects will become ever more obvious and dangerous to us and future generations. In Nottinghamshire and beyond, we need a concerted effort through a partnership approach to mitigate and adapt to these changes. Indeed, consider it a "war on climate change" if you will.

Newark and Sherwood District Council

Global climate change is also a local issue. The fragmented wildlife of this county will find it hard to adapt naturally. The Climate Change Framework is useful in highlighting individual and corporate responsibilities. Take steps now to protect the nature of your county whose health will reflect that of our own.

Paul Learoyd, Chief Executive, Nottinghamshire Wildlife Trust

'Gedling Borough Council recognises the vital and immediate importance of addressing the impacts of climate change and welcomes the Climate Change Framework for Action. We will support the delivery of the programme through our own efforts and by encouraging the community to take practical and meaningful steps to bring about change.'

Cllr Ivan Gollop, Portfolio Holder for Agenda 21, Crime and Community Development, Gedling Borough Council

Chapter 1: Introduction

Purpose of this document

Climate Change is now widely acknowledged as a critical global issue, with Sir David King, the UK Government Chief Scientist describing it as “...*the most severe problem we are facing today, more serious even than the threat of terrorism*”.

This document is aimed at the key stakeholders in the Nottinghamshire area. It sets out the main issues and challenges which face us all in the coming years. The document complements wider work by the Nottinghamshire Agenda 21 Forum, which includes a report by Dr. Brian Waters and a raising awareness conference that attracted over 120 delegates. However, Climate Change is evident now and our responses may take years to implement so swift action is essential. Despite this, anything we may do now to reduce green house gas emissions will not prevent a certain amount of warming. There is going to be a need to adapt to a future climate which is already showing signs of change.

Five local authorities in the County have already signed up to the Nottingham Declaration on Climate Change (see appendix 3). What we now need is for local people and organisations to sign up to the vision and targets set out in this document. Working together we can build on the work to create Action Plans that will minimise the potential threats posed by Climate Change.

How this document can be used

- As an introduction to what the likely effects of Climate Change are going to be for each sector and Nottinghamshire's current response
- As examples of case studies on how to mitigate emissions and adapt to changes
- For practical examples of what you can do (in appendix 2)
- To raise awareness of issues and inspire key stakeholders within the county to develop their own action plans

Causes and effects of Climate Change

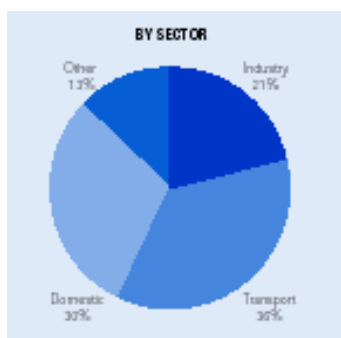


Figure 1: Final Energy Consumption in the UK (2002) [Source: DTI (2003)]

Scientific evidence suggests that global temperatures are getting significantly warmer with an increase of 0.6°C since the beginning of the 19th Century. This is widely attributed to the emission of greenhouse gases (GHGs), the main one being carbon dioxide (CO₂) through the burning of fossil fuels. Others gases include methane (CH₄) and nitrous oxide (NO_x), which are of lesser concern.

Nationally, approximately 90% of energy is derived from fossil fuels, and hence contributes to Climate Change. Figure 1 shows the national breakdown for final energy consumption by sector with the transport sector being the largest energy user. Transport is also the only source of end user CO₂ that is rising, as shown in figure 2.

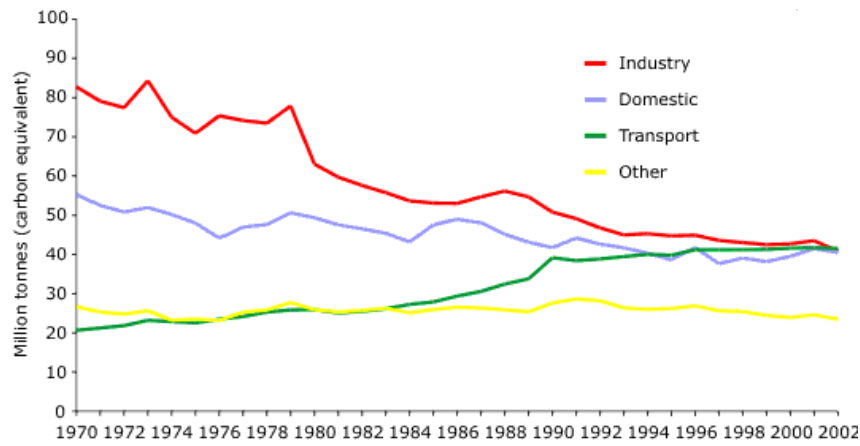


Figure 2: UK Carbon Dioxide Emissions by End User: 1970 – 2002
 [Source: Defra (2004) © Crown copyright 2004]

The principal effects of Climate Change in the UK are likely to be seen in warmer, drier summers and with warmer, wetter, stormier winters. This may already be happening, with the hottest five years on record all being since 1997. 2000 was the wettest year in the 20th century, with severe floods in Nottinghamshire.

Due to inertia of the global climate system, any changes in GHG emissions we make now will have little impact until the 2050s by which time a temperature rise of 1 or 2°C is widely considered to be inevitable, so whatever we do to reduce emissions we must also adapt.

Global and national responses to Climate Change

At an international level, initial action to combat Climate Change resulted in the 1997 Kyoto Protocol. The UK is seen as a global leader in terms of addressing climate change and, as a signatory to the Kyoto Protocol, it is committed to reducing greenhouse gas emissions by 12.5% by 2012 (using 1990 levels as a baseline). In addition to this the UK has agreed a domestic target to reduce CO₂ emissions by 20% by 2010 as shown in figure 3. Although the UK has already reached the Kyoto target, for three out of the last four years, UK emissions have actually been rising. In addition, the UK Energy White Paper (2003) suggests that 60% reductions are required by 2050 if global temperature increases are to be halted. To achieve this, a 1.9% reduction is required year on year.

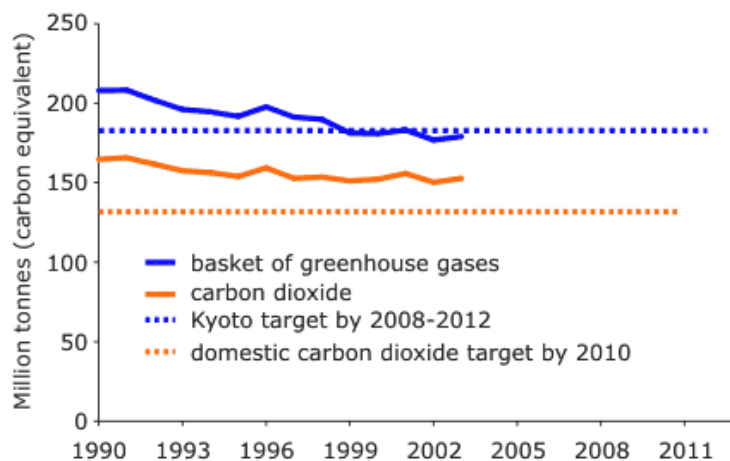


Figure 3: Emissions of greenhouse gases: 1990-2003

[Source: Defra (2004) © Crown copyright 2004]

The 2000 UK Climate Change Strategy describes a two-pronged approach to tackling Climate Change. In addition to the mitigation measures required for the Kyoto and domestic targets, the UK aspires to adapt to the negative impacts of the changing climate, and take

KEY MESSAGE
 We need to **reduce** GHG emissions and **adapt** to the changing climate

advantage of any opportunities that arise.

Nottinghamshire's response to Climate Change

Although there have been a number of global and national responses to Climate Change, the effects will be felt at a local level and therefore local action is necessary. Local authorities within the county have long been committed to tackling Climate Change. Five local authorities in the county are signatories to the Nottingham Declaration on Climate Change (2000). This Declaration has nationwide status and is endorsed by the government. It requires each signatory authority to prepare a plan with the local communities to address the causes and effects of Climate Change, as shown in Appendix 3.

Signatories to the Nottingham Declaration on Climate Change:

- Ashfield District Council
- Broxtowe Borough Council
- Mansfield District Council
- Newark and Sherwood District Council
- Nottingham City Council
- Nottinghamshire County Council

Nottinghamshire Agenda 21

Nottinghamshire Agenda 21 Forum was established in 1999 with the task of developing a Nottinghamshire Agenda 21, covering a wide range of issues that impact on our quality of life. It is now taking a lead role in responding to Climate Change. The forum members are drawn from a mix of public, private and voluntary sector organisations from across the county. In 2004, Nottinghamshire Agenda 21 commissioned a report by Dr. Brian Waters that looked at impacts of Climate Change in Nottinghamshire along with options for mitigation and adaptation. An attractive four page summary document was also produced that is aimed at a more general audience.

A summary of 'Climate Change in Nottinghamshire, Impacts and Options for Mitigation and Adaptation'

This study found that local effects of Climate Change will be similar to the national picture with higher temperatures, increased winter rainfall, decreased summer rainfall and more storms and weather extremes. The impacts of these changes will be seen in damage to the natural and natural historic environment, property and the economy. Farming, forestry and gardens will be affected as much as the natural wildlife along with archaeological sites and historic buildings. Health impacts are likely to be variable – with some potentially beneficial outcomes. Disruption to transport and business by extreme heat or flood events will increase in frequency. Lifestyle patterns will have to change.

The study went on to describe measures by which partners within Nottinghamshire can reduce GHG emissions. These measures include improving energy efficiency by utilising better insulation and more energy efficient equipment and through changing transport patterns, leading to potential other socio-economic benefits. Development of renewable energy sources and technologies was also seen as an important consideration. In terms of adaptation, the report saw that an important part of the process would be to help biodiversity, agriculture and other sectors to respond to the changes in climate.

The report noted that many of these adaptation and mitigation responses will offer opportunities for improvements in lifestyle and business.

Climate Change is a community issue and Nottinghamshire Agenda 21 considers it is vital to ensure stakeholder involvement at all stages in implementation of a strategy. With this in mind, a Climate Change conference was held in October 2004. Its aim was to stimulate and further a response to tackle causes and effects of Climate Change in Nottinghamshire. The conference, which involved Michael Fish as keynote speaker and 120 delegates from over 50 organisations, included a mix of presentations and workshop sessions. Many of the key messages and aims for action in this document originate from the workshop groups.

OUR VISION

A Nottinghamshire where...

- ***a reduction in energy use, energy efficiency, use of renewable energy and sequestration achieves:***
 - a) ***A low carbon economy by 2050***
 - b) ***A carbon neutral economy by 2100***
- ***Our adaptation to the inevitable changes in the climate minimises risks and maximises of benefits to society***

Chapter 2: A low carbon economy

Nottinghamshire's GHG emissions

It is thought that Nottinghamshire will generally follow the national trend of emissions shown in figures 1 and 2, although it should be noted that the county is a major producer of electricity and as such the largest point sources of industrial GHG emissions in Nottinghamshire are the power stations based at Ratcliffe-on-Soar in the south together with West Burton and Cottam in the north of the County. Much of the electricity generated is exported and used beyond County boundaries. In addition, with a high percentage of pre-1920 housing located within the county, the energy efficiency of the housing stock will also be low, adding to increase energy use and CO₂ emission levels.

The National Atmospheric Emissions Inventory (NAEI) compiles estimates of emissions to the atmosphere from UK sources such as cars, trucks, power stations and industrial plant. The estimates are on a 1km² grid and results for Nottinghamshire are shown in Appendix 1.

Individual household emissions have been calculated by the Newark and Sherwood Energy Agency, who has estimated the global warming liabilities of an average Newark and Sherwood household, shown in Figure 4. Although this is representative for the district of Newark and Sherwood, it is likely that other areas of the County, particularly the rural areas, would have comparable values.

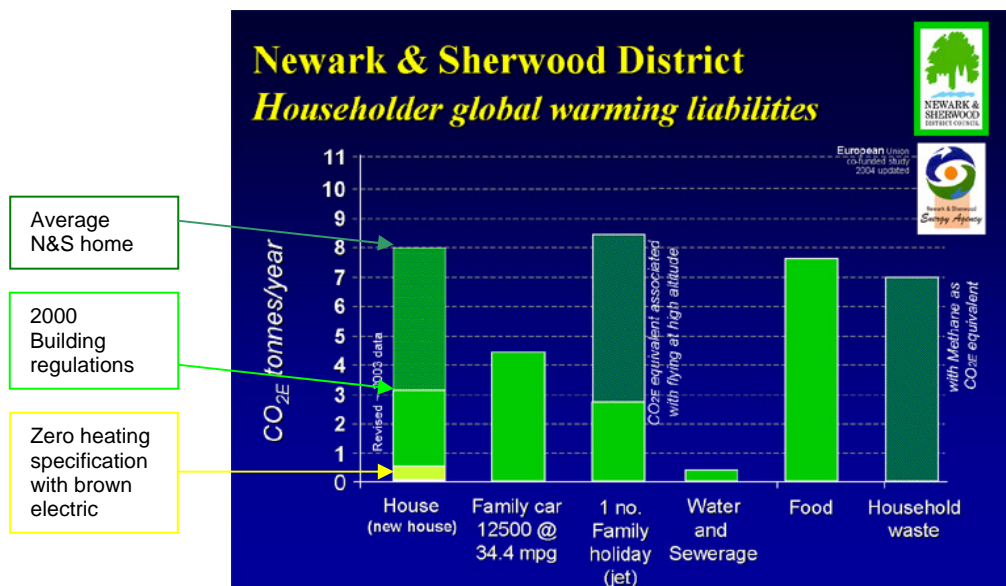


Figure 4: Newark and Sherwood District Household global warming liabilities
[Source: Newark and Sherwood Energy Agency, 2004]

A low carbon economy can be obtained by implementation of the “Energy Hierarchy”. This was originally conceived in 'Energy Services for Sustainable Communities' a Local Government Position Statement on Energy in 1998. It states that organisations and individuals should:

First, reduce the need for energy through careful planning, design, lifestyle choices and encouraging behavioural change.

Next, use energy more efficiently through a variety of measures such as improving insulation, heating or lighting.

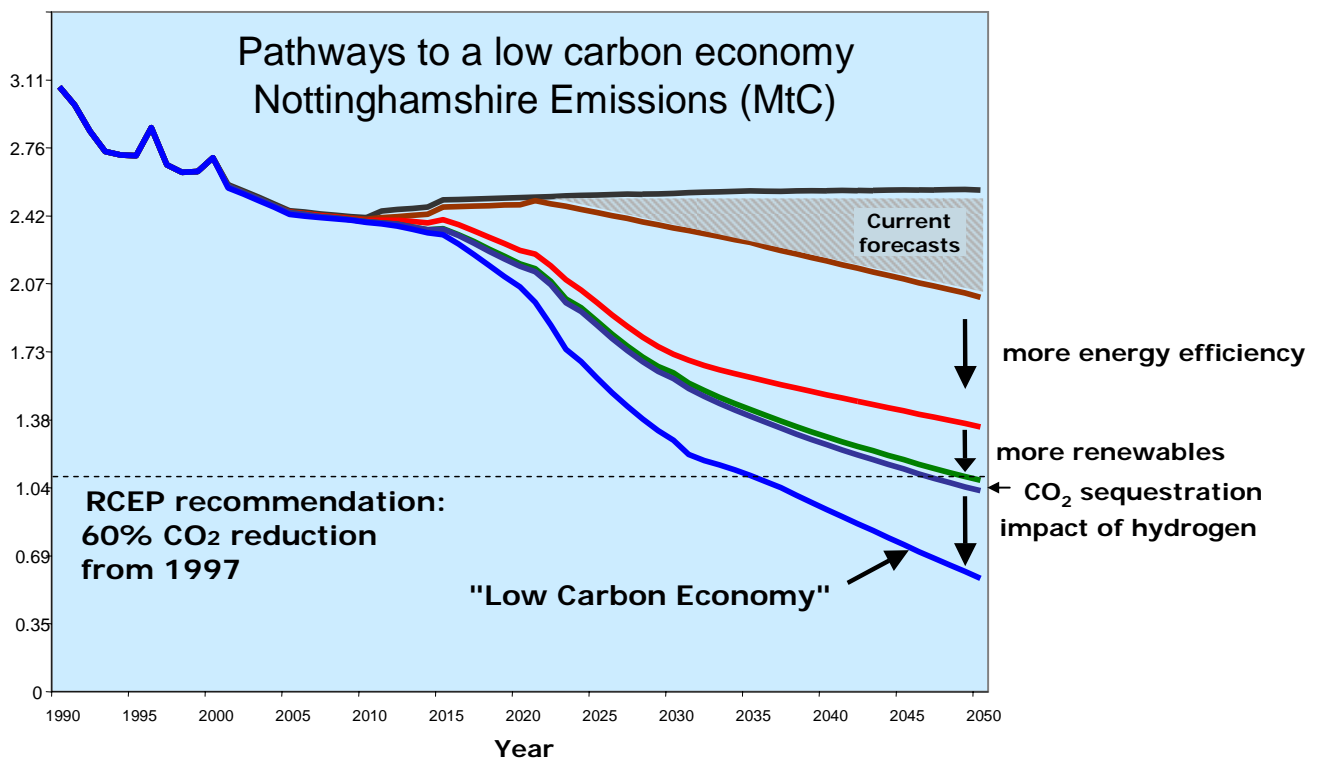
Use energy from renewable sources such as wind, solar, biomass and hydropower.

And finally, make clean and efficient use of fossil fuels such as coal and gas.

Benefits of a low carbon economy

- Improved health and social justice - warm homes through energy efficiency measures, reduced pollution, active lifestyles
- Greater security of energy supply - diverse, local supply of renewable energy
- Increased habitat for biodiversity from sequestration (e.g. the storage of carbon in trees and plants)
- A sustainable transport system
- Economic regeneration - new industries and resource efficiency.

The target of a 60% reduction of CO₂ by 2050 may seem a daunting and unachievable target. However, work by the Carbon Trust has shown that a low carbon economy with a 60% reduction of CO₂ is technically feasible by 2035 using current and emerging technologies. The original figures have been scaled to Nottinghamshire’s population. It is possible to see that energy efficiency is still responsible for the majority of the reduction in emissions, although the impact of hydrogen fuel cell technology will begin to have a significant impact during the 2020s



[Source: The Carbon Trust]

Tyndall Integrated Assessment Scenarios Workshop January 2005

In January 2005, the Tyndall Centre for Climate Change Research held a “Backcasting” workshop that brought together energy experts and stakeholders to produce backcasts to the present day from the end point of a the Energy White Paper’s target of a 60% reduction in CO₂ by 2050. Four end-point scenarios were used, based around different energy demands: with two above and two below current demand. The scenarios included emissions from international aviation and shipping that have largely been neglected in previous activities, including the Energy White Paper target. They found that reducing energy demand in line with the energy hierarchy is essential if large low-carbon supply-side increase is to be avoided – the two scenarios with above present demand both included significant nuclear build. It emphasises the point that there are many currently available technologies that ultimately save money and yet the take-up rate is still low. Therefore without a widespread change in practice and/or values, the only way that a significant reduction in energy demand is likely to be achieved is through imposition of constraints upon the activities and constraints of individuals and organisations, whether through taxation, tradable permits, quotas or regulations.

Carbon neutral

Our ambition to be carbon neutral by 2100 involves a further tier to the energy hierarchy. Although we will reduce emissions as much as possible, it is not practical to achieve zero emissions through these means.

We can therefore achieve 'carbon neutrality' by offsetting emissions through projects that reabsorb CO₂ – such as tree planting.

Milestones

In addition to the overarching aim of a low carbon economy by 2050, it is important to have milestones that we can work towards over a shorter timescale. These milestones are detailed below. The baseline year decided for emissions is 1997 as this is the baseline used in the Energy White Paper.

	CO2 Reduction
2010	20%
2030	40%
2050	60%
2070	80%
2100	CARBON NEUTRAL

These targets will be spread equally across all sectors i.e. they should all aim to achieve the 60% reduction target by 2050. Through continued monitoring it may become obvious that some sectors may achieve their targets with ease whereas others are having difficulty. In this case 'carbon trading' between sectors may be necessary to achieve the overall target effectively. **However, all sectors must aim for the 60% reduction in CO₂ initially.**

2.1 Buildings

2.1.1 Residential

Residential emission data for Nottinghamshire can be estimated using the 2003 Dti *Energy Trends* report that gives regional gas and electricity information. This was scaled to Nottinghamshire's population and it was found that for 2001 gas consumption was the equivalent of 1,417,964 tonnes of CO₂ and electricity consumption was the equivalent of 2,028,776 tonnes of CO₂.

What is being done

Reducing Energy Use and Improving Energy Efficiency

Considerable work with the domestic market has been accomplished by the Nottinghamshire and Derbyshire Local Authorities Energy Partnership (LAEP). It represents all 19 local authorities in the sub region and also works with central government. All participating authorities operate free and impartial energy reduction and energy efficiency advice services to the domestic market.

Improving Energy Efficiency

Under the Home Energy Conservation Act (HECA) (1995), local authorities with housing responsibilities were required to prepare an energy conservation report to improve energy efficiency of all residential accommodation. In Nottinghamshire, this responsibility lies with the City, District and Borough Councils. All of these local authorities within Nottinghamshire have improved their energy efficiency since the introduction of HECA, as shown in the table opposite. There was an average improvement in the domestic energy efficiency of 10.6% for Nottinghamshire between 1996 and 2003. This includes all residential accommodation in the district wards. The results are obtained through different methodologies including postal or phone surveys.

Authority	Overall percentage improvement in domestic energy efficiency (1/4/1996 - 31/3/2003)
Ashfield	10.7
Bassetlaw	6.0
Broxtowe	10.0
Gedling	10.5
Mansfield	5.0
Newark & Sherwood	14.9
Nottingham	15.0
Rushcliffe	12.3
Average	10.6

These improvements in energy efficiency have been achieved through a number of measures, including promotion of energy saving light bulbs, and grants such as the Warmfront grants that allow people in receipt of benefits up to £1500 for insulation and heating improvements.

Newark and Sherwood District Council has worked particularly hard to improve energy efficiency and in 2002-3 were awarded beacon status for tackling fuel poverty – see case study below.

Case Study: Newark and Sherwood District Council – A beacon authority for tackling fuel poverty 2002-03

Newark and Sherwood District Council can demonstrate a long standing commitment to tackling fuel poverty through their property based approach i.e. improving the energy efficiency of the worst dwellings first on the assumption that properties at any point could be occupied by a fuel poor household. In 1988, the authority established its £16.4 million, 20 year energy efficiency investment programme for its 7,500 council owned dwellings. As the approach is widely based around energy efficiency measures, it also helps reduce the district's CO₂ emissions. The approach has involved working in strategic partnerships with agencies such as Age Concern, Care and Repair and other partners in the health and social services.

Implementation of energy efficiency measures in the development of new build houses represents an opportunity for reducing GHG emissions. The average UK house contributes 8.5 tonnes CO₂ a year (solely through the building – this does not include waste etc.) whereas a 1995 new build home only contributes 4.2 tonnes CO₂ a year. The Sustainable Developer Guide for Nottinghamshire, www.sdg-nottinghamshire.org.uk cites a number of examples of energy efficient new build sites such as Millennium Green in Collingham – see case study below.

Case Study: Millennium Green, Collingham

In this development, houses are energy efficient with emissions of CO₂ being reduced by up to 70% (and cost savings of 50-70%) due to high insulation, argon filled low E windows and ventilation with heat recovery.

Housing Associations can play a large role in improving residential energy efficiency, having such a large housing stock under their control. Being part of the community, and having a high turnover of tenants, they are in a prime position to raise awareness about energy efficiency to their tenants – many of whom may then go on to buy their own properties. This also has the added benefit of reducing costs to tenants, being especially important as many of them are on low incomes.

Case Study: Nottingham Community Housing Association (NCHA)

NCHA core philosophies recognise the need to reduce the cost of electricity to tenants and the association whilst improving the environment. At Beaconsfield Street in Hyson Green, they have heavily insulated a small timber framed housing scheme using newspapers. At Yorke Drive in Newark they replaced problem council flats with 34 bungalows all accessed through communal glazed “streets” for maximum heat benefits.

www.ncha.org.uk

Renewables

Small scale renewable energy schemes are being promoted in domestic properties through grant schemes such as Sungain – see case study opposite.

Case Study: Sungain

Sungain is a local authority accredited scheme in Nottinghamshire that offers grants to help with the cost of installing solar hot water in residential buildings.

What we need to do**Reducing Energy Use**

A reduction in Energy Use is best achieved through a change in behaviour, initiated by awareness raising and education.

Improving Energy Efficiency

Through HECA, local authorities in the county will continue to work towards the target of a 30% improvement in domestic energy efficiency based on 1996 levels by 2011. This means as an average for the county, the local authorities need to improve energy efficiency by a further 19.4% on 1996 levels by 2011. This is approximately 2.8% per year for the next 7 years. Until now the local authorities within the county have improved efficiency by approximately 1.3% per year on average. Therefore, if we are to meet the target for all districts and boroughs within the county a lot more work needs to be done.

Renewables

As part of the Energy Hierarchy it is necessary for renewable energy to be promoted in the domestic sector. Many companies now offer green electricity at comparable prices.

Small scale renewables in the home will also be important in increasing the percentage of electricity from renewable sources and should be continued to be promoted through grant schemes.

2.1.2 Public Sector

Public Sector buildings including council buildings, schools, libraries and hospitals make up a significant amount of Nottinghamshire’s building stock. However, there is very little information about emissions from this sector. The best information available is from a Public Service Agreement between eight local authorities in the county and Nottinghamshire Police. In the baseline year of 2001/2 the CO₂ emissions were 121,664 tonnes. Schools (under Nottinghamshire County Council) are responsible for the majority of these emissions.

One of the key issues that was raised at the Nottinghamshire Climate Change conference is that public buildings and schools should be exemplars for Climate Change mitigation and adaptation. It is therefore essential that public sector buildings strive to reduce GHG emissions as much as possible.

Fact Box:

- Lighting accounts for 50% of a hospital's electricity costs

What is being done

Nottinghamshire County Council's *Energy Strategy for Buildings* aims to deal with GHG emissions from the Council's building stock and covers all areas of the energy hierarchy – see case study below.

Case Study: Nottinghamshire County Council's Energy Strategy for Buildings 2002

The Energy Strategy for Buildings was prepared in late 2001 primarily in response to the increased emphasis upon reducing greenhouse gas emissions in order to combat Climate Change. Allied to this, the clear economic reasons for continuing to improve the Council's annual fuel consumption, given the size, age and diversity of its building portfolio, were also paramount. It focused upon the 671 sites where the council was responsible for paying the fuel bills. It was based upon a re-assessment of the energy performance of these buildings and of past investment programmes in relation to cleaner fuel options and green electricity purchase. The report examined future opportunities that may occur, notably through the use of wood heat, emissions trading, carbon offsetting and through seeking out new funding streams.

The Strategy was adopted by the Council's Cabinet in March 2002 and featured a framework for action based on the energy hierarchy, with emphasis upon a dedicated investment package of £11m, an annual budget of £30k for energy awareness raising and a new monitoring and reporting system. The proposals were tied to UK targets for CO₂ emissions established in 2000 and to the Council's own Strategic Plan (2001–2005). A target of a 25% reduction of CO₂ emissions (on a 1998 baseline) was adopted (and subsequently achieved) for 2003, which has helped launch the Council towards its long term vision of becoming a carbon-neutral Authority. This will only be reached if future opportunities, particularly for the generation of both electricity and heat from renewables, can be exploited.

Improving Energy Efficiency

Nottinghamshire County Council is part of the Local Authority Energy Finance (LAEF) scheme, with a £1million 'Invest to save' scheme that is 50% financed by a Carbon Trust grant. This aims to kick-start energy efficiency projects within the County Council's buildings. Approved projects receive a loan to implement energy efficiency measures, making repayments from the savings. This repaid money is then ploughed into further projects and over time the scheme becomes self-financing. This will aim to extend the 25% reduction that has already been achieved.

Energy efficiency of public sector buildings within the county has been improved through a unique Public Service Agreement. It is the first in the UK for Carbon Management CO₂ reduction, and is a partnership led by the County Council, but including all seven Nottinghamshire District Councils and the Nottinghamshire Police. It will invest £1.5 million and achieve annual emissions reductions of 5,000 tonnes CO₂.

Renewables

A number of public sector buildings in the county are already beginning to embrace the opportunities offered by renewable energy. The County Council is keen to use biofuels at a number of its sites. The example below is of woodheat in a Nottinghamshire school.

Case Study: Woodheat in Garibaldi School, Mansfield

Garibaldi School in Mansfield is a large comprehensive school of 8,872m² with 1100 pupils, including 170 sixth form students. The original oil boilers were old, inefficient and producing high CO₂ emissions, and thus were in need of replacement. Garibaldi was given the opportunity to have a wood fuelled boiler installed to replace the old system. The environmental impact of these new wood fuel boilers is clear - any CO₂ that is produced during the process of heating the school is equivalent to the amount of CO₂ absorbed by growing trees. Therefore, the emissions from heating the school are reduced from the equivalent of 350 tonnes CO₂ to virtually zero every year.

What we need to do**KEY MESSAGE**

Schools and Public buildings should act as exemplars and share good practice amongst the community.

Although the County Council has a comprehensive strategy in place to reduce CO₂ emissions from its buildings, this is not the case across all public sector buildings. It is therefore going to be important to work with all public sector buildings, particularly hospitals, and use Nottinghamshire County Council as an example of good practice – this will need to be implemented across all stages of the energy hierarchy.

2.1.3 Commercial

Within Greater Nottingham the service sector is both the most rapidly growing sector and employs the most people, making up 79.8% of jobs in the 2001 census. Much of this is due to a number of large companies that have located in Nottingham – Capital One, Experian and Clinphone Ltd. to name a few. Large commercial spaces and offices tend to have high energy demand with lighting, heating and computer equipment being used continuously.

Limited data is available for CO₂ emissions of commercial buildings, but nationally, 'Business' made up 32.5% of CO₂ emissions in 2002. It is expected that Nottinghamshire would be slightly lower than the national picture as the service economy is still below the national average for the county and the manufacturing sector is above the national average in terms of employment. However, it can be seen that the commercial sector will still be important in terms of mitigation of GHGs.

Fact box:

- A photocopier left on overnight uses enough energy to produce over 1500 copies
- Lighting an office overnight wastes enough energy to heat water for 1000 cups of tea
- A typical window left open overnight in winter will waste enough energy to drive a small car over 35 miles
- A PC monitor switched off overnight saves enough energy to microwave six dinners
- The extra CO₂ produced in running a typical air-conditioned office for a year is equivalent to printing almost 900 million A4 sheets
- Good use of daylight whenever possible can reduce lighting costs by up to 15%
- The energy you could save by installing a condensing boiler in a typical office is enough to power 240 TVs every year
- In most office buildings in the UK, a night set-back temperature of approximately 10 degrees C is sufficient
- Leaving a computer on 24/7 costs four times more than if you switch it off at night and weekends

What is being done***Reducing Energy Use and Improving Energy Efficiency***

A number of government measures have been introduced that cover energy use in commercial buildings – including the Climate Change Levy and the EU Emissions Trading Scheme. Although these are in the early stages it is hoped that they will reduce energy use through behavioural changes and energy efficiency measures in the near future.

Case Study: Experian, Nottingham

Experian is one of the largest employers in the Nottingham area and have used this power to influence its people. It has introduced energy efficient lighting systems in many of its offices and encourages staff to switch off computers and monitors when they leave work. Experian is also beginning to use renewable energy – with 5% of its energy from a green tariff.

Many businesses in the county are beginning to become aware of the need for energy efficiency and realising the positive impact it can have on their bottom line. Experian is one large Nottinghamshire company that have taken steps to reduce their CO₂ emissions – see case study above.

Renewables

Case Study: Tesco, Hucknall

Tesco's petrol station in Hucknall has incorporated renewable energy into its design with the installation of 96 photovoltaic (PV) roof panels, giving a total size of 15 kWp. This generates 12.5 megawatt hours of electricity a year - 20% of the energy required for the petrol station. This gives CO₂ savings of 5.5 tonnes per year - enough to fill three Olympic-sized swimming pools. The system acts to raise awareness, being highly visible to the 3,500 customers who use the store every day, and having a display meter showing how much energy is generated and used.

CHP (Combined Heat and Power)

Nottingham's Eastcroft generator produces combined heat and power from waste in the region. Much of this goes to heating large commercial properties in Nottingham – including Victoria and Broadmarsh shopping centres and Capital One.

What we need to do

Reducing Energy Use and Improving Energy Efficiency

It will be important to encourage businesses in the county to adopt energy saving measures in their buildings, throughout all stages of the energy hierarchy. This can best be promoted through emphasis of the cost saving implications for the business.

With the growth in the service sector leading to a greater demand for office and retail space it is important that any new builds are as energy efficient as possible

Renewables

Green electricity contracts should be promoted and introduced where appropriate.

On site renewables for the larger companies would be highly beneficial and therefore the options should be considered.

KEY MESSAGE

We need to increase the use of **biofuels** in all building types

Top tips

- Fit at least one energy saving light bulb – this will save you approximately £7 per year
- Turn down your heating thermostat by 1°C – this can save you up to 10% on energy bills

For more tips refer to the 'What can you do?' appendix

2.2: Transport

Introduction

Nationally, between 1970 and 2001 emissions of CO₂ from transport more than doubled, whilst that from industry and the domestic sectors fell by 40% and 23% respectively – see figure 2. It is likely that Nottinghamshire's emissions follow national trends now accounting for approximately 27% of CO₂ emissions. The transport sector, therefore, is an area that could potentially offer great CO₂ savings.

What is being done

The County Council and Nottingham City Council are responsible for the production of Local Transport Plans (LTPs) for the county. There are two - the Greater Nottingham LTP and North Nottinghamshire LTP. Their aim is to develop transport strategies in line with people's needs, therefore reducing the use of vehicles and in turn reducing emissions of GHGs. In 2002/3 over £47 million was spent between the two LTPs. In this period in Greater Nottingham the total volume of traffic was down 1.5% combined with increased bus usage of 6.8%. In North Nottinghamshire traffic volumes were up 2% in the Mansfield area and 6% in rural areas, however, this is still 1% less than the 1999 base. Spending is set to continue with combined bids of £52 million for the LTPs in the 2004/5 period.

Fact box:

- 90% of people live within a six minute walk of a bus stop
- One in four trips by car is less than one mile long.
- Four out of five journeys are made by car
- If half of UK motorists received a lift one day a week, congestion and pollution would be reduced by 10% and traffic jams by 20%

Public transport

Nottingham's tram system, NET (Nottingham Express Transit) Line One, was launched in March 2004 and is already carrying around 23,000 passengers every weekday - and a thousand more on Saturdays - and this figure is rising. NET is expected to achieve eight million passengers in its first year of operation. Trams are powered by electricity from overhead wires and are therefore a sustainable method of travel which does not cause local pollution. The trams use far less fuel per passenger than cars and each tram is able to carry over 200 passengers – the equivalent of 3 double decker buses. And when they brake electricity is channelled back into the system which further improves their energy efficiency. By providing fast, reliable and attractive public transport with priority over traffic at junctions, NET encourages people to leave their cars at home or at its five large Park and Ride sites. Two more lines are proposed. If approved, these lines would run south and west of the city, doubling the length of the system, as well as adding two more Park & Rides just off the M1 and creating a state-of-the-art interchange above Nottingham Station.

The £28 million Robin Hood Line developed by the County Council as lead authority is nationally renowned for encouraging local passenger rail use. The Line has been highly successful and patronage levels have continued to grow. Problems with over-crowding led to the introduction of additional morning peak and shoppers services from summer 2000. The line has achieved a modal shift in transport, provided decongestion and environmental benefits and assisted community regeneration. It also has good access for people with disabilities, including portable ramps on trains.

School travel

Nationally, between 1996-8 and 2002, the percentage of children walking to school decreased by 10%, while the percentage taken by car increased by 13%. Over fifty schools in the county have formed a travel plan in a partnership of the local authority, the school, governors, parents and members of the local community with the aim to reduce car use and improve safety around the school. Improving cycle routes for schools is also a priority in the county and the County Council has worked with the National Cycle Network to improve cycle links to schools – see case study below.

Fact Box:

- In Notts, 1 in 3 children are now driven to school and the numbers are set to increase.
- 54% of all Primary Schools in Notts took part in the 'Walk to School Week' in October, 2004

Case Study: The National Cycle Network and Links to Schools Programme

The Links to School Programme is being run by Sustrans and aims to extend the National Cycle Network, aiming to make it easier for young people to cycle or walk to school. Nottinghamshire County Council was awarded a £95,000 grant in 2004 to help fund a cycle route between Newark-on-Trent and Collingham, to open links to the national cycle network from Newark High and The Grove schools. Work is currently underway and should be completed during 2005.

Employee commute**Fact box:**

Boots has estimated that if it were to cut its £250,000 a year support to the works bus service, the number of cars coming to the site would increase by over 1,000 per day

As with the school run, the employee commute also offers huge potential for CO₂ savings – in Nottinghamshire 7 out of 10 journeys to work are by car and half of all journeys to work are under 2 and a half miles, causing congestion and pollution problems. Travel plans can be drawn up by any organisation to help reduce travel from both staff commute and business travel. This can include initiatives such as flexi-time and working from home and encouragement of car sharing through allocation of better car parking spaces.

Case Study: STEPS Nottinghamshire County Council

'Sensible Travel Equals Perfect Sense' (STEPS) started in 1996, as an innovative idea from Nottinghamshire County Council to assist staff in managing their journeys to work in an environmentally friendly way. It involved the introduction of a "travel plan" to encompass all modes of travel (bus, tram, train, cycling, car and walking). STEPS has put in place a wide range of incentives for staff, including cycle facilities, a car share scheme, better public transport and information. It also looks at other ways of reducing unnecessary car journeys, such as flexible working and video conferencing. It is a way of demonstrating good practice to other employers in the County. As the first Authority to have a travel plan, many large employers have followed suit, including Boots, Experian, Capital One, and Wilkinsons. The plan fits into Government's Sustainable Development Strategy and the County Council's transportation policy.

Fleet transport

In the case of fleet travel, most journeys are essential and therefore the way to reduce CO₂ emissions will be through improving energy efficiency and introducing renewable fuel types where applicable. This can be best implemented when working in conjunction with an organisation such as Motorvate – see case study below.

Case Study: Motorvate

This government-backed award scheme can help your company cut vehicle fleet costs and benefit the environment. For payment of a small fee (relative to your fleet size) fleet managers are given professional advice from an independent consultant. For a fee of £800 a typical 200-strong car fleet could save around £33,000 per year by meeting their Motorvate targets.

www.transportenergy.org.uk/moreefficient/motorvate/

Case Study: Hardstaff Group, Rushcliffe

This haulage business near Junction 24 of the M1 has a fleet of over 100 trucks. Through introduction of an on board computer the company can monitor the way a truck is being driven e.g. fuel economy and whether the engine has been left idling. Through the system they found fuel savings of 6-9% were achievable – giving savings of £144,000 a year for the company.

Improving Energy Efficiency

Launched in September 1999, the Nottinghamshire Millennium Electric Vehicle Project brought 38 electric vehicles (the largest number ever in a single UK project) onto the streets of Nottinghamshire. A total of 19 diverse public and private organisations took part. The aim of the project was to promote green transport and reduce traffic-related air and noise pollution. PowerGen, in association with the Powershift programme, formulated a project designed to attract high profile exposure and maximise effect. In most cases, PowerGen and Powershift funded 100% of the price difference between an electric and a conventional vehicle, which meant that organisations could purchase an electric vehicle with no added cost.

What we need to do

Richard Davies of MARCHES energy agency identified three options that would achieve the 60% CO₂ reduction by 2050:

- Drive 250 fewer miles year on year
- 2% increase in vehicle efficiency year on year
- Additional 5% biodiesel fraction year on year

KEY MESSAGE

We need a **transport strategy** that can achieve a 60% reduction in CO₂ by 2050

Reducing Energy Use

The easiest way to reduce energy use from transport is to reduce the need to travel. This can be implemented through sustainable planning that encourages walking and cycling through provision of good quality routes and promotes public transport. Working with schools provides an ideal opportunity to reduce car use and educate future generations on the benefits of sustainable transport – between 2005 and 2010 the target is for a further 1406 schools to have a completed travel plan. It will also be important to continue to work with companies to form travel plans.

In the office environment, video conferencing offers an ideal opportunity to reduce emissions from transport whilst having the added benefit of saving time for the employees. This should be promoted to companies through organisations such as the Institute for Sustainable Development in Business, <http://www2.ntu.ac.uk/susdev/>

Improving Energy Efficiency

Along with a reduction in car usage, improvements in fuel efficiency will help to tackle CO₂ emissions. We need to ensure that any improvements in energy efficiency are not outweighed by the new trend for larger and heavier vehicles. Government support is required to have higher taxes on the more polluting vehicles and promotion of vehicles that have the highest fuel efficiency.

It will be important to identify companies that are operating fleets and ensure they are aware of how to adopt fleet management measures to run a fleet more efficiently.

Renewables

Biodiesel is produced from plants and is considered to be carbon neutral. A major advantage is that sales of the product can be blended with conventional diesel, to be used in conventional engines with no modification – therefore offering huge potential for CO₂ savings.

Electrical vehicles using green energy can provide an opportunity for carbon neutral motoring and should be promoted.

Top tips

- Stick to speed limits - Driving at 70mph uses 30% more fuel than at 50mph
- Check your tyre pressure regularly - Under-inflated tyres wear out more quickly and can increase fuel consumption by up to 3%

For more tips refer to the 'What can you do?' appendix

2.3: Industrial

Introduction

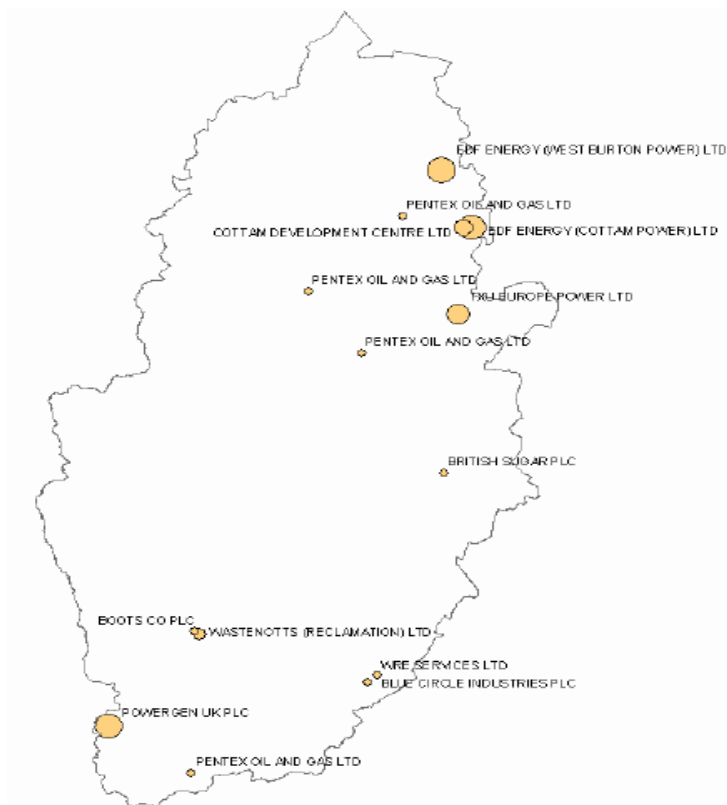


Figure 5: Major industrial sources of greenhouse gases in Nottinghamshire
 [© Crown Copyright. All rights reserved. Environment Agency, 100026380, 2004. Taken from Waters, 2004]

Nottinghamshire has a long industrial history and although this has declined in recent years it still accounted for 26.2% of employees in 2002. Figure 5 shows 'Part A processes' which are the point source emissions that are required to be regulated by the Environment Agency. As would be expected, the major sources are the four power stations that burn fossil fuel. Pentex Oil and Gas Ltd. account for half of the other eight sources. In the 2001 *Nottinghamshire Emissions Inventory*, these Part A processes accounted for 25,643,460 tonnes of CO₂ - 97% of Nottinghamshire's emissions - therefore giving significant scope for major CO₂ reductions. It must be emphasised that this figure is not comparable to others quoted in this publication as it is emissions from source rather than end user. For example, E:ON (formerly Powergen) is a power producer and therefore is a major industrial source of CO₂. However, much of this is used in domestic properties or exported beyond the county boundaries and therefore the emissions are not directly attributable to Nottinghamshire.

What is being done

As the Part A emissions that are shown above are regulated by the Environment Agency, with a permitting process, these companies will be aware of the need to reduce emissions as shown in the case study below.

Reductions at all levels of the energy hierarchy are required and the case study below describes what Blue Circle Industries is doing.

Case Study: Blue circle industries.

Blue Circle Industries are shown as a large point source of greenhouse gas emissions in Nottinghamshire in figure 5. As part of Lafarge cement, they have put a number of measures in place to help reduce GHG emissions.

In Blue Circle Masonry Cement, 35% of the raw materials do not need to pass through the kiln and therefore less energy is used per tonne of end product made, thus reducing emissions.

The company also use scrap tyres as a fuel source. Not only are scrap tyres high energy, but the disposal of tyres is a major problem, especially as they are now banned from landfill sites. Other alternative fuels being trialled by the company include recycled liquid fuel, PSP (processed sewage pellets) and packaging waste.

It is important that smaller businesses that are not regulated by the Environment Agency still work to reduce their emissions as collectively they can have a significant effect. Organisations such as the Institute for Sustainable Development in Business work with businesses to help them reduce emissions.

Case Study: Fireplace Gallery, Worksop

This company produces fireplace surrounds and has taken a practical approach to reducing energy use. Although an initial investment was required to purchase better machinery to cut the wood, the company has found that man hours are reduced and materials are cut perfectly reducing waste. Energy efficiency was improved by insulating the roof and fitting a dust extraction system that filters out dust but pumps the warm air back in.

Fact Box:

- British Steel Stainless saved over £50,000 a year by installing a regenerative boiler designed for small furnaces

What we need to do

Nottinghamshire Agenda 21 acknowledges that many local businesses in the industrial sector have begun to recognise that they can have an effect upon the environment and have endeavoured to reduce their GHG emissions, mainly through energy efficiency measures. However, we must look for further savings if we are to achieve our overall vision. Therefore Nottinghamshire Agenda 21 will seek to identify those industrial companies that are not large enough to be regulated by the Environment Agency but still significant in terms of GHG emissions.

Top tips

- Fix leaks on compressed air systems – A compressed air leak the size of a match head wastes enough energy in a working day to toast 444 slices of bread
- Keep motors maintained - a badly maintained motor and drive system can add 5% to your energy costs

For more tips refer to the 'What can you do?' appendix

2.4: Waste

Introduction

Waste can contribute to Climate Change in a number of ways. Incineration releases CO₂ whereas decomposition in landfill emits CO₂ and methane (21 times a more potent greenhouse gas than CO₂ although it can be captured and used). But it is not only this management of waste that contributes to global warming – the manufacture, distribution and use of the products all result in the emission of greenhouse gases. We therefore need to work to reduce waste and recycle what waste there is to reduce emission of GHGs.

Nottinghamshire County Council and Nottingham City Council worked together to produce a waste local plan for Nottinghamshire that was adopted in 2002. This documents waste management in Nottinghamshire for all types of waste – household, industrial, commercial and construction. It aims to protect the environment whilst ensuring efficient use of resources. The plan identifies potential future sites for new facilities such as waste transfer, recycling, composting, energy recovery and landfill. It also sets out the detailed environmental and other criteria against which all applications for waste management will be judged.

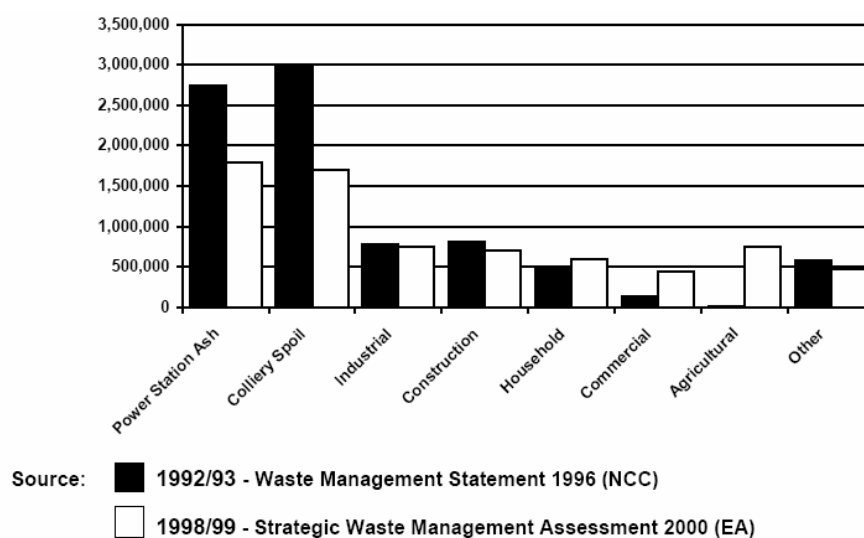


Figure 6: Total Waste Arisings 1992/93 compared to 1998/99

[Source: Nottinghamshire and Nottingham Waste Local Plan Monitoring Report, 2000-2003 (2004)]

Data availability for waste (apart from domestic waste) is scarce and therefore it is difficult to recognise trends. The Environment Agency collates waste data, and the most recent data available is from 1998/99. The Nottinghamshire breakdown (including Nottingham City) is shown above, along with 1992/93 data. Historically, it can be seen that a high proportion of waste can be contributed to power station and colliery waste. Both showed a large decline over the 1990s, attributed to a sharp decline in coal fired power generation and coal production. This has continued since the late nineties, and so it is expected that the waste from these sources will have also continued to decrease. All other types of waste remained relatively stable, with the large increase in Agricultural waste likely to be due to more information being collected in the 1998/99 survey.

Data for domestic waste is more readily available than most other types of waste and between 1992 and 2003, there has been an average growth rate of 1%, which is lower than the national average of 3%. Domestic waste is now in the region of 560,000 tonnes per annum. Approximately 350,000 tonnes of this is deposited in landfill and approximately 120,000 tonnes is incinerated. The remainder is recycled or composted.

Newark and Sherwood District Council calculated the Global Warming Liabilities of an average Newark and Sherwood home (see figure 4) and found that waste contributed the equivalent of 7 tonnes per year – this could obviously offer potential savings in the domestic sector.

Recycling levels for domestic waste, at approximately 14%, is lower than that for industrial and commercial waste (40%) and construction and demolition waste (35%). A large amount of this is aggregate, soils and colliery spoil that when recycled not only reduces the need for landfill, but also reduces the demand for natural resources.

What is being done

Reducing energy use through reduction of waste

Notts Nappy project – promotion of cotton reusable nappies rather than disposable. It is estimated that a baby uses 5000 nappies from birth until it is potty trained. This obviously causes a considerable amount of bulky waste if disposable nappies are used, and therefore the Notts Nappy project (for which Nottinghamshire County Council is a supporter) promotes the use of the reusable cotton variety.

Materials Exchange Network – launched by Nottinghamshire County Council in partnership with the Institute for Sustainable Development in Business at Nottingham Trent University. This project will enable businesses to reduce the amount of waste they throw away through passing it on to other companies for reuse as a raw material.

There are a number of schemes operating in Nottinghamshire under the 'Nottinghamshire Furniture Recycling Network' umbrella. These schemes work to collect unwanted furniture from residents and redistribute it to people in need.

Improving energy efficiency through recycling

Fact Box:

Rushcliffe Borough Council increased their recycling rate 500% between 2002 and 2004 – with nearly 50% of household waste now being recycled.

Until now most waste reduction work has concentrated on domestic waste. Collection of domestic waste is the responsibility of the district councils and all local authorities in Nottinghamshire have developed an integrated waste management strategy. This has concentrated on increasing recycling rates, with the implementation of a twin bin scheme, where households have been allocated an extra bin for recyclable material, where collection is alternated on a

fortnightly basis with the non-recyclable material. An advantage of reducing and recycling paper waste that is not often considered is that fewer trees are harvested – and therefore they continue to act as carbon sinks reducing CO₂ levels further.

Community Group Recycling Initiative

Through the community group recycling initiative, groups such as scouts and churches can receive a recycling credit payment for rubbish that they help to recycle. The close links that community groups have with the public mean that they provide an ideal mechanism for raising awareness about waste management and encouraging changes in public attitudes.

Christmas Card Recycling Scheme

Another recycling scheme is the annual Christmas card recycling scheme. This is administered by Nottinghamshire County Council and places bins in Tesco and WHSmith stores for used Christmas cards. The initiative has been running since 2002 and in 2003 recycled 40 million cards.

Although most of the schemes set up in Nottinghamshire to date have concentrated on domestic waste reduction and recycling, it is important not to neglect the contribution that industry can have upon waste. Rolls Royce has worked to reduce waste at their plant in Hucknall – see case study opposite.

Case Study: Rolls Royce, Hucknall

Waste reduction

Rolls Royce is a large, multinational company that has works at Hucknall, Nottinghamshire. As part of their ISO14001 accreditation they have introduced an extensive waste management strategy.

The components that are produced in Hucknall used to be sent to the manufacturing plant in Derby in wooden boxes that were used once and then sent to landfill. To reduce this, the company asked a local box supplier to make boxes that could be reused. Once finished with in Derby, the boxes are collected and repaired if necessary and then returned to Hucknall for refilling. This has also been estimated to cut packaging costs from £400K to £150K.

Waste recycling

Waste is placed in separate skips so that it can be recycled rather than going to landfill.

Fact box:

- In the UK today, we only recycle about 3% of our plastic — but recycling just one plastic bottle would save enough energy to light a 100 watt bulb for up to six hours
- A single recycled aluminium can saves enough energy to run a TV for up to three hours
- If ALL the aluminium cans sold in the UK were recycled, we would need 14 million fewer dustbins for our waste
- Recycling aluminium cans uses only 5% of the power needed to make aluminium cans from raw materials — so 20 recycled cans use the same energy as making one from scratch
- Steel is the world's most recycled packaging material — three out of four cans in the supermarket are made from steel

CHP (Combined Heat and Power)

Eastcroft incinerator in Nottingham is the only municipal incinerator in Nottinghamshire - treating 150,000 tonnes of waste each year. This energy is recovered as heat and power and is then used to provide energy to a large number of commercial and domestic customers across Nottingham.

What we need to do

The manufacture of recycled goods requires less energy than making new ones but re-use requires even less – with energy not being used to extract, manufacture and transport the new materials. We should therefore ensure that the energy hierarchy is followed where waste is reduced where possible (e.g. by buying food without packaging), reused (e.g. reuse a container for another purpose) and once it is no longer useful, recycled (e.g. recycle a plastic bottle).

KEY MESSAGE

We need to **implement the waste management strategy** to move towards a 60% reduction of CO₂ equivalent by 2050

Reducing Energy Use and Improving Energy Efficiency through waste reduction and recycling

Waste Management in Nottinghamshire will need to further encourage the waste hierarchy. Nottingham City Council and Nottinghamshire County Council have a waste management strategy in place that aims to have raised the recycling rate of municipal waste to 33% by 2015. Awareness raising and education will be used to further increase recycling levels.

Municipal waste is being dealt with by the waste management strategy of the local authorities. Nottinghamshire Agenda 21 will therefore take the lead in reducing waste from the industrial and business sectors. This will be best done by identifying businesses that may have potential to reduce their waste and raise awareness of the cost saving as well as the environmental benefits.

CHP (Combined Heat and Power)

The waste management strategy for Nottinghamshire aims to raise municipal waste recovery levels to 34% by 2015. Part of this will be through expansion of the Eastcroft incinerator to 250,000 tonnes of waste per annum.

Gas Recovery

It is inevitable that some waste will continue to end up in landfill. But the impact can be minimised with gas recovery schemes where the gas can be used to generate electricity. In Nottinghamshire, the Sutton and Daneshill sites are examples that have this technology and half of all non-inert landfill sites in the county either incorporate or have permission for landfill gas recovery schemes, therefore offering potential to reduce the emission of CO₂ and methane.

Top tips

- Use email or phone where possible to avoid letters and faxes
- Home compost food and garden waste

For more tips refer to the 'What can you do?' appendix

2.5: Procurement

Introduction

To have the most beneficial effect, the emission of greenhouse gases needs to be tackled at an all-encompassing level. An individual or business can seek to reduce their emissions, but if their suppliers do not follow sustainable practice, they will still be having a far greater impact than they realise. Everybody buys things – from the individual doing their weekly food shop to large companies buying raw materials and parts. It is this buying power that can influence companies to help tackle Climate Change through ensuring sustainable practice throughout their business.

It is difficult to calculate CO₂ emissions through procurement practices as it is an indirect source. However, Newark and Sherwood Energy Agency looked solely at food procurement and found that the average Newark and Sherwood household contributed the equivalent of nearly 8 tonnes of CO₂ per year through food (see figure 4). Although this is only an example it emphasises the potential effect our purchasing can have.

What is being done

Larger companies have greater power to influence their suppliers to be sustainable and there is evidence that companies are beginning to realise this power. See case studies below of Rolls-Royce and Boots.

Case Study: Rolls Royce, Hucknall

Rolls Royce managed to use their power as a sizeable customer to influence their suppliers to change the tape they use on packaging to paper rather than plastic so that it could more easily be recycled.

Case Study: Boots, Nottingham

Boots were one of the first companies that signed up to the Envirowise Supply Chain Partnership Forum. Eleven of Boots' suppliers took part in 2002 and they achieved cost savings of £250,000 through reducing waste, energy and packaging. Boots have benefited from the improved efficiency and reduced environmental impact of their supply chain.

[signpost to <http://www.envirowise.gov.uk/>]

Local authorities can also have a large impact – Nottinghamshire County Council spends over £200 million a year for example. The County Council Procurement Strategy states that 'Sustainability' is one of four corner stones that underpin the priorities and targets for improvement of the strategy. However, although it is in the strategy it is important to ensure that it is implemented.

Fact Box:

For every calorie of lettuce flown in from Los Angeles, we use 127 calories of fuel

Work with Nottinghamshire community procurement to date has concentrated upon the purchase of food – the impact of which is largely determined by its source with all transport emitting CO₂. This has led to the concept of food miles – the distance food has to travel from where it is grown or reared to where it is eventually consumed. Food miles have increased on average by 50% in the past 15 years. Buying local food reduces food miles and air pollution, also benefiting health. See case study below.

Case Study: Reducing Food Miles in Nottinghamshire

The Inter Authority Sustainability Working Group in Nottinghamshire has produced a booklet entitled 'Notts Nosh' – a guide to fresh, locally produced food and drink in Nottinghamshire.

The Food Initiatives Group has produced 'Food for Thought' a programme that looks at key food topics in Nottinghamshire including health and animal welfare. It has a chapter on procurement of local food to reduce food miles. Although it is important for the individual to support local food (e.g. through farmers markets) it recognises that 94% of people mainly shop in a supermarket and therefore if supermarkets purchased more local food this would have a potentially huge impact on the local food economy. Likewise, large food providers such as schools and hospitals could have a large impact with local procurement.

What we need to do

Local Authorities should follow sustainable procurement practice as detailed in the 2003 Improvement and Development Agency guidelines entitled *Sustainability and Local Government Procurement*. This guide emphasises

KEY MESSAGE

We need to reduce "Food Miles" by buying locally produced food

that sustainability needs to be built into all stages of the procurement cycle with environmental criteria being applied when selecting suppliers and awarding contracts. However, it is important that Best Value is still complied with. Staff should be educated to understand that 'Best Value' does not necessarily translate to the cheapest – it is "the optimum combination of whole-life costs and benefits to meet the customer requirement". This will therefore account for factors such as fuel efficiency and the replacement cycle.

As work with the community until now has concentrated upon food procurement, Nottinghamshire Agenda 21 will aim to identify and target other areas of community procurement.

Top tips

- Buy recycled products e.g. paper where possible
- Purchase 'green' renewable electricity with no associated CO₂ emissions

For more tips refer to the 'What can you do?' appendix

Chapter 3: Adapting to a Changing Climate

Some Climate Change is inevitable however successful the efforts to reduce the emissions of CO₂ and other GHGs. The inertia in the climate system means that the outcome to the 2050s is fixed. However, mitigation of GHGs now is vitally important as beyond 2050 the climate change scenarios diverge, with a huge rise in temperatures if CO₂ emissions remain high. In the meantime we must prepare to adapt to the inevitable changes until 2050 by preparing to minimise the negative impacts and maximise any benefits of Climate Change.

KEY MESSAGE

Adaptation **should not exacerbate the causes of Climate Change**

3.1: Water resources

Introduction and Effects

With the predicted climate of wetter winters and drier summers, water is likely to become a scarce summer resource. Not only will there be less water available, but demand is set to increase due to the hotter summer temperatures. Domestic demand for water is likely to increase a few percent, and the demand for agricultural irrigation may increase by as much as 20%. Although agricultural irrigation currently only accounts for 4% of total abstraction, it is concentrated in the spring and summer when the flows are lowest.

The main water sources in Nottinghamshire are the River Trent, its tributaries, and groundwater in sandstone and limestone aquifers. With abstraction for agriculture and cooling for power generation as well as water supply, water is already limited in some parts of the county. Abstraction of groundwater is at the upper limit (and in some cases is over-abstracted) and low flows in the spring and summer often lead to restrictions on surface water abstractions. In particular, in the North of the county around Retford, there is no new water available and so new abstraction licenses are not likely to be granted. Reduced river flows not only lead to problems with water availability, but with water quality and the river wildlife.

Not only will there be a reduction in the quantity of water supply, but the quality may deteriorate with warmer summer temperatures leading to algae blooms, which can cause fish stress as well as posing health risks in the case of toxic blue-green algae blooms.

Fact Box:

- Spray taps on hand basins typically save up to 80% of the water used with standard pillar taps
- Leaking taps waste water and money - a constant drip wastes 90 litres per day (approx. £50 per tap per year)
- Toilets use between 7 and 13 litres of water every flush
- In the UK, every person uses on average 155 litres of water a day, compared to developing countries that only use 20 litres
- Sprinklers can use as much as 540 litres of water per hour, that's as much as a family of four can use in a day.
- Did you know that one bath is enough for three 5-minute showers? A bath uses 90 litres of water compared to only 30 litres used by a shower. Be careful though, a power shower can use more water than a bath
- On average, a family of four flush the toilet 7,592 times a year
- A tap left running wastes 10 litres of water per minute - that's 14,400 litres a day! If it's hot water you're wasting energy too

What is being done

The Environment Agency is the principal body responsible for the regulation of water resources through resource planning and licensing of abstractions. They have formed a Water Resources Strategy that looks ahead for the next 25 years considering all users of water: public, agriculture, commerce and industry, as well as the environment. The strategy discusses the potential effects on Climate Change on our water resources and accounts for these when making projections.

Severn Trent Water supplies the majority of houses and businesses in the county. The company has its own plans to monitor the impact of Climate Change and to manage demand and the development of new sources of supply. This is monitored by OFWAT through the Asset Management Planning (AMP) process every five years.

Although the Environment Agency is responsible for water regulation, it is everybody's responsibility to conserve water. Greywater recycling (i.e. using rainwater for non-drinking purposes e.g. watering the garden) is one way of reducing the need for clean water. Everybody in Nottinghamshire was eligible for a reduced price water butt (and composter) through a county wide promotion.

Through the Broxtowe partnership, Nottinghamshire Agenda 21 has helped produce a booklet entitled *Mind your own business – A guide for Businesses to enhance profits and combat Climate Change*. This includes a chapter on water and gives advice on water efficiency techniques.

What we need to do

It is important that the planning authority liaise with the Environment Agency and utility companies to guarantee water supply and disposal infrastructure that will be necessary for the increasing demand in water supply. For new developments, the use of greywater recycling should be standard and water collection points be included in the initial designs.

KEY MESSAGE

We need to have **better water management** if we are to avoid widespread water shortages

Case Study: Stormsaver System

The Stormsaver system collects rainwater that falls onto building roofs, automatically filters it and then stores it in underground tanks ready for use in processes other than drinking. Skills Coaches based in Bulwell, Nottingham, use the system to wash 50 vehicles a day and it has helped them to save £2000 a

Most people are not aware of how much water they are wasting – or of the number of simple measures that are available to help save water. It will be important to highlight the money saving aspect of conserving water especially in industry.

Case Study: Hawthornes Printers, Nottingham

In order to receive ISO14001 accreditation, Hawthornes Printers in Nottingham reviewed the environmental performance of the company. By introducing simple and relatively inexpensive water recycling units to wash equipment they were able to use the same amount of water that would previously be used in a day over a month.

Top tips

- Turn off the tap when you clean your teeth / shave – if the entire adult population of England and Wales were to do this it would save enough water to supply nearly 500,000 homes
- Fit a save-a-flush bag in your toilet cistern. This will save a litre of water each time you flush your toilet [[signpost to Severn Trent Water www.stwater.co.uk](http://www.stwater.co.uk)]

For more tips refer to the 'What can you do?' appendix

3.2: Flooding

Introduction

Nottinghamshire has been no stranger to flooding over the past few years with the storms in the autumn/winter of 2000 flooding a considerable area throughout the Trent valley. The risk of flooding is set to increase because of the wetter and stormier winters expected to come with Climate Change. This will not only cause more areas to become flood-prone but increase the flood intensity in the already vulnerable areas. At present approximately 350,000 people in the East Midlands live in an area that is at risk from flooding. And it is not just flooding from rivers that will be a problem – urban flooding (e.g. overflowing drains) is set to increase with more land being taken up by roads and buildings.

What is being done

The Foresight Programme, commissioned by the Office of Science and Technology in 2004, studied the risk of flooding in the UK considering a number of factors, including Climate Change. The current national cost of flooding is £1.4 billion. By 2080 this could rise by between £1 billion and £27 billion, with most increases having occurred by 2050.

Severn Trent Water, the main utility supplier in the county, recently commissioned a study by the meteorological office to look at the impacts of storms on their sewerage systems. It was found that in many places the 19th century sewers would not be able to deal with the 21st century storms that are anticipated. Severn Trent Water has therefore changed the sewerage design standards to include headroom for Climate Change.

Sustainable Urban Drainage Systems (SUDS) use management practices that aim to ensure water follows the natural water cycle. The largest example of the use of SUDS in the UK is in Nottinghamshire at Sherwood Energy Village in Ollerton. The system has been successful through a network of swales that collect run-off from rainwater and clean pollutants through plant remediation. The water then evaporates or permeates into the groundwater. Severn Trent Water and the Environment Agency support the use of SUDS.

What we need to do

It is important to approach flood management from a county perspective as this scale is appropriate for the river catchment. The Environment Agency is responsible for the main rivers in the county and its *River Trent Strategy* considers options to manage flooding of the Trent. SUDS is seen as important in the upper reaches, and although it will have less impact, it is still encouraged around the Nottingham area, particularly for new developments. Also, development in the areas that are at risk from flooding will be monitored and different land management options considered. This is important for Nottinghamshire County Council to consider with its role in planning. Not only are developments on floodplains at risk from flooding, but they can restrict flow and reduce the storage capacity of the floodplain and therefore accentuate flooding elsewhere. The Environment Agency Floodplain Map should therefore be consulted during the planning process to show areas that have a 1 in 200 year probability of flooding www.environment-agency.gov.uk. However, these maps do not take into account the expected changes in flood risk due to Climate Change and therefore the actual probability may be higher, and other areas may be at risk. The Council will seek to ensure that local authority services such as Planning, Building Control, Highway Engineers, Environmental Health and Emergency Planning work together to take Climate Change into account throughout the planning process.

KEY MESSAGE
Land use and spatial planning will be necessary to minimise flooding impacts

Top tips

- Check the Environment Agency flood risk map for current or potential properties [[signpost to www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)]
- If you are in a flood risk area prepare for flooding with the development of a flood plan – consider different flood scenarios and how you can protect property and people [[signpost to www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)]

For more tips refer to the 'What can you do?' appendix

3.3: The Built Environment

Introduction

Most buildings in Nottinghamshire were built when Climate Change was not a consideration and therefore many will not be able to cope with the changing climate. Although more research is required as to what effect Climate Change will have on the built environment the following changes are likely:

- Prevailing wind may change and allow the increased winter rainfall to penetrate roofs and renders and bricks that are not used to the extreme conditions.
- Hotter summer temperatures may cause decay and pest infestation e.g. House Longhorn beetle
- Increased flooding may cause damage to buildings.
- Effect of increased UV radiation arising from greater sunshine hours and ozone depletion.
- Subsidence is likely to be a particular problem in historic properties, with many old buildings (e.g. churches) built on timber piles or rafts that are only stable as long as they are kept wet by groundwater (with levels that are falling due to climate change). Above ground timber is also likely to be adversely affected by the changing climate.
- The vulnerability of some buildings to fire may increase.
- Lowered groundwater levels and clay soil shrinkage have already begun to create a problem with building subsidence, which the insurance industry has acknowledged as one of the first tangible effects of Climate Change (the National Trust have also noted subsidence problems in some of their properties).

3.3.1 The Construction Industry

What is being done

The new Construction Research and Innovation Strategy Panel (nCRISP) has recognised the challenges that face the construction industry to adapt to Climate Change. It has a task group that is studying the effects of Climate Change facing the construction industry at a national and regional level.

At a local level, the Sustainable Developers Guide for Nottinghamshire has been developed, which is aimed at anyone involved in the development process. It brings together a variety of ideas from the maze of published advice about Sustainable Development to minimise environmental impacts. It covers more general planning guidance such as Land Use to more detailed information on Building Design and Specification. A simpler Householders version of the guide is also available, which is being sent out with selected planning applications and aims to initiate thought on sustainable measures that can be taken during planned work.

www.sdg-nottinghamshire.org.uk

There are a number of examples of new build projects that have taken Climate Change into consideration and have planned to allow adaptation measures e.g. natural ventilation to allow cooler temperatures to be maintained without the use of energy intensive air conditioning. These are of an *ad hoc* basis and it will be important in future that these considerations are included in all projects.

Case Study: Mansfield i centre

A 1990s office building which incorporates passive design measures to reduce energy consumption and costs. The striking design concept includes a first floor overhang to reduce ground floor solar gain. Mechanical systems can be monitored and adjusted for optimum energy efficiency. Roof lights, and narrow plan offices allow for natural ventilation and cross ventilation into deeper plan offices.

What we need to do

Existing buildings

We need to ensure that existing buildings are adapted so that they can cope with the changing climate not just from a structural perspective, but also so that they can maintain a comfortable internal environment. Where possible this should not rely on air conditioning, as this will increase energy use. This will involve extensive surveying to determine which buildings are likely to be at risk, and then use measures to increase natural ventilation.

New Build Projects

New build projects offer the opportunity to provide developments that will be able to cope with the changing climate. Nottinghamshire Agenda 21 will work to promote the Sustainable Developer Guide to ensure that all new build projects within the county incorporate Climate Change into their plans. The key to adaptation is to

use heat effectively – so that the building is cool in the summer and warm in the winter. The following themes are taken from the Sustainable Developer Guide:

- **Passive Solar** – Use of the sun to warm a building interior directly through windows or a ‘sunspace’ (e.g. conservatory), and of thermal mass (see below) plus insulation to store the heat
- **High Thermal Mass** – Use of materials with a high capacity to absorb heat energy within a building structure that can be later released as the air temperature drops.
- **Timber Frame** – A form of lightweight construction using timber to provide a structural frame (normally clad with brickwork to provide the waterproof layer) and faster heat up capability
- **Earth Sheltered** – Earth covering of building, except south facing side, to provide additional insulation and/or to reduce visual impact and the area of exposed external wall
- **Natural Ventilation** – Use of natural cross air flows controlled by building users

At a larger scale it is important to ensure that planning of the layout and facilities, particularly in town centres allow for increasing temperatures and help to minimise the effects by providing adequate shade.

KEY MESSAGE

Planting of trees will provide shading and cooling

3.4: The Natural Environment

Introduction

It is inevitable that Climate Change is going to affect our Natural Environment – disturbing plants and animals alike with loss of habitat such as grassland and shallow rooted trees. The changes in climate will cause changes to plant and animal species distribution and may also have positive effects through an extended growing and breeding season. The changes in distribution may lead to an influx of new pests and diseases, further depleting the biodiversity. Additionally, water shortages in the summer months mean irrigation will not be possible. This might not appear to be too serious until we consider that plants and animals are essential for many things we rely on – not least food.

3.4.1 Nature Conservation

There is no direct study of the likely effect of Climate Change on Nottinghamshire's biodiversity. MONARCH (Modelling Natural Resource Responses to Climate Change) has looked at Climate Change and Nature Conservation in Britain and Ireland and highlighted potential 'winners' and 'losers' at the national scale. Nothing was highlighted that related to the county. However, at a global scale it is claimed that a million of the world's species could be extinct from Climate Change by 2050 and therefore Nottinghamshire's biodiversity is unlikely to escape unharmed.

Perhaps Nottinghamshire's most well known asset in terms of nature conservation is Sherwood Forest, covering a third of the county. It is a Site of Special Scientific Interest (SSSI) and was declared a national nature reserve in 2002. With nearly 1000 ancient oak trees, it is home to a wide range of wildlife, ranging from rare beetles, fungi, bats and birds.

It is not just the terrestrial biodiversity that will be affected. Changes in temperature are likely to disrupt the food chain of freshwater ecosystems with invertebrates being unable to cope with large variations. This is likely to affect the freshwater communities of the Trent and other freshwater habitats although as yet, there has been little study into the likely effects within Nottinghamshire.

What is being done

The UK Phenology Network is run by the Woodland Trust and the Centre for Ecology and Hydrology. It monitors the effects that Climate Change is having on plants and wildlife by recording natural life cycles over time. The first signs of the seasons – such as the first snowdrop, first cuckoo and first swallow in springtime and fieldfares arriving in autumn – are recorded and added to a central database to show changes over time and space.

www.phenology.org.uk

Case Study: Sherwood Initiative, Sherwood Forest Trust

The Sherwood Forest Trust is currently co-ordinating a £5.5million Heritage Lottery Funded 'Area Partnership Scheme' that started in 2002 and will run until 2007. With the onset of Global Warming one concern is the ability of plant and animal species to move between patches of habitat and colonise new areas. Part of the project therefore involves linking together important fragments of habitat providing corridors and stepping stones for the movement and migration of (mobile) plant and animal species. Another part of the project is undertaking genetic testing of Sherwood's ancient oaks to look at provenience, origin and movement of genes through oak progeny.

What we need to do

A Defra report *Climate Change and UK Nature Conservation* identified the need for BAPs (Biodiversity Action Plans) and Habitat and Species Action Plans to consider Climate Change.

KEY MESSAGE

We need to work to allow **wildlife to survive and adapt**

3.4.2 Agriculture

Defra has conducted a lot of research into the likely impact of Climate Change upon agriculture. In short it is likely that summer water shortages will threaten traditional crops like beets, onions and potatoes, especially where soils are sandy, such as much of Nottinghamshire.

Over clay, flooding will be common. New pests will arrive from Europe, joining existing pests to cause long summers of crop-bothering. However, there is a school of thought that believes increased CO₂

KEY MESSAGE

Agricultural adaptation will be vitally important

concentrations could increase yields sufficiently so that it compensates for the decreased water availability resulting in little overall difference in yield.

What is being done

Although there has been extensive research and the likely problems are well known, agriculture faces many short-term pressures and therefore it is difficult to introduce decisions that are seen as long-term issues. Agricultural adaptation is therefore seen as low priority except in areas where the availability of water is potentially a limiting factor, which is much of the west of the county.

What we need to do

It is still important that we work to raise awareness of the issues among the farming community to emphasise that Climate Change needs to be considered in long term planning. In terms of water availability water will be scarce in the summer months but in excess in the winter and therefore winter storage will be necessary to provide summer irrigation. New technologies may also be necessary including trickle irrigation and wetting agents.

As the increased CO₂ and longer growing seasons may increase crop yield it is important that farmers are ready to take advantage of any opportunities that are presented.

There is a wide range of adaptation techniques that can help us adapt to the changing climate including:

- Introduction of later-maturing crop varieties and species and switching crop sequences
- Conservation of soil moisture through appropriate tillage methods and improved irrigation efficiency
- Research the possibility of economic changes such as shifts in the regional production centres and adjustments of capital, labour and land to maximise opportunities
- Support the breeding of new crop varieties that are drought and heat resistant

3.4.3 Gardens

Climate Change will affect public and private gardens as well as other green public areas such as parks and amenity areas. Plants and trees will be vulnerable to storm damage and changes in temperature and drought, water-logging and soil erosion. Although some gardeners may relish the challenge of growing plants in difficult circumstances, owners of public land would probably prefer to adapt.

UKCIP (UK Climate Impacts Programme) have produced a report on the likely effects on gardens as well as identifying some potential opportunities offered by the longer growing season. It is likely that a range of exotic species will be able to be grown when they were not able to be before.

What is being done

At present, work has been restricted to research with very little in the way of practical examples of adaptation.

What we need to do

When promoting the use of allotments etc. it is important to be cautious about the effects of Climate Change and make sure that it is adapted to the likely changes.

It will be necessary to change plant species to those that are more drought resistant and adapted to the new climatic conditions. This is less of a problem for those with a short plant life; larger grassed areas and trees will take years to establish different varieties and therefore planning must begin now.

The creation of green spaces can reduce the urban heat island effect by providing shade and reducing the concentration of heat-absorbing surfaces. The planning authorities in Nottinghamshire must therefore work to increase the amount of green space, particularly in urban centres.

Water features within gardens must also be considered, with warmer temperatures and increased light intensity leading to more algae, giving potential problems with fish stress and toxic blooms. It will therefore be important to have regular monitoring to identify algae problems and act to minimise the impacts with procedures such as artificial oxygenation to alleviate fish stress.

To take the recommendations from the UKCIP, Nottinghamshire Agenda 21 will work to raise awareness and help to implement these recommendations:

- Encourage networking between major gardening organisations and institutions to exchange and coordinate observations, ideas and innovations, disseminate information and inform policy decisions

- Initiate a Hortus Europaeus, to map the distribution of garden species in Europe, allowing large scale monitoring of effects of Climate Change on garden plant species
- Produce a list of indicator plant species likely to be sensitive to Climate Change, allowing nationwide monitoring of its progress and impacts
- Implement practical actions to enable gardens to adapt to Climate Change. Forward plan for flooding, drought, soil changes and structural impacts on buildings, features and facilities

3.5: The Historic Environment

3.5.1 The Built Historic Environment

What is being done

With high intrinsic value, it is important to ensure that the historic environment is ready to adapt to the likely effects of Climate Change upon historic buildings. Until now the historic environment sector has been fairly slow to respond to the issues although English Heritage and the National Trust are both beginning to study the impacts that it is likely to have on buildings and the actions that are needed to introduce mitigation and adaptation measures.

What we need to do

Nottinghamshire contains many historic buildings including Mattersey Priory, Newark Castle and Rufford Abbey. These may all be at risk and so initial work will include surveying these buildings to determine what the likely effects will be so that we can better prepare for them. In most cases this will be carried out in consultation with the National Trust and English Heritage. An audit of the risks from climate change to historic buildings owned by the county and district councils should also be carried out.

Equally, churches, particularly Anglican, make up a considerable proportion of the county's historic buildings, and those responsible for their management are largely unaware of the need to adapt. It will therefore be necessary to work closely with churches to raise awareness and instigate action.

Top tips

- Consider the likely future climate in any modifications to your property – refer to the Sustainable Developer Guide and Householders leaflet www.sdg-nottinghamshire.org.uk These will need to be carried out sensitively, particularly on statutorily protected (listed) buildings.
- Consider how you are going to maintain a cool summer temperature without the excessive use of air conditioning – its installation may be damaging to historic fabric and inappropriate.

For more tips refer to the 'What can you do?' appendix

3.5.2 The Natural Historic Environment

In terms of the Natural Historic Environment, Sherwood Forest is Nottinghamshire's greatest asset. It will be under threat mainly from the risk of soil degradation caused by drying out in the summer and storms leading to high rates of erosion and tree damage. Not only is the Forest important in terms of nature conservation, but also it has historical value, with many believing it was the home of Robin Hood, and therefore it acts as a major tourist attraction in the county.

Historic parks and gardens may have particular problems in trying to display a traditional selection of plants as the climatic conditions will not be suitable, meaning that high care and irrigation will be necessary.

Fact Box:

- In the extreme summer of 2003, over 300 mature trees died in the Historic Royal Parks of London, with repairs in Hyde Park alone costing over £250,000.
- Nationally, our historic gardens and their plant collections, representing 500 years of garden history, attract 24 million visitors each year, contributing an estimated £300 million to the tourism industry.

What is being done

As with the Built Historic Environment, there has been very little work done on the impact of Climate Change upon the Natural Historic Environment, although work by English Heritage and the National Trust is beginning to study the impacts that it is likely to have on their land and the actions that need to be taken. Both organisations were involved in the preparation of the UKCIP report, "Gardening and the Global Greenhouse", which considers climate change impacts on modern and historic gardens.

The UKPN (Phenology Network) described below can also give information on changes to biodiversity that

will be able to be used to help conserve historic parks and gardens etc. www.phenology.org.uk

What we need to do

We need to study historic environments in Nottinghamshire e.g. Sherwood Forest and Clumber Park to ascertain the likely impacts so that adaptation measures can be implemented in long term plans.

Top tips

- Register with the UK Phenology Network to record changes in nature www.phenology.org.uk
- Consider introducing plant and tree species in your garden that are more drought resistant e.g. Hollies, Rosemary and Lavender.

For more tips refer to the 'What can you do?' appendix

3.5.3 Archaeology

For archaeology, climate change is likely to impact on waterlogged sites and sites within river valleys as well as on standing structural and earthwork monuments. Waterlogged and river valley remains may be at risk from changes in water tables and dehydration during periods of drought. Dehydration alters the soil condition and can lead to the degradation of fragile remains. The Trent Valley is one of the most important sources of wetland archaeology in the county. Archaeology may also be affected by changes in land management influenced by climate change, for example new crops, irrigation and reservoirs may all cause damage. Sites may also be at risk from flood management work.

What we need to do

We will need to ensure that the impacts of any changes on archaeology are adequately assessed and be prepared to take action, either to protect the archaeological resource, e.g. by maintaining water levels, or to gather and conserve knowledge from at risk resources.

3.6 Health and Society

Introduction

Climate Change is likely to have a mixed impact upon health – in the UK it is thought that 20,000 fewer people will die of cold each year by 2050, but 3,000 more will die directly from the increased temperatures in the summer. However, this does not account for the risk of increased deaths from food poisoning, diseases, weather related disasters (e.g. skin cancer) and worsening air quality.

Fact Box:

The heatwave in August 2003 is estimated to have caused 15,000 extra deaths in Northern France and around 2,000 extra deaths in England and Wales, mainly among older people.

What is being done

At a national level, the DoH and NHS have taken the likely effect of the increased frequency of heatwaves into account and have published a Heatwave Plan for England (July 2004) – see case study. However, it is widely acknowledged that other adaptive measures will also be needed to shift the policy emphasis away from 'disaster management' and towards 'risk management'. There has been very little work considering adaptation to the health and social issues at the county level.

Case Study: The Heatwave Plan for England

From June to September each year a 'heat-health watch' will be in place that defines four levels of response based on threshold temperatures that are ~30°C in the day and ~15°C at night depending on the region. The most severe level is 'Emergency' and this is reached when a heatwave is so severe that the effects threaten the integrity of, or extend beyond the health and social care systems. The plan also sets out the responsibilities of the various health and social service bodies including Primary Care Trusts and Local Authorities.

What we need to do

We need to be prepared to adapt to the health issues that the changing climate may bring. At a local level this will mainly be concerned with raising awareness of the issues.

- Educate on the importance of using sun screen to protect against skin cancer
- Make sure that the health benefits of new transport patterns e.g. cycling and walking are realised and promoted
- Promote good practice when preparing and storing food in hotter temperatures – outdoor eating e.g. barbeques are likely to be more common in the warmer weather
- Educate about the possibility of malaria and other diseases that may invade with the warmer climate.
- Social services need to be aware of the potential effects of Climate Change on their facilities, including transportation of meals and health issues.
- Planning departments need to be made aware of potential effects and ensure there is adequate shade in parks and amenity areas within the county to allow for the increasing temperatures.

KEY MESSAGE

'Health Planning' will be necessary to adapt to the changes in climate

Top tips

- Use sufficient sunscreen in the hot weather
- Ensure that food is stored properly in the hot weather to avoid cases of food poisoning

For more tips refer to the 'What can you do?' appendix

3.6: The Economy

Introduction

Inevitably Climate Change is going to have an impact upon Nottinghamshire's local economy. Over the last decade, the county has generally seen a shift from manufacturing to the service sector – so that approximately 85% of working people in Nottinghamshire are now employed in this area. It is hard to predict the overall impact that Climate Change will have on the economy, with disruption caused by storms and flooding being counter-balanced by warmer temperatures improving the tourism sector. Not only will the county's economy be affected but also that of the individual, with increased flood risk leading to higher insurance premiums and affecting the value of properties.

What is being done

At present there has been very little work that attempts to help the economy adapt to Climate Change and maximise benefit where necessary.

What we need to do

- Work with SMEs to identify the specific risks that Climate Change may pose to their business and ensure that they are well prepared to adapt. Where possible we will encourage companies to complete a risk assessment.
- Identify the specific sectors that will be able to benefit from Climate Change and work with these to ensure they maximise these opportunities
- The demand for different goods will change in the future e.g. increased demand for summer furniture and clothes and less demand for winter clothes. The retail sector needs to be prepared to adapt to these changes.
- Identify specific tourist spots that may benefit (e.g. Sherwood Forest and Clumber Park). Work with these areas to ensure they maximise the opportunity, whilst not allowing damage through over use.
- All other regions will be maximising their tourism potential too and so we need to ensure that we market our attractions carefully and effectively – we will work through emda tourism strategy and tourist offices

Top tips

- Identify the specific risks that Climate Change will pose to your business – use the UKCIP adaptation wizard www.ukcip.org.uk
- Maximise opportunities presented by changes by stocking goods such as garden furniture and barbeque equipment in the summer months and rainwear in the winter months

For more tips refer to the 'What can you do?' appendix

Chapter 4: Awareness Raising and Education

A constant theme throughout the document has been that of awareness raising and education. The greatest challenge in implementation of many of the actions identified in the plan will be to encourage all stakeholders in the community to realise the impacts that Climate Change will have so that they can change their behaviour in terms of both mitigation and adaptation. The greatest challenge is to try and make the global issue local and relevant at a county level. It will therefore be important to highlight the local changes that are already occurring (e.g. flooding on the River Trent in 2000) and emphasise that everybody must do their 'bit'. Action may also be instigated if people are able to see the additional benefits e.g. economic savings through fuel efficiency.

"Whatever you do will be insignificant, but it is vital that you do it" *Ghandi*

What is being done

Climate Change is now regularly covered in the national media. However, it is important for to make the link between everyday actions and the images of Climate Change that are seen on television and in the newspaper.

It is important to work with school children to convey the message of Climate Change and energy use at an early age. It is in their lifetimes that the effects of Climate Change are likely to be felt and also the time when we can do most to mitigate CO₂. The Energy Learning Centre works with primary schools in the county to educate about energy, conservation and pollution. Whilst at the Centre the children work with an experienced teacher on stimulating and enjoyable activities and models and displays.

Case Study: Bowbridge Primary School, Newark-on-Trent

Through a partnership with Newark and Sherwood Energy Agency, Bowbridge Primary School has been involved in high profile European Energy Awareness Projects. This included a school production entitled '*Revenge of the Eco-Warriors*', where humans are put on trial after aliens visiting the earth see what destruction and damage we have caused.

What we need to do

Easy to read information should be available to the general public on the issue of Climate Change, along with practical things that can be done to tackle Climate Change. This document is aimed at key stakeholders but a summary version aimed at a wider audience is also planned.

Road shows and events are a good place to promote Climate Change. Nottinghamshire Agenda 21 will therefore develop a 'Climate Change in Nottinghamshire' display that can be used at appropriate events.

Climate Change affects everybody and therefore all social sectors must be targeted in publicity campaigns. This can be done by using a number of different methods. The internet is a cost effective way to convey information and up-to-date information should be posted on Local Authority and the Nottinghamshire Agenda 21 websites. However, it is important that those groups without internet access are not overlooked. The Nottinghamshire Agenda 21 magazine 'Living for Tomorrow' will be particularly useful to convey Climate Change messages to the wider community. By using a range of mediums to convey the climate change message it will ensure that we are not simply preaching to the converted through standard environmental pathways.

KEY MESSAGES

- We need to **change behaviour** through **awareness raising and education**
- **Local Authorities** need to **assume the role of leadership**

There are many other organisations (e.g. Environment Agency, Nottinghamshire Wildlife Trust) in the county that are working to raise awareness of Climate Change in the county, and Nottinghamshire Agenda 21 must work with these agencies to help them promote the issues in the existing frameworks. In terms of local businesses the Chambers of Commerce will work to raise awareness of the issues.

'Behaviour as a barrier is just the wrong way of looking at it... Start from the assumption that people don't know very much about energy efficiency and Climate Change, aren't very interested in it, won't spend much time on it... then you reach the solution that energy efficiency policy needs to be about making things easy to do, simple and easy to understand, and cheap'. (Eyre, 2004)

Chapter 5: Next Steps

The Nottinghamshire agenda 21 forum steering group will:

- work to influence national and regional activity on climate change so that it supports and adds value to action in Nottinghamshire
- encourage organisations in Nottinghamshire to sign up to the vision contained in this framework
- encourage organisations and sectoral groups in Nottinghamshire to develop their own climate change action plans in support of this vision. This could involve a specific climate change plan and/ or integrating actions into existing plans, such as travel plans, biodiversity action plans, environmental management plans, economic development plans and land use plans
- specifically encourage local authorities and local strategic partnerships to develop their own plans in support of the Nottingham Declaration on Climate Change
- continue to raise awareness about climate change in Nottinghamshire
- continue to work to establish baseline information for carbon dioxide emissions in Nottinghamshire and to measure and monitor progress in moving towards a low carbon economy
- review progress against this framework in 2 years time

KEY MESSAGE

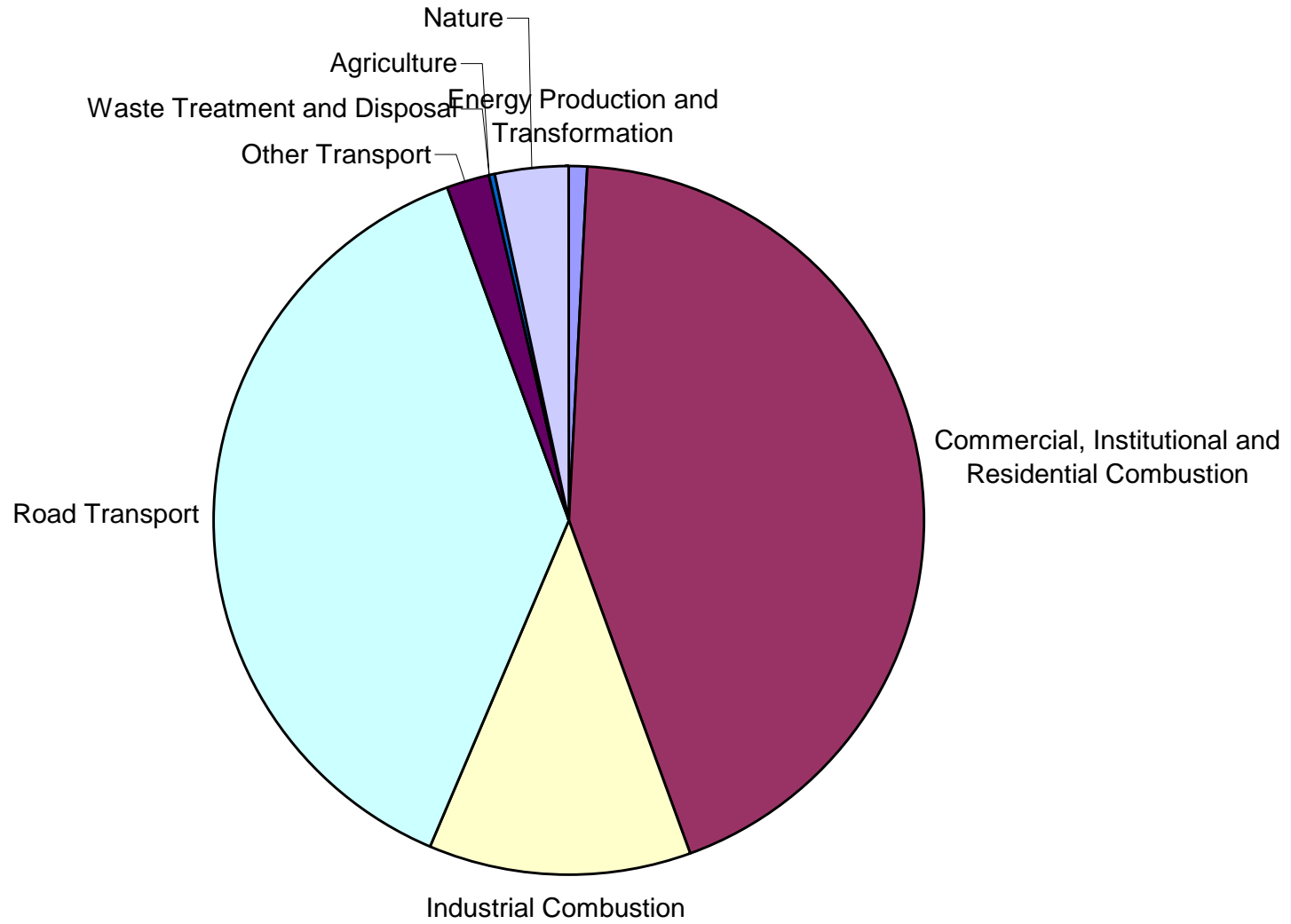
We need to create a **Notts GHG emissions** inventory to measure and monitor emissions

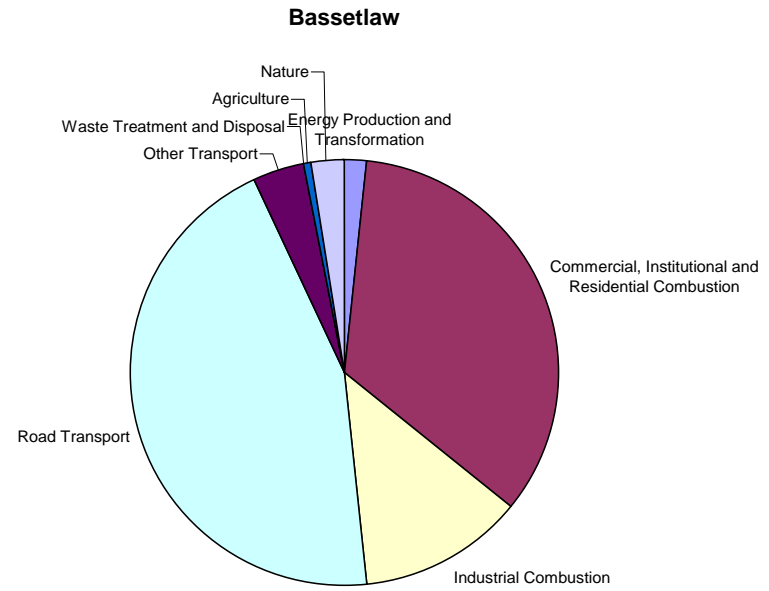
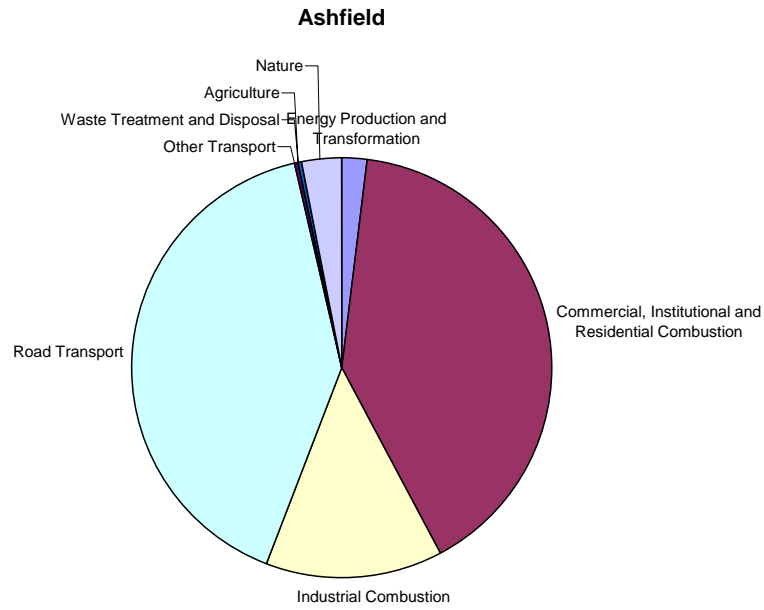
Appendix 1: Nottinghamshire's CO₂ EmissionsCO₂ emissions in tonnes

CO2 IN TONNES	Area source emissions										Sum of area source emissions	Point source emissions	TOTAL (sum of area and point source emissions)
	Energy Production and Transformation	Commercial, Institutional and Residential Combustion	Industrial Combustion	Industrial Processes	Production and Distribution of Fossil Fuels	Road Transport	Other Transport	Waste Treatment and Disposal	Agriculture	Nature			
ASHFIELD	9966	220201	74338	0	0	221294	1696	749	472	17396	546113	0	546113
BASSETLAW	12134	246614	91814	0	0	322236	27638	368	4816	17689	723308	13835873	14559181
BROXTOWE	34	192746	61761	0	0	270681	9573	10	279	18441	553525	0	553525
GEDLING	2469	207433	43748	0	0	84769	2595	32	638	17381	359065	0	359065
MANSFIELD	9582	220930	47169	0	0	84669	12912	196	307	15330	391095	0	391095
NEWARK AND SHERWOOD	6300	240477	77898	0	0	352073	16090	126	5196	16575	714735	2521897	3236632
NOTTINGHAM	5821	543609	127445	0	0	247514	3394	3013	154	40623	971572	107800	1079372
RUSHCLIFFE	288	213416	57721	0	0	245731	9678	43	2798	16521	546195	6821247	7367442
NOTTS TOTAL	46593	2085425	581893	0	0	1828967	83577	4539	14660	159956	4805609	23286817	28092426

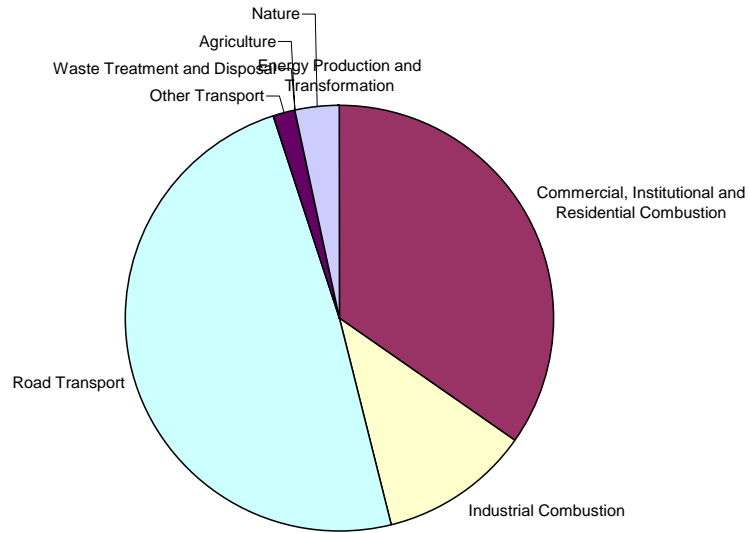
The above table shows Nottinghamshire's CO₂ emissions in tonnes broken down by sector for each district and totals for the county for 2002. The data is taken from the National Atmospheric Emissions Inventory (www.naei.org.uk). The charts below show the breakdown of emissions by sector. It can be seen that for Nottinghamshire as a whole, most CO₂ emissions are related to Commercial, Institutional and Residential Combustion. The next largest sector is Road Transport.

Nottinghamshire

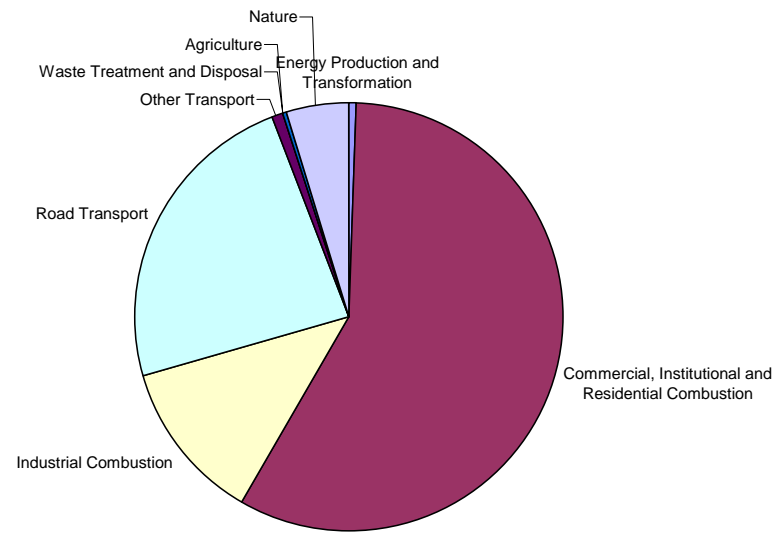




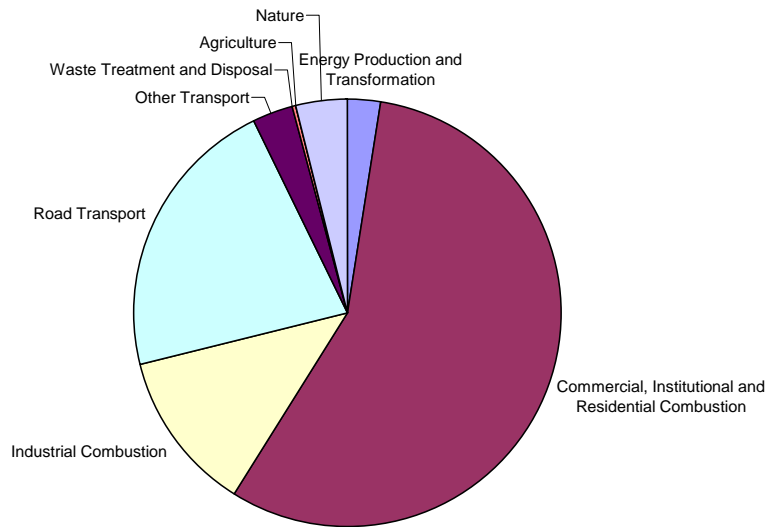
Browtowe



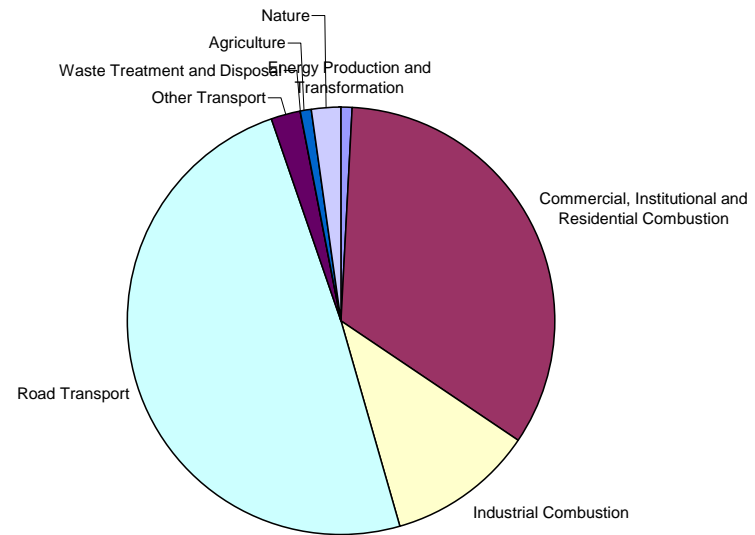
Gedling

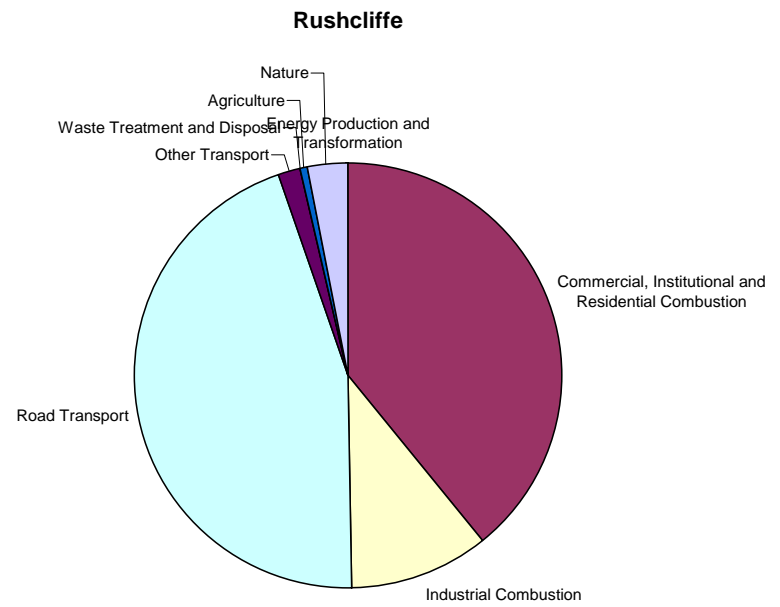
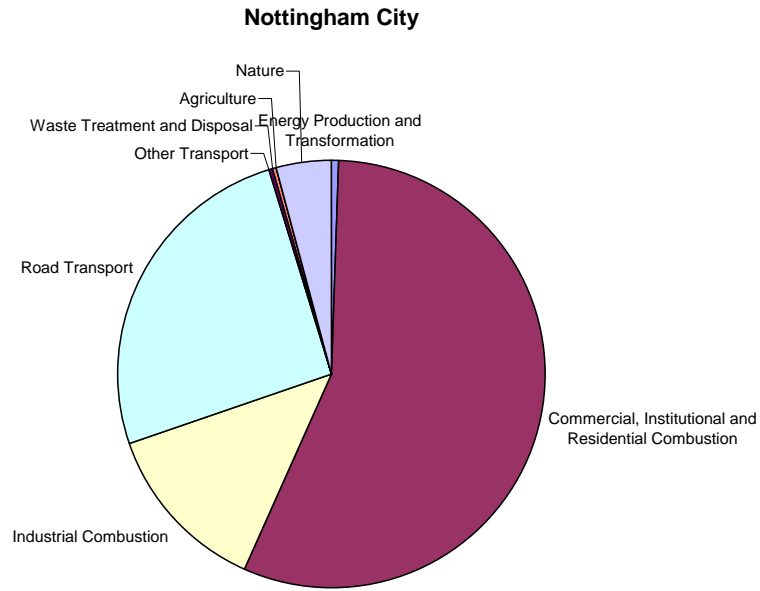


Mansfield

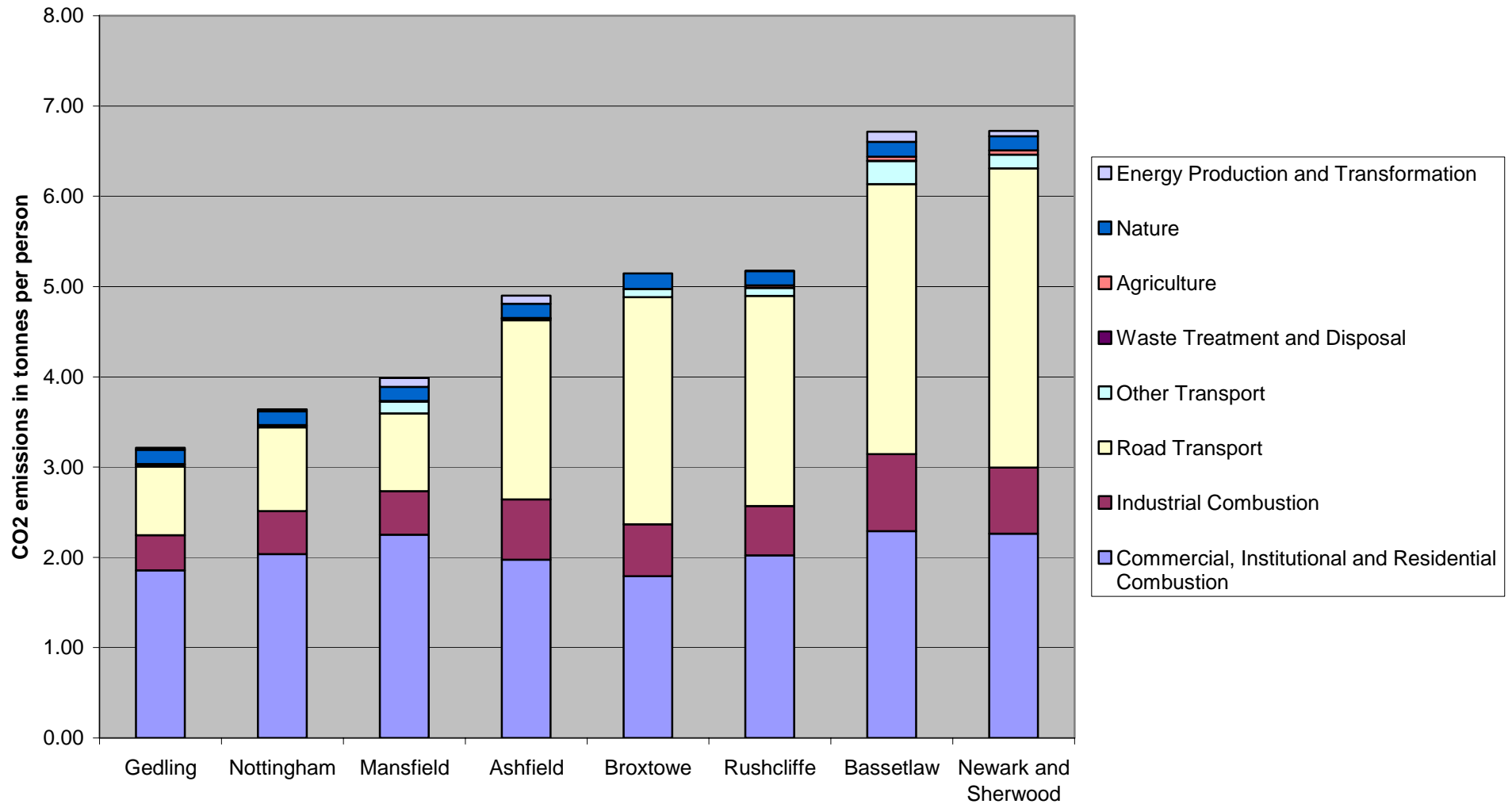


Newark and Sherwood





Nottinghamshires Carbon Dioxide emissions scaled to population



When the data is scaled to the population it is easy to see that the largest variation is caused road transport. And, as expected, this appears to be related to area, with the largest two districts having the largest road transport emissions.

Appendix 2: What can you do?

	Individuals	Business
Buildings	<ul style="list-style-type: none"> • Get a home energy check from the Energy Saving Trust • Install insulation – loft / hot water tank and pipes / walls / floors • Draught proof windows and doors • Install heating controls that can regulate the amount of heat and how long for • If replacing your boiler, buy an energy efficient condensing boiler • Fit energy saving light bulbs • Buy energy efficient domestic appliances – look out for 'A' rated on the energy labels • Fit double (or secondary) glazing • Turn your thermostat down by 1°C – this can save 10% on fuel bills • Close curtains at dusk to stop heat escaping • Turn off lights when you leave a room • Don't leave appliances on standby • Don't leave fridge or freezer doors open for longer than necessary • Wait until you have a full load until you use washing machine / tumble dryer / dishwasher • Don't overfill the kettle • Cover letterboxes and keyholes to stop draughts • Do not obstruct radiators and ventilators with furniture or other objects • Avoid patio heaters and electric lights 	<ul style="list-style-type: none"> • Consider appointing an 'energy champion' to be responsible for energy matters of the business • Fit energy saving light bulbs • Install reflective radiator panels on external walls • Do not obstruct radiators and ventilators with furniture or other objects • Introduce a 'switch off' policy and agree who is responsible for switching off lighting, heating and computers when not requires and ensure the heating system is adequately controlled • Check the temperature of any hot water for general use. A minimum of 60°C should be maintained to control bacteria • Fix leaks on compressed air systems – this can account for 40% of demand • Do not heat buildings over the recommended 19°C – costs rise 8% for every 1°C of over heating • Don't heat unused spaces and reduce heating at holidays and weekends • Check regularly on your consumption of electricity, gas and oil, and check that your bills relate to what you actually use, rather than an estimate. • Ask your colleagues where they think energy is being wasted, and for their ideas about saving energy.
Transport	<ul style="list-style-type: none"> • Replace one car journey a week with public transport • Investigate alternative fuel sources such as LPG or biodiesel • Carsharing cuts down on CO₂ emissions as well as being sociable • Working from home has been made easier with the advent of the internet – discuss the possibility with your employer • Stick to speed limits – driving at 70mph uses up 30% more fuel than at 50mph • Check your tyre pressure regularly – under-inflated tyres wear out more quickly and can increase fuel consumption by up to 3% 	<ul style="list-style-type: none"> • Develop a travel plan for your organisation to address all types of travel – commuter journeys, business trips, deliveries, fleet vehicles and trips made by visitors • Consider joining a travel club that consist of companies providing support and guidance on best practice • Investigate sources of funding to assist in implementation of a travel plan • Consider investing in low energy / clean fuel vehicles e.g. LPG, electric or natural gas [signpost to Powershift fund: http://www.transportenergy.org.uk/grants-available/powershift/] • Set some targets [Signpost to Motorvate: http://www.transportenergy.org.uk/more-efficient/motorvate/] • Reduce employee travel by reducing car allowances for employees and rewarding small car, cycle use and car-sharing.
Industry		<ul style="list-style-type: none"> • Consider greywater recycling for industrial processes • Fix leaks on compressed air systems – this can account for 40% of demand • Keep motors maintained as a badly maintained motor and drive system can

		<p>add 5% to your energy costs</p> <ul style="list-style-type: none"> • Replace old motors with energy efficiency ones – you may even be eligible for tax relief through the Enhanced Capital Allowance scheme • Check for motors (fans, pumps, etc.) that are running when they are not needed. A motor running without load can still use as much as 40% of the full load power. • Keep Freezer doors closed as it costs £6 an hour on average to leave a door open. • Maintain correct temperatures for refrigeration as every 1°C lower than needed can add 2- 4% to costs. • Check that the condensers of refrigerators are located in a position that is not overheated and has sufficient airflow. • Check the system has the correct amount of refrigerant charge as leakage can typically increase energy costs by over 10% • Check the settings of your process are correct and the right settings are included in quality management procedures
<p>Waste</p>	<ul style="list-style-type: none"> • Use email or the phone in preference to letters and faxes wherever possible • Send e cards rather than greeting cards • Use rechargeable rather than disposable batteries • Use cotton not plastic bags • Avoid buying highly packaged food from the supermarket • Use cotton rather than paper cloths in the kitchen • Buy refills for washing powder etc • Home compost your kitchen and garden waste • Use clothes banks for old clothes • Dispose of old fridges through the council Household Waste Recycling Centres [signpost to http://www.nottinghamshire.gov.uk/home/environment/recycling/recyclingcentres.htm] • Recycle steel cans • Don't throw away old computers – donate them to charity • Reduce junk mail through the mailing preference service [signpost to www.mpsonline.org.uk] • Hire DVDs and borrow books from a library rather than buying them • Recycle unwanted furniture through the Furniture Reuse Network [signpost to http://www.frn.org.uk/] • Use cloth rather than disposable nappies • Give old spectacles to high street opticians • Try selling stuff rather than throwing it away [signpost to www.ebay.com] 	<ul style="list-style-type: none"> • Raise employee awareness • Dispose of waste safely – have proper arrangements for the disposal of your waste using secure containers and transferring to authorised carriers • Check skips are full when emptied – don't pay for fresh air • Consider joining a waste minimisation club where local companies can share experiences and ideas • Reduce waste at source e.g. purchase printers that can print double sided • Reuse envelopes for internal circulation • Reuse scrap paper for draft printing and messages • Recycle – regularly check what is going into skips and waste to ensure materials are not being thrown away unnecessarily • Promote a green bin policy so that glass, cans and paper can easily be recycled • Donate unwanted furniture and computers to a local scheme • For further information see the Environment Agency publication 'Waste Minimisation – getting staff involved' • Use email or the phone in preference to letters and faxes wherever possible • Recycle or refill inkjet cartridges • Don't throw away old computers – donate them to charity • Use roller towels in the toilets rather than paper towels • When organising awareness raising events avoid giving out 'freebies' that will just end up in the bin • Avoid the use of plastic vending cups

	<ul style="list-style-type: none"> • Use refillable pens instead of disposable biros • Avoid disposable razors • Use a jug filter rather than buying bottled water • Reuse containers for storage 	
Procurement	<ul style="list-style-type: none"> • Buy Green electricity • Purchase local food where possible • Buy energy efficient appliances 	<ul style="list-style-type: none"> • Buy Green electricity • Ensure office supplies are green e.g. recycled paper • Buy energy efficient equipment • Investigate the environmental performance of your suppliers and put pressure on them to improve or change suppliers
Flooding	<ul style="list-style-type: none"> • Keep important personal documents in a sealed bag, and in a location safe from floodwater • Make sure you know where gas, electricity and water mains are so they can be turned off easily in case of a flood • Have sufficient sandbags so that they can be used in case of a flood • If your home is in a flood risk area, consider preparing in advance with removable floor board and air brick covers. You can surround the whole of your property with plastic skirts or temporary free-standing barriers • If buying a new house check the flood risk on the Environment Agency flood risk map – be wary of locating in a flood risk area [signpost to www.environment-agency.gov.uk] 	<ul style="list-style-type: none"> • If locating to new premises check the flood risk on the Environment Agency flood risk map – be wary of locating in a flood risk area [signpost to www.environment-agency.gov.uk] • Prepare a flood plan – this encourages your business to consider different flood scenarios and how you can protect equipment and staff [signpost to www.environment-agency.gov.uk] • Train staff so they know how to deal with a flood • Be ready to move important equipment, such as computers, above flood level upon receipt of a flood warning • Keep a store of plastic bags (grocery bags are fine) to place around the legs of furniture when you receive a flood warning • Identify a suitable location for evacuation of vehicles to higher ground • Consider the height at which goods are fixed, stored or displayed - the higher the goods, the less chance of damage • Copy vital hard copy and electronic records and store them in a safe place. This includes financial and insurance records, product lists, formulas and specifications, staff, customer and supplier databases and staff files • Install back flow valves on all toilets and drains • Raise electrical sockets above flood level • Raise electrical machinery on a platform above flood level • Buy sturdy plastic sheeting for use in case of a flood warning. Place large furniture on top of the sheeting and raise the sheeting around it • Move computer servers permanently away from the basement or ground floor • Secure equipment that could move or fall during a flood • Store stock on pallets or shelving • Purchase building materials, such as wood, nails, sandbags and plastic sheeting and learn how to use them to

		<p>defend your property</p> <ul style="list-style-type: none"> • Move air-conditioning and heating systems permanently away from the basement or ground floor • Raise wire cabling or position in suspended ceilings above ground level • Purchase machinery with motors, gear boxes and programmable electric controls that are above flood level (i.e. at the top) • Purchase an emergency power generator • Purchase permanent or semi-permanent flood protection products
Water resources	<ul style="list-style-type: none"> • Only boil the water you need • Only do full loads in the washing machine / dishwasher • Turn off the tap whilst you brush your teeth / shave • Use a 'save-a-flush' or 'water hippo' in your toilet cistern • Shower rather than bath • Replace worn out washers on dripping taps • Energy Efficiency labels on appliances also give water consumption information – buy water efficiency appliances • Collect rainwater in butts for use in gardening • Investigate greywater recycling for toilet flushing 	<ul style="list-style-type: none"> • Consider greywater recycling for manufacturing processes • Use 'save-a-flushes' or 'water hippos' in your toilet cisterns • Monitor facilities to ensure there are no dripping taps
The Built Environment	<ul style="list-style-type: none"> • Consider Climate Change in any modifications made to your house – e.g. it may be appropriate to install greywater recycling if replacing a roof [signpost to SDG] • Look at possible adaptations that will be needed to keep your house cool in the summer and protect against the winter storms 	<ul style="list-style-type: none"> • Have a survey done to consider the effect that Climate Change will have on your buildings • Look at possible adaptations that will be needed to keep your buildings cool in the summer and protect against the winter storms
The Natural Environment	<ul style="list-style-type: none"> • Register with the UK Phenology network (UKPN) to monitor changes to nature's events [signpost to www.phenology.org.uk] • With water being scarce in the summer investigate the use of drought resistant plants in your garden 	<ul style="list-style-type: none"> • As a farmer, you should be ready to maximise on the longer growing season and increased CO₂ levels that may increase productivity. However, you must also be ready to introduce new crops that are drought resistant in the summer months
Health and Social	<ul style="list-style-type: none"> • In the warmer weather, consider the health of older friends and relatives • Ensure that you wear sufficient sunscreen in the hot weather • Consider the health benefits gained by changing transport patterns to walk and cycle more • Ensure food is stored correctly in the hot weather to minimise the risk of food poisoning 	<ul style="list-style-type: none"> • Consider the effects that heatwaves can have on your business – how can these impacts be minimised?
Economic development and tourism		<ul style="list-style-type: none"> • Identify the specific risks that Climate Change will pose to your business – complete a risk assessment • Maximise opportunities presented by



stocking goods such as garden furniture, barbeque equipment in the summer months and rainwear in the winter months

Appendix 3: The Nottingham Declaration on Climate Change

The Nottingham Declaration on Climate Change

.....The Council recognises that Climate Change is likely one of the key drivers of change within our community this century.

We acknowledge that

- Evidence continues to mount that climate change is occurring.
- Climate change will have far reaching effects on the UK's economy, society and environment.

We welcome the

- Social, economic and environmental benefits, which will come from combating climate change.
- Recognition by many sectors, especially government and business, of the need for change.
- Emissions targets agreed by central government and the programme for delivering change as set out in the climate change-UK programme.
- Opportunity for local government to lead the response at a local level and thereby play a major role in helping to deliver the national programme.
- Opportunity for us to encourage and help local residents and local businesses to reduce their energy costs, to reduce congestion, to improve the local environment and to deal with fuel poverty in our communities.
- Addition powers to address the social, economic and environmental well being of our communities contained with local Government Act 2000, which will assist in this process.

We commit our Council to

- Work with central government to contribute at a local level, to the delivery of the UK climate change programme.
- Prepare a plan "with our local communities" by December 2002, to address the causes and effects of climate change and to secure maximum benefit for our communities.
- Publicly declare, within the plan, the commitment to achieve a significant reduction of greenhouse gas emissions from our own authority's operations especially energy sourcing and use, travel and transport, waste production and disposal and the purchasing of goods and services.
- Encourage all sectors in the local community to take the opportunity to reduce their own greenhouse gas emissions and to make public their commitment to action.
- Work with key providers, including health authorities, business and development organisations, to assess the potential effects of climate change on our communities, and to identify ways in which we can adopt.
- Provide opportunities for the development of renewable energy generation within our area.
- Monitor the progress of our plan against the actions needed and publish the results.

Bibliography

DTI (2003). *Our energy future – creating a low carbon economy*. DTI, London. www.dti.gov.uk

Defra (2005). *The Environment in your Pocket 2004*. Defra, London.
<http://www.defra.gov.uk/environment/statistics/eiyp/intro.htm>

Newark and Sherwood Energy Agency (2004) Newark and Sherwood District Household global warming liabilities. From <http://nsdc.rol.co.uk/pp/gold/viewGold.asp?ID=1944>.

Waters, B. (2004). *Climate Change in Nottinghamshire. Impacts and options for mitigation and adaptation*. Nottinghamshire Agenda 21 Forum, Nottinghamshire.

Nottinghamshire County Council and Nottingham City Council. (2004). *Nottinghamshire and Nottingham Waste Local Plan, Monitoring report 2000-2003*.