

Front Cover

C-Change

The Draft Leeds Climate Change Strategy

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'Leeds Climate Change Strategy: Dawn of a New Way'

DARK/LIGHT IMAGES OF LEEDS THAT CAN BE 'FLIPPED' ON PDF

'Leeds Climate Change Strategy: Make a Difference/Changing Leeds for the Better'

TO ADD PRIOR TO PUBLICATION

FOREWORD

9 CASE STUDIES TO ILLUSTRATE THEMES

- adapt – LCLIP?
- built env – dom = new Npower scheme/Connect housing
Comm. = polestar petty
- edu – groundwork – green doctor;
- nat env – Fairburn lngs
- plan – green house/MEPC
- proc – local food/Leeds Met
- trans – whizzgo
- waste – NISP (leeds project)

Inside Cover

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1. Foreword

Acknowledging the science of climate change

Recognise the imperative of taking early action

Detailing need for strong partnership approach in a growing city like Leeds

Call to arms – signing pledge; contributing to strategy

CLLR STEVE SMITH AS CHAIR OF THE CCSG

FINAL STRATEGY WILL HAVE JOINT SIGNATURES OF

- CHAIR OF LSP
- LEADER OF COUNCIL
- BUSINESS REPRESENTATIVE

2. A Climate Vision for Leeds

If we collectively make the most far-sighted decisions possible, within budgetary and technical constraints, the following scenarios could become the reality that we live in 2010, 2020 and 2050.

By 2010...

Leeds is just beginning to change. Some visible progress has been made. Our first carbon neutral homes have been built. Recycling rates are rising rapidly. More people are choosing to walk and cycle, particularly in the city centre. A climate Festival captured the public's imagination and is now a regular fixture. Sales of local food are going through the roof. Biomass is replacing coal and is emerging as the fuel of choice for new rural heating systems. New drainage systems, better designed urban areas and new river defences are reducing the risk of flooding.

All of these are isolated examples; the fundamental changes are not yet visible but are far more important. A transport strategy has secured funding for a major public transport scheme. Planners and developers are co-operating to design low carbon areas, not just buildings and the retrofitting of the existing building stock is under way. Some of the low skilled residents have been successfully brought into the work force to help deliver these improvements. This is just one example of the turn towards encouraging 'green' businesses into Leeds. The public are getting excited about solving climate change and grass roots participation is growing. Many have pledged to reduce their personal impact on climate change. Businesses have signed up to Carbon Action Yorkshire in droves and are being assisted to develop carbon reductions strategies. Feasibility studies have shown where and how to build renewable energy and community heating networks and a significant fund has been assembled to solve simple energy efficiency problems in all existing houses in Leeds.

Leeds knows that it is going green and is excited by the potential.

By 2020...

Leeds looks and feels like a different city. It's a bigger city; a more mature city. It's a city that is happy with its past achievements and looking forward to the future. Economically, Leeds is performing well with a diverse economy strengthened by the booming environmental goods and services sector. Leeds is physically bigger too: well planned and executed developments that are low or zero carbon complement the existing built environment. Greenspaces have been enhanced, linked and created. The massive energy efficiency drive has insulated all but a few cavity walls and lofts and new solid wall insulation is now affordable and being well used. An informed and concerned public demands more sustainable goods and services and many businesses have profited from responding to this demand, supplying consumers within the region and franchising their innovations for production and local distribution elsewhere. All organisations sell a maximum proportion of their waste stream as inputs to other processes and products.

Clean mobility underpins progress, with citizens proud of the safe, reliable and affordable public transport service. Careful re-engineering of roads means cycling and walking rates have surged. The cost of carbon is reflected in the cost of motoring and inefficient private transport is reducing, but still affordable for essential journeys. Appropriate scale renewables are much more visible across Leeds and unspectacular but essential community heating hubs are growing and linking up in densely populated areas. Recycling rates for domestic waste have exceeded 50%, significant value is now being recovered from residual waste, and waste to landfill has been reduced to less than 10%. Recent extreme weather events have tested our adaptation strategies, which are responding well. New buildings are all now built to cope with climatic conditions at least 50 years ahead (as well as reducing their overall environmental impact in terms of design, construction and use) and emergency services have strong plans in place to deal with extreme weather impacts on Leeds.

Leeds is thriving; there is a collective confidence that together we can tackle climate change.

By 2050...

Leeds is almost unrecognisable. Our grandchildren's city is in a different climatic zone: the hot summer of 2003 is considered cool now; warmer, wetter winters mean less heating but more vermin and additional risks from other organisms not previously found at 53 degrees north. Extremes of drought and flood are far more commonplace. Society is very different yet quality of life is not greatly affected, thanks to the far-sighted decisions taken forty years ago. The built environment is well able to cope and careful planning has allowed the natural environment to adapt to the new climate. Personal working and leisure patterns have changed to reflect the prevailing weather conditions and a resource-constrained society. The economy and social life are much more locally focused with inputs and outputs covering much smaller distances than was the case in the early 21st century.

Technological innovations are all around us, affecting the way that we produce and use energy, the way that we communicate, travel and do business. Behaviours have changed too: carbon is priced into all activities and the population has responded by choosing lifestyles that allow them to live within declining carbon budgets. Leeds has been better able to cope than have many other places and the city is becoming more multicultural as refugees from land-use and water conflicts are welcomed to the city.

Leeds is leading the world in coping with life in a new climate thanks to far-sighted decisions and an ongoing focus on practical action.

This strategy will start us on the long toad to making this vision a reality for Leeds.

Q. 1 – Do you agree with the climate change vision for Leeds? If not, how would improve it?

3. Purpose and scope of the strategy

3.1. Purpose

Leeds recognises that climate change presents a grave threat to the climate system that has allowed humanity to flourish and that it is the greatest long-term threat to both the environment and our future development.

This strategy will focus on tackling specific issues which organisations in the city can influence by working together to move Leeds incrementally towards reducing the impact of climate change. The purpose of the strategy is therefore twofold:

1. Mitigation

Reduce Leeds' contribution to climate change by minimising GHG emissions from all sectors and achieve reductions of at least 60% in total.

2. Adaptation

Improve the resilience of Leeds to current and future climate change by understanding the most likely climate scenarios and responding to the threats and opportunities presented.

The Mission Statement of the strategy sets out how the twofold purpose is to be delivered:

Organisations and individuals within Leeds will work together to reduce levels of greenhouse gas (GHG) emissions from all sectors and to develop solutions to adapt to the impacts of a changing climate.

3.2. Ownership

This strategy has been developed jointly by the Leeds Initiative and Leeds City Council, with detailed input from Leeds City Council working groups and eight theme groups with membership from organisations across the city. As the largest employer in the city, the author of key strategies and a major service deliverer, Leeds City Council will take responsibility for delivering large elements of the strategy. The strategy has been structured to show how Leeds City Council can tackle climate change through corporate management, through service delivery and by working with the wider city. The strategy will only reach its full potential if organisations from all sectors also commit to corporate management and to work in partnership on issues with shared ownership.

To ensure that it is clear that this is owned by all organisations in the city, not just Leeds City Council, the Leeds Initiative has established a climate change sub-group (referred to as the Climate Change Strategy Group – CCSG). This group is responsible for developing, consulting and publishing the strategy and associated action plan. Going forwards, the group will take responsibility for monitoring delivery.

In addition to the CCSG, eight theme groups have been established to focus attention on sectors or activities with most relevance to climate change. The groups

are: Adaptation; Built Environment; Education & Awareness; Natural Environment; Planning & Development; Procurement; Transport and Waste. Each theme group comprises a broad spectrum of organisations with subject expertise and a balance of interests between the private sector, public sector and 3rd sector. Each theme group has responsibility for developing specific actions most relevant to their area. Theme group chairs sit on the CCSG in order to share information between theme groups and avoid duplication of effort. It is anticipated that by taking this broad and inclusive approach, more organisations will feel that they truly have a stake in the strategy and will therefore sign up to delivery.

C.1 Therefore we will seek the support of all Leeds Initiative partners and of the third and private sector organisations across the city. To formalise this, a Climate Change Charter has been developed for Leeds (shown in Appendix 1) which we will encourage a large number of Leeds based organisations to sign.

3.3. Evidence based

The strategy has used scientific evidence responsibly to identify the key issues. However, we are aware that there is currently a need for greater modelling of emissions reduction potentials, the possible adaptation responses and the economic costs of both action and inaction. This will be progressed prior to the final version of the strategy being published.

Scientists have stated increasingly clearly that only with significant greenhouse gas emissions reductions will we avoid dangerous climate change. This strategy will help the people of Leeds and Leeds' public, private and 3rd sector organisations to reduce emissions based on technically and economically viable interventions. It will demonstrate how working together can make meeting challenging emissions reduction targets more achievable.

C2. Further modelling work will set a clear and viable trajectory to meet our emissions reduction targets. This work will identify where the most significant emissions reductions will come from at lowest cost, and sometimes at no net costs, in order to both deliver emissions reductions targets and to ensure that Leeds remains an attractive city in which to live and invest.

At the same time, scientific understanding of climate change is becoming increasingly firm. We know *beyond reasonable doubt* that we are already experiencing the effects of climate change and will continue to do so for the next 30-40 years due to the effect of GHG emissions that are already in the atmosphere. This strategy aims to build capacity in organisations across Leeds to better understand how current and future climates will impact upon their operations and to work together to minimise the risks to Leeds and to take advantage of any opportunities.

3.4. Powers

The Leeds Climate Change Strategy is a non-statutory document and therefore does not have specific powers. Instead, the Leeds Initiative will use existing relationships with private and public sector partners across the city to take actions which support the delivery of the strategy. We will also work with other cities in the UK and abroad

to lobby for more effective powers to develop and deliver local climate change priorities.

This strategy primarily focuses on actions that members of the Leeds Initiative can take to reduce emissions from their own operations and to adapt their own services to the impacts of a changing climate. It also looks further afield to what needs to happen in partnership across Leeds to deliver the challenging emissions reduction targets.

3.5. Scope

The physical boundaries of this strategy are the boundaries of the Leeds City Council area, as shown in Figure 1 below.



Figure 1

The strategy covers all sectors (domestic, transport, commercial, municipal, university, school, hospital and industrial sectors) for both emissions reduction and adaptation activities.

Mitigation

The emissions reduction element of this strategy focuses on CO₂ (and to a lesser extent methane) since CO₂ is the dominant greenhouse gas released in Leeds. However, many of the proposed solutions will provide complementary reductions in other harmful pollutants such as nitrous oxides.

Emissions reductions will be delivered principally from primary emissions from energy use, e.g. those emissions directly related to the consumption of fossil fuels for heat, power, process and transport (including electricity consumption). This is

due to two factors. Firstly, emissions from energy use are the dominant source in Leeds. Secondly, accurate measurement of indirect emissions is currently very difficult to achieve at a sub-regional level.

We will also include some actions that lead to indirect emissions reductions or contribute to emissions reductions outside the Leeds boundaries. The strategy will concentrate on using procurement to encourage local sourcing of goods and services, new processes to improve resource efficiency and carbon sequestration in the natural environment.

Direct emissions from waste disposal are relatively small and the Integrated Waste Strategy (2006) sets out the Councils strategy for municipal waste, and to a lesser extent commercial and industrial wastes. There is potential to achieve additional emissions reduction through maximising the energy recovery element of waste disposal through waste to energy plants and anaerobic digestion of putrescible wastes.

Emissions from water supply and sewerage within Leeds are even lower than those from waste and reducing them further is the responsibility of Yorkshire Water which already has a strong commitment to this agenda. Although reducing the environmental impact of water and sewage is important, it is outside the scope of the strategy.

Adaptation

The adaptation element of the strategy focuses on understanding and managing the risks and opportunities provided by a changing climate. This element of climate change is often overlooked but it has to be recognised that our climate is already changing and will continue to do so into the future.

Fundamentally, this part of the strategy will ensure that Leeds' services and infrastructure continue to function appropriately in the face of climate change. It has to be acknowledged that the need for adaptation is not understood by many organisations across the city. Therefore this element will focus on using risk assessments to identify priority interventions and use these to raise awareness of key partners in Leeds.

The focus will be on identifying solutions that are 'no regret' low cost, win-win or flexible.

Timescales

The priorities for action focus on strategic priorities that need to be tackled over the next few years. The headline actions detail more specific actions that will be delivered in the short term to contribute towards the strategic priorities. This plan will be periodically updated, since these initiatives will evolve over time.

Q. 2 – Do you agree with the purpose and scope of the strategy? If not, how would you like to see it altered?

4. Background

4.1. Scientific Context – Summary And Signposting

The science of climate change

Climate change is caused by the rise in average global temperature due to increasing levels of greenhouse gases (GHG) in the Earth's atmosphere. This in turn causes rises in sea level, increased surface ocean temperatures and changes to weather patterns. If unchecked, these changes will radically alter our environment and will lead to catastrophic loss of human life and massive extinction of other species. There is overwhelming scientific evidence that human activity is the primary cause of observed recent changes, and that urgent action is needed to cut emissions to stabilise atmospheric GHG at levels which avoid catastrophic climate change.

Greenhouse gases occur naturally in the atmosphere, trapping heat that originates from the sun, but then radiates back from the Earth. Without the natural greenhouse effect the Earth would be over 30 degrees Celsius cooler and uninhabitable. However, there is now overwhelming scientific evidence that human activity is upsetting this natural balance, causing a so-called "enhanced" greenhouse effect.

The Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report (2007) is unequivocal about the threat of climate change and the direct link between human behaviour and average temperature increases. This report has been agreed by the governments of over 100 countries and by over 2,000 leading scientists. The burning of fossil fuels and land deforestation has altered the balance of sources and sinks of greenhouse gases. This has resulted in rises in the atmospheric levels of greenhouse gases, and resulting increases in atmospheric and surface ocean temperatures. Since 1860, twenty out of the twenty-one hottest years have occurred within the last 25 years; and globally 2005 was the hottest year ever recorded.

Responding to climate change

Globally, in order to respond effectively to the threat of climate change, two inter-related actions are required.

- i. **Mitigation (Reducing GHG emissions to a safe and stable level).**
Mitigation is prioritised in order to slow the rate of climate change, to reduce the severity of climate change and to avoid climate 'feedbacks'. 'Feedback' is the term used to describe how exceeding GHG concentration thresholds will trigger other events which speed up climate change. A classic example of this is warming oceans reducing the level of sea ice and hence increasing the amount of radiation absorbed by the oceans, increasing warming of the oceans further. At present mitigation is the top priority in countries with high levels of GHG emissions and receives most media attention.
- ii. **Adaptation (Building climate resilience to ensure that our society and natural environments can cope with a radically different climate).**
It is already known that there is a 30-40 year time-lag in the climate system, so no matter what happens to emission rates from now on we will still have

to cope with a different climate in the future. However, exactly how much we need to adapt will be defined by how successfully we mitigate.

4.2. Science and policy position

Scientific understanding of climate change is progressing rapidly. National and international climate change policy is also advancing rapidly but is some way behind the latest scientific recommendations. There is a further time lag to media and popular understanding of the reality of climate change. It is important therefore to clearly state the policy position that we are adopting for the strategy. This is:

i) We accept the scientific findings presented in the IPCC's Fourth Assessment Report that conclude beyond reasonable doubt that climate change is happening now as a result of human emissions of greenhouse gases.

ii) We accept the findings of the Exeter Conference on Dangerous Climate Change¹ that conclude that efforts should be made to limit average global temperature increases to no more than 2°C to avoid the most damaging effects of climate change.

iii) We acknowledge that the overwhelming majority of reputable, peer reviewed, climate change scientists now state that if atmospheric GHG concentrations are stabilised at approximately 450 ppm CO_{2e} there is still only a 50% chance of limiting temperature increases to 2°C². The current UK targets are based on stabilising CO₂ only at 550 ppm³.

iv) We accept that climate change is a global phenomenon that has been caused by historical emissions from the developed world (the UK is responsible for approximately 6.3% of historical global emissions⁴). The future severity of climate change will be dependent on how successful the global community is in reducing global emissions levels.

v) We accept that developing countries need to grow their economies to improve quality of life. This is likely to lead to increased per capita emissions in the developing world. We therefore accept the contraction and convergence model⁵, which seeks to achieve equitable per capita emissions, as a fair way to reach emissions targets without unduly constraining quality of life in the developing world.

vi) We acknowledge therefore that in order to stabilise atmospheric CO₂ concentrations at 550 ppm it is likely that by 2050, UK emissions will need to be at least 60% lower than they were in 1990 and that steady progress must be made towards that target.

¹ For conference proceedings see www.stabilisation2005.com.

² 4th Assessment Report (IPCC, 2007)

³ The Energy White Paper (2003) used scenario work by the Royal Commission on Environmental Pollution to set an emissions reduction target based on stabilisation at 550 ppm CO₂.

⁴ Navigating the Numbers: Greenhouse Gas Data and International Climate Policy, World Resource Institute, 2005.

⁵ Contraction and Convergence was first proposed by the Global Commons Institute and further information is available from www.gci.org.uk.

vii) We accept that if the 450 ppm CO_{2e} stabilisation level is adopted in the future, the target will be significantly lower than this.

viii) We commit to reducing emissions from Leeds in line with the above targets, with all organisations and individuals making efforts to contribute to this target, but acknowledge that some sectors will be able to achieve greater emissions reductions than others.

ix) We accept that no matter what level of emissions reductions are achieved in the coming years we will still experience a degree of climate change due to the time lag between GHG emissions and a response from the global climate system.

x) We commit ourselves to implement measures that will ensure the city is prepared for these climate impacts.

4.3. National and International Policy Context

There is now near universal acceptance by world governments that climate change is occurring as a result of man-made greenhouse gas emissions. This is a major step forward, with previously sceptical nations such as the USA now accepting the scientific basis of the UN Framework Convention on Climate Change (UNFCCC).

However, finding an agreed international solution has been less easy. The Kyoto Protocol, developed in 1997 and ratified in 2004, aimed to agree binding emissions reduction targets for developed countries in order to stabilise “GHG concentrations in the atmosphere at a level that would prevent dangerous [human] interference with the climate system.” As of June 2007, a total of 172 countries had ratified the agreement. The USA and Australia are the two largest non-ratifying countries, instead preferring to set voluntary emissions goals, primarily through the Asia Pacific Partnership on Clean Development and Climate. This seeks to work in partnership to develop market driven technological solutions to climate change.

EU

The EU, which makes up around 22% of global GHG emissions, has launched two EU Climate Change Programmes (2000 & 2005). These aim to identify and develop all the necessary elements of an EU strategy to implement the Kyoto Protocol. A major contributor to this is the EU Emissions Trading Scheme (EUETS) which came into being in 2005. This allocates emissions permits to the most polluting sites in member states which then require industries to either reduce emissions on site or to purchase emissions permits from other industries. Due to over allocation of permits in the first phase, this has not functioned as expected, but will become increasingly stringent over time.

UK

In this country, the UK Climate Change Programmes (UKCCP) published in 2001 and 2006 provide the overall strategic direction for climate change mitigation and adaptation work. The Energy White Papers of 2003 and 2007 have built on this strategic framework and developed specific actions, largely targeted at business and industry. The publication of the Stern Review on the Economics of Climate Change

(2006) has transformed business approach to climate change. This review calculated that the economic cost of inaction was significantly higher than the cost of taking action to reduce emissions, making a clear macroeconomic case for multi-lateral action.

Government has adopted a long-term goal to reduce carbon dioxide emissions by 60% between 1990-2050 and by 20% between 1990-2010. The 2006 UKCCP acknowledged that is likely that the 2010 goal will be missed, estimating CO₂ reductions of 15-18% would be achieved. This realisation has stimulated the government to draft a Climate Change Bill which, when it becomes an Act, will set legally binding targets for 2020 and 2050, legally binding five year 'carbon budgets', a duty to report annually and new powers to enable government to more easily implement policies to cut emissions.

Government has recently announced the new National Indicator Sets against which local authority and partner performance will be measured. These include three specific climate change indicators and a number of supporting ones, reflecting the importance of climate change action at a local level.

4.4. Regional and Local Policy Context

Climate change has been identified as a priority within key strategies at both a regional and local level. We recognise that as a non-statutory strategy and action plan, the Climate Changes Strategy for Leeds could be just one of many strategies vying for attention and resources. Therefore it must be clear about the roles that it has, which are twofold. First, it must assist the delivery of national and regional climate change policies and initiatives at a local level. Second, it must set out policies and actions that will enable Leeds to better manage climate change, some of which will have important implications for the existing and developing local strategic context.

Regional context

The two most relevant key regional strategies are the Regional Economic Strategy 2006-15 (RES, 2006) and the draft Regional Spatial Strategy (RSS, 2007 – which also includes the draft Regional Transport Strategy).

The RES has made climate change one of the 10 regional priorities:

“The region will respond vigorously to climate change by integrating sustainable development into activity and mainstreaming practical projects. It will reduce polluting emissions, dependency on fossil fuels and create new business opportunities – for instance by reducing waste, promoting efficient and renewable energy, and managing flood risks”

The draft RSS contains a 'Climate change and resource use' policy as one of the eight core policies. The headline policy is that:

“Plans, strategies, investment decisions and programmes should ... Help to reduce greenhouse gas emissions [and] Plan for the successful adaptation to the predicted impacts of climate change”

Draft RSS also integrates the Regional Transport Strategy which states that:

“...transport is a major and growing contributor to greenhouse gas emissions. Measures to reduce the number and length of journeys by road will help to scale back the growth in emissions”

It also contains a specific policy:

“The Region will aim to reduce travel demand, shift to modes with lower environmental impacts, reduce congestion and improve journey time reliability.”

In addition to these two key statutory strategies, a number of specific strategies, action plans and work streams have been devised to mitigate or adapt to climate change. Principal amongst these are *Your Climate: Yorkshire and Humber's Climate Change Action Plan (2005)*; *Regional Energy Infrastructure Strategy (2007)*, *Regional Housing Strategy (2005)*, *Vision For Coal (2006)* and *Vision for Biomass (under development)*.

Leeds City Region and Northern Way

The Leeds City Region, consisting of West Yorkshire, Craven, Harrogate, York, Selby and Barnsley, has Leeds at its centre. The 2006 version of the City Region Development Programme (CRDP) has been prepared and agreed by the 11 councils⁶ and is essentially the economic plan for the City Region. The CRDP puts forward a growth scenario to achieve 4% per annum growth in GVA per capita across the City Region over the coming ten years which will contribute to the Northern Way's aim of closing the £30 billion gap in the North. The CRDP has to date focussed almost exclusively on economic growth without considering sustainable development issues, which, if allowed to continue, is likely to dampen long-term prosperity in the City Region.

C3. The Leeds Climate Change Strategy concentrates on climate change issues in Leeds but will seek to influence the next iteration of the CRDP to include green and critical infrastructure issues.

Local context

The most important city wide strategy is the Vision for Leeds 2004-2020, produced by the Leeds Initiative. This sets out 12 major priorities and 8 themes. The environment theme contains the statement:

“We must use resources like energy, water and land more carefully, contributing to the international effort to tackle global warming by making continuous environmental improvements.”

The Leeds Strategic Plan 2008-11 focuses on what the Council will deliver by itself or in partnership with others in the context of the Vision for Leeds themes. It streamlines the Council's Corporate Plan, the Local Area Agreement and the Leeds Regeneration Plan into one plan. It is currently being developed and has a draft strategic outcome and draft improvement priorities in relation to climate change as follows:

Draft Strategic Outcome:

⁶ Also including North Yorkshire County Council.

Reduced ecological footprint through leading the response, influencing, mitigating and adapting to environmental and climate change

Draft Improvement Priorities:

- Increase recycling rates and reduce the amount of waste going to landfill.
- Reduce emissions from public sector buildings, operations and service delivery.
- Undertake actions to improve our resilience to current and future climate change.

The Council Business Plan is complementary to the Leeds Strategic Plan, setting out what the Council needs to do internally to enable the organisation to deliver the outcomes in the Leeds Strategic Plan. It is currently under development and the links to the Climate Change Strategy are yet to be established.

Other local plans and strategies of direct relevance to the Leeds Climate Change Strategy include:

- The West Yorkshire Local Transport Plan 2006-11 (LTP2)
- Integrated Waste Strategy 2005-35 (IWS)
- Leeds Economic Development Strategy and 2002 Review
- Leeds Regeneration Plan 2005-08
- Leeds Housing Strategy 2005-10
- Leeds Unitary Development Plan Review 2006 (UDP) *to be replaced by Local Development Framework (LDF) and Area Action Plans (AAP)*
- Warm Homes Cool Planet, 1996-2011 (Home Energy Conservation Act Strategy)
- Air Quality Action Plan 2004
- Leeds City Council Energy and Water Management Plan 2003-2008
- Leeds City Council Capital Strategy and Asset Management Plan 2007/08

Many of these strategies already contain aspirations to reduce energy use or GHG emissions, although few have quantified the reductions. It will therefore be very important during policy revisions and development of new policies to cross-reference with the Leeds Climate Change Strategy to ensure that both mitigation and adaptation activities are prioritised.

C4. Potential policy clashes will also need to be faced head-on during policy revision. In order to facilitate this, we will investigate methodologies to quantify the effect on emissions of different policy scenarios and specific actions, with the aim of adopting one for the city.

5. Greenhouse Gas Emissions

Defining Greenhouse Gas Emissions

'Greenhouse Gas' (GHG) is the collective term given to all the gases that contribute to climate change. The IPCC's Second Assessment Report (1995) identified 27 man-made GHGs and assigned to each one a 'Global Warming Potential' (GWP), based upon the relative contribution of a unit emission of each gas to global warming over a period of time.

UK GHG emissions

Table 1 below shows the relative contributions of the 6 most important gases to the UK emissions inventory from 1990 - 2004 and projected emissions up to 2020.

Gas	Base Year	1990	1995	2000	2004	2010	2015	2020
Total carbon dioxide ²⁶	161.5	161.5	149.9	149.0	152.5	144.3	149.0	146.6
Methane	25.1	25.1	21.8	16.3	12.5	10.8	10.0	9.5
Nitrous oxide	18.6	18.6	15.5	12.1	11.1	11.0	11.0	11.0
Hydrofluorocarbons	4.2	3.1	4.2	2.5	2.4	2.7	2.6	2.5
Perfluorocarbons	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.1
Sulphur hexafluoride	0.3	0.3	0.3	0.5	0.3	0.4	0.3	0.3
Total greenhouse gas emissions ²⁷	209.9	209.0	191.9	180.5	178.9	169.2	173.0	170.0
Total greenhouse gas emissions including only mandatory Art 3.3 LULUCF activities ²⁸	209.5	208.2	191.6	180.3	179.0	168.9	172.1	168.5
Change from base year levels (for row above)		-0.6%	-8.5%	-13.9%	-14.6%	-19.4%	-17.9%	-19.6%

Table 1

In 2004, carbon dioxide made up 85% of emissions, Methane 7% and nitrous oxides 6%, with the other 3 gases making up the remaining 2% of emissions.

Carbon dioxide emissions are associated with the combustion of fossil fuels. The largest source is energy generation, with transport, business and domestic fuel use also being important. Methane emissions come from landfill sites, agriculture, natural gas distribution and coal mining. Nitrous oxides come primarily from agricultural soils with smaller contributions from industrial processes and catalytic converters.

This strategy will focus on reducing carbon dioxide emissions but will also include methane emissions from landfill.

Building a corporate emissions inventory for Leeds City Council

In order to effectively reduce emissions from an organisation it is necessary to first understand where emissions are generated to allow effective targeting of interventions. Leeds City Council has been monitoring energy consumption and expenditure in buildings and street lighting for a number of years,. A Carbon Trust report in 2005 recommended installing real-time smart meters for both gas and electricity in a number of key buildings to enable better monitoring and targeting of interventions. The electricity meter installation programme to 200 buildings is now virtually complete and a smart gas meters is being actively considered in discussion with potential suppliers.

C5. Given a positive outcome to the discussions, and following procurement, we aim to install the first 250 smart gas meters by end 2008..

The other corporate emissions sources (transport fleet, landfilled waste, street lighting and employee travel) are less well understood. The EMAS team is now working with departments across the council to gather baseline data for these sources in order to establish a full emissions inventory. We are working to improve

data quality where data is questionable and aim to ensure that emissions associated with staff travel for official duties and for employee commute will also be included by 2008/09. Figure 2 below shows estimated corporate emissions for Leeds City Council for the year 2005/06.

Corporate emissions (tonnes of CO2 and percentage)

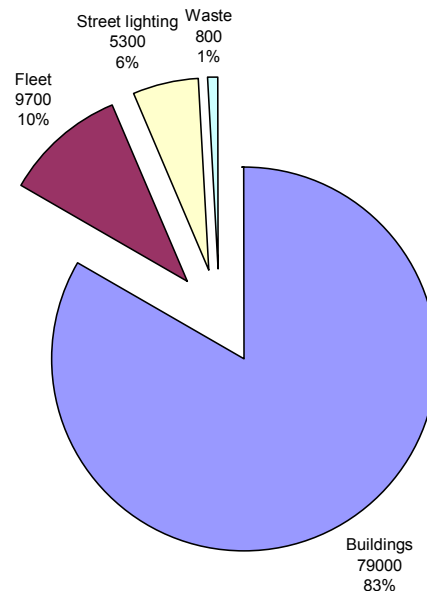


Figure 2

This indicates that emissions from buildings dominate emissions from the LCC corporate estate. Significant progress has been made in this area. In 2006/07, buildings produced approximately 69,000 tonnes of CO₂, 65% lower than they were in 1990. Switching electricity supplies to green electricity has had a very large impact, saving 42,000 tonnes of CO₂ in 2006/07. If this is discounted, emissions reductions are approximately 45%.

By the end of the consultation period, we would also like to understand what percentage of the city's emissions is under the direct control of members of the Leeds Initiative. We would also like to encourage other organisations, particularly major businesses, to commit to reporting the level of corporate emissions from their operations in Leeds. This will allow us to better understand and report on emissions which are directly under the control of organisations committed to taking action.

Q. 3 – We want to build up a picture of emissions from organisations in Leeds to help target emission reduction actions. Do you know the carbon footprint of your operations in Leeds? Would you be prepared to make this information publicly available?

Building a City wide emissions inventory for Leeds

Building and maintaining a detailed and accurate emissions inventory is often seen as an essential first step towards establishing a realistic Leeds Climate Change

Strategy and action plan for a local area. Yet no local authority area has fully achieved this. Obtaining accurate primary local data, using a common methodology that allows comparison over time, is the main obstacle.

Defra has recently developed a carbon dioxide emission inventory⁷ suitable for local area use. This presents all emissions within a local authority area by 27 categories, using primary data wherever available and suitable indicators where there are data gaps. The 2004 inventory (the most accurate and recent) indicates that 84.8% of emissions in Leeds have uncertainty ratings that indicate data is either 'high quality' or 'good quality'. Defra will continue to publish annual updates and hope that the data from 2006 onwards becomes adopted as a recognised national statistic.

The Defra inventory will be our primary source. This will avoid duplication of effort, enable comparisons over time and allow us to benchmark with other cities. However, this inventory has two principle gaps, waste and aviation. An attempt has been made to calculate the magnitude of emissions from waste and aviation but this data has to be treated with caution. Additionally, some data was available from gas and electricity suppliers prior to energy market liberalisation. This has been combined with more recent Defra data to produce the partial emissions inventory between 1990-2004 in table 2 below.

Year	Industrial and commercial electricity	Industrial and commercial gas	Industrial and commercial other emissions	Domestic Electricity	Domestic Gas	Domestic Other	Road Transport	Rail transport	Aviation	Land Use Change	Waste	Total
1990	1321	500		883	860							3565
1991	1238	530		867	837							3472
1992	1167	547		811	865							3390
1993	1113	461		745	728							3047
												0
2003	1103	769	306	766	1091	40	1641	7		27		5750
2004	1173	759	285	763	979	82	1837	24	271	13	127	6314

Table 2

Figure 3 below shows total emissions for Leeds for 2004.

⁷ www.defra.gov.uk/environment/statistics/globalatmos/galocalghg.htm

A summary of emissions in Leeds 2004 (in ktCO2 and percentage)

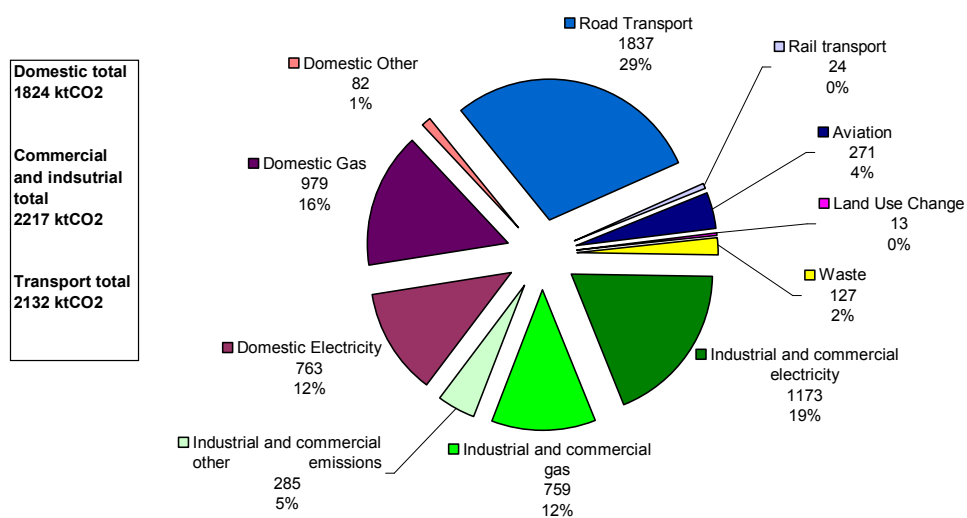


Figure 3

Q6. This strategy will continue to use Defra data supplemented by improved local data as a means to monitor and report headline progress. This data will be supplemented by the more accurate corporate emissions inventories which will be used to demonstrate the proportion of emissions in the city that are targeted for reductions by corporate strategies.

6. Reducing Greenhouse Gas Emissions in Leeds

Leeds needs to be in a position whereby challenging emissions reductions targets can be set, to allow us to contribute proportionately to national efforts, together with a realistic plan as to how targets can be achieved. Currently, we are only part-way there, but few local authorities have yet managed to achieve this. The best example of a challenging target with a realistic action plan is the London Mayor's Climate Change Action Plan.

This Action Plan first developed an emissions inventory, as we have, and then used this as the basis of detailed scenario work to understand the impact of actions in different sectors. These actions were then summed, adjusted to include desired changes at the national and EU levels and presented as a graph showing the contribution of different sectors as 'emissions slices'. Figure 4 reproduces this below as an example.

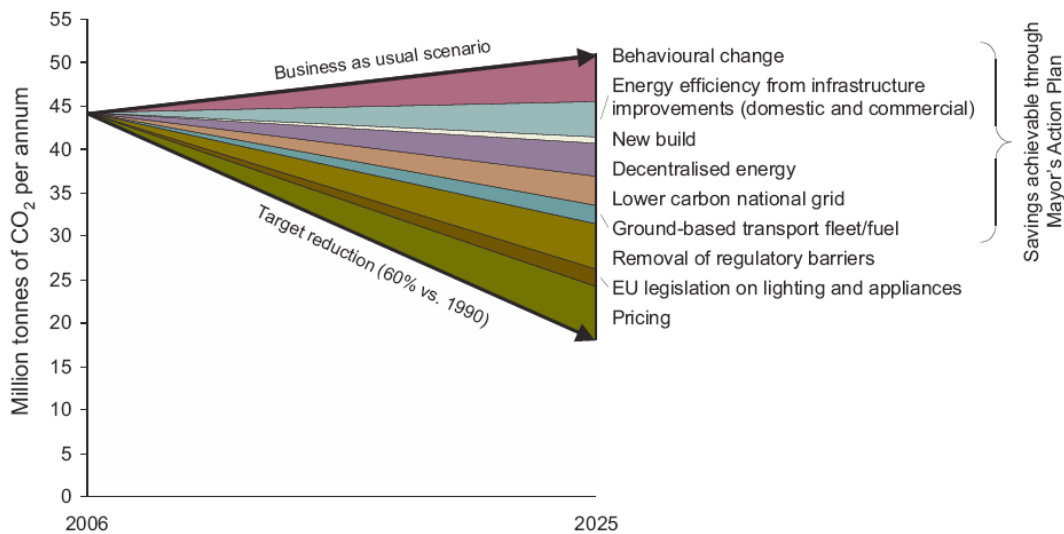


Figure 4 Reproduced from the Mayor's Climate Change Action Plan (GLA, 2007)

This is the approach that we intend to follow in Leeds. We have already developed an emissions inventory and have commenced work to understand the potential impact of the various headline actions we have identified, which will we progressed with support from the Carbon Trust and Energy Saving Trust. These, together with the results of the consultation process, will form the basis of our realistic action plan and target. When formulating this, questions that we will seek to answer include:

- What is the business as usual emissions forecast, factoring in anticipated growth?
- What local, regional and national programmes are in place and what emission reductions will they achieve?
- What additional reductions will the headline actions achieve?

Q. 4 – Do you agree with the approach taken to developing emissions reduction targets or would you prefer to see a different approach taken? What should our overall target be – either expressed numerically or as a statement?

7. Impacts of Climate Change

Severity of Climate Change.

The IPCC conclude that if global atmospheric CO_{2e} can be stabilised to 450ppm, there would still be a 50% chance of experiencing 'dangerous climate change', defined as a 2°C global rise in temperature. Current emission trends indicate stabilisation will occur at levels approaching 550ppm. This will greatly increase the risk and severity of dangerous climate change.

Climate Change Scenarios

Scenarios of future climate change based on different levels of emissions have been modelled by the Hadley Centre (part of the UK Met Office) and the Tyndall Centre. This information was published by the UK Climate Impacts Programme (UKCIP) in 2002 as the 'UKCIP(02) Scenarios'. These scenarios have been based on low and

high GHG emissions for the years 2020, 2050 and 2080. Figures 5, 6 and 7 illustrate the likely changes in summer and winter rainfall and annual temperatures.

Yorkshire and Humberside Change in annual average daily temperature

Source: UKCIP02 Climate Change Scenarios (funded by Defra, produced by Tyndall and Hadley Centres for UKCIP)

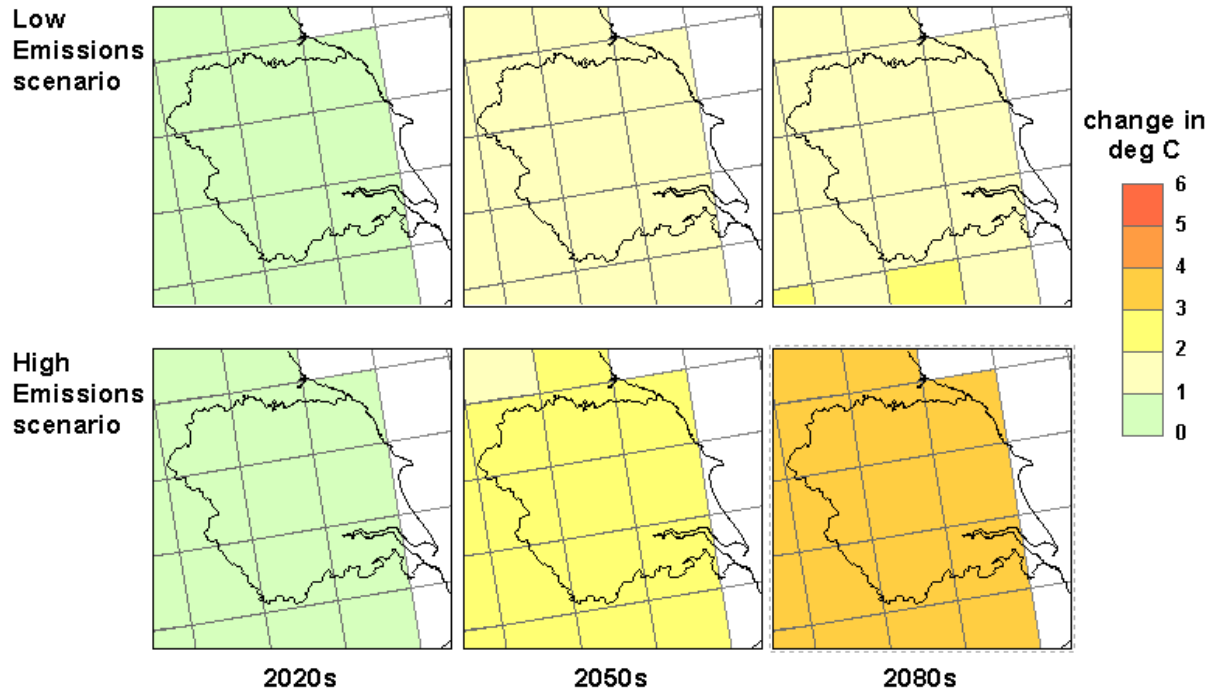


Figure 5

Yorkshire and Humber Percentage change in summer precipitation

Source: UKCIP02 Climate Change Scenarios (funded by Defra, produced by Tyndall and Hadley Centres for UKCIP)

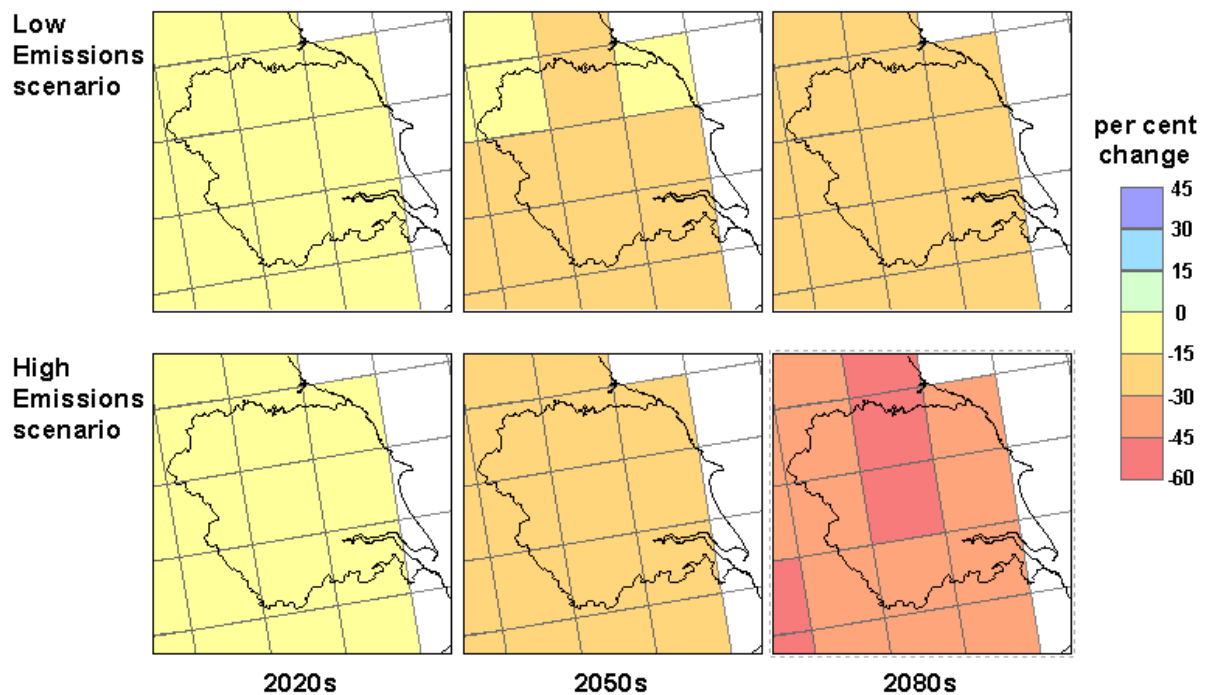


Figure 6

Yorkshire and Humber

Source: UKCIP02 Climate Change Scenarios (funded by Defra, produced by Tyndall and Hadley Centres for UKCIP)

Percentage change in winter precipitation

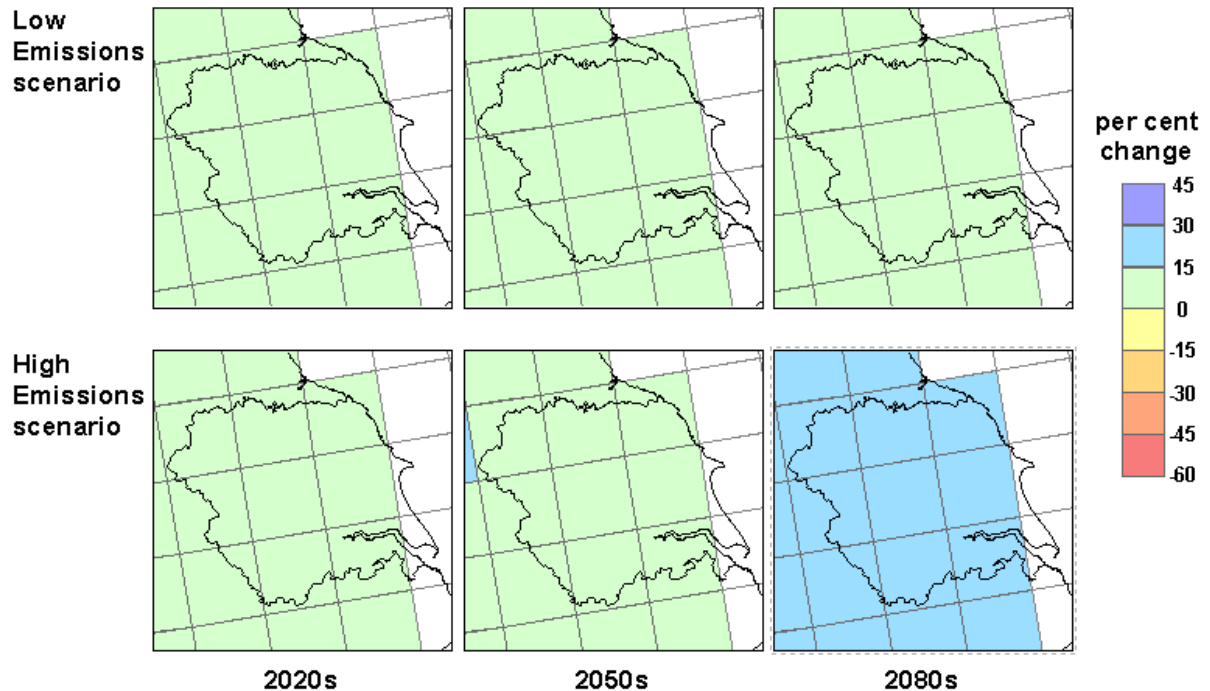


Figure 7

UKCIP have identified the following climate change headlines:-

- **Long term/Seasonal Changes.**
 - Warmer drier summers
 - Milder wetter winters
 - Rising sea levels
- **Extreme Events.**
 - More very hot days
 - More intense downpours of rain
 - Increased storm surges
 - Potential increase in winter storms

UKCIP are now developing a new climate change modelling system to be published in 2008 (UKCIP(08) Scenarios), that will predict the probability of future severe weather events. It will also be possible to combine weather variables. For example it will be possible to predict the percentage probability of intense rainfall events in summer, following a period of drought.

Observed Weather Trends in Leeds

The former Leeds Weather Centre and the Leeds CC Met Station have been used to obtain comprehensive weather data for central Leeds for the period 1985- 2007. This data set has been investigated to establish whether there are signs of evidence for local climate change. The following weather related parameters have been assessed and are presented in figures 8-11 below:

- Historic/seasonal and extreme temperature trends.
- Rainfall intensities and distribution.
- Frequency of air frost and snowfall.
- Frequency of gales.

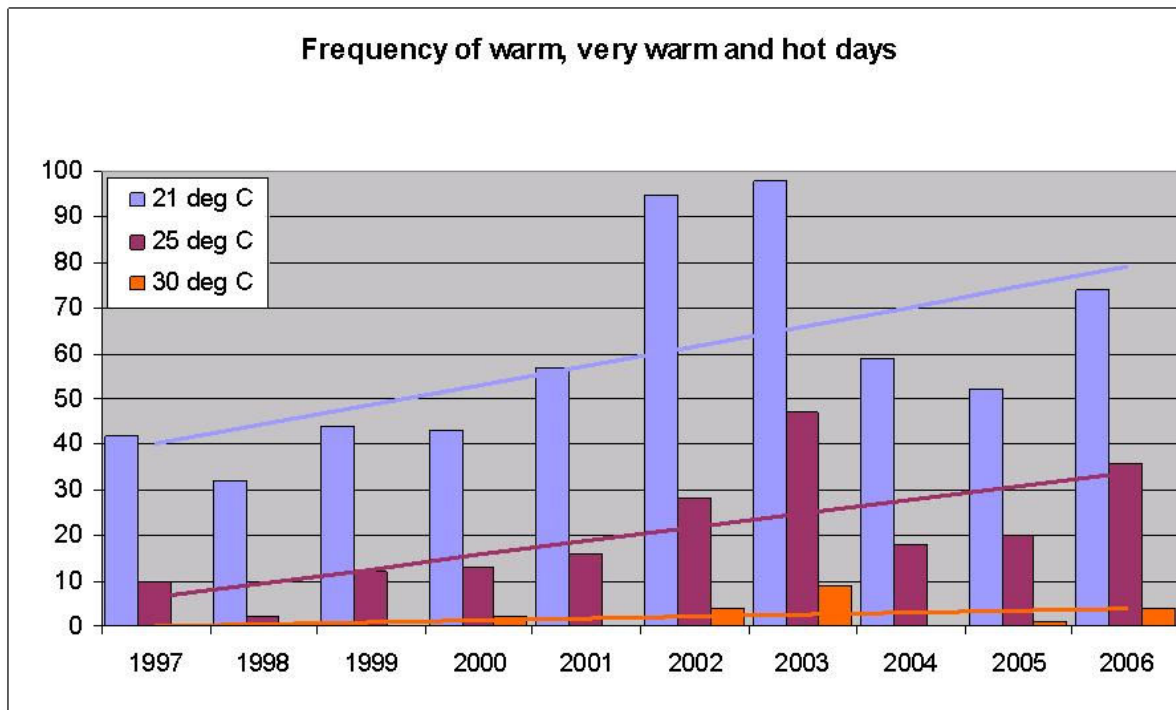


Figure 8

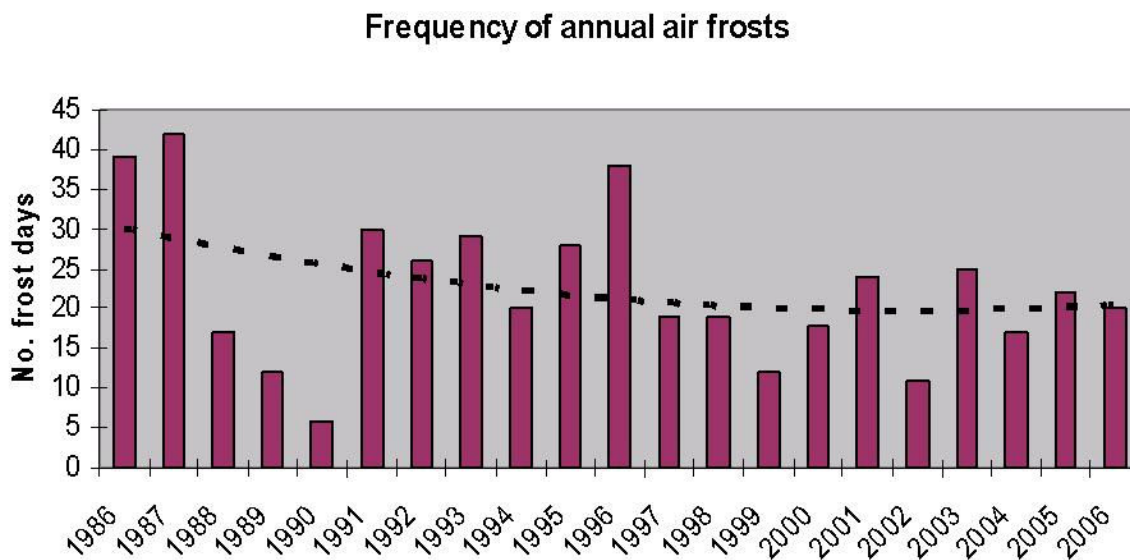


Figure 9

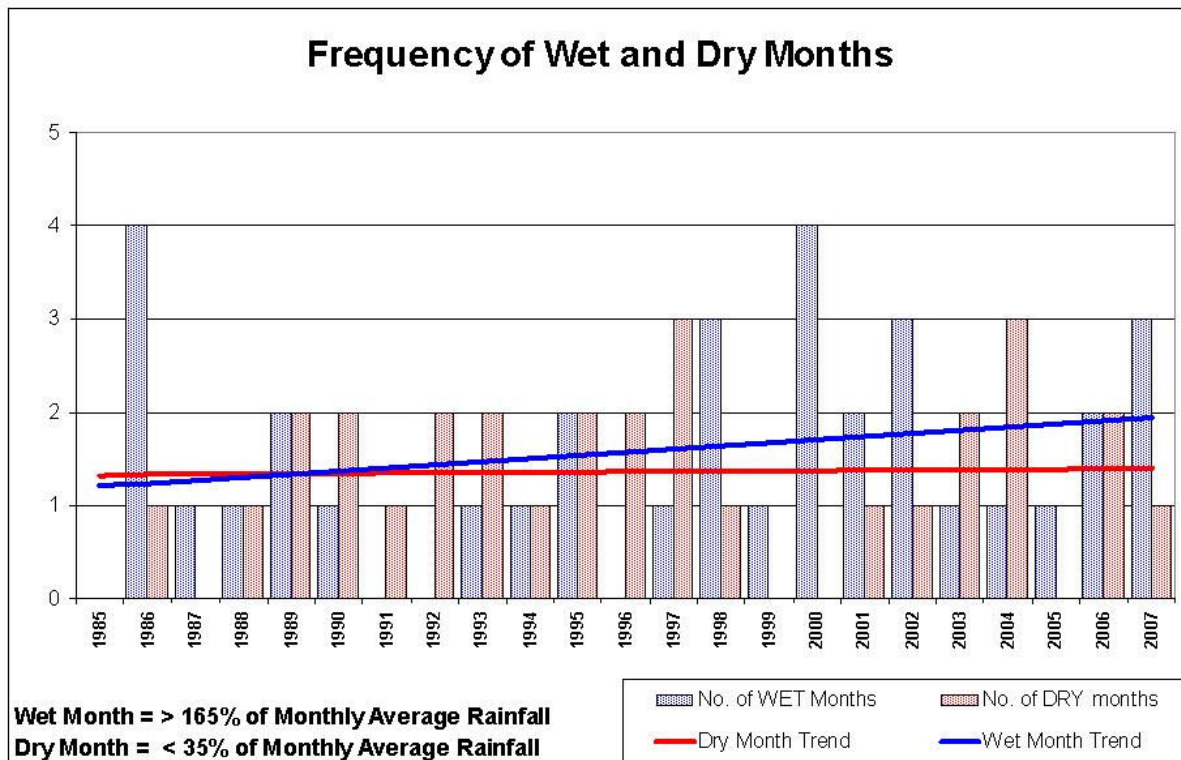


Figure 10

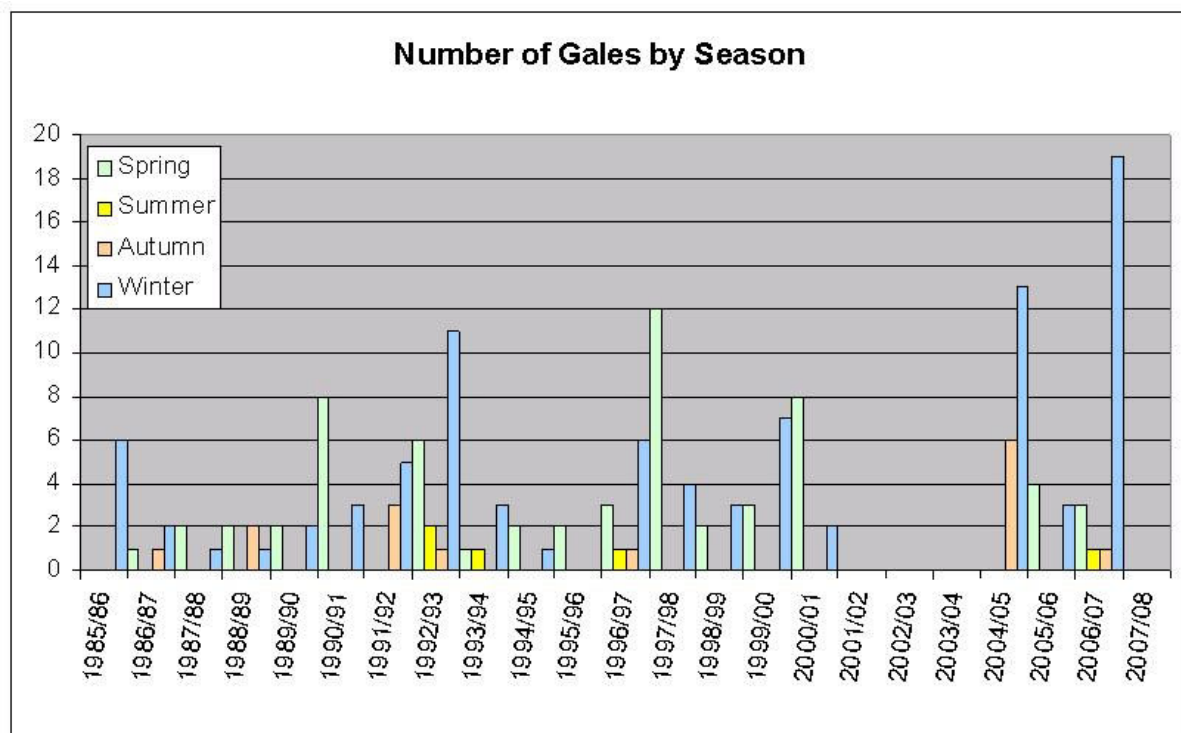


Figure 11

It must be noted that a 30 year data set is officially required to define trends in climate change. However, all of these graphs illustrate noticeable trends in support of climate change (as predicted by UKCIP(02) scenarios) with the exception of wet/dry months. Some of these trends, particularly those related to temperature,

frost and snowfall may have been strengthened by the increased 'Urban Heat Island' effect of Leeds.

The observed weather trends for Leeds provide clear evidence of why there has been an increase in severe weather related events in the Leeds District. Some examples have been listed below:-

- Increased frequency and severity of fluvial/valley flooding.
- Increased occurrence of flash floods adjacent to highways and watercourses.
- Increased frequency of drought and summer heatwaves.
- Increased occurrence of winter gales.
- Reduced frequency of air frost, snowfall and severe winters.

All of these weather events have happened before, but it is important to stress that these events are occurring with greater frequency.

Development of a Local Climate Impacts Profile (LCLIP)

Leeds is currently developing a Local Climate Impacts Profile (LCLIP) which will help identify how the local climate in Leeds has changed with time. The LCLIP will investigate past severe weather events and their impacts and consequences for Leeds. This information will help target the most cost effective ways to adapt our infrastructure and working practices to reduce our vulnerability to future severe weather events in Leeds.

8. Adapting to climate change in Leeds

Whatever progress is achieved in helping to mitigate or reduce GHG emissions, we are committed to significant or even dangerous levels of climate change. It is therefore essential that we adapt our infrastructure to cope with future climate change. We simply cannot afford not to do this.

Development of a Risk Assessment Strategy.

UKCIP have developed tools and provided training on how to develop an appropriate risk assessment methodology for Leeds. It is not possible to adapt all organisations and services in Leeds against all possible adverse effects of climate change. For this reason, a risk assessment approach will help guide where essential adaptation measures are most needed. Our risk assessment methodology will incorporate the following elements:-

- Use of UKCIP training and tools.
- Systematic approach across all service sectors.
- Utilise the LCLIP and identify vulnerable service areas.
- Identify the most cost effective measures.

Monitoring Climate Impacts and Adaptation

We propose to monitor climate impacts where possible. This will focus on observed climate within Leeds; the impacts that this has and the development of adaptation actions.

Proposed climate factors to be monitored:

- Total number of warm, very warm and hot days.

- Total number of wet/dry months
- Total incidences of rainfall intensity greater than 25mm/15 minutes
- Total number of gales.
- Total days with air frosts.

Proposed impact and adaptation action indicators:

- Number of organisations conducting risk assessments.
- Number of homes flooded annually (LCC/Environment Agency/ABI data).
- Number of Heatwave watch, warnings etc issued (Leeds PCT data).
- Phenology/grass cutting/growing season (LCC Parks and Countryside data)
- Number of times roads were gritted.(LCC Highways data)

Q. 5 – Do you agree with these propose adaptation indicators? Should the strategy set any specific adaptation targets? If so, what should the targets be?

9. The strategy

Sections 10-17 detail the key strategic issues for the city, divided by the eight themes. The content is based on the input of the cross-sectoral theme groups which have all met a number of times since early 2007. There will be areas of overlap between the themes, but an effort has been made to avoid this becoming a problem by regularly sharing progress in the CCSG. Following consultation, the theme groups will meet again to finalise detailed action plans including SMART actions with clear leads.

Each section will share the same format, namely:

Introduction to theme	Will provide an introduction to the theme, with a definition where necessary, and explanation of the scope of the theme.
Review of current actions and gaps	Will analyse climate change progress in Leeds, work planned for the near future and highlight any important gaps. Activities will be sub-divided into three areas: corporate, service delivery and city wide. Links to other themes will be highlighted.
<ul style="list-style-type: none"> • Leeds City Council corporate 	Corporate affairs that Leeds City Council manages and are therefore entirely within the council's direct control. These include: energy efficiency in council buildings, sustainable procurement, trade waste and recycling, fleet management and parks and green space management.
<ul style="list-style-type: none"> • Service delivery 	Services that LCC delivers on behalf of the community. These include: transport planning, planning policy, municipal waste collection and energy efficiency in existing housing.
<ul style="list-style-type: none"> • City wide 	External issues that LCC currently has little involvement in, or influence over, but which are critical to the effective delivery of a Leeds Climate Change Strategy across Leeds. These include: energy efficiency in commercial/industrial buildings, adaptation of existing building stock to be climate resilient, management of non-LCC green spaces, and consumer behaviour.
Strategic issues for theme	Will use tables to highlight the main strategic issues and the sub-issues identified by the theme group.
Priorities for action	Will detail key strategic priorities that need to be dealt with over the next few years.
Headline actions	Will provide more fleshed out short-term actions that contribute to meeting strategic priorities.

Summary of key actions and targets

Table 3 below summarises the cross-cutting actions included in the first half of the strategy and selects some key actions from the next eight sections. These indicate some of the key targets for the strategy and provide linkages to the National Indicator Set. This is not intended to be comprehensive but instead provides a summary of how different elements of the strategy interact.

Selected Headline Actions contributing to target	Targets	Local / National Indicator Set	Baseline
C.1 Encourage organisations to sign the 'Climate Change Charter', and individuals to sign the 'Climate Pledge'.	Climate Charter signed by 50 organisations responsible for 10% of emission by end 2010; 2,000 people taken Climate Pledge end 2008 and 25,000 end 2020.	NI 186; number of signatories	Zero
C.2 Use modelling to identify and prioritise cost-effective emissions reductions to set a trajectory to meet our emissions reduction targets.	At least 60% reduction on 1990 baseline by 2050, with interim target of 30% by 2020.	NI 186;	Emissions of approx 6.2m tonnes CO ₂ e in 2005 (including aviation and waste)
C.3 Influence the next iteration of the CRDP to include green and critical infrastructure issues	Study into capacity of green and critical infrastructure for City Region conducted by end 2008.	n/a	n/a
C.4 Adopt a methodology to quantify the effect on emissions of different policy scenarios and specific actions.	Methodology to allow CO ₂ emission impacts to be evaluated developed and adopted.	NI 186	n/a
C.5 Commence smart gas meter installations in LCC buildings in 2008.	250 meters installed by end 2008	NI 185	Zero
C.6 Use Defra data supplemented by improved local data as a means to monitor and report headline progress and develop corporate emissions inventories for LSP partners.	Report accurate emissions data annually.	Percentage of emissions that are covered by corporate emission reduction targets	n/a

Adaptation I. Adopt and use a climate risk assessment tool.	To improve the resilience of Leeds to current and future climate change	NI 188	n/a
Built environment (non-domestic) I. Improve energy efficiency in existing LCC and LSP partner estates.	To reduce emissions from the LCC estate by 3% pa and encourage other partners to adopt the same target.	NI 185 & NI 186;	2006/07 LCC buildings emitted 69,000 tonnes CO ₂ . Tbc for other partners.
Built environment (domestic) III. Provide incentives to encourage private sector landlords and homeowners to take up energy efficiency measures.	Reduce domestic emissions by 2% pa.	NI 186	Emissions of 1.79m tonnes CO ₂ in 2005.
Education and awareness II. Develop a 'Climate Change Centre of Excellence' to bring together information and assistance for individuals and organisations .	Centre operational by end 2008.	NI 186;	n/a
Natural Environment III. Encourage the use of sustainable techniques that optimise the local food, construction materials and fuel outputs of land.	Research the extent of local food economy and develop plan to further develop it.	NI 186	n/a
Planning and Development IV. Develop and deliver a future energy infrastructure plan (including CHP, renewables and community heating) for Leeds.	Renewables capacity 11 MW by 2010; 75 MW by 2021 CHP capacity: additional 5 MW _{th} by 2010; additional 50 MW _{th} by 2021	NI 186	Renewables 9.7MW (2007); CHP tbc

Procurement I. Specify low carbon and well adapted new buildings and major refurbishments within the LCC and key partner organisations' estates.	LCC buildings to be 20% lower CO ₂ than current Building Regulations and encourage partners to adopt the same target. To ensure that new buildings are well adapted and designed to cope with end of design life climate..	NI 185; NI 186 & NI 188	No requirement to exceed Building Regulations
Transport IV. Work with employers to incentivise sustainable transport and to make sustainable transport information more accessible.	Grow number of West Yorkshire Travel Plan Network members year on year.	NI 167; NI 177 & NI 186;	73 members of WYTPN in 2007.
Waste I. Incorporate GHG emission performance in the evaluation framework for the waste treatment infrastructure procurement.	Optimise GHG emissions reduction potential of new infrastructure.	NI 186	n/a

Table 3

Key to National Indicator Set

NI 167: Congestion – average journey time per mile during the morning peak

NI 177: Local bus passenger journeys originating in the authority area

NI 185: CO₂ reduction from local authority operations

NI 186: Per capita reduction in CO₂ emissions in the LA area

NI 188 Adapting to climate change

All measurables and indicators for these and all other actions in the strategy will be monitored annually and reported through the EMAS statement.

Q 6 Is this summary useful as a summary of key actions and targets? Do we need to select other targets to monitor?

10. Adaptation

10.1. Introduction to theme

Climate change adaptation has two parts: firstly understanding what the likely level of atmospheric carbon concentrations at different points in time will be and modelling the most probable climate impacts. Secondly, successful adaptation involves putting in place actions which reduce vulnerability to climate risks and take advantage of new climate opportunities.

Climate adaptation is subtly different from the other themes. As a policy area it is far less well developed than climate mitigation, so an effort has to be made to raise awareness of the key issues. Therefore, this theme will focus on awareness raising, providing evidence, supporting other themes to incorporate adaptation issues where relevant and only on delivering adaptation action where no other theme is well placed to do so.

The theme aim is:

- To identify current and future climate impacts, using the latest UKCIP climate scenarios, and establish cost-effective adaptation strategies to cope with climate risks and to take advantage of opportunities presented by climate change.

10.2. Review of current actions and gaps

10.2.1. Leeds City Council corporate

Risk assessment of climate impacts. Climate adaptation is often overlooked but Leeds is in a strong position to ensure that our services are resilient to current and future climate change. LCC has access to 22 years worth of weather records from the former Leeds Weather Centre and the council run Met Station data in central Leeds which allows the comparison of weather trends to climate model predictions. Already, Transport Policy, Emergency Planning and Parks and Countryside take climate impacts into consideration when planning services. LCC is working closely with the other Core Cities and UKCIP to better understand how to reduce our vulnerability to climate impacts on different service areas and to share experience between like cities. In the near future, a risk management tool will be adopted for Leeds to help develop a risk management plan.

10.2.2. Service delivery

Emergency planning. The LCC Emergency Planning team is already working with partners in Fire, Police and Health to prepare for climate impacts. Work to date has focussed on heatwave planning and flood risk and recovery. Climate change impacts should be considered in reviews of the Leeds Risk Register, which identifies the chief hazards for Leeds.

One method of demonstrating clearly the impacts of weather related events is to develop a Local Climate Impacts Profile (LCLIP). A LCLIP uses primary media sources to identify significant weather events and then a series of interviews to

attempt to place a value on the impacts and consequences of these events. LCC is currently leading the development of one for Leeds.

10.2.3. City wide

Climate risk and opportunity assessment for Leeds. Although LCC has some expertise on climate impacts and risk assessments, many organisations across Leeds have not even considered climate impacts and adaptation. The exception is those organisations involved with the work of Water Asset Management Group, Strategic Flood Risk Assessment and Emergency Planning. We therefore need to undertake a full risk assessment for current and future climate risks to ensure that Leeds becomes a city resilient to emerging risks. LCC can assist with technical climate information and future scenarios but will need the buy in of all partners for this to be effective.

Once this has been achieved Leeds will be in a position to effectively address key strategic adaptation issues for the city, including ecosystem and biodiversity response, health impacts and new and enhanced business opportunities.

10.3. Strategic adaptation issues

No	What are the main issues?	Threats or opportunities for change
1a	Risk assessment	Various methodologies available so must select most appropriate. Implement risk assessment across strategic areas in partnership And analyse cost of action vs inaction.
1b	Developing and presenting the local evidence base	The principle data sources to present are: - UKCIP08 scenarios (available next year) - Leeds met station weather data. - Other local/regional weather data. - Local Climate Impacts Profile (LCLIP).
1c	Increasing understanding of adaptation	Use 1a and 1b to target strategic decision makers and practitioners. Integrate with Managing Urban Europe (MUE).
2a	Emergency planning and resilience	Principle roles include: flood mitigation; ind damage recovery and managing heat stress. Need to better understand risk to emergency services of flooding.
2b	Utilities	Need to conduct more research to understand: - Resilience of water treatment to flooding. - Availability of water in drought. - Resilience of electricity sub-stations to flooding.
3a	Land use and transport planning and future development	SPD on Sustainable Design and Construction needs to contain adaptation examples (see Three Regions Adaptation Checklist).. SA/SEA of LDF considers adaptation. MUE Strategic Programme/Model can help with strategic decision making.

		Use of SUDS/green roofs should be promoted. LTP2 already contains adaptation actions.
3b	Existing built environment	Ability to cool will need improving, through – solar shading/natural ventilation/air conditioning/'cool' grids. Need to understand subsidence risks.
3c	Ecosystem and biodiversity response	Need to identify and connect fragmented and stressed ecosystems. Select species that tolerate expected climate change.
4	Health and social impacts (consequence of failure to address climate change in other areas)	Heat stress. Changing diseases and vectors. Increased pests. Air quality. Food poisoning. Flood recovery. Skin cancer. Mental health. Differential effects on different groups and communities in the city.
5	New and enhanced business opportunities	Tourism. Outdoor leisure. Changing agricultural and horticultural practices. New products and services. Reduced winter fuel poverty. Enhanced reputation of Leeds.

10.4. Priorities for action

The table shown in section 10.2 has been ordered by priority area. This initial prioritisation has been achieved by considering the immediacy of the risk or the need for the strategic issue to be addressed before other issues can be progressed. Suggestion for more detailed prioritisation of actions would be to use the Town and Country Planning Association (TCPA) categorisation of No regrets; Low cost; Win-win; and Adaptable flexible and resilient policies.

10.5. Headline actions

- I. Pilot and adopt a suitable climate risk assessment tool and work with key organisations across Leeds to identify and manage risks.
- II. Work with Emergency Planning to ensure that risks uncovered by risk assessment are included within the Risk Register.
- III. Continue to develop and present the local evidence base of past climate trends and future climate scenarios to raise awareness in key sectors.
- IV. Complete LCLIP and use to develop Vulnerability Mapping to further aid prioritisation.
- V. Build on current successes in the transport sector to develop new interventions which will further improve transport climate resilience.
- VI. Conduct research into the capacity of the natural environment to reduce the impact of climate change on Leeds, through increased green space to reduce urban heat island effect and curtail flood risk.

Q. 7 – Have we identified the major strategic issues? Are the priority areas and headline actions right? How could you contribute to the specific actions?

11. Built Environment

11.1. Introduction to theme

The built environment theme deals with mitigation and adaptation issues for the existing built environment. This primarily looks at improvements to the building fabric, heating and cooling systems, lighting, appliances and processes. It specifically does not include transport or new buildings as those areas are covered by other themes. Whilst it is recognised that some of the best solutions involve sharing services between domestic and commercial/industrial buildings these arrangements are very complex. There is very good potential to achieve significant emissions reductions over the next few years by facilitating the uptake of simple solutions in each of the different sectors. As the domestic issues are so different from the commercial and industrial ones, and thus the methods to achieve change are accordingly different, this theme has been split into two sub-sections.

The theme aims are:

- To work within the existing built environment to reduce emissions from existing domestic, commercial and industrial buildings through enhanced energy efficiency and on site renewable energy.
- To help to reduce instances of fuel poverty by improving the efficiency of the existing housing stock in Leeds.

11.2. Review of current actions and gaps

11.2.1. Leeds City Council corporate

Energy management in existing LCC buildings. This is a critical area. The majority of LCC's emissions come from the existing buildings and the total utility bill now exceeds £20m. Crude oil prices continue to rise, Defra is developing a carbon emissions trading scheme covering large public sector organisations and the new local authority national indicators now include internal emissions management.

LCC has had some notable successes in this area already. LCC has taken part in the Carbon Trust's Local Authority Carbon Management Programme and has received central government grant funding to establish a £760k revolving loan fund for energy efficiency improvements. LCC has switched the majority of the electricity supply to green electricity, has a programme to install real-time energy meters in larger buildings and has carried out energy surveys of selected buildings.

However, recent research by Defra indicates that the public sector has the greatest potential for cost-effective carbon reductions of all sectors in England. A good example of the potential to reduce carbon cost effectively is within the leisure centres where a typical large Combined Heat and Power unit can reduce energy consumption by approximately £50,000 pa.

A common rule of thumb used to calculate a fair allocation of resources for energy management is that for every £1m spent on energy, one energy manager is

required. A review of this area to ascertain whether the right management structure, number of staff and financial resource is available is recommended.

11.2.2. Service delivery

There is very limited joined up work between LCC and the public or private sector regarding reducing emissions or adapting buildings to prepare for the impacts of climate change.

11.2.3. City wide

Energy efficiency in commercial/industrial/public buildings. Non-domestic buildings make up about 1/3rd of emissions from Leeds, but outside the emissions from Leeds Initiative partners and Part A industries that the council and the Environment Agency regulates, there is little council influence over them. Many of the largest multi-national companies that operate in Leeds (e.g. ASDA, M&S, Boots) already have strong corporate responsibility agendas that are driving emissions reductions from their premises, in their transport networks and in their supply chains. However, in the small to medium sized commercial, retail and industrial sectors there are few drivers of change and little support available. Additionally, LCC has little contact with this sector so needs to improve communications and provide new support mechanisms.

11.3. Strategic commercial and industrial built environment issues

No	What are the main issues?	Threats or opportunities for change
1	Reducing emissions from large businesses	Driven by EUETS and impending Carbon Reduction Commitment (CRC) plus rising cost of energy. CSR agenda and marketing/public relations importance of carbon management generally understood. Energy management teams in place and measures with bottom line benefits being taken. Supported by Carbon Trust, BitC and Yorkshire Forward.
2	Reducing emissions from public sector buildings	Driven by performance targets, energy costs and impending CRC. Not always seen as priority as energy is small % of overall budget. Very high potential to achieve cost-effective savings in this sector (CRC research). Supported by Carbon Trust.
3	Reducing emissions from small and medium sized businesses and 3 rd sector buildings	Large number of individual organisations. Not prioritised for many due to lack of time and understanding of potential savings. Lack of support.
4	Improving understanding of contribution of different organisations to emissions	To target emissions reductions realistically need to understand top 50 contributors and their plans for emissions reductions.

	profile of Leeds	
5	Ownership of buildings.	Many smaller industries and commercial organisations do not own their buildings, limiting ability to improve energy efficiency. Work needed with property owners/investors.
6	Lack of local authority engagement	Limited contact between businesses and LCC, with primary focus on enforcement.
7	Separating process and building fabric emissions	Commercial emissions are heavily influenced by building fabric, heating/cooling and lighting. Many industrial processes significantly outweigh emissions from buildings. Process emission improvement generally requires be-spoke or sector-specific advice.

11.4. Priorities for action

Improving the efficiency of the LCC estate is the top corporate priority as emissions from buildings dominate the council emissions profile. A priority for the city-wide non-domestic sector will be to better engage with the sector, gather better performance data and develop new services in partnership that tackle specific barriers to improvement.

11.5. Headline actions

- I. To improve the energy efficiency of the existing LCC estate, and those of our key LSP partners, through investment in energy efficiency technologies and energy management.
- II. To work with existing business support organisations, such as Chamber of Commerce, Business Links, Envirowise and trade associations, to build stronger relationships with the non-domestic sector.
- III. To develop a clearer breakdown of emissions from this sector across Leeds through a local carbon disclosure project.
- IV. To promote existing, and develop new, support services specifically targeted at SMEs in Leeds.
- V. To develop a mechanism to overcome the leasehold barrier to energy efficiency improvement in commercial space.

Q. 8 – Have we identified the major strategic issues? Are the priority areas and headline actions right? How could you contribute to the specific actions?

11.6. Review of current actions and gaps

11.6.1. Leeds City Council corporate

Responsibility for the maintenance and improvement of council homes has been devolved to three Arms Length Management Organisations (ALMOs) so emissions from existing council homes will be dealt with under service delivery.

11.6.2. Service delivery

Domestic energy efficiency in existing housing. Domestic emissions account for approximately 1/3rd of total carbon emissions for Leeds. The ALMOs are directly

responsible for improving energy efficiency for approximately 60,000 homes which they are delivering through Decent Homes and investment in stock improvements. Registered Social Landlords (RSL) have a similar remit for approximately 10,000 social housing units. The remaining 200,000 privately owned and 35,000 privately rented homes are serviced by the Energy Efficiency Advice Centre run by LCC's Fuelsavers team. In the short term, this is focussing on improving basic energy efficiency through loft and cavity wall insulation and efficiency heating and lighting, particularly in vulnerable or fuel poor households. It already delivers a number of successful schemes and is forming a partnership with a utility to tackle energy efficiency systematically on an area by area basis. Longer term, this service will need to expand to include measures for non-standard households, such as solid wall insulation, and a renewable energy service. One of the biggest barriers is a lack of interest from homeowners and landlords. To counter this, developing incentives, penalties or marketing initiatives that resonate with the target audience is essential.

11.6.3. City wide

City wide activities are considered in service delivery above.

11.7. Strategic domestic built environment issues

No	What are the main issues?	Threats or opportunities for change
1	Reducing emissions from ALMO and RSL properties.	Social housing has best energy performance in city so few low cost opportunities remain. Driven by Decent Homes standards and reports to government. Asset management plans include targets to reduce emissions, primarily through insulation and efficient heating. Renewables and solid-wall insulation being trialled and could significantly reduce CO ₂ but at relatively high cost.
2	Reducing emissions from privately rented properties.	Lack of standards to reach, except for Unipol registered houses. Perceived lack of benefit to landlords from energy efficiency as tenants save money. Unclear whether energy efficiency is a selling point for tenants.
3	Reducing emissions from privately owned properties.	Energy efficiency is low priority for householders, evidenced by low take up of grants and cost effective measures. Large number of individual decision makers. House-sale and refurbishment are key decision points. HIP energy surveys could be used to encourage energy efficiency.
4	Reducing emissions from lighting and appliances.	High growth in number of appliances in homes, many of which remain on standby. Low efficiency light bulbs being phased out. Marketing of cold and wet appliances has

		increased uptake of high efficiency models. Progress will be driven by manufacturers producing higher efficiency appliances. Challenge to reduce consumer demand for new appliances and patio heaters etc.
5	Reducing emissions from hard-to-treat homes.	Many solutions (e.g. solid wall insulation) remain expensive. Visually unacceptable in some areas (e.g. conservation areas). Renewables offer some potential. Stock clearance will be only option for some areas.
6	Encouraging take up of micro-renewables.	Currently high capital costs although some grants available. Poorly developed local supply chain. Low take up but perceived as desirable and exciting by some householders.
7	Increasing uptake of smart-meters to engage people in energy management.	Householders have poor understanding of where energy is used in homes or even total spend on energy. Smart meters in prominent places can draw attention to this.
8	Avoiding increasing emissions from affordable warmth work.	Partial energy savings from insulation taken as 'comfort gains'. Switch from individual room heaters to central heating can lead to higher CO ₂ emissions.
9	Improving skills	Shortage of skilled construction workers. Lack of specialist skills for sustainable energy.

11.8. Priorities for action

The table above has not been ordered in terms of priority. The priority for this sector is to reduce emissions as quickly and cost effectively as possible. This is easiest where there are a limited number of decision makers such as ALMOs and RSLs but these organisations have already taken the majority of the cost effective actions. However, there is still potential to mass-deploy newer insulation and renewable energy technologies. The key to the market with mass decision makers is either to make it easier to improve energy efficiency than not to do so or to find key decision points, such as purchasing a house or doing major refurbishments.

11.9. Headline actions

- I. Support social landlords to install cost-effective energy efficiency measures into all households as quickly as possible and to trial and finance newer insulation and renewables technologies.
- II. Develop and implement new area-based marketing approaches to make it easier for householders to choose to be energy efficient.
- III. Investigate and implement new financial incentives to encourage private sector landlords and homeowners to take up energy efficiency measures.

- IV. Develop partnerships with estate agents to offer services linked to HIPs for newly purchased properties.
- V. Improving sustainable energy installation skills base.

Q. 9 – Have we identified the major strategic issues? Are the priority areas and headline actions right? How could you contribute to the specific actions?

12. Education and Awareness

12.1. Introduction to theme

This theme exists to raise awareness of key climate change issues and to inspire and enable individuals and organisations to take action. To do this, we will develop some generic campaigns. The theme also has a role to support the other theme groups to develop more specific campaigns and to ensure that climate change communications activities are tied together into a cohesive whole.

The theme aim is:

- To develop a series of campaigns and communication mechanisms to improve awareness and understanding of climate change amongst those who live or work in Leeds and to encourage organisations and individuals to take positive action to reduce emissions and prepare for the impacts of climate change.

12.2. Review of current actions and gaps

12.2.1. Leeds City Council corporate

Staff awareness and behaviour change. A key component of an effective corporate response to climate change is understanding and buy-in at all levels. In LCC, Senior Managers are focussing on climate change in the Chief Officer Leadership Forum meeting in December which will encourage all to understand the services that they deliver in terms of both emissions reductions and climate impacts. Additionally, the recycling and Energy Guardian campaigns running across the council are encouraging members of staff to become more involved with managing environmental impacts at a local level. A new programme of staff engagement initiatives is planned by the Environment City Team to build on these foundations. Education Leeds has implemented Healthy Schools in 99% of Leeds' schools and is now building on these foundations by piloting EMAS in 12 schools.

12.2.2. Service delivery

Communicating our services. LCC already delivers a number of services that reduce greenhouse gas emissions but require community involvement. For example, the Fuelsavers team provides advice on domestic energy efficiency and access to a wide range of grants; the Recycling team encourage residents to reduce waste going to landfill and the TravelWise team promotes healthy and sustainable transport. Currently, these services are communicated separately and there could be value in bringing the whole range of services together under a climate change banner to make access easier for residents.

12.2.3. City wide

Public engagement (all areas). If Leeds is to tackle climate change effectively, it is critical that the individuals who live and work in Leeds understand the issue and desire to be part of the solution. LCC has a role to play by providing clear and impartial information and by leading by example. However, for this to succeed, people will need to be inspired and to think for themselves about their own solutions. Therefore, LCC will need to work closely with opinion formers in Leeds to make

climate change relevant to the very different audiences in the city. The council should provide strong support to campaigns, but campaigns initiated and supported by the local community are far more likely to succeed long term than council-driven ones.

12.3. Strategic education and awareness issues

No	What are the main issues?	Threats or opportunities for change
1	Increasing awareness and understanding of climate change issues	Clearly separate fact from misinformation. Collate and provide easily accessible and understandable information. Develop different styles and media for different niches. Collate all climate change relevant policies emerging from Leeds. Highlight importance and relevance of climate change to different audiences. Provide clear sign-posting to sources of help and assistance for different audiences. Provide training to enable message to be effectively cascaded.
2	Motivating positive action and stimulating behaviour change	Use of price signals (incentivising wanted behaviour; disincentivising unwanted). Encourage people's personal values to align with reduced climate impacts. Stimulate community led activities that change social norms. Utilise business Corporate Social Responsibility volunteer time and funds. Emphasise positive marketing and reputational impacts to organisations that proactively deal with climate change.
3	Coordinate communications across themes and developing shared key messages (<i>all themes</i>)	Nominate lead in each theme group to identify key issues to communicate, key audiences and indicative timescales. Develop a consistent message and brand. Central point of contact for climate change issues. Maximise impact by clustering activities around key events. Counter resource intensive 'consumerism' messages.
4	Engaging a wide audience by running high-profile and inclusive climate change campaigns	New events (World Environment Day; Festival of Climate Change; etc). Jointly-run events (Film Festival; displays at community days; etc). Identify and attract new funding for campaigns. Create support for bold decisions.
5	Developing Leeds-based	Organisational pledge that commits businesses,

	pledges to generate ownership of the issue	public sector organisations and NGOs to specific actions, demonstrating leadership. Individual and community pledge, linked to sources of help and advice.
6	Use local and specialist media to promote climate change successes (<i>all themes</i>)	Hold regular meetings and briefings with key media outlets in Leeds. Develop a series of case studies. Develop a number of spokespeople from across the theme groups.
7	Showcase climate change achievements to external audiences.	Build partnerships with existing showcasing organisations such as Marketing Leeds and Leeds City Region. Develop a green/climate change branding for the city. Include climate change messages within existing visitor offers (e.g. conferences, events, hotels, attractions, tourist information).

12.4. Priorities for action

The strategic issues have been partially prioritised in the table above, with the first three being identified as the priority issues for Leeds.

12.5. Headline actions

This strategy proposes a number of high-profile partnerships and capacity building actions, namely:

- I. Developing and implementing a communications and media plan to raise awareness of the Leeds Climate Change Strategy, increase public profile of positive action on climate change in Leeds and support delivery of theme group actions;
- II. Developing a 'Climate Change Centre of Excellence' (possibly in conjunction with the proposed 'City Room' and the joint university 'Innovation Zone') to bring together practical assistance to help individuals and organisations to tackle climate change.
- III. Developing and publicising both a 'Climate Pledge' for individuals and a 'Climate Charter' for organisations to commit to helping to solve climate change.
- IV. Developing and delivering an annual Climate Change Festival in partnership with CABE and other commercial partners across the city.
- V. Securing funds from government, European or other sources to target communications activities at specific audiences in Leeds.

Q. 10 – Have we identified the major strategic issues? Are the priority areas and headline actions right? How could you contribute to the specific actions?

13. Natural Environment

13.1. Introduction to theme

The natural environment refers to green infrastructure within Leeds, including both the non-built environment (e.g. farmland, gardens, parks, sports pitches, woodlands, protected habitats, etc) and green elements within the built environment (e.g. street trees, green roofs, etc).

The theme covers both efforts to reduce greenhouse gas emissions and to adapt to the impacts of climate change. The group has established three overriding aims:

- To use the natural environment to reduce carbon emissions through increased use of locally sourced wood and energy crops; through increased localisation of food production and consumption; through better land management to reduce resource input and through increased carbon sequestration.
- In the short-term, enhance the resilience of the natural environment to the current and future impacts of climate change.
- In the medium-long term, understand and promote the critical importance of a robust functional landscape that provides the basic needs of the population of Leeds (e.g. food, water, fuel, flood risk management, etc).

13.2. Review of current actions and gaps

13.2.1. Leeds City Council corporate

Management of LCC parks and greenspaces (Adaptation, Built Environment). Leeds City Council manages extensive parks and greenspaces (including street trees, woodlands, allotments and sports pitches) on behalf of the city that not only provide a leisure function for the people of Leeds but can deliver services that help tackle climate change. For examples:

- Management of trees and woodlands could provide both biomass for heating and electricity generation and locally sourced timber for construction.
- Good land management could sequester carbon in both the soil and in organic matter.
- Individual trees, woods and greenspaces are known to help reduced the urban heat island effect and can reduce the risk of flash flooding, both services which will help to build resilience to a changing climate.

Parks and greenspaces will themselves need to be carefully managed to avoid the impacts of climate change. Good species selection will ensure that longer-lived flora can cope with a warmer climate and by linking greenspaces together it may be possible to help natural and semi-natural ecosystems migrate as climatic zones move. As habitats are put under increasing pressure, species ranges will shift to stay within their climate envelope. Many species will not be able to do that and therefore will be at risk of becoming locally and globally extinct. All of this will require a close understanding of the extent of our environmental assets, the risks they face

and how they feature in their wider environment. The Parks and Countryside service is looking at a number of pieces of work to achieve this. Notably some research projects with external organisations to evaluate how existing and future green infrastructure can reduce the urban heat island effect and another to look at ways the service can help reduce CO₂ emissions. It will also highlight the important role our parks and greenspaces play to help the City adapt to climate change.

13.2.2. Service delivery

This is covered under corporate issues above.

13.2.3. City wide

Management of non-LCC greenspaces (Adaptation). Issues here are very similar to those outlined above but are complicated by ownership issues. In urban areas, the predominant greenspaces are the gardens owned by individual householders. In rural areas, it is the fields that are owned, or leased, by farmers. Finally, individually large and ecologically important, but collectively small, parcels of land are managed for environmental reasons by organisations such as the National Trust and Woodland Trust. LCC has no direct influence over any of these through land use planning powers but relies on the ecosystem services that they provide to cool, provide food and manage water. Therefore, Leeds will need to:

- Build partnerships with major land-owners to use innovative land-management techniques with minimal GHG emissions and the ability to adapt to climate change;
- Influence the multitude of individual garden owners to retain and manage their gardens.

Longer term, the greenspaces around Leeds could prove to be very important if, as some predict, a re-localisation of the global economy favours areas that can produce their own food.

13.3. Strategic natural environment issues

Adaptation

No	What are the main issues?	Threats or opportunities for change
1	Reducing urban heat island effect	Understand role of green infrastructure in urban cooling. Increase urban woodlands, street trees & green space.
2	Reducing flood risk (increasing water holding capacity of landscape)	Encourage green roofs & green terraces. Increase capacity of parks and greenspaces to intercept water. Increase the potential for water storage in designed landscape.
3	Protecting important ecosystems and enhancing their resilience	Location and inter-relation of important ecosystems. Likely climate and ecosystem pressures. Develop management plan detailing ecosystems to protect and which to abandon and when.

4	Protecting and enhancing parks and green spaces	Select species that tolerate expected climate change. Understand and promote the value of ecosystem services provided by the natural environment.
5	Prepare agricultural community for climate impacts	Localised food production and consumption to enhance food security. Crop selection to cope with changing climate. Increase water holding capacity of farmland.
6	Species selection for climate resilience	Understand likely future climatic conditions. Enhance ability to withstand likely lifetime climate conditions.

Mitigation

No	What are the main issues?	Threats or opportunities for change
1	Localisation of food production and consumption	Increase availability of allotments in Leeds. Encouraging people to grow own food in gardens. Plant more fruit trees in parks. Encourage use of farmers markets. Promote local organic vegetable-box schemes.
2	Maximising sustainable use of biomass for fuel	Quantify and use thinnings from existing woodlands. Plant mixed woodlands on municipally owned land. Encourage farmers to grow sustainable biomass crops. Promote use of biomass boilers and CHP in homes, businesses and municipal buildings.
3	Maximising sustainable use of biological construction materials	Promote locally sourced wood for construction. Promote straw bale construction techniques.
4	Maximising sustainable carbon sequestration through land management	Increase soil carbon through low till techniques etc. Increase the extent and quality of peat bogs. Understand and minimise impact of increasing soil carbon on agricultural productivity. Increasing extent of woodlands.
5	Sustainable use of transport biofuels?	Use of biofuels encouraged by UK and EU policy but land required threatens ability to produce local food.
6	Reducing resource input into farming	Promote crops that require minimal fertiliser and pesticide. Promote techniques that minimise need for fertiliser and pesticides.
7	Quality landscape that facilitate walking and cycling <i>transport</i>	Demonstrate leisure value and increased use of sustainable transport modes.

Cross cutting

No	What are the main issues?	Threats or opportunities for change
1	Identifying and carrying out research in key areas	Collate relevant information. Identify knowledge gaps. Identify funding/partnerships for research. Undertake research.
2	Increasing skills and understanding	Skills required to improve sustainability of land use (e.g. permaculture techniques). Target audiences (professionals, key decision makers).
3	Communicating climate change and natural environment	Develop communication channels and messages to help people engage with key issues.
4	Engaging farmers and land managers	Identify business cases and promote to farmers/land managers. Support and develop partnerships.

13.4. Priorities for action

There is clear overlap between many of the strategic issues identified above, with for example, increasing urban woodlands helping to reduce flood-risk and the urban heat island effect whilst also providing a biomass resource and a quality environment to motivate walking and cycling. Additionally, the disconnection between people and the environment has led to a poor understanding of the fundamental importance of a multi-functional and resilient landscape. Therefore the natural environment will prioritise cross-cutting issues that:

- Increase understanding and encourage long-term thinking.
- Develop essential land management skills.
- Encourage better land management practices that deliver multiple benefits.

13.5. Headline actions

- I. Help decision makers and the public to better understand the value of a multifunctional and resilient landscape for providing food, fuel, water management, ecological and leisure services.
 - Encourage collaborative working between agencies working to secure multi-functional landscapes and showcase the benefits.
 - Influence key agencies (e.g. Environment Agency, Network Rail, Leeds City Council and British Waterways) to take a multi-functional and ecological approach to land holdings.
 - Develop and adopt a set of principles for land management in Leeds.
- II. Enhance practical land management skills amongst land managers, the public, and relevant LCC workforce.
 - Support and promote existing voluntary skills development programmes.
 - Engage with further and higher education to develop short courses and training for trainers.

- Collate and share information between skills providers.
- III. Encourage the use of sustainable techniques (such as silvaculture, agro-forestry and low-till techniques) that optimise the local food, construction materials and fuel outputs of land, including gardens, allotments, parks and agricultural land.
- Provide guidance regarding the most suitable techniques and links to training provision.
 - Pilot a 'Grow Leeds' scheme to provide a fruit tree or bush for everyone in a local community.
 - Work with local farmers to take advantage of the market for local food within Leeds by building supply chains and infrastructure.

Q. 11 – Have we identified the major strategic issues? Are the priority areas and headline actions right? How could you contribute to the specific actions?

14. Planning and Development

14.1. Introduction to theme

Planning and development focuses on the future spatial and physical development of the city and will do this by transforming the way buildings are designed, connected, constructed, managed and used in order to develop a sustainable future for Leeds. The group covers all aspects of commercial, industrial and domestic buildings. There are clear overlaps with the built environment and transport themes so strong links must be maintained between these work areas.

The theme aims are:

- To contribute to the future vitality of the Leeds economy by ensuring that the planning and design of the urban fabric results in a city with reduced fossil fuel energy requirements, reduced transport demand and the ability to cope with anticipated climate change.
- To plan strategically for both microgeneration and large scale renewable energy generation within the metropolitan area.

14.2. Review of current actions and gaps

14.2.1. Leeds City Council corporate

Specification of future LCC buildings. The approach that LCC takes to the specification of new buildings and major refurbishments will define whether or not the council can meet challenging emissions reduction targets in the future. Bringing in a policy to use Whole Life Costing analysis when specifying a new building and providing additional capital to pay for a lower carbon building (through additional PFI credits, prudential borrowing or a corporate capital fund) would enable LCC to reduce overall emissions from the future estate.

As well as defining the emissions from our new estate, success in this area will go a long way to ensuring that the city develops in a low carbon manner. LCC cannot expect others to implement stronger planning policies unless the new council estate can demonstrate the viability of the principles and policies prior to them becoming law. Even where capital costs to LCC are relatively high for an individual building the value will be in inspiring others to follow where we lead. This is of particular importance for high profile new buildings, such as the arena, which should include achieving class leading carbon performance as a key success criterion in the tender documentation.

14.2.2. Service delivery

Planning policy that limits emissions growth in new developments. Leeds is the main driver for growth in Yorkshire and Humber and as such has high targets for both housing and commercial and industrial growth. The planning policy team are attempting to consider carbon emissions from new development holistically by

including the impacts of location, built form and transport. However, in a business as usual scenario, assuming that Building Regulations improve as projected by government to become carbon neutral by 2016 and that housing projections in RSS are built, there will be an additional 100-145,000 tonnes of CO₂ from new housing alone by 2021. To counter this, the Planning Policy team are developing specific policies within the LDF and in a separate SPD that insist on a set percentage of energy coming from on site renewables and a set percentage improvement in CO₂ performance against Building Regulation standards. However, continued uncertainty over the wording of the revised PPS1 is jeopardising the development of strong policies. In order to implement these policies successfully, officers responsible for development control and building control will need specific technical training.

This is a particularly important area for two reasons. Firstly, many private sector developers now see sustainable design and construction as central to their business and LCC planning policy must support private sector aspirations for green buildings. Second, it is likely that within 6 years the only way to economically meet increasingly stringent Building Regulations will be by providing a low carbon energy network, through locally generated heat and power. It is therefore economically important to support the strategic development of CHP and community heating across the city to ensure that Leeds remains a competitive place in which to do business.

14.2.3. City wide

Energy generation strategy (Built Environment). Leeds has no energy generation strategy at present, although two past studies (Authorities Municipal Power study and potential for a South Leeds CHP system) have been conducted. A new study to help understand natural resource flows (including energy) is being commissioned as a Development Plan Document. Efficiently generating and distributing energy locally is a key component of a low carbon city so this is a major omission. Leeds needs to bring together a multi-disciplinary team of engineers, planners, utilities and renewable energy experts to assess the potential for:

- Combined Heat and Power and community heating networks;
- Medium and large scale commercial renewables;
- Clusters of small scale renewables;
- Waste to energy generation.

The study will also need to cover legal and financial issues and should work towards the establishment of an Energy Services Company (ESCO) for Leeds to promote and deliver the above technologies.

14.3. Strategic planning and development issues

No	What are the main issues?	Threats or opportunities for change
1	Developing new planning policies to limit CO ₂ and manage climate change	Lobby for supportive government and regional policy frameworks. Take a holistic view to planning (incl transport, building CO ₂ , green infrastructure, adaptation).

		Understand economic impacts of policies. Involvement of private sector in policy development. Developers to demonstrate how landscape plan helps manage climate change.
2	Implementing planning and building control policies to limit CO ₂ and manage climate change	Staff capacity and resources. Sustainable construction skills for key staff. Clear process that engages developers at early stage of design. Post-construction monitoring.
3	Encouraging exemplar developments	Use new public sector estate to demonstrate potential for very high performance buildings. Encourage private developers to set challenging targets for high-profile new developments. Use fiscal measures (land values; council tax bands; business rates; etc) to encourage low carbon developments. Architecture awards sustainable design winners promoted widely.
4	Planning for a sustainable energy infrastructure	Develop CHP/community heating plan for high density sites, including suitable ownership model/ESCO. Capacity to deliver RSS renewables targets. Map potential use of different renewable technologies in different spatial areas. Incorporation of suitable on-site renewables.
5	Pressure for large amounts of new development in Leeds	Measure potential impact of higher housing and employment growth to understand risk of increasing CO ₂ emissions. Use new development pressure to obtain funding for sustainable transport. Avoid new developments that encroach on productive agricultural that should be used for increasing localisation of food production <i>natural environment</i> .
6	Minimise flood risk associated with new development (<i>adaptation</i>)	Strategic Flood Risk assessment to avoid unnecessary development on highest risk sites. Increase use of sustainable urban drainage systems (SUDS). Increase water holding capacity of landscape.
7	Minimising urban heat island effect and building overheating (<i>adaptation</i>)	Design key public buildings that remain cool even in extremes of temperature to provide refuges. Encourage use of shading, thermal massing, reversible heat pumps and natural ventilation to achieve cooling without need for air-conditioning. Encourage use of green roofs and green terraces to reduce urban heat island effect. Maximise green infrastructure in city centre.
8	Maximising value of green	(see 5, 6 and 7 above)

	infrastructure (<i>natural environment</i>)	
9	Reducing transport emissions that arise from new developments (<i>transport</i>)	(see 2 above) Encourage development near existing transport hubs. Minimise parking spaces in new developments and replace with dedicated car club spaces. Promote green travel plans for large new developments. Use section 106 monies to subsidise public transport provision.

14.4. Priorities for action

The table above has not been ordered in terms of priority. As Leeds is growing so rapidly, failure to address emissions from development will leave a legacy of buildings and transport infrastructure that would make achieving significant emissions reductions very difficult. Therefore, the priority is to ensure that the planning system works to support developers with ambitious carbon targets, that it is strong enough to challenge poor developments and that really good developments are championed and promoted.

14.5. Headline actions

- I. Develop, enforce and monitor holistic planning policies to reduce carbon emissions from new developments and associated transport, and improve climate resilience in Leeds.
- II. Implement a policy to build new LCC buildings or major refurbishments that have at least 20% lower CO₂ emissions than current building regulations.
- III. Train key planning staff to ensure that skills are available to support forward thinking developers and challenge poor design.
- IV. Bring together a multi-disciplinary team to develop a future energy infrastructure plan (including CHP, renewables and community heating) for Leeds with appropriate governance structures to deliver.
- V. Build and promote exemplary new developments in Leeds.

Q. 12 – Have we identified the major strategic issues? Are the priority areas and headline actions right? How could you contribute to the specific actions?

15. Procurement

15.1. Introduction to theme

The procurement theme refers to the potential for large public and private sector organisations to drive change through positive purchasing decisions. This also includes the globalisation of the supply chain and the ability to reduce impacts through local sourcing and offsetting unavailable emissions.

The theme aims are:

- To ensure that sustainability is at the core of procurement, that it is considered in the scoring criteria alongside financial considerations whilst eliminating the tension between what is seen as cost-effective and what is seen as sustainable through the use of mechanisms such as whole-life costing and improved process efficiency.
- To share best practice regarding corporate procurement strategies to ensure that the procurement of goods and services (particularly food, energy consuming appliances, vehicles, buildings and distribution strategy) help to lower carbon emissions and prepare for the impacts of climate change.

15.2. Review of current actions and gaps

15.2.1. Leeds City Council corporate

Sustainable procurement. Sustainable procurement contributes to efforts to tackle climate change in two ways. Firstly, specifying electrical products with high levels of energy efficiency will reduce our electricity demand over time. Secondly, specifying locally sourced products (where possible) cuts down mileage and hence reduces emissions. Thirdly, LCC participated in a direct carbon offset scheme with one of the city partners in Durban by paying for fruit trees to be planted by community partners for local food and soil stabilisation, whilst offsetting our unavoidable air travel.

15.2.2. Service delivery

There is currently no joint service delivery relating to procurement in Leeds and future developments will be picked up below.

15.2.3. City wide

Joint procurement. Currently, organisations in Leeds tend to cooperate on procurement issues with other organisations in their sectors that are remote from Leeds. This can lead to transport inefficiencies. Also, national framework contracts tend to favour larger suppliers, again leading to longer supply chains. It may be possible to collaborate effectively within Leeds to bring about joint procurement and reduce these inefficiencies, particularly by collaborative working between Leeds Initiative partners.

15.3. Strategic procurement issues

No	What are the main	Threats or opportunities for change
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	issues?	
1	Procurement of low carbon goods and services	Policies that prioritise low carbon. Embed policies across organisation. Allow higher capital costs where lower running costs will payback initial investment.
2	Procurement of local goods and services	Local food a priority. Reduce emissions from transport. Enable smaller organisations to compete effectively (hubs; joint procurement). EU/anti-competitiveness laws sometimes a barrier.
3	Influencing supply chain	Demanding standards of performance from suppliers. Tenders that share KPIs across organisations. Transparency in environmental standards from leading suppliers.
4	Reducing carbon from distribution network	Joint procurement by neighbouring organisations. Customer collates orders to avoid multiple deliveries to the same site. Low carbon vehicles used. Technology employed to optimise delivery schedules.
5	Reducing packaging waste	Reduction in excess packaging (also allowing more goods per vehicle). Greater use of returnable/reusable packaging (may take up more room in vehicle). Easily recyclable packaging.
6	Joint working	Share best practice. Joint contracts for local goods. Use common environmental KPIs.

15.4. Priorities for action

The table above has been partially prioritised, with the first two strategic issues being of highest priority. This has been based partly on the level of control that partner organisations can have and on the anticipated direct impacts on carbon emissions.

15.5. Headline actions

The strategy will:

- I. Use procurement process to specify low carbon and well adapted new buildings and major refurbishments within the LCC and key partner organisations' estates.
- II. Investigate joint procurement and distribution initiatives between Leeds based public and private sector organisations, to encourage locally sourced products and reduce distribution inefficiencies.
- III. Support the delivery of the sustainability element of the Leeds Food Matters strategy by taking ownership of actions related to local food.

- IV. Challenge key suppliers to encourage and incentivise better environmental performance.
- V. Share best practice regarding procurement policies that drive up sustainable supplies and reduce inefficient distribution patterns.

Q. 13 – Have we identified the major strategic issues? Are the priority areas and headline actions right? How could you contribute to the specific actions?

16. Transport

16.1. Introduction to theme

In a city that is continuing to grow, additional demands for mobility and accessibility put upward pressure on greenhouse gas emissions. Travel and transport is the glue that connects places where people live to the places in which they work, shop and spend their leisure time. Many complex factors affect people's need to travel and the mode of travel chosen, but if Leeds is to be serious about reducing emissions from the city, transport must play a part. This means a serious consideration of demand management as part of the transport strategy and provision of safe, reliable, affordable and convenient alternatives to the car. Ultimately, the future prosperity of the city will be reliant on tackling our transport problem. All solutions will require investment and as the necessary funds are not available through conventional sources so we will need to seek alternative funding for the measures we need to introduce.

The theme aims are:

- To develop plans and secure sufficient resources to ensure that the trend of rising transport emissions within Leeds is reversed by reducing the need to travel, providing affordable low carbon alternatives to private car travel and encouraging more efficient use of road transport.
- To reduce the vulnerability of transport to current and future climate impacts.

16.2. Review of current actions and gaps

16.2.1. Leeds City Council corporate

Fleet management. Whilst emissions from the LCC fleet are currently relatively low (9,700 tonnes in 2006/07), this is likely to increase in future. The need for increased segregation of municipal waste is likely to lead to a greater number of collections and improved social care for the elderly will also require additional journeys to be made. Fleet management currently procure vehicles which meet the Euro IV standards for air pollutants and run on a 5% biodiesel blend. The Cenex alternative vehicle exhibition held recently at Elland Road indicates the potential to switch to low emissions vehicles, particularly gas vehicles with gas from anaerobically digested waste, will be high in the future. Fleet management is now working closely with Cenex to investigate ways to cost effectively procure low emissions vehicles.

Staff travel. The impact of staff travel (both employee commute and staff travel on official business) is currently poorly understood. Work is currently underway to better understand the baseline as part of EMAS and the new Corporate Travel Plan will focus on reducing the impact.

16.2.2. Service delivery

Transport planning and operation (Adaptation). Transport is the most rapidly growing source of emissions in Leeds and our transport infrastructure is recognised as being a potential barrier to city development. The lack of government support for

Supertram and refusal of TIF funding has undermined the future of effective public transport across the city. Additionally, cycling facilities are poor and the inner ring roads create severance problems for adjacent residential areas, reducing the attractiveness of walking. LTP2 will improve walking, cycling and public transport in Leeds, but without taking major new steps to make these alternatives more attractive, it is hard to see transport as anything other than a growing emissions source. The difficult longer-term choices around demand management, limiting long stay parking and diverting funding to alternative modes are being discussed with Government Officials and must be faced if emissions are to be reduced. This is an issue that is perhaps best tackled as a city region.

The other element of transport planning is resilience to climate impacts. Roads are liable to melt in hotter summers, increased levels of salt are required to deal with freeze-thaw conditions and increased gales are making highways hazardous for goods vehicles. The Transport Policy team is working with Highways Services to improve our resilience and is recognised as a leading example nationally in relation to climate change.

16.2.3. City wide

Transport is an area that can only be effectively tackled through joint working so city wide issues have been considered above.

16.3. Strategic transport issues

No	What are the main issues?	Threats or opportunities for change
1	Reducing transport emissions in a congested and growing city	Ensure planning controls continue to limit overall parking levels particularly long stay in urban centres and provide low carbon alternatives. Consider whether transport problems present a limit to growth.
2	Securing sufficient funding to pay for demand management and infrastructure	Current funding regime insufficient. Work with city region partners to make strong case to government. Consider stronger demand management measures as a means to access funding.
3	Improving the public transport infrastructure	Maximise existing infrastructure by providing better integration of modes. Complicated by cross-boundary travel and privatised ownership.
4	Motivating individuals to choose modes other than cars	Ensure that public transport is safe, reliable, convenient, comfortable, competitively priced and increasingly acceptable to hard-to-convince groups. Provide easy access to relevant information.
5	Reducing commuting journeys by car	Locate high employment organisations close to existing public transport infrastructure. Employers to develop green travel plans and provide incentives to avoid car travel.

6	Reducing emissions from business travel	Provide incentives to reduce emissions and remove perverse incentives such as higher mileage payments for larger engined cars. Encourage use of new technologies to reduce the need to travel. Small number of high mileage firms (e.g. haulage, bus companies) provides opportunity to tackle emissions.
7	Making walking and cycling more attractive	Much of Leeds is dominated and divided by roads making walking and cycling unattractive. Requirement for space for safe walking and cycling paths in competition with road space for cars. Greenways would improve attractiveness of walking and cycling.
8	Encouraging low and zero carbon vehicles	Many LCVs are currently significantly more capital intensive. The alternative fuel refuelling network currently very weak.

16.4. Priorities for action

Transport makes up such a high – and growing – proportion of emissions from Leeds, that effective action is essential. This will require the development of financial packages that will allow significant investments in new low carbon infrastructure together with stronger demand management to make better use of the infrastructure that we already have.

16.5. Headline actions

- I. Consider stronger demand management proposals, together with transport improvements, as part of the overall transport strategy and identify ways to generate funds to subsidise sustainable transport.
- II. Lobby as Leeds City Region for increased levels of transport investment.
- III. Use regional models to assess the impact of our current strategies on emissions and develop models to allow future proposals to be assessed and prioritised based on carbon emissions impacts.
- IV. Work with employers to incentivise sustainable transport and to make sustainable transport information more accessible.
- V. Consider more flexibility over pre-payment for bus fares (e.g. smart cards with discount incentives) and better integration between public transport providers and across relevant boundaries.
- VI. Promote and subsidise bus travel more with the younger people to embed bus travel as the norm for later life.

Q. 14 – Have we identified the major strategic issues? Are the priority areas and headline actions right? How could you contribute to the specific actions?

17. Waste

17.1. Introduction to theme

Waste, resource efficiency and recycling are environmental issues where performance has rapidly improved recently, driven by price signals, regulations and increasing public engagement. Increasingly stringent regulations and rising disposal costs will force even greater efforts in future. Therefore, the waste theme will focus on maximising emissions reductions from the way that waste is managed in the future across all sectors. The aims of the theme are:

- To reduce total emissions from the Council's management of municipal waste through a range of measures and technologies to reduce waste production, increase re-use, increase recycling, increase recovery of value from waste and minimise landfill.
- To reduce total emissions through promoting and enabling more sustainable management of non-municipal waste arising in Leeds, and reductions in the waste arising from product manufacture and retail.

17.2. Review of current actions and gaps

17.2.1. Leeds City Council corporate

Trade waste. LCC has a strong programme in place to increase internal office recycling rates to 40% by 2010. Whilst direct emissions from our waste production is relatively low (circa 800 tonnes CO_{2e} in 2006/07) the act of recycling is strongly associated with tackling climate change by many people so encouraging more staff to recycle will help to engage more staff with other campaigns, such as energy management and travel.

17.2.2. Service delivery

Municipal waste and recycling (Planning and Development). Leeds already has strong targets in place to increase recycling and divert waste from landfill, through the use of residual waste treatment technologies. Municipal waste in itself is a relatively minor component of Leeds' emissions profile (circa 1-2%) but has the potential to make great contributions towards emissions reductions through well designed services, infrastructure and education programmes. In 2007, the Council approved plans to increase the frequency of the current recycling collections and to introduce collections of glass, garden waste and food waste. The use of anaerobic digestion for processing source segregated food waste is promoted in Defra's Waste Strategy 2007, and presents a potential opportunity for the recovery of renewable energy from this waste stream. The Council is also looking to procure a residual waste treatment solution. This procurement will not specify a preference on technology, and carbon emissions performance will be a key consideration within the evaluation criteria. Waste management could provide an important energy stream for both buildings and transport.

17.2.3. City wide

Commercial and industrial waste and resource efficiency. Commercial and industrial waste production (excluding construction waste) is twice as large as domestic waste for the average local authority. Industrial recycling has already reached a higher level than for municipal waste, driven by national and EU legislation, which has created fiscal incentives to recycle. However, smaller commercial organisations that produce lower value waste are struggling to recycle. The planning policy team are developing a Natural Resources Development Plan Document which will include consideration of how to recover maximum value from commercial and industrial wastes.

17.3. Strategic waste issues

No	What are the main issues?	Threats or opportunities for change
1	Recycling and landfill diversion targets for municipal waste	Targets and detail in Integrated Waste Strategy. Driven by national recycling targets, LATS and landfill tax increases. Maximise CO ₂ benefits from new waste treatment infrastructure.
2	Commercial and industrial waste	Driven by landfill tax and disposal pre-treatment regulations. Already high re-use and recycling rates in industrial sector. Potential for greater industrial symbiosis (using one industry's waste as another's raw material). Targeting greater coverage for small business and NGO recycling. Potential for cross-sector use of processing facilities.
3	Construction and demolition waste	Very large amounts of waste but mostly inert. Measures introduced to promote recycling in demolition. Large amount of new construction material goes straight to waste.
4	Waste minimisation	Driven by consumer demand and ability of manufacturers to deliver goods securely with less waste. Reducing unnecessary packaging. Increasing use of reusable packaging. Increasing recyclability of packaging.
5	Public engagement and behaviour change	Capitalising on public interest in reduction, re-use and recycling through enhanced education and increasing range of services provided.

17.4. Priorities for action

The Integrated Waste Strategy already contains strong targets and actions to constrain municipal waste generation and improve recycling rates. The implementation of this strategy now needs to focus on maximising the emissions

reductions from landfill diversion and residual waste treatment, and on engaging key industries and smaller businesses.

17.5. Headline actions

- I. Incorporate GHG emission performance in the evaluation framework for the waste treatment infrastructure procurement.
- II. Facilitate and enable the development of means for smaller organisations to access cost-effective recycling.
- III. Promote resource efficiency and industrial symbiosis to target industries in Leeds especially via NISP.

Q. 15 – Have we identified the major strategic issues? Are the priority areas and headline actions right? How could you contribute to the specific actions?

18. Preparation of the consultation draft and the consultation process

18.1. Strategy preparation

This draft strategy has been produced to demonstrate the importance of climate change to everyone in Leeds. It sets out many possible actions that are required by a range of different stakeholders to ensure the city meets the challenges that climate change presents. It has been drawn up by a wide and varied body of organisations and individuals, operating under the banner of the Leeds Initiative. Leeds City Council has taken responsibility for coordinating the input of different organisations and has led the writing team. Further details of the development process and organisations involved with drafting this strategy are given in appendix 3.

18.2. Consultation for organisations

We are now seeking comments and contributions from businesses, public sector organisations and NGOs that will help ensure that the strategy will deliver its stated aims. We have included a set of consultation questions that we are particularly interested in hearing your thoughts on as a separate document and inserted them in relevant places in the text. Please focus on areas that your organisation has most expertise on. In all cases, try to be as specific as possible and back up your comments with evidence where appropriate. Please feel free to provide more general comments if you feel that this is more appropriate.

Details of consultation – period, where to send comments, what happens next etc

18.3. Consultation for individuals

To make it easier for Leeds residents to have a voice, a short summary of the Leeds Climate Change Strategy and specific set of questions have been produced and distributed. These are available on the Leeds Initiative website at:

Website address xyz

18.4. Publication of the final strategy

Following the consultation period the final strategy and action plan will be published by June 2008. To make this as widely accessible as possible, this will be published in a number of different formats:

- A full detailed strategy will be published electronically as a pdf document, available from the Leeds Initiative website.
- A full colour summary document will be printed and circulated widely. This will contain the key strategic statements, vision and high level actions. It will contain examples of organisations in Leeds already benefiting from their actions and will emphasise how participating will help Leeds individuals and organisations.
- A number of short 'call to action' documents will be produced, providing locally relevant and practical guidance for different audiences (e.g. industry sectors, homeowners, commuters etc.).

All organisations and individuals that participate in the consultation process will automatically be sent a link to the pdf version of the full strategy. Anyone else can register to receive either the pdf, printed summary or call to action documents by:

calling: xyz
emailing: xyz
writing to: xyz

(LI OFFICE)

Q. 16 - Are the publication plans right? Which key organisations in the city should be targeted?

19. Glossary and definition of terms

Adaptation - Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Agro forestry - The practice of growing trees and crops together. Agro forestry systems benefit from the ability of trees to protect soil from erosion and to capture and recycle plant nutrients.

ALMO – Arms Length Management Organisation. A company owned by Councils or in which a Council has a majority share, which manages the housing stock but does not own it. Tenants enjoy the same status as they did under council management.

Anaerobic digestion - A process where biodegradable material is broken down in the absence of oxygen in an enclosed vessel, producing a gas (methane) and solid (digestate). The by-products can be useful, for example biogas can be used in a furnace, gas engine, turbine or gas-powered vehicles, and digestates can be re-used on farms as a fertiliser.

Biomass - Organic matter available on a renewable basis for use as a fuel. Biomass includes forest and mill residues, agricultural crops and wastes, wood and wood wastes, animal wastes, livestock operation residues, aquatic plants, fast-growing trees and plants, and municipal and industrial wastes.

Building Regulations - Building Regulations ensure the health and safety of people in and around buildings by providing functional requirements for building design and construction. In addition, the Regulations promote energy efficiency in buildings and contribute to meeting the needs

CABE – the Commission for Architecture and the Built Environment is the government's advisor on architecture, urban design and public space and acts as the champion of good design.

Car club - A car club provides its members with access to a car for short term hire. Members can make use of car club vehicles as and when they need them, often from a variety of sites. Whizzgo operate a car club in Leeds.

Carbon – (C) the element used as the standard unit of measurement for the impact of different gases on the atmosphere. It is 3.67 times as powerful as CO₂ due to molecular differences.

Carbon footprint - Carbon footprint is a measure of the amount of carbon dioxide emitted through the combustion of fossil fuels; in the case of an organization, business or enterprise, as part of their everyday operations; in the case of an individual or household, as part of their daily lives; or in the case of a product, in manufacturing, distribution, operation and final disposal.

Carbon neutral - a term applied to individuals, businesses, or organizations whose practices contribute zero net carbon dioxide emissions to the atmosphere.

Carbon Trust - A private company set up by Government in response to the threat of climate change, to accelerate the UK's move to a low carbon economy.

CHP - Combined Heat and Power (or cogeneration) is the term used when electrical energy is made onsite and the waste heat from the engine is utilized for a heating application such as making hot water or space heating.

City Region - The concept of the city-region can be understood as a functionally inter-related geographical area comprising a central, or Core City, as part of a network of urban centres and rural hinterlands. A little bit like the hub (city) and the spokes (surrounding urban/rural areas) on a bi-cycle wheel.

City Room – a proposal to bring together a variety of resources in a publicly accessible venue to visualise the physical form of Leeds with sufficient supporting data overlays to help with strategic decision making.

Climate - The long-term average weather of a region including typical weather patterns, the frequency and intensity of storms, cold spells, and heat waves. Climate is not the same as weather.

Climate Change - Refers to changes in long-term trends in the average climate, such as changes in average temperatures. In IPCC usage, climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity.

Climatic zone – Different regions of the world which share broadly similar climates. Climatic zones can be defined using parameters such as temperature and rainfall.

CO₂ - Carbon Dioxide is a colourless, odourless, non-poisonous gas that is a normal part of the ambient air. Of the six greenhouse gases normally targeted, CO₂ contributes the most to human-induced global warming.

CO₂e carbon dioxide equivalents by volume - Carbon Dioxide Equivalent (CO₂e): Carbon Dioxide Equivalent (CO₂e). The emissions of a gas, by weight, multiplied by its "global warming potential."

Community heating - Community heating is the distribution of steam or hot water through a network of pipes to heat a large area of commercial, industrial or domestic buildings or for industrial processes. The steam or hot water is supplied from a central source.

Core Cities - The Core Cities group is a network of England's major regional cities: Birmingham, Bristol, Leeds, Liverpool, Manchester, Newcastle, Nottingham and Sheffield. They form the economic and urban cores of wider surrounding territories, the city regions and are the economic drivers of their regions.

CRC – Carbon Reduction Commitment. A new mandatory Government emissions trading scheme, due to commence in 2009, that aims to cut carbon emissions from large commercial and public sector organisations (including supermarkets, hotel chains, government departments, large local authority buildings) by 1.1 MtC / year by 2020.

CRDP – City Region Development Programme

The City Region Development Programme (CRDP) has been prepared and agreed by the 11 councils in Leeds City Region and is essentially the economic plan for the city region.

CSR – Corporate Social Responsibility is a concept that relates to organisations taking on their social and environmental responsibilities and includes factors such as provisions for employees, participation in local community, green working practices, ethical trading and good corporate governance.

Defra – Department for the Environment, Food and Rural Affairs.

Demand Management – A general term for strategies that result in more efficient use of transportation resources without significant new infrastructure investment. Examples include: flexible working, car sharing and strategies for bicycle transport and pedestrian improvements.

Ecological footprint – a term to describe the area, scattered throughout the world on which an individual, organisation or spatial area depends, in terms of its resource demands and disposal of waste and pollution.

Ecosystem - A community of organisms and its physical environment.

EEAC – Energy Efficiency Advice Centre. A network of advice centres partly funded by the Energy Saving Trust to provide free and impartial energy advice to householders.

Emissions: The release of substances (e.g., greenhouse gases) into the atmosphere.

Energy efficiency – describes making the best or most efficient use of energy in order to achieve a given output of goods or services, and of comfort and convenience.

ESCO – An Energy Service Company is a business that installs energy efficient and other demand side management measures in facilities in order to reduce a client's energy consumption with the cost savings being split with the client.

EU – European Union

EUETS - the European Union Emissions Trading Scheme, which began on January 1 2005. Its first phase ends on December 31 2007; the second runs from 2008-2012. The EUETS is the largest scheme in the world to reduce emissions and is the EU commitment to the Kyoto Protocol.

Euro IV standards - European emission standards are sets of requirements defining the acceptable limits for exhaust emissions of new vehicles sold in EU member states. The emission standards are defined in a series of European Union directives staging the introduction of increasingly stringent standards. Euro V is the highest standard.

Farmers Market - Farmers' Markets enable local producers to sell their goods directly to consumers. This means fresher food; a better understanding between producer and consumer; high quality produce at an affordable price; a fairer income for producers and a reduction in "food miles".

Fleet management – describes the procurement, management, maintenance and operation of a company's vehicle fleet.

Fossil fuels - Carbon-based fuels including coal, natural gas and fuels derived from crude oil (eg petrol and diesel); called fossil fuels because they have been formed over long periods of time from ancient organic matter.

GDP – Gross Domestic Product. The value of all goods and services produced within a nation in a given year.

GHG - Greenhouse Gas describes any gas that contributes to the "greenhouse effect."

Green Infrastructure - The open environment within urban areas, the urban fringe and the countryside. It is a network of connected, high quality, multi-functional open spaces, corridors and the links in between that provide multiple benefits for people and wildlife.

Green roofs - A green roof is a roof of a building that is partially or completely covered with vegetation and soil, or a growing medium, planted over a waterproofing membrane.

Green roofs help to tackle climate change by reducing heating (by adding mass and thermal resistance value) and cooling (by evaporative cooling) loads on a building; reducing the urban heat island effect; reducing stormwater run off and filtering CO₂ out of the air.

Greenway - A network of traffic free routes, often in large green areas, designed to provide a pleasant environment for pedestrians and cycling.

Green Travel Plans - a document produced by an organisation setting out the ways in which the use of public transport and other more sustainable means of travel will be encouraged amongst employees and customers. Incentives might be offered to encourage car sharing, cycling and walking, and to make business vehicles more fuel efficient, or use non-fossil fuels.

GWP - Global Warming Potential is an index, based upon radiative properties of greenhouse gases that represents the combined effect of the differing times these gases remain in the atmosphere and their relative effectiveness in absorbing outgoing thermal infrared radiation.

HIPS - A Home Information Pack (HIP) must be provided before a property in England and Wales can be put on the open market for sale. The pack contains a set of documents about the property, including an Energy Performance Certificate, local authority searches, title documents and guarantees.

Industrial Symbiosis – this is a term for the identification of sustainable business opportunities by working across traditional industry and sector boundaries through resource exchange. There are three primary opportunities for resource exchange: 1) By-product reuse; 2) Utility/infrastructure sharing; 3) Joint provision of services.

IPCC – The Intergovernmental Panel on Climate Change was established in 1988 by the World Meteorological Organization and the UN Environment Programme. The IPCC is responsible for providing the scientific and technical foundation for the (UNFCCC), primarily through the publication of periodic assessment reports, the most recent of which is the Fourth Assessment Report, published in 2007.

IWS – The Integrated Waste Strategy for Leeds (2005-35) sets out the long-term vision for dealing with waste in Leeds, and includes detailed plans of how the vision will be achieved.

KPI – Key Performance Indicator.

LAA –Local Area Agreement (LAA) A three year agreement, based on local Sustainable Community Strategies, that sets out the priorities for a local area agreed between Central Government, represented by the Government Office (GO), and a local area, represented by the local authority and other key partners through Local Strategic Partnerships (LSPs).

Landfill Tax - A charge levied against those disposing of material in a landfill site.

LATS - Under the Landfill Allowance Trading Scheme, Waste Disposal Authorities will be able to trade their landfill allowances with other Authorities; selling allowances if their waste has already been diverted to other disposal routes or buying allowances if they have no alternative but to landfill.

LCC – Leeds City Council.

LCLIP – Local Climate Impacts Profile. A tool developed by UKCIP to help decision makers to understand the impact of current extreme weather events on a local area based on primary newspaper records and interviews with key personnel.

LDF - Local Development Framework (LDF) is a non-statutory term used to describe a folder of documents, which includes all the local planning authority's local development documents. An LDF is comprised of Development Plan Documents (which form part of the statutory development plan) and Supplementary Planning Documents plus a range of supporting material. .

Leeds Initiative – the Local Strategic Partnership (LSP) for Leeds.

Low carbon – A principle whereby everyday activities become progressively more sustainable to a point where carbon emissions are reduced to a level that is within 'safe' limits.

Low till techniques - Low- or no-till agriculture leaves ground cover and harvested waste on the fields, helping to reduce soil erosion and increase ground cover.

LSP - Local Strategic Partnership. A LSP is an overall partnership of people that brings together organisations from the public, private, community and voluntary sector within a local authority area, with the objective of improving people's quality of life.

LTP - Local Transport Plan - A five-year integrated transport strategy, prepared by local authorities in partnership with the community, seeking funding to help provide local transport projects. The plan sets out the resources predicted for delivery of the targets identified in the strategy.

Methane - Methane (CH₄): CH₄ is among the six greenhouse gases to be curbed under the Kyoto Protocol. CH₄ has a relatively short atmospheric lifetime of approximately 10 years, but its 100-year GWP is currently estimated to be approximately 23 times that of CO₂.

Microgeneration - Microgeneration is the generation of zero or low-carbon heat and power by individuals, small businesses and communities to meet their own needs.

Mitigation - attempts to slow climate change by reducing greenhouse gas emissions or permanently removing carbon from the atmosphere.

Managing Urban Europe (MUE) – An EU funded project that aims to improve the environmental quality and sustainability of European cities by delivering a framework for better implementation of already existing environmental management systems like EMAS, ISO 14001 and ecoBUDGET.

Municipal waste - Waste, including household, commercial, clinical, hazardous, fly-tipping, street sweeping and any other that is controlled by the local authority.

NGO - A non-profit organization which is independent from government. In general, NGOs have as their agendas social, political, and environmental concerns.

NISP - National Industrial Symbiosis Programme is a free innovative business opportunity programme delivering triple bottom line, environmental, economic and social benefits across the UK. NISP delivers industrial CO2 reductions by adoption of industrial symbiotic approaches to business.

No regret – a term coined by UKCIP to describe any adaptation actions that will pay off immediately under current climate conditions.

Nitrous Oxide - N2O is among the six greenhouse gases to be curbed under the Kyoto Protocol. The atmospheric lifetime of N2O is approximately 100 years, and its 100-year GWP is currently estimated to be 296 times that of CO2.

Permaculture – Permaculture designs are based on the observation of natural systems and incorporate food, energy, and shelter for people and animals while linking the needs and outputs of each element of the system.

PFI – Private Finance Initiatives provide a way of funding major capital investments, without immediate recourse to the public purse. PFI is a partnership where the private sector provides and operates an asset in order that the public sector can procure a service.

Polycultural - The simultaneous cultivation or exploitation of several different crops or animals.

ppm or ppb - Abbreviations for “parts per million” and “parts per billion,” respectively - the units in which concentrations of greenhouse gases are commonly presented.

PPS1 - Planning Policy Statement 1. This sets out the Government's overarching planning policies on the delivery of sustainable development through the planning system. It is currently under review to include more detailed policies regarding adapting and mitigating to climate change.

Renewable energy - Energy derived from a source that is continually replenished, such as wind, wave, solar, hydroelectric and biomass. Although not strictly renewable, geothermal energy is generally included.

RES – Regional Economic Strategy. These statutory strategies take an integrated and sustainable approach to economic development and regeneration by tackling business competitiveness, productivity and the underlying problems of unemployment, skills shortages, social exclusion and physical decay.

Retrofitting - The addition of new technology or features to existing buildings in order to make them more efficient and to reduce their environmental impacts.

RSL - Registered Social Landlords that operate as a non-profit making business, providing housing for people who cannot afford to buy housing locally on the open market. Most are housing associations but there are also trusts, co-operatives and companies.

RSS – Regional Spatial Strategy. A strategy for how a region should look in 15 to 20 years time. The Regional Spatial Strategy identifies the scale and distribution of new housing in the region, indicates areas for regeneration, expansion or sub-regional planning and specifies priorities for the environment, transport, infrastructure, economic development, agriculture, minerals and waste treatment and disposal.

SA – Sustainability Appraisal. An appraisal of the economic, environmental and social effects of a plan from the outset of the preparation process to allow decisions to be made that accord with sustainable development.

SEA – Strategic Environmental Assessment. A process of systematically appraising the environmental opportunities and constraints of a project, and identifying and managing its implications. SEA is a statutory requirement of certain plans and programmes, under the Environmental Assessment of Plans and Programmes Regulations 2004.

Section 106 - Section 106 of the Town and Country Planning Act 1990 allows for agreements between landowners/developers and local authorities, eg for social facilities or affordable housing to be included within or contributed through the development of a site.

Sequestration - The capture of atmospheric carbon dioxide either through biological processes (eg plants and trees) or geological processes through storage of CO₂ in underground reservoirs.

SFRA – Strategic Flood Risk Assessment. An assessment usually undertaken by a Local Authority at a District-wide level that considers flood risk, both fluvial and tidal and examines the risks involved for developing certain areas within the District.

Silviculture - Silviculture is the art and science of controlling the establishment, growth, composition, health, and quality of forests to meet diverse needs.

Smart meters - A type of advanced meter (usually an electrical meter) that identifies energy consumption in more detail than a conventional meter. They often use telemetry to communicate that information back to the local utility for monitoring and billing purposes.

SME – Small and Medium Sized Enterprise. SME: small and medium-sized enterprises are defined by the European Commission as independent enterprises that have fewer than 250 employees, and an annual turnover not exceeding £34 million or a balance-sheet total not exceeding £29 million.

SPD - A Supplementary Planning Document is a Local Development Document that may cover a range of issues, thematic or site specific, and provides further detail of policies and proposals in a 'parent' Development Plan Document.

SUDS - Sustainable Urban Drainage systems. An alternative approach from the traditional ways of managing runoff from buildings and hardstanding. They can reduce the total amount, flow and rate of surface water that runs directly to rivers through stormwater systems.

Supply chain - A supply chain is a coordinated system of organisations, people, activities, information and resources involved in moving a product or service in physical or virtual manner from supplier to customer.

Thermal Mass - Material within a building, such as concrete or brick, in which heat energy from the sun or other sources, is absorbed, stored and then gradually given off, lessening energy costs.

Thinning - The process of removing excess and poorer quality trees from a stand for the purpose of improving the growth and value of the remaining crop trees. Thinnings are a renewable fuel source.

TIF – Transport Innovation Fund. This was established by Government to incentivise smarter, innovative, local and regional transport strategies. The fund supports demand management measures; innovative mechanisms which raise new funds; and regional, inter-regional and local schemes that are beneficial to national productivity.

Transport hubs - A location where traffic is exchanged across several modes of transport. These modes may include any of railway, tramway, rapid transit, bus, automobile, truck, airplane, pedestrian or any other kind of transportation.

UDP – Unitary Development Plan. A former development plan, now being replaced by the LDF which provided a land use designation for every piece of land within the City and set out policies and proposals for the provision of new development and the protection of the environment.

UKCCP – UK Climate Change Programme (Defra, 2001 and 2006). The Government strategy for mitigating and adapting to climate change.

UKCIP – The UK Climate Impacts Programme helps organisations assess how they might be affected by climate change, so they can prepare for its impact. It is Defra funded and aims to co-ordinate research on how climate change will have an impact at regional and national levels by working closely with stakeholders.

UNFCCC - UN Framework Convention on Climate Change. A treaty signed at the 1992 Earth Summit in Rio de Janeiro that calls for the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”

Unipol - a charitable company which works for the benefit of its student clients by supporting over 20,000 college and university students to find somewhere to live in the private rented sector in Leeds and Bradford directly housing 2,000 students including 194 student families in self-catering provision.

Urban Heat Island - Refers to the tendency for urban areas to have warmer air temperatures than the surrounding rural landscape, due to the low albedo of streets, sidewalks, parking lots, and buildings. These surfaces absorb solar radiation during the day and release it at night, resulting in higher night temperatures.

Veg-box scheme - These provide a regular delivery of (usually) locally grown, organic, seasonal vegetables direct to your door or at a local drop-off point. They aim to reduce food miles; encourage local commerce; highlight the seasonality of our crops and reduce the retail price by cutting out the supermarket intermediary.

Vision for Leeds – the strategic vision for the development of Leeds, based on sustainable principles, for 2004-2020. Published by the Leeds Initiative.

WEEE - A recently implemented EU Directive (2002/96/EC) designed to secure the recycling and recovery of components and materials in products such as computers, domestic white goods etc.

Weather - Describes the short-term (i.e. hourly and daily) state of the atmosphere. Weather is not the same as climate.

Whole life costing - A technique which assesses the total cost of an asset over its whole life; it takes into account the initial capital cost, as well as the costs of operation, renovation, repairs and maintenance over the expected lifetime of the property.

Zero carbon - is any activity (whether an operation, plan or policy) where absolute carbon emissions are zero.

20. APPENDICES

20.1. Appendix 1: Climate Change Charter for Leeds

This strategy will only succeed if there is buy-in from organisations across the city. In order to formalise this, we have developed the following climate change charter which will allow organisations to sign up to different levels of commitment to support the city's climate change aspirations. The suggested wording is:

By signing up to the Charter, your organisation:

Acknowledges:

1. That climate change will profoundly influence the environmental, social and economic conditions in Leeds and will continue to be a critical factor throughout the 21st Century.
2. That action needs to take place at all levels – global, international, European, national, regional and locally – and that all organisations should take responsibility for reducing their own impact

Commits To:

1. Taking action in your organisation to mitigate and adapt to climate change
2. Helping Leeds to contribute to the national goal of reducing CO₂ by 60% by 2050 (based on 1990 levels)
3. Supporting better ways to co-ordinate action on climate change across the city

Agrees to take on the climate change challenge by:

1. Putting climate change at the heart of your internal decision-making process
2. Setting up organisation-wide and effective CO₂ measurement and monitoring arrangements and comparing your results with appropriate benchmarks
3. Taking all practical steps to limit CO₂ emissions
4. Working with others to understand the impact of climate change on your organisation
5. Working with others to improve the resilience of your organisation and the city to the impacts of climate change
6. Working with others to communicate your progress and successes and
7. Encourage others to take action to ensure that Leeds is recognised for its climate change activity

Q. 17 – Would your organisation be willing to sign up to the Climate Change Charter for Leeds? If not, what would you like to see changed?

20.2. Appendix 2: Climate change pledge for Leeds

The strategy will only succeed if the people of Leeds share our aims and play their part. Climate change is an intangible subject for many people and often people's aspirations are undermined by a feeling that they are acting alone. Therefore we will produce and promote a simple pledge for the people of Leeds to try to generate the sense of collective action. The pledge states:

“I care about climate change and pledge to join the thousands of other people in Leeds who are part of the solution by taking action to reduce my personal greenhouse gas emissions.”

To do this, I will:

- Understand my impact - Calculate my carbon footprint using ‘ActOnCO₂’!
- Make my home more comfortable - insulate it!
- Eat well - buy my fruit and vegetables locally!
- Enjoy the UK - take more holidays at home!
- Love off - switch off unused appliances and lights!
- Slim my bin - recycle and compost more waste!
- Let the train take the strain - use public transport more!
- My own pledge...

20.3. Appendix 3: how this strategy was drafted

The development of this strategy began at an event on 5th June 2006 at which LCC signed the Nottingham Declaration on Climate Change. Over 60 people attended and contributed their ideas regarding priorities and actions within the eight themes. Since then, all eight theme groups have met a number of times to further develop these ideas which have been crystallised into the 8 theme chapters presented above. We would like to thank all the following people and organisations for freely giving their time and expertise and look forward to working with you to deliver the strategy.

Addleshaw Goddard	Leeds Met University
Alliance & Leicester	Leeds Metropolitan University
Allied Glass Containers Ltd	Leeds Partnership Foundation NHS Trust
Archbold Logistics	Leeds PCT
ARUP	Leeds South Homes
Barratt Homes	Leeds Teaching Hospital NHS Trust
Bauman Lyons	Leeds Teaching Hospitals NHS Trust
BIFFA	Leeds Trinity & All Saints
Biofuels Corporation Trading Ltd	Leeds Voice
BITC	Lyreco
Bramham Estate Office	MEPC
British Waterways	Metro
BTCV	Microgeneration Yorkshire
Cable & Wireless	Modec
Carbon Trust	Montpellier Estates
Carey Jones Architects	Natural England
Carlsberg UK Ltd	NFU

Cenex	Northern Rail
Community Recycling Network	Optare Group Ltd
Dacre, Son & Hartley	OXFAM
Department of Work & Pensions	Park Lane College
DLA Architecture	Permaculture Association
Education Leeds	Polestar Petty Ltd
Environment Agency	Premier Farnell plc
Envirowise	Premier paper
Farmline	Procurement Centre of Excellence
First West Yorkshire	Pyroban Envirosafe
Forestry Commission	Recycling Action Yorkshire
Future Energy Yorkshire	Red Squirrel Media
Government Office for Yorkshire & Humber	Re'new
Groundwork Leeds	Round Foundry Media Centre
Harewood Estate	RSPB
Heritage Learning Consultant	RTPI Centre for Design
Highways Agency	Skelton Grange
HM Revenue & Customs	Spawforths
House Builders Federation	Sustrans
Kodak Polychrome Graphics Ltd	University of Leeds
KW Linfoot plc	VIPRE UK
Leeds Architecture and Design Initiative	Wates Construction Ltd
Leeds Bradford International Airport	West Yorkshire Fire Service
Leeds Chamber of Commerce	West Yorkshire Police
Leeds City Council	White Young Green
Leeds College of Music	WSP Development & Transportation
Leeds East Homes	WYPTE
Leeds Environmental Design Associates	Yorks & Humber Transport Roundtable
Leeds Federated Housing Association	Yorkshire and Humber Assembly
Leeds Health Protection Unit	Yorkshire Forward
Leeds Initiative	Yorkshire Water
Leeds Mental Health NHS	Yorkshire Wildlife Trust