

- Final 3.1 (30 Sept 08, including Norfolk LGA comments) -

Tomorrow's Norfolk, Today's Challenge

A Climate Change Strategy for Norfolk

Acknowledgements (reverse of cover/title page)

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Foreword

One of the greatest challenges facing Norfolk today is addressing how 'human-induced climate change' will affect the county. This understanding of climate change is now a mainstream economic and social issue, not just an 'environmental problem'¹.

As a low-lying county with a soft coastline and a growing population, Norfolk is particularly vulnerable. The challenges of coastal erosion, flooding and water shortages could have serious consequences for the homes, livelihoods and well-being of our population and the economy, as well as wildlife and landscapes. At the same time climate change could bring a number of opportunities for the county, in sectors such as renewable energy, low carbon technology, agriculture, local food and recreation.

Our past actions mean that a certain amount of climatic change is already inevitable, but decisive action now to save energy and reduce emissions can avert the worst scenarios. The case for action has never been more pressing. We are all feeling the effects of rising fuel prices – councils, businesses, households – and the need to cut energy demand is now a question that concerns us all.

As local authorities we have a major role to play in rising to this challenge, as corporate estate managers, major service providers and community leaders. We need to set the example by getting our own house in order, but that is only a small part of the solution in terms of Norfolk's overall carbon footprint. Clear community leadership is needed to bring about widespread behaviour change.

This Strategy aims to provide the vision and drive for Norfolk to tackle this challenge. It has been developed collectively by the local authorities of Norfolk, and demonstrates the commitment of all council leaders to tackling this priority issue. It's primary audience is policy makers within the county to provide them with clarity on our climate change priorities and enable us to work together to align strategies and action plans accordingly.

The vision set out in this Strategy is just the first step, it provides a framework for partnership working and community engagement, and as such it is central to delivering the "Environmentally Responsible" theme in Norfolk Ambition, our Sustainable Community Strategy.

The actions of our generation will affect the quality of life of our children and generations to come. The full effects of climate change may not be felt for some decades, but decision time is upon us.

The time to act is now.

[signed - leaders of all Norfolk local authorities]

¹ Stern Review: The Economics of Climate Change. 2006. http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_Report.cfm

Foreword from the Youth Parliament

Climate change is becoming a bigger issue everyday. We hear more about it in the media, but we still continue to pump greenhouse gases into our atmosphere. There is more and more scientific evidence that suggests something should be done sooner rather than later. It is real.

The issue of climate change keeps being put to the public in mainly two different ways. One is that people deny that it is influenced by what we do and the other is that climate change is happening now but it's too late to do anything about it, so let's carry on as normal. It is a serious matter, which the current science supports, but it isn't too late to make a difference.

You can make a difference very easily by adjusting your daily lifestyle just slightly. Whether this is recycling waste, or cycling or walking to school or work, it's an easy adjustment. However it's not only individual families that should be making a difference to their ways of life; industries and companies should, and could, make huge differences by monitoring their carbon footprint and by reducing their environmental impact in other areas.

The effect of climate change on young people at the moment is small, our daily lives in general haven't changed much, however I believe that things could change for the better for young people. For example, if better public transport systems were put in place, parents wouldn't have to take us everywhere by car, thus adding to Norfolk's carbon footprint. Schools could also make a bigger effort to combat climate change, educating young people about the problems now is vital to making a positive difference that will affect our future.

Climate change is a serious issue, but it's not too late to make a difference. We need to work as individuals as well as a team. This is the way to combat climate change.

Anna Mijnlieff, Norfolk Member of the UK Youth Parliament

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1. Introduction

What is Climate Change?

Climate change refers to the long-term change in the Earth's climate. The current trend is one of global warming.

“Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level” IPCC, November 2007

The natural ‘greenhouse effect’ keeps the Earth much warmer than it would otherwise be, with gases such as carbon dioxide (CO₂), methane and water vapour acting like a blanket that traps heat inside the atmosphere. Global emissions of these gases due to human activities have grown markedly since pre-industrial times, with an increase of 70% between 1970 and 2004 alone (including an 80% increase in emissions of CO₂, the main contributor) (IPCC, 2007).

The latest report of the UN Intergovernmental Panel on Climate Change (IPCC) in November 2007 uses international scientific evidence to make the strongest link yet between human activity, greenhouse gases and climate change. Over the past 100 years, the earth's temperature has risen by 0.74°C, of which 0.4°C has occurred since the 1970s. By the end of this century, the Panel predicts a ‘Best Estimate’ that it will rise by between 1.8°C and 4°C above 1990 levels², unless decisive action is taken now to cut greenhouse gas emissions. Even if emissions stay constant at the 2000 level, the Panel predicts a further 0.6°C rise (Best Estimate) by the end of the century.

“There is *very high confidence* that the net effect of human activities since 1750 has been one of warming” (IPCC, 2007)

How will it Impact on Norfolk?

The UK Climate Impacts Programme publishes scenarios on behalf of the Government showing how the UK's climate might change during this century, with the latest published in 2002 (UKCIP02) and the next due in late 2008.

Using UKCIP02 data, scenarios developed under the University of East Anglia's CRANIUM project³ (consistent with UKCIP08) and the IPCC (2007) method of describing likelihood, the following impacts are predicted **for Norfolk by the 2080s⁴**:

- | | |
|---|--------------------------|
| ❖ Increased annual average temperature | <i>virtually certain</i> |
| ❖ Rise in annual average temperature of 1-5°C | <i>extremely likely</i> |
| ❖ Increase in heatwaves | <i>extremely likely</i> |
| ❖ Increased winter rainfall and intense rainfall events | <i>likely</i> |
| ❖ Sea level rise of up to +0.88m | <i>likely</i> |

² International Panel on Climate Change (2007) Annual Report 4.

³ The CRANIUM project applies latest climate modelling techniques, allowing for the development of probabilistic climate change projections, in line with UKCIP08. Further details on this, and the methodology used to assign likelihood, can be found in the Mott MacDonald NI188 Baseline Report (July 2008).

⁴ Mott MacDonald. 2008 (research and analysis by James Dunham)

- ❖ Drier summers, with average daily rainfall decreasing *likely* by as much as 100%
- ❖ Increase in duration of summer dry periods by up to *more likely than not* 10 days

Extreme events are also projected to increase, with higher wave and storm surge elevations, greater frequency of winter storms and higher wind speeds.

The Case for Action

As a low-lying county with a lengthy coastline, large agricultural sector and growing population, Norfolk is particularly vulnerable to the climate impacts detailed above. These can be expected to result in:

- ❖ Greater flood risk, both coastal and fluvial.
- ❖ Water scarcity and drought
- ❖ Accelerated coastal erosion
- ❖ Change or reduction in biodiversity and rare habitats.
- ❖ Changes in the viability of different types of agriculture
- ❖ Health risks from temperature rises and heat waves

All Norfolk residents have a real interest in taking action to minimise these environmental risks. Action now to reduce our demand for energy, reduce reliance on fossil fuels and to adapt Norfolk to the changing climate can also bring a range of benefits:

- | | |
|---|---|
| <i>For householders</i> | <ul style="list-style-type: none"> ➤ Cash savings (reduced energy bills) ➤ Less exposure to global oil and gas markets, where long-term supply is declining and prices increasing ➤ More affordable heating ➤ Healthier lifestyles ➤ Less risk to well-being and home security |
| <i>For businesses</i> | <ul style="list-style-type: none"> ➤ Cost savings (reduced energy bills) ➤ Economic opportunities in sectors such as low carbon technology, renewables and the rural economy & tourism and recreation ➤ Living with less risk |
| <i>For council tax payers</i> | <ul style="list-style-type: none"> ➤ Better value for money, with less energy wasted ➤ Excellent council services maintained and tailored to the changing climate |
| <i>For the local environment</i> | <ul style="list-style-type: none"> ➤ Healthier eco-systems ➤ Resilience to adapt to the changing climate |
| <i>For visitors</i> | <ul style="list-style-type: none"> ➤ An historically green county developing a reputation as an exemplar of sustainable living and a desirable tourist destination |
| <i>Future generations</i> | <ul style="list-style-type: none"> ➤ A stable and secure future, exposed to less risk |

This Strategy

This Strategy was commissioned by the Norfolk Local Government Association and developed by a Task Force of experts from each of the Norfolk local authorities. It is intended to create a framework for partnership working and community engagement to drive forward real action across Norfolk.

It has drawn on the analysis and conclusions of two baselining studies conducted by environmental consultants, Mott McDonald (July 2008), which identify the key impact sectors, actions taken by local authorities to date, and those areas most likely to benefit from targeted future action.

The Climate Change Strategy is central to delivering the “Environmentally Responsible” theme in Norfolk Ambition, our Sustainable Community Strategy for 2003-2023. The Strategy sets two high level goals to **mitigate** and **adapt** to the impacts of climate change. Norfolk’s Local Area Agreement (LAA) for 2008-2011 now includes two national indicators (NI) intended to measure our progress on each of them:

(1) To cut carbon emissions by reducing energy consumption and promoting a shift to low-carbon technology (*mitigation*)

NI186 - Per capita reduction in CO₂ emissions in the local authority area

Our LAA target is a 11% reduction in CO₂ emissions across Norfolk by 2011 (of which local authorities are responsible for 3%). Our longer term goal is to ensure Norfolk plays its part in delivering the CO₂ reduction targets proposed in the national Climate Change Bill: 60% by 2050 and 26-32% by 2020, against a 1990 baseline.

(2) To improve Norfolk’s resilience to the changing climate, including reduction of the socio-economic and environmental risks associated with flooding and coastal erosion (*adaptation*)

NI188 - Adapting to climate change

Our LAA target is to reach Level 3 of the Government’s performance framework by 2011. This means conducting a comprehensive risk assessment for Norfolk, identifying the vulnerabilities and opportunities for each sector, developing a detailed action plan and embedding those actions in the strategies of all local authorities and key partners.

This Climate Change Strategy aims to set out the key challenges and identify our overall strategic priorities for tackling climate change in Norfolk. More detailed action planning and performance management will be taken forward by a new Climate Change Partnership and relevant Sector Groups to be established over the coming months.

2. Towards Low Carbon Norfolk

[A] Council Operations

Our Carbon Footprint

Together, the local authorities of Norfolk are major employers and major consumers of energy. So we have enormous scope to cut carbon emissions and save money. As well as leading by example, this will provide better value for money for council tax payers and can also improve working conditions for staff. Our first priority is therefore to get our own house in order.

The major sources of councils' direct carbon emissions include:

- council buildings - such as council offices, schools, care homes, museums, libraries, leisure centres
- waste services - street-cleaning, household waste collection, waste management and recycling
- travel and transport - our own business travel, commuting and service fleet
- streetlighting - countywide streetlighting and traffic signs and supporting infrastructure

Buildings typically represent by far the largest element of a Council's direct footprint. In the case of the County Council, which has the largest carbon footprint of all Norfolk authorities, buildings represent 71% of the total carbon footprint (excluding waste and outsourced services), of which 73% is accounted for by school buildings (Norfolk County Council Carbon Management Strategy and Implementation Plan 2008-2013).

In addition to managing our own direct impacts, local authorities can also use our role as major purchasers to reduce the carbon impact of the goods and services we buy – for example, public transport, construction and waste management.

Progress

All of the county's local authorities are required to establish a baseline of CO₂ emissions by March 2009, and to work towards setting reduction targets. Most Norfolk councils have already made good progress towards this goal, or have already set targets.

Case Study - Norfolk Schools Energy Programme

By 2013, we aim to have conducted free energy audits for all Norfolk schools and engaged each school in Energy Busters (primaries) or Energy Futures (secondaries) - an awareness-raising and behavioural change campaign that involves teaching children how to lead and embed an energy efficiency campaign in their school. Pilots have shown that schools achieve an average 19% reduction in energy consumption, with some achieving up to 30%. Applied to all schools, we expect the Programme to save at least 9,000 tonnes of CO₂ and £1.1m (based on current energy prices) annually from 2013. The Energy Programme will be underpinned by a new £250k p.a. Schools Capital Incentives Fund to finance low cost, low carbon capital investment (£12.5k per secondary, £1.5k per primary).

Priorities

1. A carbon emissions baseline and reduction targets for all Norfolk councils

Each council will work to establish a carbon emissions baseline by March 2009 and set reduction targets. The baseline will cover both direct operations and the majority of outsourced services (a balance struck between the feasibility and fairness of obtaining data from a large number of possibly small suppliers, and the need to cover the majority of council transactions).

We will establish a portfolio of carbon management knowledge. We will share best practice and promote consistency of approach across councils; such as development of green travel plans, green fleet reviews of all council vehicles, Display Energy Certificates and our approach to tracking emissions from outsourced services. We will support staff to undertake the necessary culture change.

2. Preparation for carbon trading

The Climate Change Bill now before Parliament aims to introduce mandatory carbon emissions trading (the “Carbon Reduction Commitment”) for large organisations, such as councils, whose energy use is above 6,000 MWh per year. This is expected to take effect from April 2010, and preparation will therefore need to be a key priority during 2009/10 for those Norfolk organisations affected.

3. Waste

Overall volumes of waste and the diversion of waste from landfill towards recycling and re-use is already being addressed by the County’s Waste Partnership and measured by new national performance indicators on waste. Benchmarking shows that we are the most improving county for recycling since 2001, and we now collect less waste per capita than any other county.⁵ Recycling and composting at around 38.5% in 2006/07 puts us among the top ten counties nationally. For the waste that does end up in landfill, the way it is managed can have a dramatic impact on greenhouse gas emissions. We will explore possible options for reducing the methane emitted from the landfill sites that local authorities manage. As methane is a major greenhouse gas, reducing the impact from its release, either through bioremediation measures or through methane capture to provide an energy source, is crucial in reducing the impact from this major source of emissions.

4. Sustainable Procurement

Councils in England spend over £40 billion each year undertaking capital projects and buying in goods and services. Across the public sector as a whole, this figure is approximately £150 billion. There is a compelling business

⁵ Norfolk County Waste Partnership:
http://www.norfolk.gov.uk/consumption/idcplg?IdcService=SS_GET_PAGE&nodeId=3394

case to make this procurement more sustainable. (Local Government Sustainable Procurement Strategy, 2007)

Sustainable procurement is about efficient procurement and is crucial to delivering on our carbon reduction goals. Savings can be realised through lower operating costs, better management of demand, and the purchasing of products that are more efficient in their use of energy, water and material resources.

Next steps

- Establishment of a CO₂ baseline and reduction targets for all councils
- Prepare affected councils to participate in carbon trading from April 2010
- Identify the best options for managing landfill sites so as to reduce the impact of the methane emitted.
- Review, and where necessary, reset our strategies, policies and targets for sustainable procurement and asset management against the national purchasing 'Flexible Framework'.

2. Towards Low Carbon Norfolk

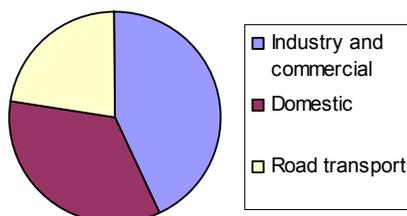
[B] Community Emissions

Norfolk's Carbon Footprint

While local authorities must lead by example, it is vital that we also use our role as community leaders to tackle carbon emissions across Norfolk, targeting those areas which make the biggest impact. Councils are well placed to lead all sections of their community's response to climate change. They are uniquely placed through their democratic mandate, their service delivery, regulatory functions, partnership convening, and leadership.⁶

UK CO₂ emissions by end user (2006)⁷

Proportion of emissions by sector:
UK (2006)



Industry and commercial	43.2%
Domestic	34.0%
Road transport	22.8%

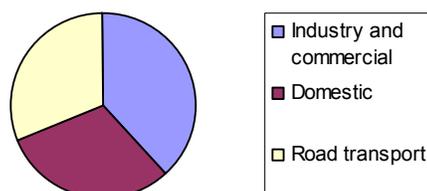
Note

The emissions categories listed are those deemed to be influenced by actions by Local Authorities and local partnerships. Therefore emissions from Emissions Trading Scheme installations and motorways are excluded as are Land Use, Land Use Change and Forestry (LULUCF) emissions

This equals **7.4t/CO₂ per person**

Norfolk's CO₂ emissions by end user (2006)

Proportion of emissions by sector:
Norfolk (2006)



Industry and commercial	38.3%
Domestic	30.3%
Road transport	31.4%

This equals **8.0t/CO₂ per person**

⁶ A Climate of Change: Final Report of the LGA Climate Change Commission. 2007

⁷ Defra (2008). Local and Regional CO₂ Emissions Estimates for 2005-2006

Breakdown of Norfolk's CO₂ emissions by district (2006)⁸

Local Authority Area (CO ₂ emission in Kilotonnes – by end user) 2006	Industry and Commercial	Domestic	Road Transport	Total emissions	Per capita emissions –tonnes of CO ₂
Breckland	462	303	447	1213	9.5
Broadland	215	306	256	777	6.4
Great Yarmouth	180	219	144	543	5.8
King's Lynn & West Norfolk	693	358	465	1516	10.7
North Norfolk	261	264	254	780	7.7
Norwich	444	282	115	841	6.5
South Norfolk	300	287	413	1000	8.6
Norfolk Total	2555	2020	2095	6670	8.0

The Challenge

The above statistics show that the average carbon footprint per person in Norfolk is higher than the national average. We all have a role to play in reducing this – businesses, organisations and individuals. The Norfolk County Strategic Partnership has set an **11% target reduction in carbon emissions by 2011** (based on 2005 data).

The industry and business sector produces the highest share of carbon emissions in Norfolk, with road transport providing the second highest (as a proportion, significantly higher than the UK average). However, this is not clearly reflected in the action that local authorities have taken to date to address carbon emissions, with the majority of activities focused on the domestic area. Research suggests that:

- Council activity is not focusing adequately on the sectors responsible for the highest emissions (business, transport);
- Although councils are implementing a variety of measures to reduce domestic and public sector emissions, there are significant differences across councils. Efforts should be streamlined and focused on priorities.
- A greater focus on strategic actions that provide community-wide direction (rather than one-off exemplar projects) is likely to result in greater carbon reductions overall;
- A number of strategic opportunities for carbon reduction are being missed. While councils have understandably focused on measures over which they

⁸ Defra (2008). Local and Regional CO₂ Emissions Estimates for 2005-2006

have direct control or that have been driven by legislation, a more proactive approach to address priorities would yield more significant results.

- The growth and diversification of the renewable energy sector in particular offers major economic opportunities for Norfolk and must be regarded as a priority.

Strategic Priorities

With this in mind, we have identified five strategic priority areas, and the reasons for their inclusion, for carbon reduction across Norfolk:

T ravel and transport	-	higher than average emissions per person
E conomy and business	-	our biggest impact sector
E nergy	-	a major economic opportunity, key for all sectors
T houghtful development	-	vital for a county with high levels of planned growth
H ousing	-	potential for big wins through partnership working across the existing housing mix, to influence consumption habits and lifestyle change.

Our strategy for addressing these priorities is set out in the following chapters.

Although this Strategy focuses on action to reduce overall CO₂ emissions, other activities can make an important contribution to offsetting existing emissions. Annually Norfolk councils help plant more than 130,000 trees and shrubs and 30km of hedgerow.

2. Towards Low Carbon Norfolk

Travel and Transport

The Challenge

While air travel has seen the steepest rise in carbon emissions, the most significant source of transport emissions is road transport. It is the only sector where emissions are predicted to be higher in 2020 than in 1990⁹.

As a largely rural county, this poses Norfolk with a particular challenge. Car ownership, considered a necessity in many rural areas, is higher than the national average and continuing to rise. Car travel in Norfolk increased by 77% from 1980 to 2000¹⁰, and such trends are set to continue. According to national statistics, car traffic across Great Britain as a whole increased by 87% from 1980 to 2007 (75% between 1980 and 2000)¹¹, and so the increase in Norfolk is slightly higher than the national average. Road transport represents 31.4% of our carbon footprint compared to 22.8% nationally. This makes it one of our top strategic priorities for tackling carbon emissions. The trend of rising fuel prices means that it is high on the political agenda.

The expected growth in road travel may outweigh any technical improvements and shifts to public transport. To achieve substantial reductions in fuel use and carbon emissions we must reduce the overall need to travel, for example, through improved accessibility planning and pragmatic siting of new development, and travel more sustainably. This may involve both a modal shift away from road travel and reducing the carbon impact of cars. Analysis of the vehicle fleet data in Norfolk shows that although people are buying newer cars, the carbon emissions per km remain higher than the national average, and are not falling at the expected rate.

Defra (Department of Environment, Food and Rural Affairs) evidence shows that Norfolk's transport emissions are highest in King's Lynn & West Norfolk, Breckland and South Norfolk (Defra, 2008¹²). These three districts are home to Norfolk's major trunk roads. From modal share monitoring data carried out by Norfolk County Council, residents in these Districts travelled further than people in other Districts. Although heavy goods vehicles make up around 5% of vehicles on main roads in Norfolk, it is worth bearing in mind that they are disproportionately more polluting than light goods vehicles and private cars.

While Defra's data is correct, however, it does not acknowledge that the reality is that people often have to use a car to get to essential services, especially in rural areas, due to the distances involved and that there may be limited opportunities for people to do this by public transport.

⁹ Reducing Carbon Emissions from Transport, Environmental Audit Committee, 2006

¹⁰ Norfolk Local Transport Plan 2006-2011, Norfolk County Council, 2006

¹¹ Roads and Traffic. 2007.

¹² Defra (2008). Local and Regional CO2 Emissions Estimates for 2005-2006

Dealing with the impacts of climate change also brings its own challenges. We need to ensure that the transport network can continue to fulfill its vital role in the face of changes such as rising sea-levels and increases in temperature. Similarly, we need to ensure that the evolution of the transport network does not add to the problem.

Progress

Norfolk's Local Transport Plan (LTP) (2006-2011) identifies protecting and enhancing the environment as one of its 5 strategic priorities and sets an ambitious target of 10% reduction in carbon emissions from transport by 2011 (compared to 2001).

Norfolk authorities have already had success in promoting a modal shift away from cars towards lower carbon forms of transport, including.

- A 9.2% increase in public transport use in Norfolk, between 2003/04 - 2006/07.
- Traditional bus services switched to providing a service where demand was identified in rural areas. Consequently, 67,000 more people used this type of service in 2006/7 than in 2003/04.
- The largest Park & Ride service in the country, ringing Norwich with six sites, generating 3.5m trips a year.
- School travel plans for all our schools, delivering a 10% increase in sustainable travel, with 4203 young cyclists trained in 2007/8
- An 8% increase in cycling across the county since 2004/05, with an investment of £1.1m in the cycle network, promotion of the urban cycling choice and travel planning in 07/08.
- A range of targeted initiatives in and around Norwich, including more cycle stands, pedestrianisation, low emissions zones and car clubs.

Other council initiatives aim to reduce the carbon impact of car travel, such as eco-driving¹³ courses (from September 2008 Eco-safe driving will form part of the national driving test). Other initiatives have promoted the use of alternative fuels in council vehicles and public transport to the promotion of cycling commuter routes (South Norfolk Council and Norwich City Council).

Norwich Park and Ride Bus Scheme

A national exemplar project which has successfully demonstrated that there is willingness in the community to support alternatives to the car. It has not only reduced congestion but has demonstrated clear improvements in air quality and significant carbon savings.

Perhaps our biggest impact as local authorities is in how we help shape and develop communities to ensure that sustainable travel becomes a way of life. The development of accessibility planning has helped to shape public transport routes, and the goal of locating and designing new development so as to reduce the need to travel has been included in Local Development Frameworks.

Reepham Car Club

Reepham has been awarded £30,000 from the EEDA Cut Your Carbon Campaign to develop a car club, to reduce car ownership and emissions among community members. Learning from the success of car clubs in a city context, this will be the first trial of a club in a rural setting. The project will help people who don't have ready access to transport now, and will use vehicles with ultra low emissions.

¹³ Norfolk County Council Eco-Safe scheme:

http://www.norfolk.gov.uk/consumption/idcplg?IdcService=SS_GET_PAGE&nodeId=3633

Priorities

1. Reduce the need to travel

We will continue to work with other partners to ensure that new development is sited so that the need to travel is reduced, for example by making sure that houses and jobs are co-located.

We will work with partners in the business sector to promote smarter ways of working to reduce the need to travel – such as greater use of home-working and teleconferencing. We will continue to strengthen the Norfolk Food Hub to localise the sourcing of food and fuel, and will work with partners on how to promote local produce more widely in the community.



Cittaslow – Diss

An Italian initiative, Cittaslow helps people enjoy a good quality of life and respect the environment by embracing local goods and services. In Diss, one of the key aims is to cut the local carbon footprint by encouraging shopkeepers to source locally-produced food and getting people to shop locally

2. Make travel more sustainable

This strategy recognises that we must look not only at ways to reduce the need to travel but also encourage a modal shift to more sustainable modes of transport. We will continue to implement improvements that achieve a shift away from car travel, such as joined up cycle and pedestrian networks in urban areas and market towns and making improvements in public transport. We will work with the business sector to develop sustainable travel plans. We will also work with partners to make it easier for visitors to travel without a car, and promote Norfolk as a sustainable holiday destination.

We recognise that some car travel will always remain necessary to access essential services, particularly in rural areas, due to distances involved or limitations in public transport. So we will also tackle the carbon impact of road travel. This will include information and marketing about the impacts of different vehicles, and encourage people to choose less polluting cars. We will also continue with initiatives, such as differential car parking charges (where charging applies), to encourage people to move to more environmentally friendly vehicles. Also, encourage a more efficient use of vehicles through promoting car-share schemes to ensure higher occupancy.

Finally, we will work with distribution companies and major generators of freight to promote more sustainable, efficient networks and reduce the carbon impact of distribution throughout Norfolk.

3. Sustainable Transport Infrastructure

We will review the process of road development and design so as to minimise carbon impact both during construction and during the long-term operational life of the road. We have developed Guidance on Delivering Carbon Neutral Transport Schemes and will roll this out to transport design engineers and practitioners. We will also ensure that road development and maintenance takes account of the need to adapt to the changing climate and does not exacerbate problems such as the risk of flooding.

Next Steps

- Reduce the need to travel by promoting smarter ways of working, and ensuring good access to services, including in the location and mix of development
- Make travel more sustainable by continuing to encourage a modal shift away from cars to more sustainable travel solutions
- Encourage higher occupancy and promote the uptake of more energy efficiency vehicles
- Reduce the long-term carbon impact of road development through scheme design.

2 Towards Low Carbon Norfolk

Economy & Business

The Challenge

Industry and business, together with the public sector, accounts for the highest proportion of Norfolk's carbon footprint (38.3%), but the sector has had relatively little attention from councils to date. The new role of local authorities in relation to promoting economic development¹⁴ now promises a more proactive partnership approach.

There is already growing awareness amongst businesses, with many having long recognised the opportunities of a low carbon economy both for cutting costs and benefiting from new future markets such as green technologies and local energy production. Others are motivated more by the need to reduce risks to supply chains or to demonstrate their green credentials to customers. Action remains patchy, however. There is a need to raise the overall level of ambition and action both to reduce carbon emissions and to seize strategic opportunities. This makes the sector one of our strategic priorities for action.

Progress

'Shaping Norfolk's Future' (SNF), the economic partnership for Norfolk, has a strategic ambition for Norfolk to become an exemplar of environmentally sustainable prosperity by 2015. As part of this work, SNF have established a Sustainable Prosperity group, to oversee the development and delivery of interventions, through:

- Improve communication and knowledge transfer
- Developing a network of physical centres for sustainable technologies
- Encourage the implementation of higher building standards, linked to the growth agenda
- Investigate and develop alternative transport options
- Encourage smarter ways of working.

The SNF Sustainable Prosperity Group aims to deliver these goals by working with a wide range of public and private sector partners as well as engaging with the planning and transport agendas to deliver more sustainable patterns of business development and travel.

Individual councils are undertaking a range of one-off initiatives to promote low carbon behaviour in businesses – including food waste collection initiatives, working with the highest business consumers of energy to set carbon reduction targets, and some support of initiatives to promote local goods and services, such as 'Buy Local' and the Rural Enterprise Valley in Breckland. However, the

¹⁴ Under the Review of Sub-National Economic Development and Regeneration published in July 2007.

picture is mixed and there is a lot of scope to identify and extend best practice across the county.

Case study

Eastex - Norfolk's free online business materials exchange enables businesses to trade surplus materials for reuse and has now been extended to a total of eleven counties – saving carbon emissions and delivering real financial savings for businesses. We aim to promote greater take-up of the scheme among Norfolk businesses.

There are a significant number of sources of advice available to businesses in the county, ranging from national organisations such as the Carbon Trust and Energy Savings Trust, to local advice from the 'CRed' at the University of East Anglia, Business Link East and the Forum Trust, and those supported by local authorities such as the Environmental Business Advisor and Norfolk Rural Business Advice Service.

This is leading to local confusion about where to go for environmental business advice. There is scope to join up these various initiatives and develop a "first stop shop" approach to low carbon advice tailored to businesses in Norfolk. This has been acknowledged by the SNF and will be driven forward by SNF's ' Sustainable Prosperity Group, Business Support Alliance and sector group activity. There is also scope with linking with the Regional Development Agency – EEDA – to address these issues at a regional level.

Like large organisations in the public sector, large businesses will be affected by the Carbon Reduction Commitment – the proposed new carbon trading scheme for non-energy intensive organisations – from April 2010. We will raise awareness of this at every opportunity.



Source: Lotus Cars.

Along with a number of leading car manufacturers globally, Lotus Cars is investigating greener fuels (their current models are multi-fuel). They are also investigating solar power. As well as the fuel, other aspects of the vehicle have not been overlooked. From the paint to the fabrics, the latter incorporates hemp and wool, effort is made to make the total package more sustainable.

Priorities

1. Communications

We will encourage individual businesses to reduce their energy use and carbon footprint by developing a communications strategy with partners that:

- Develops a “first stop shop” to energy efficiency and carbon advice for Norfolk businesses;
- Promotes a single consistent message for Norfolk businesses on how to reduce their carbon footprint, and the business benefits of doing so
- Promotes EASTEX and other local waste recycling initiatives.
- Promotes and encourages take-up of Carbon Trust and other financial support
- Promotes local procurement initiatives to reduce carbon emissions.

2. Knowledge Transfer

We will promote greater communication between partners and across sectors to identify and disseminate best practice, providing businesses with real examples of how changes made and use of technology can reduce environmental impact and save money. We will stimulate innovative project development and provide a strategic approach to funding opportunities such as delivery of the low carbon aspects of the European Regional Development Fund (ERDF) Competitiveness Programme in Norfolk.

3. Support Development of Sustainable Technologies

We will develop a network of physical and virtual centres for sustainable technologies. We will support the Hethel Engineering Centre to develop supply chain opportunities to develop low carbon manufacturing across Norfolk. Also, we will work to assist businesses to exploit the commercial opportunities associated with climate change mitigation.

Next Steps

- Develop a communications strategy and ‘first stop shop’ approach for business advice
- Promote knowledge sharing, including a strategic Norfolk approach to funding opportunities
- Support the development of sustainable technology networks and supply chains

2. Towards Low Carbon Norfolk

Energy

The Challenge

Rising energy prices and the need to tackle climate change have put energy supply at the top of the political agenda. The need to use energy efficiently has never been more pressing. As energy efficiency improves, switching to renewable and low carbon forms of energy will be important both to reduce our carbon footprint, to improve security and diversity of domestic energy supply and cushion us against the vagaries of the international energy market. Development of new energy sources could also bring new business and employment opportunities to Norfolk.

The Government has set a target to increase the share of renewables in the UK's energy mix from 1.5% in 2006 to 15% in 2020. The UK Renewables Strategy published for consultation in July 2008 proposes to introduce a range of new incentives for renewables development and to extend and raise the level of the Renewables Obligation on energy suppliers to encourage up to 30-35% of our electricity to come from renewable sources by 2020.

This represents a major economic opportunity for Norfolk. Our geography offers rich natural resources – in particular wind, sunshine, a substantial coastline and a large rural landscape. We also have a strong base of engineering and research skills in the Great Yarmouth area built from more than 40 years of North Sea gas production, with many specialist businesses already diversifying into the renewables sector. The East of England Plan has an ambitious target for the Region to supply 44% of its energy from a combination of onshore and offshore wind by 2020, with significant job creation opportunities.

Our challenge is to make sure Norfolk exploits this major economic opportunity, which is why we have made it one of our key strategic priorities.

Progress

Local authorities make a range of decisions that are vital for delivering sustainable energy policy – including in areas of planning, regeneration and development, procurement, housing, transport and sustainable development. Local authorities can also play a pivotal role in building local support for renewable energy and explaining the benefits to local communities.

<p>The East of England has as much as 70,000 hectares of under-managed woodland that could provide renewable fuel. Woodfuel East has received a grant from EEDA (East of England Development Agency) of £16 million in order to facilitate a significant increase in the uptake of woodfuel installations, and to build capacity in the associated supply chain within the region.</p>
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In May 2008, the Regional Spatial Strategy for the East of England (East of England Plan) was revised to include clear policies on CO₂ emissions and renewable energy. This includes the requirements that any new development of more than 10 dwellings or 1000m² of non-residential floorspace should secure at least 10% of their energy

from decentralised and renewable or low carbon sources, that authorities should take steps to incentivise greater energy efficiency and encourage the establishment of energy supply companies and similar energy saving initiatives. All Norfolk planning authorities must now have regard to these principles.

Although councils invest a lot of effort into managing energy supplies of individual properties and developments, the more strategic question of creating a sustainable energy supply across the county has received less attention from authorities to date. Authorities could usefully develop a more detailed, evidence-based understanding of the local feasibility and potential for renewable and low-carbon technologies, including micro-generation, and use this evidence to inform planning and economic strategies.

The Department for Business Enterprise and Regulatory Reform (BERR) Low Carbon Buildings Programme, which introduced grants for sustainable micro-generation initiatives, has helped to raise public awareness. However, many technologies are only suitable for individual houses in specific situations, or may only be cost-effective for larger developments. Local authorities, with partners, may be able to play a valuable role in promoting shared energy services for communities, to make such technologies more economically viable.

While the Government is promoting a mix of energy solutions to satisfy our energy requirements for the future, including renewable sources, work within the county is progressing as part of the residual waste treatment contractual process to explore other solutions to provide additional heat and power technology.

Priorities

1. Evidence Base: The Renewables Market

We will develop a thorough understanding of supply and demand in the renewables and low carbon energy market in Norfolk including the scope for, and feasibility of, expansion of different forms of technology. To this end we will commission a Norfolk-wide study of the renewables market, drawing on evidence already available from each local authority, and paying particular attention to the energy requirements of growth points, for example, the work of the Greater Norwich Development Partnership. This evidence could be used to inform both planning and economic development strategies.

2. A Sustainable Energy Strategy for Norfolk

To ensure that we exploit this major opportunity, we will work with key partners in the energy and business sector to develop a sustainable energy strategy for Norfolk, which learns from best practice elsewhere in the UK, draws on the results of the renewables study above and takes account of community sensitivities. It will address both major energy developments and small-scale options such as biomass and energy from waste. The goals will be:

- (i) to reduce the carbon footprint of energy used in Norfolk;
- (ii) to increase the diversity of energy supplies; and
- (iii) to increase our overall self-sufficiency in terms of energy supplies.

3. Energy Services

We will work with expert advisors and partners in the housing and energy sectors to analyse the scope for promoting community-based energy projects and establishing energy services schemes in Norfolk. This may include consideration of the scope for creating an Energy Services Company (ESCO) to manage the energy requirements of developments in the growth points (also referred to in the next chapter). This could be a mechanism to assist in meeting renewables targets for new development.

4. A Community Engagement Plan

If the full benefits of renewable energy are to be harnessed, it is vital that any changes to policy or approach must be coupled with the involvement of local people who should be consulted, fully informed, and their issues of concern discussed. An effective community engagement plan will be vital to the development and implementation of the sustainable energy strategy. This should include a strong role and voice for young people.

Next Steps

- Develop a Sustainable Energy Strategy for the county, including targets for development of the renewables sector and encouragement of energy services schemes, underpinned by a community engagement plan.

2. Towards Low Carbon Norfolk

Thoughtful Development

The Challenge

Norfolk's population and economy is set to grow significantly in the next two decades. By 2021 the aim is to create:

- 78,700 new dwellings (of which 47,500 in Greater Norwich)
- 55,000 new jobs (of which 35,000 in Greater Norwich)

It is possible that these figures will increase as a result of the current review of the Regional Spatial Strategy, though a number of these dwellings have been built, or are currently in development.

Growth on this scale could clearly exacerbate the challenges of climate change. But it also offers opportunities. Councils are in an excellent position to shape towns and villages that exemplify sustainable living and build consensus for low-carbon, resilient development. Through effective planning, we can ensure the new development is located and designed so as to minimise the need to travel, enables the use of sustainable transport modes (designed to be energy efficient and low carbon) and promotes the use of local renewable and sustainable energy sources. That is why we have identified thoughtful development, through the planning system, as one of our strategic priorities.

Progress

Policy developments at the national and regional level are setting an increasingly ambitious framework for improving the sustainability of new development. The Planning Policy Statement (PPS) 1 Supplement on Climate Change (December 2007) requires that new development:

- be located and designed so as to limit CO₂ emissions;
- makes good use of opportunities for decentralised and renewable or low carbon energy
- minimise future vulnerability in a changing climate;

In addition, the Government's *Building a Greener Future* sets out a progressive tightening of Building Regulations to require major reductions in carbon emissions from new homes – a 25% increase in energy efficiency requirements in 2010 (compared to the Building Regulations 2006), 44% in 2013, building to a zero carbon target from 2016.

While the government is wishing to develop a small number of Eco-Towns¹⁵, the principles inherent in this approach could be incorporated into all new development.

We are already building many of these measures into Local Development Frameworks (LDFs), Core Strategies and Growth Point Master Plans across Norfolk.

¹⁵ Best Practice in Urban Extensions and New Settlements (2007). TCPA (for CLG). Also Eco-Town worksheets: <http://www.tcpa.org.uk/ecotowns.asp>

The strengthening of energy efficiency requirements is also being anticipated in other ways. For example through the publication of a Low Carbon Development Advisory Note for the Greater Norwich growth point, the setting of minimum code levels in district LDFs (minimum Level 3 or 4) under the Code for Sustainable Homes and through individual exemplar projects.

However, planning policies are variable across the different authorities and some of these goals, such as 'zero carbon' and promotion of renewable energy, will be a challenge to deliver in practice. To ensure we are making maximum impact right across the county, we need to focus on using our strategic planning role to shape low carbon communities in a more systematic way. We therefore propose to make these priorities within our Strategy.

Case Study – Lingwood Low Energy Housing



Lingwood Housing Development. This low carbon exemplar scheme for a housing development is aimed at showing how we can reduce the carbon footprint that new homes leave on our environment. Combining Modern Methods of Construction with the use of sustainable materials and a commitment to renewable energy sources, the carbon footprint of the entire development, from manufacture of components through their transportation to site and the final construction process will be monitored. Working alongside the University of East Anglia, the homes' performance post-completion will also be monitored (via smart meters)

The proposed introduction of a new Community Infrastructure Levy (CIL)¹⁶, has potential to support the development of infrastructure that will either reduce the carbon impact or improve the climate resilience of growing communities. This might include use of funds for transport, green space, flood defence or possibly energy-related infrastructure. This will offer a further mechanism for planners to reduce the carbon impact of new development, alongside the existing system of planning obligations.

Priorities

1. Decision-making
We will embed sustainability and climate change in planning decision-making across Norfolk, by:
 - a. Ensuring national and regional policy guidance on climate change and CO₂ emissions is adopted as a minimum in all LDFs.
 - b. Develop county guidance on planning obligations to support carbon reduction and climate change initiatives, and incorporating such initiatives into any future proposals for the new Community Infrastructure Levy in Norfolk.

2. Zero carbon development
We will work with developers and the construction industry to improve implementation of part L of the Building Regulations and set out a road map

¹⁶ In the Planning Bill before Parliament 2007-08.

for achieving zero carbon development by 2016, with clear low carbon targets applying to development due before 2016. Indeed, some of the Norfolk authorities already have carbon reduction targets for new development. In addition, we will ensure development is located so that sustainable travel options are addressed. This should include promotion of support available through the Low Carbon Buildings Programme and possible use of the new Community Infrastructure Levy.

3. Capacity and training

Planning and development management areas need to develop capacity to drive the increasing environmental standards forward. We will examine existing capacity and expertise to provide effective environmental advice through the planning process and develop an appropriate training package for Members and officers.

Next Steps

- Ensure national and regional climate change policies are adopted in all LDFs
- Incorporate climate change initiatives into planning obligations guidance and future proposals on how to apply for the new Community Infrastructure Levy
- Work with partners to set out a roadmap towards zero carbon development by 2016
- Establish a training and awareness raising package for planning officers and Members.

2. Towards Low Carbon Norfolk

Housing

The Challenge

Households across the county are feeling the impact of rising energy prices and want to cut bills. Depending on the age of the property and the construction method, it is estimated that households could on average save 2 tonnes of CO₂ per year – and make significant cash savings - from standard energy efficiency measures such as loft and wall insulation (LGA 2007). Simple behaviour changes to the way we use energy in the home can increase the savings further.

New homes produce half as much CO₂ as homes built between 1920 and 1960. However, more than two thirds of the homes expected to be in use in 2050 will have been built to pre-2005 standards and will be key emitters of CO₂.¹⁷ So the majority of the housing stock in Norfolk will not benefit from new build initiatives.

For all these reasons we have identified the energy efficiency of our existing housing stock as one of our strategic priorities alongside new development, which is covered in the previous chapter. Additionally, there is a social dimension to this agenda in terms of reducing fuel poverty.

Progress

The Carbon Emissions Reduction Target (CERT), which came into effect on 1 April 2008, places an obligation on energy suppliers to achieve targets for promoting reductions in carbon emissions in the household sector. It is now the principal driver of energy efficiency improvements in existing homes in Great Britain.

Energy suppliers are free to achieve their targets in different ways using a range of measures (predominantly insulation, but also micro-generation, renewables, smart metering and behavioural change). Although some councils are active in promoting the funds available through CERT, there is a need to raise awareness of the initiative more consistently across the county to increase consumer demand to take up these energy efficiency measures.

In the meantime, all Norfolk Councils have dedicated officers responsible for implementing the Home Energy Conservation Act (HECA) 1995, which requires authorities with housing responsibilities to promote and encourage energy efficiency in households and to report on measures that significantly improve the energy efficiency of residential accommodation in their area. These officers, in conjunction with energy suppliers, have a pivotal role in reducing the impact of existing housing. For example, Norwich City Council manages nearly 17,000 dwellings, making it the single largest property owner in the county.

Most HECA teams are active in providing energy efficiency advice and incentives to householders, including awareness campaigns, Energy Bus visits to local communities, one-off events, talks and promotion of funding sources such as Warm

¹⁷ A Climate of Change: Final Report of the LGA Climate Change Commission. 2007

Front and Carbon Emissions Reduction Target grants. There is recognition that clear, consistent advice for householders across the county would greatly aid reinforcement of the overall behaviour change message.



The Energy Bus is a purpose built information bus designed specifically for shows and events to act as a focal point for energy conservation promotion. The bus, which can be seen around the county promoting energy efficiency, has been designed to run on biodiesel. It has demonstration equipment on board, including renewable energy devices, low energy lighting, insulation samples and information leaflets.

Case Study – The Energy Team

Since 2003 The Energy Team has covered both the Broadland and South Norfolk districts, and has provided advice on how to reduce energy consumption around the home in order to cut greenhouse gas emissions and lower fuel bills. Insulation grants are offered to all homeowners and private tenants regardless of household income, and guidance is also made available on the renewable energy technologies.

The Energy Team has built up strong working partnerships with other organisations such as the Energy Saving Trust and Warmfront over the years to the benefit of its residents. An example of which was between the period of April 2006 and March 2007, when over 1100 residents in the Broadland and South Norfolk area received a government funded Warmfront grant to help improve the heating or insulation of their home. During this period, over £1.1 million worth of Government money was spent on making local residents' homes warmer and more energy efficient.

More recently the remit of the Energy Team at Broadland Council has expanded to cover aspects of climate change other than energy efficiency, however the service provided to South Norfolk Council still remains.

Priorities

1. Private stock

We will work with energy suppliers on how best to incentivise private owners and raise awareness of the availability of CERT grants more consistently to increase consumer take up. We will also promote existing guidance for older and hard to treat buildings, such as historic buildings, and explore the possibility of providing best practice events for owner-occupiers and private landlords.

2. Social Housing Stock

We will also work with energy suppliers and Registered Social Landlords (RSLs) to encourage the channeling of CERT funds towards energy efficiency improvements for social housing. Energy suppliers must direct at least 40% of carbon savings to a priority group of low-income and elderly consumers. This is particularly valuable given links with wider fuel poverty and vulnerability issues. Measures might include energy efficiency advice, metering, and identification of social housing blocks suitable for combined heat and power (which can make large energy savings) or for own generation of renewable energy supplies.

Ultimately this could support localised targets on the quality of social housing and new energy use standards in management agreements.

3. Behaviour change

The key to improving energy efficiency in the home will be through changing individual behaviour. Public awareness is growing, and rising energy bills have increased householders' appetite to improve efficiency and cut energy use. However, there remains a great deal of uncertainty about what measures are most cost-effective and who to turn to for advice. We therefore plan to make behaviour change and clear, consistent communications a key component of our strategy. We address this further in Chapter 4 (Turning Awareness into Action). In terms of households, our priorities will be to:

- Develop a full understanding of public attitudes, lifestyles & energy use and use this to target our communications strategy effectively
- Work with partners to develop a "one-stop-shop" approach for energy advice for Norfolk households
- Develop a community outreach strategy to promote behaviour change, for example including an Environmental Community Champions scheme or community outreach via school projects.

Next Steps

- Develop an action plan with partners to incentivise home owners and channel energy supplier funds towards social housing improvements
- Develop a Behaviour Change Strategy, including detailed plans for community engagement.

3. Adapting to the Changing Climate

Saving energy and reducing carbon emissions is vital to avoid the worst effects of climate change. However, our past actions mean that a certain amount of climatic change is already inevitable.¹⁸

Norfolk's Changing Climate

As set out in the Introduction, by the 2080s Norfolk is likely to experience:

- An average temperature rise of 1-5°C
- Hotter, drier summers
- Wetter winters
- Sea level rise of up to 0.88m
- More extreme events (heatwaves, gales, storms, tidal surges and intense rainfall)

Over the coming decades, this could result in:

- Greater flood risk
- Water scarcity
- Coastal erosion
- Change or reduction in biodiversity and rare habitats
- Heatwaves and associated health risks
- Increase in pests and animal diseases

Our Aim

The Norfolk County Strategic Partnership has made adaptation to climate change one of its key priorities in Norfolk Ambition and the Local Area Agreement. Our goal is **to improve Norfolk's resilience to the changing climate**, by:

- understanding and managing the changes and their impact on the Norfolk economy, communities, individuals and environment; and
- working with partners to minimise risks and maximise opportunities.

Specifically, we aim to:

- Develop a detailed understanding of the likely impacts in Norfolk over different time periods, and the vulnerabilities and opportunities for all sectors, based on the latest science in UKCIP08 (2009)
- Agree an Adaptation Plan with partners to address all key vulnerabilities and opportunities (by 2011)
- Embed adaptation measures in strategies, plans, investment and decision-making processes across all council service areas (by 2011)

¹⁸ International Panel on Climate Change (2007) Annual Report 4.

These steps are crucial for delivery of our adaptation target in the Norfolk Local Area Agreement.

Vulnerabilities

The effects of the changing climate, and in particular the projected increase in frequency and intensity of extreme weather events, will be felt in all sectors:

Transport & infrastructure:

Flooding may affect roads and rail, while high winds may affect the safety of air, sea and land transport. Rising temperatures could damage rail and road surfaces, while there may be less need to prepare for the likelihood of frost or snow. Norfolk railway stations and the airport are generally at medium risk from flooding.

Health: Extreme events such as gales, storms and flash flooding increase the risk of mortality or injury, particularly in vulnerable groups. Rising temperatures may increase medical problems associated with heat, reduce air quality and result in greater skin disease from exposure to UV rays.

Economy and tourism:

May experience greater disruption from extreme events, flooding and water shortages. There could be a negative impact on coastal and Broads-based tourism. Equally, there could be some adverse impact on some business sectors, such as manufacturing, that consume large quantities of water (see water supplies below).

Energy & communications:

High winds may cause widespread disruption to electricity supplies and telecommunications, particularly in rural areas, while significant storms or flooding could result in damage to the national grid network, power cuts and fuel shortages. Many power and gas stations and a number of telephone exchanges in Norfolk are vulnerable to flooding. Rising temperatures may increase demand for cooling systems such as air conditioning, while demand for heating may decline.

Water supplies:

Higher temperatures and longer dry periods in summer are likely to increase pressure on water resources due to increased evaporation and a shortened recharge period. The impacts on both groundwater and surface sources could be substantial. Extreme rainfall during dry periods can have implications for water quality and disease outbreaks, adding to water stress.

Agriculture: Longer dry periods and pressure on water resources may result in greater variability in crop quality and reduce average yields in traditional crops. Higher average temperatures will increase the risk of heat stress, death and disease amongst farmed livestock. Extreme rainfall can increase nitrate leaching from agricultural land, with implications for water quality.

Biodiversity: Sea level rise and storm surges may result in loss of species and habitats in low lying coastal areas. Rising temperatures and increased rainfall will result in a complex range of impacts on wildlife and habitats.

Waste services:

Rising temperatures will have implications for the management of waste.

Buildings: Rising temperatures will increase demand for cooling measures, both inside and outside, while pressure on water resources will require greater adoption of water conservation measures. Many Norfolk buildings, including some schools, hospitals and care homes, are already highly vulnerable to flooding. Greater flood risk will make it ever more important to site development away from the most vulnerable areas and improve the resilience of buildings.

Conservation:

More frequent extreme rainfall and storm events may damage historic and archaeological structures, while rising temperatures may have implications for ventilation of heritage buildings.

Emergency planning:

An increase in extreme weather events is likely to increase costs and demands for emergency services, in particular in response to flooding.

Opportunities

The changing climate also offers some key opportunities for Norfolk:

Agriculture: Higher average temperatures may present opportunities for diversification into new crops and fruit to take advantage of the increase in the growing season, such as those seen in the warmer parts of Europe.

Energy: Different forms of renewable energy may become more viable, such as growing *miscanthus* (a fast growing grass) as an energy crop

Tourism: Rising average temperatures and hotter, drier summers will help make Norfolk more favourable as a tourism destination.

Biodiversity: The changing climate may create conditions for new habitats and species to thrive, and managed appropriately, including improved environments in growth areas. Linking tree planting programmes to carbon sequestration could benefit both biodiversity and the community.

Economy: Benefits to the wider economy and society through the growth in low carbon technologies.

Progress

Base-lining work has provided an initial assessment of existing action by councils to adapt to climate change in Norfolk. For example:

- Water resource requirements are being investigated by water companies, in conjunction with the Environment Agency.
- Good progress has been made in identifying potential health impacts through the Health Partnership.
- The Biodiversity Partnership has already made some progress through development of a series of ecological network maps for the county, although comprehensive assessment of the impacts of climate change is required to develop a co-ordinated adaptation response.
- Emergency planners are actively addressing climate change impacts through the Norfolk Resilience Forum.
- Those responsible for spatial planning – councils' most powerful tool for embedding climate change adaptation measures in new development – are also alert to the need to improve resilience to climate change, and there is now a large volume of related planning policies and guidance, particularly on flooding. Most of the planning authorities are commissioning flood risk assessments, but increasingly other impacts are under investigation.

However, progress in other areas has been limited to date, and the various sectors are not yet working to a consistent or shared understanding of the specific impacts or priorities for Norfolk. There is a particular need to link to the work that the Broads Authority, Environment Agency and other partners are doing to address this issue. For example, the Broads is the county's only national park and one highly vulnerable to flooding risk. A substantial amount of work is already underway to address climate change threats in the Broads, and local authorities need to join up with this work.

Priorities

We have identified two sets of priorities. The first (A) is about professional risk management: ensuring that all risks and opportunities are understood, prioritised and can be addressed systematically. The second set (B) identifies four immediate priorities for action based on what we believe to be the most significant impacts.

A. To develop a partnership Adaptation Plan for Norfolk, based on a robust, shared evidence base of likely impacts, vulnerabilities and opportunities for Norfolk.

We will commission a Local Climate Impacts Profile based on UKCIP08 data, by 2009, which will provide a comprehensive risk assessment for Norfolk, and assesses the implications for all sectors. This will be used to agree priorities with partners and develop a detailed action plan over the next three years. The actions identified will need to be embedded in the strategies and plans of all councils and those of our partners. We will achieve this by working proactively with partners and establishing adaptation networks across all Council services.

B. Priority actions to address the most significant impacts

The projected impacts of climate change we have set out are for the 2080s. However, in some areas (such as new development) we need to take action now to ensure that Norfolk is as resilient as it can be to future changes. Our immediate priorities are based on those risks we believe are likely to have the highest social, environmental and economic impact overall, where communities are already feeling the effects of climate change, or where there is a strategic opportunity to take action now.

(i) Water Resources

There are already severe constraints on the ability of the county to produce sufficient water supplies to meet growing demand. The prognosis for water supply in other areas is likely to be similar, so opportunities for long-distance transfers cannot be guaranteed. Alternative sources such as a new reservoir or desalination may need to be considered. We also need to be conscious of risks to those rural households and businesses not on the mains supply, and the possible impact of extreme weather events on drinking water supplies.

Against this background, better water conservation will be absolutely crucial. Education will be key to changing people's behaviour and reducing demand for water. Other measures such as better measurement and monitoring, reviewing water tariffs, dealing more promptly with leaks, and promoting rain-water collection and grey water recycling will also be essential.

Responsibility for water management lies primarily with the Environment Agency and the water companies. However, corporate and individual responsibility will also rest with councils, other public organisations, businesses and households. As councils we can play a particularly valuable role by incorporating water resources objectives into planning strategies, setting high water efficiency standards for new development and promoting behaviour change among the wider public.

We will need to engage actively with water companies, the Environment Agency and others to tackle this challenge and agree how we can best work together towards a common sustainable water strategy for Norfolk. We also plan to set our own house in order by addressing councils' own water consumption as a matter of priority and encouraging other organisations to do the same.

(ii) Flooding

Flood risk is an ever present issue in Norfolk, whether from rivers, groundwater or rising sea levels. Those risks will continue to rise in future, compounded by the scale of development planned for the county that will put increased pressure on urban drainage and our capacity to manage floodwaters.

An aging sewerage and surface water infrastructure puts the county at risk from an excessive load on the foul and surface water systems during flash storms or continued periods of heavy rain. Steps need to be taken to focus on the vulnerable areas and wherever possible partners should work together to improve

the existing infrastructure. A detailed assessment of current capacity should be made prior to the allocation of any land for development and sustainable systems installed to relieve the pressure on existing infrastructure.

The single most important tool that councils can use is spatial planning. It is planning that must ensure new development does not exacerbate flood risk, that it works with and does not impede local water cycles and develop schemes such as sustainable urban drainage systems. We will work with the Environment Agency and other partners to identify strategic priorities for addressing flood risk in the county, with particular reference to the growth points in Greater Norwich, Thetford and Kings Lynn.

Another significant and widespread risk faced by Norfolk is from sea level rise and the associated flooding and coastal erosion this may bring. Over much of the county this might only affect several hundred metres inland from the coast, but in other parts the effects could extend some considerable distance inland. Coastal erosion is not a new issue in Norfolk, but we need to take steps to ensure that important infrastructure and assets are not at undue risk.

To this end, Norfolk is participating in a regional Coastal Initiative led by the Government Office that aims to develop a strategic vision for a sustainable future for the region's coast, identifying the key assets that need to be protected and enhanced in order to promote the long term social, economic and environmental well-being of the region.

(iii) Emergencies

The area where adaptation activity is already most advanced is emergency planning. With experience of dealing with regular and serious flooding, Norfolk already has a well equipped and comprehensive response capacity for extreme events. Plans can be refined further through improved understanding of the specific climate change impacts expected for Norfolk. However, continued investment will be crucial. Climate change is likely to bring more frequent and more intense weather events. It may not be possible to rely on additional support from emergency services elsewhere if extreme events affect neighbouring regions as well. We will work with the Norfolk Resilience Forum to develop a shared understanding of the specific impacts expected in Norfolk and the priorities for action.

(iv) Growth

Most of the houses and infrastructure that we build now will still be standing in 2080, when the impacts of climate change will be much greater. The considerable level of growth planned for the county by 2026 provides an immediate strategic opportunity to plan housing and infrastructure that will be much more resilient to the impacts of climate change. This will reduce long term risks to Norfolk residents and help avoid the potentially major expense of addressing problems at a later stage, after the impacts of climate change have been felt.

Next Steps

- Develop a partnership Adaptation Plan for Norfolk, based on robust, shared evidence base of the likely impacts, vulnerabilities and opportunities for Norfolk
- Prioritise actions through partnership sector groups to address the most significant impacts: flooding, water supplies, emergency planning and the impact of growth.

Turning Awareness Into Action

The Challenge

Substantial progress in reducing carbon emissions and adapting to climate change can only be achieved by concerted action across the whole community. The success of this strategy will depend on a wide range of Norfolk organisations, businesses, communities and individuals all playing their part. Councils, as the democratically elected bodies charged with community leadership, have a pivotal role to play in this. To drive forward action we need to show strong leadership, engage partners and communities, and communicate clearly and consistently.

Priorities

1. Leadership

This Strategy sets out the Norfolk councils' vision for tackling climate change in Norfolk. It is based on close partnership work between all Norfolk councils over the past year. All Councils will undertake to have regard to the Strategy in preparing their annual Service Plans, and we will encourage district local strategic partnerships to do the same in developing their plans.

The Norfolk County Strategic Partnership will receive annual reports on the progress of implementing the Strategy. To underline top level commitment to the issue, the Leader of each Council will make a corporate pledge on delivering the principles of this strategy.

2. Partnership

The Strategy is intended to provide a springboard for driving forward partnership engagement and action. To this end we will establish a Norfolk Climate Change Partnership, consisting of a Sector Group on each of our strategic priorities. The aim is to engage with a wide range of partners on specific issues to turn this high level vision into a robust plan of action with effective performance management. The Partnership, structure and governance arrangements will be determined by the end of 2008.

3. Communications and Community Engagement

Our success will depend in a large part on the willingness of citizens and communities to change their behaviour. Public awareness and general concern about the environment is growing due to continued media coverage, with individuals and communities starting to question how they can help through lifestyle change and consumer choice. However, people are often unsure which measures would have the most impact or who to turn to for advice. The volume of information and sources of advice can be confusing. And for many, it is not clear what the benefits would be here and now.

To lead and encourage behaviour change successfully, we first need to understand current public attitudes and lifestyles in Norfolk, to identify which measures are most likely to be successful in different parts of the community.

We then need to work with partners to develop a joined-up approach to communications, promoting a clear and consistent message for Norfolk supported by locally specific examples and tips, a rolling programme of green events and a “first stop shop” approach for advisory services and internet advice.

The younger generation has the biggest stake in action to tackle climate change. There should be a strong role and opportunities for young people to represent their views and act as champions in their community. We will also explore opportunities to develop community outreach programmes via schools by working with schoolchildren to promote energy efficiency in their homes and family lifestyles.

Our behaviour change strategy should be unified under a strong, single sustainability brand for Norfolk that is readily recognised and promotes a clear message. We will need to include clear steps for engaging proactively with the wider local community to incentivise and reward behaviour change, working with community groups, schools, businesses and local partners. This could include developing a network of Climate Change Champions in the community, and support events that promote a carbon reduction ethos.

Next Steps

- Establish a wider Climate Change Partnership for Norfolk, with Sector Groups to address our strategic priorities, with clear governance and performance management arrangements to ensure we deliver.
- Develop a Behaviour Change Strategy, including detailed plans for community engagement.

Conclusion

Norfolk is particularly vulnerable to the impacts of climate change, and has a higher carbon footprint per person than the UK average. We need to take action both to reduce our contribution to the problem and minimise our exposure to future risks.

This strategy has set out a number of key priorities for local authorities and our partners. In particular, we need to reduce carbon emissions from transport, business, energy, development and existing housing. We also need to develop a much more robust approach to managing risks from the changing climate, focusing in particular on flooding, water supplies, emergency planning and growth. We need to make sure we turn awareness into action to deliver effectively on our goals

We can only do this in partnership. We all have a common interest in tackling the climate challenge – as public organisations, businesses, individuals and communities – and we owe it to future generations of Norfolk residents to do so.

Taking timely action now can bring many benefits, including financial savings, healthier lifestyles, and taking advantage of developing economic opportunities. We encourage all of you to play your part; if not you, then who?

Further information

Glossary

Carbon Dioxide: Often referred to as CO₂, this greenhouse gas is mostly produced by the combustion of fossil fuels. Its high atmospheric concentrations are a result of human activity which interferes with the natural CO₂ cycle. This can cause negative effects, such as rapid climate change.

Carbon Footprint – a generic term to describe the emissions of carbon dioxide or greenhouse gases (in CO₂ equivalent). This is usually measured in either kilogrammes or tonnes of CO₂.

Carbon Reduction Commitment - The Carbon Reduction Commitment (CRC) is a new emissions trading scheme for large non-energy intensive commercial and public sector organisations. The scheme will place an emissions cap on up to 5,000 large business and public sector organisations responsible for around 14 million tonnes of carbon (MtC) emissions each year. It is due to take effect from April 2010. (See Carbon Trading).

Carbon Trading - The UK Emissions Trading Scheme, launched in April 2002, is the world's first economy-wide, national-level greenhouse gas trading scheme. Emissions trading is designed to allow businesses to reduce their emissions of greenhouse gases in the most economically efficient way through the buying and selling of 'carbon allowances'. (See Carbon Reduction Commitment)

Climate Change: A significant change from one climatic condition on Earth to another, currently also referred to as Global Warming (see Global Warming). While a natural phenomenon, accelerated changes in the last century have been related to the burning of fossil fuels for energy.

CRed (Carbon Reduction Project) - CRed was founded by the internationally renowned [School of Environmental Sciences \(ENV\)](#) at the University of East Anglia (UEA), and was inspired by the philosophy of the national [Tyndall Centre for Climate Change Research](#) - Seeking sustainable solutions to climate change. The CRed community of partners aims to lead the way in demonstrating how we can make deep cuts in our CO₂ emissions.

Fossil fuels - Natural hydro-carbon fuels (oil, coal and gas) and their derivatives such as petrol.

Global warming- A rise in global temperatures threatening wildlife and its habitat, attributed to the burning of fossil fuels.

Greenhouse gases Any of the atmospheric gases that contribute to the greenhouse effect by absorbing infrared radiation produced by solar warming of the Earth's surface. They include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), and water vapor. Although greenhouse gases occur naturally in the atmosphere, the elevated levels, especially of carbon dioxide and methane, observed in recent decades, are directly related, to human activities such as the burning of fossil fuels and the deforestation of tropical forests.

IPPC (Intergovernmental Panel on Climate Change) The IPCC is a scientific intergovernmental body. Its role is to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts and options for adaptation and mitigation.

Landfill Gas - Municipal solid waste contains significant portions of organic materials that produce a variety of gaseous products when dumped, compacted, and covered in landfills. Landfill gas consists of 50-60% methane and 35-40% carbon dioxide

LAA (Local Area Agreement) - 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).

Local Strategic Partnerships (LSPs) – Local Strategic Partnerships are non-statutory, multi-agency partnerships, that match local authority boundaries. LSPs bring together at a local level the different parts of the public, private, community and voluntary sectors; allowing different initiatives and services to support each other to work together more effectively.

Norfolk County Strategic Partnership (NCSP) – Norfolk’s Sustainable Community Strategy – Norfolk Ambition - is being driven by the NCSP. This comprises of a County Strategic Partnership Board and Management Group which are multi-agency groups representing the county’s diverse private, public, voluntary and community sectors.

Renewable energy - comes from sources that are continuously replenished and that won't run out. For domestic purposes, these can include sources like the solar power, or wind or from water sources. Wood fuel (or biomass) is also classed as renewable energy.

Sustainable Community Strategy - These embody the principles of sustainable development at a local level. The UK Government’s Sustainable Development Strategy, published in 2005, included its components of what constitutes a sustainable community.

Further Information

Business Link in the East of England (environment page):

<http://www.businesslink.gov.uk/bdotg/action/layer?topicId=1079068363&site=150&r.s=m>

Carbon Trust - <http://www.carbontrust.co.uk/>

Carbon footprint websites:

Act on CO₂:

http://www.direct.gov.uk/en/Environmentandgreenerliving/actonco2/DG_067197

Carbon Footprint: <http://www.carbonfootprint.com/>
Best Foot Forward: [http://www.bestfootforward.com/carbon footprint](http://www.bestfootforward.com/carbon_footprint)

Cred - <http://www.cred-uk.org/>

Defra – Climate Change:
<http://www.defra.gov.uk/environment/climatechange/index.htm>

Energy Savings Trust - www.energysavingtrust.org.uk/

IPCC: Summary for Policy Makers, AR4 Synthesis Report. <http://www.ipcc.ch>

Local Government Association (climate change and energy page):
<http://www.lga.gov.uk/lga/core/page.do?pageId=18292>

Meteorological Office: <http://www.metoffice.gov.uk/research/hadleycentre/>

Norfolk County Council Environment and Outdoor Learning website:
www.norfolk.gov.uk/outdoorlearning

Tyndall Centre for Climate Change Research: <http://www.tyndall.ac.uk/>

UKCIP - <http://www.ukcip.org.uk/>

For further information on the detail within this document you can contact the local authorities at the numbers listed in the acknowledgements.