Cumbria climate change strategy

Draft for consultation

Consultation ends: 10th March 2008
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Draft Strategy and Action Plan on Climate Change

The Cumbria Strategic Partnership (CSP) has developed a draft climate change strategy to support the North West Climate Change Action Plan ‘Rising to the Challenge’.

The Cumbrian Strategy aims to reduce greenhouse gas emissions and enable people, organisations and industry to adapt to unavoidable impacts of climate change.

A Cumbrian strategy will need to help deliver national targets on reducing greenhouse gas emissions. It will also need to identify how climate change will affect Cumbria and provide guidance on adapting lifestyles and infrastructure, protecting assets and ensuring continued delivery of key services.

The Cumbrian strategy and action plan will guide policy and action by CSP members on managing climate change impacts and on reducing greenhouse gas emissions. The CSP wishes to consult on the content of the draft strategy, its analysis of the situation, on how Cumbria is likely to be affected and on the relevance and suitability of the draft actions proposed.

No attempt has been made to produce a glossy document at this stage. The draft strategy is very much a ‘work in progress’ document and it is open to CSP member organisations, industry and commerce, the community sector and of course the people of Cumbria to shape and influence direction.

How you can respond

The CSP wants to hear from you on this critical and pressing issue. You can respond electronically by visiting http://cumbriaacc.gov.uk/consultation/climatechange.

The Consultation will run from 11th December until 10th March 2008. A revised document will be produced and submitted to the Cumbria Strategic Partnership for approval on 7th July 2008.

Bill Lowther,
Chair Cumbria Strategic Partnership
Climate change impacts in Cumbria: An overview

This introduction gives a brief overview of the probable impacts of climate change within the North West and Cumbria. The data comes from the UK Climate Impacts Programme [http://www.ukcip.org.uk](http://www.ukcip.org.uk) and is based on the UKCIP02 data sets. This gives a level of detail most useful at a regional scale, so this information for Cumbria is based on this regional information. A more comprehensive Data model will soon be available from the UK Climate Impacts programme and will be available on [www.UKCIP08.org.uk](http://www.ukcip.org.uk). The influence and effect of mountains and climate change scenarios is little studied and more work needs to be done on this. Cumbria’s varied topography means we have many micro-climates that we will never be able to predict the exact consequences of the changing climate.

Climate change is believed to be due to human impacts. Greenhouse gases released into the atmosphere from burning fuels such as oil, gas and coal act like a blanket around the planet and prevent heat from escaping.

How much our climate changes in the future depends on how much greenhouse gas (GHG) we release. Although we are already committed to some degree of warming (between 1-2 °C) due to what we have already released.

The UK Climate Impacts Programme (UKCIP) has described four different scenarios for our future climate based on emissions of greenhouse gases over the next 100 years. With high emissions of greenhouse gases we can expect dramatic changes in our climate.

**Box 1: Greenhouse gas emission scenarios**

- **High emissions** – this reflects a world of very rapid economic growth, with a global population that peaks in the middle of the century and then declines. Market mechanisms continue to dominate and there is a rapid development and introduction of new technologies, but a continued reliance on fossil fuels. There is social, cultural and economic convergence between regions.

- **Medium high emissions** – this reflects a heterogeneous world with a continuously increasing global population. There is a regional focus to economic development and local identity remains strong. Technological change is slower and more fragmented than in the other scenarios.

- **Medium low emissions** – this reflects a world where the focus is on local solutions to economic, social and environmental sustainability. World population continues to grow but at a slower rate than the in the medium-high emissions scenario. Rates of economic growth are intermediate, while technological change is less rapid and diverse than in the high and low emission scenarios.

- **Low emissions** – this reflects a world with greater convergence between regions and global solutions to economic, social and environmental sustainability. Global population changes in a similar fashion to the high emissions scenario. Economic structures are transformed with rapid moves toward a service and information economy, reductions in materials intensity and the introduction of clean and resource efficient technologies.
In all of these scenarios it is assumed that no specific measures are taken to reduce greenhouse gas emissions. (Source: Hulme et al, 2002; and IPCC, 2000.)

Carbon dioxide concentrations have risen by just over one third from 280 parts per million (ppm) in around 1750, to 379ppm in 2005. Including other major greenhouse gases, the total warming effect is equivalent to around 430ppm carbon dioxide.

The Intergovernmental Panel on Climate Change (IPCC) report estimates that without intervention greenhouse gas levels will rise to 600-1550 ppm CO₂ equivalent by 2100, depending on future emissions. This would be associated with a warming of between around 1.7 and 7.0°C above pre-industrial levels (or 1.1 to 6.4°C above 1990 levels) by the end of the century, and a further few degrees warming in the following century. Recent climate IPCC modelling research confirms that delaying action now would require greater action later for the same temperature target and that a delay of only 5 years could be significant. If action to reduce emissions is delayed by 20 years, rates of emission reductions may need to more than double to meet the same temperature target than if reductions were begun now. The more recent work of the IPCC suggests that a limit closer to 450 ppm or even lower, might be more appropriate to meet a 2°C stabilisation limit that the government has stated as their aim.

The climate in the North West is set to get warmer and wetter. This will increase the risk of storms and flooding, and sea levels will rise.

**Weather changes in Cumbria**

By 2080 if we continue to discharge high amounts of greenhouse gases into the atmosphere then in the North West it is possible that:

- Daily temperatures in Cumbria will rise between 1 and 2 degrees by 2050’s;
- Summer rainfall will reduce by as much as 15% in Cumbria by 2020’s;
- Winter rainfall in Cumbria shows a consistent increase of up to 15% throughout the first half of the century rising to somewhere between 15% and 30% increase by 2080’s depending on GHG emission levels.
- Snowfall in Cumbria will decrease by 10% by 2020’s falling by a further 35%, possibly 55% from current levels by 2050’s. In many parts of Cumbria snow may disappear altogether as we enter the last quarter of the century.
- While predicted changes in sea level are not available for Cumbria, for the North West sea levels are predicted to rise by up to 67cm.
- Weather patterns could become more extreme e.g. high temperatures recorded occasionally today could become the norm by 2080.
**What this might mean for you**

Between now and 2080 if we continue to discharge high amounts of greenhouse gases into the atmosphere then in Cumbria it is possible that:

- Fuel (heating and transport) & food prices will increase nationally, impacting most on the poor and rural communities. Costs will also rise for cooling in the summer months through air conditioning and refrigeration.
- Flooding will become much more common, with consequential economic loss. We can expect more frequent ‘extreme’ weather conditions, with major disruption to everyday life. Land use in Cumbria’s flood plains will also be affected leading to a greater financial burden on local authorities and the insurance industry within these zones.
- Milder winters will be characterised by the earlier appearance of leaves on trees, earlier arrival of migrating species like swallows and insects, including agricultural pests and earlier breeding times for many species;
- Health, disease & pest patterns will impact on humans & livestock; e.g. the potential expansion of tick and midge borne diseases such as Lymes Disease and Blue Tongue. Some of our Lakes may also suffer from periodic algal blooms in Summer.
- Potentially more pressure will be placed on our resources from increased numbers of European tourists seeking more holidays in a more ‘temperate’ climate.
- Landscape changes may be subtle or dramatic, but equally significant for the fragile ecosystems Cumbria supports. Some species of plants, animals and birds will disappear as conditions become too hard for them to survive whilst other species move in to take their place. Warmer drier summers are predicted to reduce the rate of recharge of wetland areas and bogs with a decline (or total loss) in both habitat and associated species;
- A series of comparatively dry summers and winters will lead to water shortages, crop failures and increasing cost of water with a possible loss of water quality.
- Drier summers are likely to lead to an increase in outdoor human activity with a consequent increase in the number of outdoor fires;
- Agricultural practices could change significantly in order to cope with the longer growing season and the reduced soil moisture in summer ( or water logging in Winter). Depending on the combination of weather factors this will either result in more vigorous plant growth or stunted, patchy growth, prone to disease and crop failure. Some years will be the best ever, others very poor.

**Temperature**

The average **minimum temperature** in the Region could change by 2° Centigrade by 2080 with low emissions of greenhouse gases. With high emissions of greenhouse gases the temperature could rise by more than 3° Centigrade over this time.

Maps showing potential variations in temperature patterns in the North West with high and low emissions of greenhouse gases.
The average maximum temperature in the region could change by as much as 4° or 5° Centigrade with high emissions of greenhouse gases over the next eighty years.

Rainfall

Maps showing potential summer rainfall variations over time with high and low greenhouse gas emissions.

Winter rainfall is set to increase in the region over the next century. It could change by as much as 30% with high emissions of greenhouse gases.

Summer rainfall over the whole of the UK is expected to decrease over the coming years but with high emissions of greenhouse gases the changes in the North West could be very dramatic. Our rainfall could reduce by as much as 50%.
Energy use affects climate change. Fossil fuel energy use generates greenhouse gases (GHG) which in turn causes global warming and climate change. This continued dependency on fossil fuels is beginning to disrupt the way that society functions and is threatening the stability of the world economy. It is placing people, species and habitats at risk from extinction.

Renewable energy use produces few if any carbon emissions and therefore represents the future. Currently 42% of UK carbon emissions result from actions by individuals while the remaining 58% arise from economic activity. Around 93% of UK’s energy needs are met by oil, gas and coal with renewables providing 4%. This proportion needs to be reversed so that renewables provide around 90%. Energy efficiency combined with demand management need to replace complacency and energy wastage. If not current trends suggest that global energy demand in 2030 will be 50% higher than 2006 and GHG emission up by 55%.

Most of the UK’s electricity is generated by burning fossil fuels. In 2006, 37% of electricity was generated from coal, 36% from natural gas, 18% from nuclear, 1% from oil, 4% from renewables and 3% from continental imports.

The use of renewables is increasing. National policy is forcing the pace. Nuclear power is enjoying renewed support based on the argument that it is carbon free at the point of generation and for security of supply reasons.

Nationally major investment in replacement generation is required over the next 15 years to generate around 22 GW to replace ageing nuclear and coal plant. Security of supply is an issue as is diminishing supplies of oil and continuing increased demand and rising prices. Government is aiming for 20% of national electricity supply from renewables by 2020.

The Cumbrian Dimension

Locally the electricity network remains vulnerable to the impacts of severe storms, particularly in rural areas, and the grid is insufficiently flexible to accommodate new connections to renewable energy sources. New nuclear plant may not be located in Cumbria, despite political support, due to the lack of grid connections, grid instability and the distance from the location of energy demand. These factors also inhibit renewable energy generation.

Cumbria’s current capacity for energy generation is relatively small. The power station at Roosecote is rated at 220MW but operates to meet peak domestic demand and supplies around 800 GWh of electricity annually. Only a small proportion of Cumbria’s energy is generated from renewable sources. Data for 2007 indicates 81.5 MW of on-shore wind either operational or with planning permission and likely to proceed. Off-shore wind adds another 288MW (operational or planned). Data for 2002 suggests small scale hydro and landfill gas add around 799 kW and 3.1 MW capacity respectively.

Cumbria’s natural resources are likely to be called upon to provide energy services for the region utilising opportunities for wind, sea/tidal and biomass. Landscape quality and designation makes it difficult to increase this proportion without opposition since the majority of schemes proposed are for on-shore turbines.

Proposals have been submitted to Government to transform West Cumbria into Britain’s Energy Coast utilising existing nuclear skills and assets to construct and manage new generation nuclear plant fuelled by recycling stocks of nuclear waste.
These proposals would also seek to maximise other opportunities for renewable power generation and renewable technology manufacturing, building on existing environmental technologies skills and knowledge base. The proposals fit well with government policy aims on combating climate change and reducing risks to energy supply and would transform the local economy and make Cumbria a net exporter of energy.

The potential exists to boost the economy through the manufacture and supply of renewable energy equipment for domestic market and industrial and commercial use. Tidal and wave power are not considered to have the same potential as other coastal areas that are fully exposed to the Atlantic although proposals are being assembled for Morecambe Bay and the Solway Estuary. There are currently no plans for generating energy from household waste in Cumbria.

2004 baseline data exists for energy use and CO₂ equivalent exists across all sectors (industry, transport, housing etc.).

Likely impact of climate change on energy

In addition to carbon based energy use being one of the main causes of global warming and climate change, climate change is forcing society to switch from carbon based energy generation using gas, oil and coal to renewable energy sources throughout the economy. This is taking place in stages as awareness increases and necessity dictates the pace. Increased global demand is already pushing up oil and gas prices. Combined with lower production rates in future, demand and scarcity will rapidly drive up prices and present society with real challenges. If oil production peaks and tails off over the next few years then many Cumbrians will be badly affected. More people will struggle to heat their homes, the cost of food and other goods and services will rocket and transport costs will escalate. “Peak Oil” has serious implications for Cumbria’s economy and rural life.

Rising oil costs generally trigger investment in energy efficiency and more recently investment in renewable energy. Further refinement of this approach is required to identify and reduce carbon content across the economy. Individuals, companies and public bodies need to learn how to function in a low carbon environment and make low carbon choices involving transport energy use, space heating and lighting energy use, manufacturing and construction energy use, food production and fast moving consumer goods energy use.

This in turn opens up opportunities within the economy. Spatial planning and investment decisions will increasingly be guided by low carbon solutions on energy use. ICT will increasingly be used to reduce the need to travel and maximise energy efficiency.

What is happening already?

Proposals have been presented to Government that aim to release £500m of public sector funding to be matched by an equal amount of private sector investment. The proposal would transform West Cumbria into Britain’s energy coast. This fits with national policy aims of energy security and tackling climate change. It is anticipated that the funding would regenerate the local economy by, inter alia, funding research and business and manufacturing opportunities related to nuclear new build and renewable energy technologies.

Separate proposals for regional funding that will help implement the regional action plan on climate change involve project proposals for researching the wealth and jobs creation potential of renewable technologies.
What more needs to be done locally?

The potential exist to generate more renewable energy. Technical assessments have estimated a potential for renewable energy generating capacity in Cumbria by 2016 at between 294.1 and 466.5 MW, mainly from commercial wind turbines but including 35MW from other sources: small scale hydro, landfill gas and biomass, farm biogass and PV. In addition scope exits for domestic microgeneration.

The draft sub regional spatial strategy expects Cumbria to contribute 210MW or 35% to the region’s on-shore wind energy target by 2010. This means a further 137.5 MW is required to receive planning permission and become operational within 3 years.

Draft Recommendations
CSP member organisations are asked to:

Initiate a review of current spatial planning policy through the 8 planning authorities in Cumbria to facilitate the development of sufficient generating capacity to meet regional targets on renewable energy through the exploitation of all renewable technologies at commercial and domestic scales in locations that are appropriate to the technology.

Open discussions with National Grid Plc through Cumbria Vision and the North West Regional Development Agency to secure improvements to the grid in Cumbria to facilitate additional renewable input at a variety of locations suited to renewable technology development.

Develop an energy policy by 2009 containing targets for energy efficiency, on site microgeneration and CO₂ reduction.

Procure 100% of their energy from renewables (green tariff) by 2009.

Explore the benefits of setting up an Energy Services Company in partnership with local authorities, other agencies, utility companies and community groups to generate locally owned renewable energy in Cumbria.

Support and encourage the development of indigenous energy generation manufacturing capacity in Cumbria through existing economic regeneration agencies, encompassing both microgeneration and commercial scale technologies.
The location of housing in relation to other facilities (bus routes, schools, shops and jobs) can influence personal mobility choices and therefore generate or reduce GHG emissions. Construction methods, orientation, design, levels of insulation, choice of heating systems, energy consumption, materials selected all influence the level of GHG emissions from houses and buildings as does location, supporting infrastructure and the way in which a building functions. Some buildings generate considerable traffic flows and GHG emissions e.g. edge of town shopping malls, supermarkets and large employment sites. There are very few examples of sustainable housing schemes either in existence or planned. Currently the built environment and supporting infrastructure is responsible for about 50% of UK carbon emissions and 1% of global emissions. Spatial planning and the management of public buildings and social housing is central to any action plan to reduce GHG emissions. The focus needs to rise above individual homes and buildings to include contemporary place shaping strategies and plans for towns, villages and districts. LDFs need to incorporate carbon reduction targets and policies on adaptation.

European research suggests buildings consume around 40% of all energy produced and by increasing energy efficiency carbon emissions from buildings can be reduced by around 22%. Retail, offices and education are the largest energy users followed by healthcare and hospitality. Houses and buildings last for many years and can be difficult and expensive to modify and upgrade. It is therefore crucial to climate proof future stock to maximise energy efficiency and minimise carbon emissions from design, construction and use.

The Cumbrian Dimension

The Cumbrian Housing Strategy (2006-2011) deals with various housing issues in Cumbria but does not directly address climate change. It does seek to create ‘decent homes’ which means, inter alia, homes with ‘a reasonable degree of thermal comfort’.

House condition surveys have been carried out across the 6 districts between 1999 and 2006. While standards for measuring decent homes have changed in recent years the data suggests that around 9% of housing in Copeland is unfit, 6% in both Barrow and Allerdale, 3% in Carlisle and Eden with 4% unfit in South Lakeland. The social housing sector is expected to meet 100% target for decent homes by 2010 although 50% of Carlisle HA stock is classed as decent compared to an average figure for other HA’s nearer 90%. Private rented housing accounts for around 10% of the housing stock in Cumbria and these tend to be in the worst condition. The major part of Cumbria’s housing is owner occupied with a higher than national average level of both older properties and older inhabitants. For this sector the Government has set a target of 75% of vulnerable private sector households to be in decent homes by 2015.

The Housing Strategy contains policies on energy efficiency. The Home Energy Conservation Act 1995 introduced targets to reduce CO₂ emissions and improve domestic energy efficiency by 30% by 2010. There are additional decent homes standards on effective insulation and efficient heating. The majority of homes that fail the decent homes standard do so because of thermal inefficiency. Carlisle, South Lakeland, Eden and Barrow are working with Cumbria Energy Efficiency Advice Centre to access funding from utility companies to provide subsidised energy efficiency measures.
while Allerdale and Copeland are pursuing local solutions. Various grant schemes are also utilised to help the vulnerable stay warm, promote renewable energy and improve energy efficiency of privately rented properties.

Little is known about the carbon footprint of buildings in Cumbria although some progress has been made by local authorities in terms of energy efficiency. The CREA building in Penrith, Gamblesby village hall and Cockermouth Eco-Centre all stand out as low carbon buildings though CREA and Cockermouth School continue to generate high levels of car traffic. The carbon footprint of construction rises when building supplies are imported from outside Cumbria rather than using local materials.

**Likely impact of climate change on housing and buildings**

Changing weather patterns, rising temperatures and extreme weather events will combine and act on existing homes and buildings in a way that will increasingly test the ability of the design and construction of homes and buildings to function as planned. Equally the urban setting in which buildings tend to be located will be tested and increasingly incidences of failure are being recorded in the functioning of services (drainage and energy supply) when tested by extreme weather events. Existing homes and buildings will increasingly become less pleasant places in which to live and work without extensive and expensive modification. Existing buildings will become increasingly expensive to heat and cool using carbon based systems and less desirable than newer homes and buildings of better design offering significantly lower running costs.

Conversely the built environment is a major source of GHG emissions and a major contributor to climate change. Improvements to homes and buildings offers a major potential for carbon emissions reduction.

**What is happening already?**

Government is proposing that all new homes should be zero carbon by 2016 with building regulations raising energy performance standards by 25% in 2010 and 44% by 2013 as interim steps. Consideration is also being given to making government funding to RSLs conditional on new homes meeting level 3 of the Sustainable Homes Code. Energy Performance Certificates have already been introduced for homes and public and commercial buildings and this will introduce market pressures to drive up energy efficiency standards of existing stock. Action on delivering significant carbon savings from new commercial buildings is under consideration as is mandatory rating of all new housing against the Code for Sustainable Homes by April 2008. Proposals for micro-generation are also being developed. Micro-generation is estimated to have the potential to reduce household carbon emissions by 15%.

In Cumbria, the annual Green Build Fortnight is raising awareness by showcasing best practice examples. The Cumbria Energy Efficiency Advice Centre (CEEAC) provided advice to 28,000 householders last year in 4 Cumbrian districts working in partnership with other agencies including housing associations. CEEAC is also involved in developing an Affordable Warmth Strategy with district councils. The Cumbria Business Environment Network (CBEN) provides advice on a range of issues including energy efficiency to companies. Carlisle City and the County Council both have dedicated energy efficiency programmes and the Lake District National Park Authority has committed to being Carbon Neutral by 2012. A local community based project is improving energy management in community centres and Natural England will cut organisational CO₂ from 2005-06 levels by 50% by 2010.
The County Council is exploring joining the Carbon Trust's carbon management programme and has invited district councils to join too.

**What more needs to be done locally?**

The built environment is a significant source of GHG emissions and will be affected by climate change. If Cumbria is to reduce its carbon footprint then there is a need to gather baseline information on energy use in housing and the commercial and public buildings sectors and set targets to improve energy efficiency and additional targets to reduce CO₂ emissions. These targets would need to exceed those in Part L 2006 with separate targets for existing and new development.

Achieving this requires a step change in the planning process across Cumbria so that LDFs clearly specify targets for new housing development that dovetails and tracks the Government’s proposed targets for zero carbon homes. The programme for retrofitting existing housing stock with energy efficiency measures will contribute to this and work will be required to identify and assess the energy efficiency and calculate the carbon emissions generated by existing housing in Cumbria. Resources will need to be found for this. Once baseline data has been assembled stretch targets can be set and funding for measures put in place.

New build commercial and public sector targets can be set to mirror zero carbon homes on an equally ambitious timescale. CBEN can set up mechanisms to measure existing business energy use and carbon emissions profiles and develop outreach programmes to help convert and grant aid the transition of existing commercial building stock to lower carbon operations. Public sector movement towards lower energy use and fewer carbon emissions from schools, hospitals and offices needs to be driven by the CSP through individual public sector organisations.

This will involve a significant programme of energy audits and budgeting for improvements.

Existing grant regimes need to be explored and exploited to the full. CEEAC and CBEN to lead on this along with individual public sector energy managers. CEEAC estimates that 190,000 homes in Cumbria need basic energy efficiency work and this has significant jobs creation potential. In the private sector, low income and elderly owner occupiers may find it difficult to finance thermal efficiency improvements to their homes and local agencies will need to work with homeowners to encourage improvements utilising grants and possibly equity release mechanisms.

Housing Associations, architects, builders and planners need to be made aware of the CSP strategy on climate change through a series of events and the extent to which delivery depends on their actions and ability to incorporate microgeneration and produce low carbon design and construction.

**Draft Recommendations**

**CSP member organisations are asked to:**

- Initiate and match fund a baseline energy audit and emissions profile of existing housing stock through CEEAC.
- Initiate and match fund a baseline energy audit and emissions profile of existing commercial buildings through CBEN.
- Review the results of both audits as a basis for setting policy and CO₂ emissions reduction targets for future years.
- Initiate a revision of the Cumbrian Housing Strategy to deliver zero carbon homes and set stretch targets for existing housing stock to move beyond ‘decent homes’ standard to level 3 sustainable homes code by 2020.
• Drive forward the need for sustainable construction and low carbon homes through the community strategy process into the LDF plan-making process.

• Sponsor and fund a series of awareness raising events and training initiatives for architects, planners, builders, housing professionals developers to ensure that future development proposals are climate proofed.

• Promote available grant resources through CEEAC and CBEN to fund and expand retrofitting of existing homes and commercial buildings and explore the setting up of a sustainable energy advice centre to advise the public and industry and commerce on energy efficiency and renewable technologies.

• Explore through LA partners the feasibility of adjusting Council Tax to encourage take up of energy efficiency and microgeneration equipment in homes, lobbying Government and LGA if necessary for appropriate powers.

• Display energy performance certificates prominently in all CSP buildings by 2008.

• Initiate through Registered Social Landlords a programme of renewables and microgeneration retrofitting of social housing stock campaigning where necessary for additional funding from Housing Corporation.

• Public sector members of CSP to join Carbon Trust’s carbon management programme in April 2008 and make funding available in future budgets for CO₂ reduction.
Industry and Commerce

Industry and commerce uses energy to heat and light premises, provide services, operate machinery and secure supplies and move finished products to market. Employees also travel on business and commute to work. Energy use is a principal source of GHG emissions. Industry also generates energy and produces fuels for sale. Renewable energy is part of the energy mix provided by industry.

Industry and commerce together account for 25.5% of UK energy consumption which equates to some 44 million tonnes of oil equivalent. National industrial energy consumption trends continue downward in contrast to service sector consumption which has increased by around 80% since 1980. Policy initiatives operate that allow energy intensive companies to enter climate change agreements with Government to reduce liability under the climate change levy and large energy users are required to participate in the EU Emissions Trading Scheme which provides incentives/disincentives to reduce GHG emissions. Neither scheme however encourages carbon reduction amongst the wider business and public sectors. A new Carbon Reduction Commitment will be introduced in 2008 to deliver carbon savings of 1.3 Mtc per year from large commercial and public sector organisations.

Building a successful future economy in the face of rising fossil fuel prices and diminishing reserves of oil requires industry and commerce to look beyond energy efficiency to reduce GHG emissions and planning to cope with extreme weather events. It requires a realisation of the market potential and needs of a low carbon society. A low carbon economy opens up the possibility for innovation, entrepreneurship, regeneration, jobs and a significant boost to GVA in Cumbria.

The Government has set a 60% carbon reduction target by 2050. Similar targets apply in Europe. These will stimulate the market for low carbon goods and services affecting household goods, energy supply and use, transport, housing and a whole raft of commodity goods procured by industry, commerce and the public sector.

The Cumbrian Dimension

Cumbria’s economy is difficult to characterise in part because each district has a distinct localised economy. Large numbers of small shops, pubs, restaurants, solicitors, accountants and small services and repair businesses exist across the county but few medium sized employers. Agriculture is important but employs comparatively few. Manufacturing is a significant employer in the West of the county but less so in the East and South where hospitality industry dominates. Manufacturing employs over 30,000 people and generates £1,679m in Gross Value Added (a measure of wealth created). Mining and quarrying, electricity, gas and water supply are important rural employers. Combined they employ around 1500 and generate £158m GVA. The public sector (administration, education and health combined) employs about a quarter of the workforce. Construction and transport employ 9,700 and 11,300 respectively and together contribute £900m in GVA. The finance and real estate employs 18,000 people and generates £830m while the retail sector employs around 38,500 and contributes £868m in GVA. Agriculture is fairly fragile. Combined with hunting, forestry and fishing the sector employs about 3,500 people and generates £184m of Cumbria’s GVA.
Tourism is rapidly becoming a mainstay of the economy in many areas employing over 23,000 and contributing some £350m to the economy. GVA generated in Cumbria rising more slowly than other parts of the economy reflecting the structure, the lack of financial and business service jobs, rurality, a decline in manufacture and comparatively less successful, less productive businesses.

**Likely impacts of a changing climate on industry and commerce**

A wide range of business is likely to be affected by changes in weather patterns and extreme weather events. Any business involved in exports and imports and those with product ranges linked to seasonal demand will probably be affected by climate change. Profits can also be affected by changing climate as transport systems, telephone networks, water and electricity distribution systems and premises become increasingly vulnerable to weather related events like floods, storms, subsidence and landslip. Road and rail networks are also vulnerable to high temperatures and extreme rainfall and will increasingly disrupt travel and transport of materials. IT systems are also susceptible to power supply interruptions and this may interrupt communications and bring down web sites.

In general terms chemical processes may need to be redesigned to deal with temperature sensitive volatile chemicals. Lower river flows will restrict water extraction and aqueous waste discharges. Supply chain vulnerability may necessitate additional materials storage capacity.

Climate change will challenge the construction industry in terms of low carbon construction and climatic resilience of buildings. Changing weather patterns may also delay construction programmes. Changing weather patterns will affect crops, crop diseases and crop quality and may ultimately lead to switching to new suppliers who are more favourably located. Diversification into other produce may prove difficult if there has been significant investment for specific types of crop or livestock. Demand for low carbon refrigeration for storage and transport is likely to increase. Water supplies may become scare or contaminated through flooding.

Infrastructure for transport, water supplies and electricity are particularly vulnerable. The tourist sector is vulnerable to global and domestic changes to weather. Sustained higher temperatures and reduced water supply will make some European resort areas unattractive. Domestic tourism may benefit from this. Demand for air conditioning is expected to rise. Some beaches may disappear through a combination of storms and rising sea levels. This may affect coastal tourism particularly caravan holidays. Riverside hotels and coastal caravan sites may become prone to flooding and suffer disruption of business and insurance problems. Lower river flows may also reduce the attractiveness of some locations for tourists. Other aspects of tourism may also be vulnerable particularly historic attractions and some habitats and species. Rising temperatures are likely to bring more visitors and extend the tourist season.

In Cumbria agriculture and associated land management and land uses, while economically a relatively small part of the economy, has strong links with tourism and local food and drink production. Agriculture is vulnerable to climate change which will apply further pressures on an already fragile sector with consequent impacts on landscape and tourism. Equally opportunities exist for renewable energy generation from wind and slurry, diversification into tourism, local food production, and wood fuel production with forestry being expanded to act as a carbon sink to help offset the industry’s 7% contribution to GHG emissions.
Indirectly climate change will affect all businesses through Government intervention and regulation of carbon emissions and the use of taxation to encourage a shift towards a low carbon economy. Locally policy shifts are afoot that will require microgeneration in new development and as public policy response picks up the pace on climate change increasingly yesterday’s solutions to economic expansion and growth will become redundant.

**What’s happening already?**

Business generally is keen to control overheads and therefore managing energy costs, particularly when electricity, heating and transport costs are rising, and investing in energy efficiency measures is fairly widespread. To date the driving force has been the need to control overheads and maintain profits of the company rather than reduce greenhouse gases. Concern about a company’s reputation is leading to an increase in corporate social responsibility reporting.

In Cumbria the Chamber of Commerce does not appear to have signed up to the British Climate Change Charter which would commit the business community to reduce GHG emissions. The Cumbria Rural Enterprise Agency provides a range of consultancy advice on environmental management including energy efficiency and carbon footprinting. This programme is linked to the Cumbria Business Environmental Awards scheme. Similar consultancy advice is provided to farms which may lead to reductions in GHG though this is not the principal aim of the programme.

There are a number of small firms - around 13 - that have been established to supply and install microgeneration technologies (solar heating, ground and air source heat pumps, wood fuel, wind turbines, photovoltaic cells and small scale hydro). A further 5 companies are located in Cumbria in what can be described as energy efficiency including one that is researching and piloting underwater tidal turbines.

Broadband expansion throughout the County offers new opportunities for connectivity allowing local companies to compete for work at home and abroad and execute large parts of the contract over the internet without the need for travel.

The tourist sector has already begun to develop a range of adaptation strategies and is involved with a range of initiatives geared to reducing visitor pressures on uplands, protecting cultural heritage and promoting the need for indoor wet weather facilities.

**What more needs to be done locally?**

Business needs to move beyond investing in energy efficiency and also focus on reducing carbon emissions from its operations. It needs to put in place bespoke adaptation measures. Climate risk management needs to be built into mainstream business strategy processes. This will involve making managerial and operational changes that respond to the threats and opportunities presented by climate change.

This will require companies to allocate responsibility for climate issues and conduct or commission research on how weather events impact on the business. This review needs to focus on procurement of natural resources, raw materials, supply chains and logistics; examine any manufacturing processes, and look at the way products and services are delivered to market; it needs to assess any vulnerability inherent in the design and construction of fixed assets and how these can continue to operate and be maintained in the face of extremes of climate; consideration needs to be given to the ability of the workforce to be able to get to work and perform in extremes of temperature and climate whether in buildings or out in the field; inevitably consumer demand is affected by extremes of climate particularly in those sectors of the economy dealing with food, clothing, gardening and holidays.
The tourist industry needs to link into work on sustainable transport to reduce the carbon emissions of the tourist industry and campaign for a enhanced public transport network that links with cycling and walking to radically reduce the carbon emissions from the tourist industry. This can perhaps be combined with existing initiatives on green tourism and promote responsible travel behaviour in a valued environment.

Further research can be carried out into the opportunities available to industry and commerce arising from climate change and to promote awareness and action by industry and commerce.

**Draft Recommendations**

**CSP member organisations are asked to:**

- Urge the Cumbria Chamber of Commerce to adopt the British Chamber of Commerce climate change charter and work to encourage member companies to pledge to reduce their CO$_2$ emissions.

- Urge Cumbria Vision to update research into the jobs and wealth creation potential in Cumbria from low carbon and energy efficiency technologies.

- Ask Cumbria Vision to support the expansion of Cumbria Business Environment Network’s work on environmental management to promote climate change mitigation and adaptation by local businesses as a basis for developing a carbon resilient economy in Cumbria.
Evidence is mounting that suggests that the changing climate is already having an impact on Britain’s natural environment and that these impacts will become more pronounced as temperatures rise and seasonal weather patterns change to produce drier hotter summers and wetter warmer winters punctuated with extreme weather events. In general terms plants and animals are sensitive to temperature change and follow annual patterns that link with the seasons illustrated by coming into leaf, flowering, nest building, egg laying, migrating and shedding leaves. Sensitivity to temperature change makes biodiversity a good proxy indicator for climate change.

Changes in temperature have been shown to disrupt these patterns and may lead to: loss of species from colder and wetter habitats at the southern end of their distribution; changes in species composition of plant communities; loss of coastal habitats due to sea level rise through coastal squeeze and extinction of species due to inability to adapt. Areas may also gain new species as those found in southern Britain move northwards where habitats retain a viable network between themselves and reduced fragmentation. New threats to the environment are likely from incoming pests, diseases and invasive species.

Peat bogs and other soils can be expected to release carbon emissions previously removed from the atmosphere due to increased drying during summer and unfavourable vegetation conditions caused by previous drainage. Some biodiversity losses may occur due to increased pressure on land use for agriculture and energy crops, as agricultural land is lost due to sea level rise, saline intrusion, drought, development and population pressures.

This biodiversity loss may be accelerated as arable crop imports reduce due to crops becoming unavailable in parts of Europe, North America and Africa and UK farmers expand production to fill the gap.

The agricultural sector is the second largest source of UK greenhouse gases accounting for 7% of Britain’s emissions. Agricultural CO₂ is less of an issue contributing 1% of UK emissions but nitrous oxide and methane are significant contributing 66% and 46% respectively. Total agricultural emissions have declined by about 16% over last 25 years due to changes in agricultural practices, smaller herds and less synthetic fertiliser use.

The Cumbrian Dimension

Cumbria has a unique and valued natural environment characterised by the Solway Basin in the north with stretches of sandy and pebble beaches backed by dunes and raised beaches along the Irish sea and the inter-tidal mud flats of the Solway Firth which are internationally important as a stopover point for migrating waders and wildfowl. These are flanked by undulating pasturiland and raised peat bogs. Cumbria contains 45% of England's lowland raised bogs and 23% of blanket bog. Moses and plants in peat bogs use photosynthesis to extract, and due to the wet and cold environments, lock up carbon from the atmosphere as decomposition of the dead plants are minimal.

The River Eden and its tributaries dissect the Eden Valley with its by rolling mixed farmland neatly delineated by hedgerows and drystone walls. Brodleaved woodland is common and on either side of the valley foothills unimproved grassland and moorland merge into the wilder Cumbrian High Fells and North Pennines.
The central and northern Lake District mountains consist of u-shaped valleys, steep sided mountains, corries and tarns. The major lakes are found here as are remnant montane mosses and lichen heaths on the higher peaks and in inaccessible ungrazed areas diverse arctic-alpine plant communities exist in North facing quarries. Woodland is common on lower slopes. The rivers support populations of fish including native crayfish and freshwater pearl mussel and provide habitats for dippers and other birds. The Orton Fells contain moorland with extensive areas of limestone pavement, rock outcrops, screes and calcareous grassland with few trees. The Howgill Fells consist of ridges and valleys, with steep scree slopes, occasional waterfalls and crags, open moorland with rough grass and bracken, few trees and few settlements all of which gives a sense of wilderness. The South Cumbria Low Fells consists mainly of undulating pastureland, areas of woodland and managed estates with a parkland appearance. Morecambe Bay is the largest area of inter-tidal flats in the UK and is internationally important as a stopover point for migrating waders and wildfowl.

The Cumbrian coastline includes extensive cliff areas at St. Bees which support important populations of sea-birds and maritime cliff plants. Elsewhere softer boulder clay cliffs, sandy beeches and grassland dominate. The coastline also includes two major estuaries, the Duddon and Ravenglass both of which are of international importance. The West Cumbria Coastal Plain contains a mixture of mudflats, shingle and pebble beaches interspaced with smaller areas of dunes, sandy beaches and sandstone cliffs. Inland there is undulating or flat pasture with hedgerows and some tree cover. Wetlands and herb rich meadows exist along river valleys with semi natural ancient woodland. Elsewhere there are extensive areas of estuary with a range of inter-tidal habitats.

Cumbria is home to 103 protected and priority species. It contains 278 parcels of Sites of Special Scientific Interest covering 1m hectares; 11,500m hectares of National Nature Reserve and 425 Ha of Local Nature Reserve; 3 Areas of Outstanding Natural Beauty and 2 National Parks.

**Likely impacts of climate change on natural environment**

Predicting the likely impact of climate change on the natural environment is difficult given the range of variables of temperature and weather and a blurring of the seasons. Sea level rise and flood risk also need to be factored in.

Possible loss of biodiversity due to increased pressure for land use for agriculture with habitats becoming more fragmented with potential for extinction of species. In Cumbria species which specialise in living in colder areas high above the tree line will have no where to retreat to and are likely to disappear. Agricultural land below the 5m contour is vulnerable to flooding and salinisation. New species may move into Cumbria from other parts of the UK. Temperature rise will lengthen the growing season for plants and increase pest and disease survival across the seasons with more breeding cycles for pests. Research suggests hedgerows are fairly resilient to climate change but some trees are vulnerable to drought. Seasonal disruption will lead to a loss of synchronisation between the birth of new generations of birds, insects and animals and their food sources. There is significant potential for peatlands to dry out and emit carbon rather than capture and store it though this is less likely in Cumbria provided there is increased winter rainfall.

Decreased river flows in summer and lower oxygen levels will disrupt species movement and will affect fish breeding. Increased winter river flows will silt up gravel beds and destroy spawning areas.
In summer shallow water bodies may dry up and only regain their water levels in winter. Higher winter rainfall is likely to lead to more prolonged waterlogging of land. Increased year round temperatures are likely to disrupt waterfowl breeding and over-wintering. Increased flooding is also likely to reduce populations of soil invertebrates and fungi leading to higher numbers of bacteria and reduced decomposition rates. Woodland is vulnerable to prolonged periods of drought and increased fire risk and extreme weather events like gales. Woodland species of plants and animals are expected to survive since woodlands are not expected to change significantly as drought sensitive trees like beech, birch and sycamore will be replaced by other species.

Sea level rise and increased severity and frequency of storm surges are likely to damage sand dunes, sandy beaches, coastal vegetated shingle and mudflats and saltmarsh, grazing marsh and saline lagoons and their associated flora and fauna. Marine species are sensitive to temperature rise with research documenting species adapting by moving northwards, north easterly and to deeper waters. New marine species are already arriving from southern seas. Over-wintering birds are also shifting in a north easterly direction. Cumbria’s lakes will experience disrupted stratification, become less clear and may be at risk from invasive species.

Research work is currently underway on assessing the adaptation of the natural environment to climate change that is already occurring. Other work is being carried out by a variety of organisations on enhancing the natural environment. While this is not directly aimed at responding to climate change the indirect effect of restoration work will be habitats that are in better condition and more resilient to climate change. In addition local authorities now have a duty to ‘have regard’ to biodiversity when carrying out their functions so that consideration of biodiversity becomes a natural and integral part of policy and decision-making.

**What more needs to be done locally?**

It is clear that climate change affects ecology and also impacts on the physical environment but what is less clear is the likely rate of change and scale of impact associated with increased temperatures and climate variability. This reinforces the need for further research on the direct and indirect impacts of climate change on Cumbria’s natural environment. The Cumbria High Fells project makes a start on this and will identify the relative vulnerability of ecosystems, habitats and species to climate change. This results of this assessment may well be applicable to other upland areas and allow appropriate land management strategies and mitigation measures to be developed as part of a wider adaptation programme. This type of research needs to be carried out in other character areas of Cumbria to determine a county-wide mitigation and adaptation programme and to inform local site specific management responses based on increased monitoring of sensitive habitats.

In the meantime a more flexible approach to land use and land management is required to connect protected areas and allow habitats and species to migrate as temperatures rise. Biodiversity enhancement needs to be factored into land management and development sites.

**What’s happening already?**

Cumbria has extensive peat bogs which lock away carbon. Wedholme Flow, part of the Solway Mosses was bought for the nation by English Nature in 2001 from Scotts and commercial peat extraction has now ceased. Restoration work is being undertaken by Natural England.
The profile of climate change needs to be raised within Local biodiversity action Plans. Consideration needs to be given to increasing tree cover primarily to lock up carbon but also to create new habitats and habitat corridors. This will require advice to land owners and their managers on soil erosion and flood management options, grazing, and land use change from agriculture to non agriculture and vice versa.

Other issues that need to be considered are increased fire risk and the opportunities to create new habitats and use natural processes to protect material assets.

**Draft Recommendations**

CSP member organisations are asked to:

- Commission the roll out of further investigations (after the Cumbria High Fells Climate Change Project has concluded in 2008) into the vulnerability of ecosystems to climate change across Cumbria by 2010 to identify action needed to successfully adapt and change land management.
- Use their influence to ensure all Cumbrian natural resources (e.g. sheep wool, woodland) are used and not wasted.
- Ensure their respective policy frameworks and strategies enhance Cumbria’s high quality natural environment.
- Develop ecologically resilient and varied landscapes allowing space for natural process to take place.
- Adopt and co-fund a database and evidence based approach to underpin local development documents to enhance biodiversity.
- Integrate adaptation and mitigation measures into conservation management, planning and practice in order to prevent carbon dioxide being released into the atmosphere from natural ecosystems by the effects of climate change.
- Commission research into using natural habitats, particularly peat bogs to lock up carbon and initiate and co-fund practical local projects to ensure peat bogs retain carbon rather than release it.
- Ensure that habitat, species and landscape areas are at the heart of a spatial planning strategy for Cumbria.
- Co-fund the creation of a preferred areas map for use by spatial planners and land owners to identify broad locations that would be suitable for energy crops thereby constraining biofuel crop planting in areas that would compromise biodiversity or lead to loss of habitats, species, access and landscape.
- Initiate through local planning authorities the development of green infrastructure guidelines to enable mitigation and adaptation within urban areas by 2009 and to initiate and co-fund through the LSPs and the community strategy processes 4 best practice working examples in towns in Cumbria by 2010.
- Set up and co-fund a study that investigates use of life cycle and mass balance approaches to maximise sustainability of land based production systems within Cumbria.
- Promote through existing agencies energy efficiency programmes within the farming system to reduce carbon emissions and increase profitability.
- Encourage Developers to use Biodiversity to deliver some of the services required of our buildings and grounds that will be needed in a changing climate e.g. Green roofs and plants within buildings to reduce temperature, ponds for water buffer and storage off buildings and car parks and native species planting and habitat creation within amenity areas.
Procurement

National policy identifies sustainable production and consumption and climate change as priority action areas. Sustainable procurement means looking at how goods are produced and identifying and minimising the environmental impact of products and materials over their lifetime including. It means making managers and employees aware of the environmental impact of purchasing decisions and managing supply contracts and supply chains in a way that meets the needs of the organisation in terms of fitness for purpose and cost while protecting the environment by improving resource efficiency, reducing waste and pollution. A National Sustainable Procurement Framework has been introduced to facilitate this.

Tackling climate change through procurement takes this process a step further and involves calculating the carbon footprint of goods and services purchased and consumed by organisations. The carbon footprint is the amount of greenhouse gas emissions generated by the production and consumption of products and services. Tackling climate change through procurement means identifying and significantly reducing the carbon emissions created in making and delivering products to people and organisations and also ensuring that the procurement process, particularly supply chains, can withstand the risks associated with climate change. It also means discriminating against energy hungry appliances and procuring the most energy efficient equipment.

The Cumbrian Dimension

The CSP has over 50 member organisations 7 of which have some joint purchasing arrangements for commodity goods and services. Effective Procurement in Cumbria (EPiC) is led and hosted by the County Council and includes 5 district councils and the LD National Park. Current spend is around £1.15 m on paper, office furniture, ICT consumables, water chillers and car hire.

Cumbria’s public sector buying power has the potential to stimulate and help sustain the local economy by encouraging local supply chains. For larger organisations with high levels of demand the challenge is to join lots of small producers and businesses, which may be unevenly distributed around the county, into a steady and trusted supply chain that meets the wide range of products that are required. Currently the Centre for Regional Economic Development is conducting research on public sector spending and how it feeds into the Cumbrian economy.

Sustainable procurement across the county is not generally well developed though initial work on the Flexible Framework has been undertaken by EPiC and Cumbria is represented on the NW Centre of Excellence sustainable procurement work stream. The concept of tackling climate change through procurement by focussing on the carbon content and energy flows embodied in goods and services is less developed. The location of towns and villages means that significant ‘product miles’ are generated by importing goods and sending products to external markets. Local produce is gaining significance for residents and visitors alike.

Likely impacts of a changing climate on procurement

This is difficult to assess. However it is clear that distribution channels (road and rail) are vulnerable to extreme weather events and therefore ‘just in time’ supply arrangements may have to be revised to make provision for stockholding for some essential goods. Extreme weather events
can also affect supply of produce and shortages can push up prices. Local supply shortages may in turn increase supplies air freighted in from abroad, thereby compounding the issue. Agricultural produce is vulnerable to changes in climate and the traditional livestock and crop mix may well alter locally affecting food supplies.

Oil supplies are expected to ‘peak’ with some analysts predicting that this will happen within the next 15-20 years. The market reaction is likely to drive prices of oil up which in turn will lead to sharp increases in product prices since energy is a key price component in the manufacture and supply of goods. This provides a further reason for reducing the carbon content of products and services and reinforces the need to develop locally sourced supply chains. A switch from grain production to biofuels may also push up the price of animal feed and staples like flour and bread. These downsides also open up economic opportunities locally for innovative products, livestock, crops, bio-fuels, and other low carbon, low impact products and services that do not rely on excessive road and air freight.

**What is happening already?**

In October 2007 a new two year contract to supply all councils in Cumbria and the National Park with energy from renewable sources was announced.

Schools are now free to source their own food and while some are choosing local suppliers many remain with corporate contracts which are also able to source local produce. There is noticeable growth in farm shops and farmers markets and supermarkets are introducing a limited range of local produce. Local research is being carried out into alternative foods and biofuels.

The organisations that make up the EPIC are working in partnership to identify and develop strategic procurement priorities across Cumbria and on implementing the National Sustainable Procurement Framework.

They are likely to follow guidance on this being developed by the two northern regional Centres of Excellence in procurement. This will result in phased improvement involving the integration of sustainability into staff training, policy and contracts and will introduce a risk assessment approach to working with suppliers and assessing sustainability impacts of spend.

Changes to the EU procurement rules took effect in 2006 and now allow environmental criteria to be specified in contracts and the environmental competence of suppliers to be taken into account in procurement decisions.

**What more needs to be done locally?**

EPIC needs to gather pace and embed sustainability into the procurement process. In addition there is an urgent need to identify the carbon content of the range of products and services purchased by CSP organisations including those purchased by EPIC member organisations. This may well be given added impetus for Local Authority partners once the new National Indicator Set takes effect in April 2008. Targets will need to be set to progressively reduce the carbon content of products and services purchased. These will reflect the life-cycle emissions produced at each stage of the supply chain including disposal.

Scope exists for other CSP organisations to join EPIC thereby increasing leverage when negotiating contracts and when seeking innovation to reduce carbon emissions. This will provide an opportunity for the public sector to influence the private sector to follow suit and to encourage private sector suppliers to adopt higher environmental standards including take back and recycling of redundant office furniture and equipment and reducing, take back and recycling packaging.
More needs to be done to reduce ‘product miles’ through a combination of local procurement and using the combined purchasing leverage of the EPIC to switch goods to rail freight. More also needs to be done on increasing the skills of staff in sustainable procurement generally and specifically in understanding how to reduce embodied carbon and energy flows associated with procurement.

Beyond the CSP, public awareness of the carbon content of goods and services needs to be raised along with initiatives in the community to promote the purchase of low carbon alternatives.

Draft Recommendations
CSP member organisations are asked to:

- Join the Effective Procurement in Cumbria consortium (EPIC).

- Oversee the introduction of a sustainable procurement policy that incorporates supply chain carbon reduction for implementation by EPIC member organisations by 2008.

- Require an annual monitoring report from the EPIC indicating the carbon content of products and services purchased as a basis for setting carbon reduction targets across the common contracts commencing 2010 using Carbon Trust/BSI methodology.*

- Support local projects and initiatives to reduce the carbon content of purchasing decisions made by members of the public, households and visitors through the provision of match funding.

- Accelerate progress on sustainable procurement by drawing on best practice being established by NW Centre of Excellence programme and providing training for procurement staff.

- Work jointly and in partnership with EST and NW Centre of Excellence to develop or commission the development of a carbon calculator to assess comparative CO₂ content of similar products and inform purchasing decisions.

- Commit their organisations to procuring the most energy efficient equipment available from April 2008.

- Work jointly to prioritise local procurement and development of local supply chains.

*currently under development
Spatial Planning

Spatial planning provides the land-use development framework that shapes and links the places where people live, work and play thereby contributing to quality of life while protecting open spaces, the countryside and the wider natural environment on which we all depend. Spatial planning has a key role to play in shaping society's response to climate change. National planning policy is currently being updated to deal with climate change. The aim is to add to existing policy on sustainable development, and integrate policies on reducing carbon emissions and stabilising climate change into the planning and development process.

The Cumbrian Dimension

Cumbria is a largely rural county with its main settlements located around the central mountain core of the Lake District. This creates challenges in moving people and goods sustainably between rural settlements, into urban areas and between urban areas. Sub-regional planning policy aims to use sustainable development principles by siting the majority of new development in the main urban areas and key service centres, while trying to maintain the viability and vitality of rural areas. This policy approach requires innovative thinking on the location of new housing and to enable access to jobs, education, health services and other facilities using sustainable modes of transport. One of the key challenges is to provide sustainable transport connections from Cumbria to the rest of the country, to facilitate regeneration and widen the range of economic activity, improve the quality and range of housing and do all of this in a way that enhances a range of unique and valued local environments. The fundamental challenge that spatial planning faces in Cumbria is delivering these quality of life goals in a way that reduces carbon and energy flows, and allows society to anticipate and adapt to unavoidable climate change. ICT might provide some solutions.

Likely Impact of climate change on spatial planning

The increased risk of rising temperatures and extreme weather events and their impact on society is beginning to shape planning policy. In part it is an inverse relationship in that it is the excessive carbon emissions from buildings and transport systems permitted in the past, together with decisions on the location of development that are fuelling climate change. On the other hand, extreme weather events and rising temperatures will pose risks to infrastructure and development in vulnerable locations, so indirectly climate change is forcing policy change by guiding development to new areas and reducing overall the range of locational options.

What is happening already?

National policy is changing and as a result planning guidance is being re-worked to take account of climate change. The Buildings Regulations now contain higher standards for energy efficiency and insulation. Planning Policy Statement 1 (PPS 1) on Delivering Sustainable Development is in the process of being amended with a supplement specifically dealing with planning and climate change. Other PPSs have been revised and updated to take account of the increased Government emphasis upon climate change, for example on renewable energy and flood risk.
Government policy is to reduce energy use in buildings and the minimum energy efficiency requirements Part L of the current Buildings Regulations helps achieve this. Further amendments have been proposed that signal a 149% reduction in carbon emissions from houses by 2016. These proposals also factor in electrical appliances and renewable micro-generation in addition to improvements in space and water heating and lighting.

Regional and sub-regional (i.e. Cumbrian) spatial planning policy is also changing rapidly. Here in Cumbria, the recently adopted Cumbria and Lake District Joint Structure Plan 2001-2016 has sustainability at the heart of the plan, and contains a sustainable vision for Cumbria. It takes a hierarchical approach to sustainable development by encouraging most new development to be located in the Key Service Centres, with a smaller scale of new development in locally defined Local Service Centres. It is the exception for new development to be located in the open countryside. In addition, the Joint Structure Plan (JSP) encourages sites to be accessible by public transport, walking or cycling, and requires new development to avoid sites at risk of flooding. It also encourages high standards of design and promotes energy efficiency and water efficient design and the use of recycled materials and renewable energy technology. It requires new development to avoid reductions in air quality and in the quality of groundwater. It ensures that new development makes efficient use of, and is within, infrastructure, community and service constraints, and minimises light pollution and noise.

At district level, most of the existing Local Plans which pre-date the current adopted JSP contain policies relating to sustainable development, and the encouragement of energy efficient design. More recently prepared Local Plans, such as the Copeland Borough Local Plan (2006) and the Deposit Carlisle Local Plan (2006) contain sustainable development principles that accord with the recently adopted JSP, and include specific policies encouraging energy efficient design and renewable energy. District councils are currently producing new Local Development Frameworks (LDFs), which will replace their Local Plans and will have to accord with the sustainable development principles of the adopted JSP. The most developed of the new LDFs has been produced by Eden District Council, where the Core Strategy takes its lead from the JSP. Local Development Framework preparation is at varying stages. The emerging pattern suggests that core strategies are likely to contain draft policies requiring a proportion of energy generated by renewables in all developments, and other proposals and policies will aim to locate development in areas with sustainable transport choices. The LDNP is also producing a LDF and this will include policies on small scale renewables. Strategic Flood Risk Assessment has been commissioned by the Cumbrian Planning Authorities to guide development to areas least likely to flood. Where development is unavoidably located in high risk areas, mitigation measures will be reflected in policies. Other policies can also be strengthened to facilitate natural drainage for example the incorporation of sustainable drainage systems. The draft Cumbria Minerals and Waste Development Framework is emerging and contains both mitigation and adaptation measures.

The Joint Structure Plan will be replaced by the draft Regional Spatial Strategy (RSS) which will contain a sub-regional Cumbrian plan. However, some Policies in the JSP will be retained for at least 3 years beyond the adoption of the final version of the RSS expected in Spring 2008. The RSS is widely considered to need further strengthening in the way it deals with climate change, and the Examination-In-Public Panel recommended in their report in May 2007 a range of policy changes to reduce CO₂ emissions by 60% from 1990 levels and to adapt other threats like coastal erosion, flooding, pressure on water supply and drainage and the changes in habitats and agriculture. They also recommended changes to the policies relating to the spatial location and pattern of development to ensure that sustainable principles lie at the heart of this document.
What more needs to be done locally?

Buildings Regulations set minimum requirements for energy efficiency and insulation. Both mitigation and adaptation responses can be enhanced through the planning system. Specifically scope exists to issue design guidance to further reduce emissions and ensure buildings remain comfortable for people in extremes of weather. Design guidance can also ensure adequate rainwater drainage capacity. Scope also exists to introduce policies on parking, density and mixed use as well as cycling and pedestrian links and require travel plans for significant new developments. Policies now need to focus on bringing forward low carbon development and look at setting targets that will deliver zero carbon development at some future point.

Coastal erosion is an issue in Cumbria that will need to be addressed and risk assessments made to determine where defences will be maintained and identify areas of managed retreat. This in turn will influence future locational decisions. Current infrastructure located in vulnerable areas needs to be identified and adaptation measures agreed with utilities to increase the resilience of essential infrastructure. This also applies to critical infrastructure in flood risk zones. In parts of Cumbria opportunities may need to be found to relocate development inland and make space for new habitats to replace lost habitats.

Climate change may affect local and regional demand for water and there will be a need to give a higher level of protection to water resources and give greater emphasis to water efficiency, harvesting rainwater and recycling of wastewater in new developments. Biodiversity will be affected by climate change it will be important to ensure that development plan policies respond positively to protect species and habitats at risk through long term adaptation.

Draft Recommendations
CSP member organisations are asked to:

- Undertake sustainability appraisals to ensure that the various sub-regional strategies being drafted in the County (such as the Cumbria Community Strategy and its supporting strategy documents, the Cumbria Economic Plan and the Cumbria Housing Strategy) take full account of the sustainable development principles being sought by Government and follow a co-ordinated approach to the location and type of sustainable development considered necessary to reduce carbon emissions and adapt to the consequences of climate change.

- Initiate through the 8 Cumbrian planning authorities a revision of planning policy by 2010 to guide development control on new build, refurbishment and conversion to progressively deliver zero carbon development by 2025.

- Request the 8 planning authorities to produce Supplementary Planning Guidance on sustainable design and construction in support of policies on zero carbon development and to fully utilise planning powers to promote low carbon construction, energy efficiency and on site microgeneration.

- Initiate through the Local Development Framework process a more proactive policy approach to climate change supported by a new Supplementary Planning Document to encourage and promote microgeneration and small scale renewables.
Transport

Rapid efficient transport systems are seen as an essential platform for economic regeneration. Transport networks also underpin mobility and enable people to access jobs, education and other essential and optional services.

However CO₂ is the main greenhouse gas by volume and a principal cause of climate change. In 2005 UK road traffic produced 120 million tonnes of CO₂ (22% of all UK CO₂ emissions). Catalytic converters have also increased nitrous oxide (NOx) emissions. NOx is nearly 300 times more powerful than CO₂ and is the third largest contributing gas to global warming. Road transport produced 13% of all UK NOx emissions in 2005.

UK air transport emissions increased by 7% from 2004 to 2005. In 1990 domestic air travel, international passenger departures from the UK and air freight produced 4.6 million tonnes of carbon (Mtc). By 2000 this had increased to 10.5 Mtc and is forecast to increase to between 15.7 and 29.1 Mtc by 2050. Injecting CO₂ into the atmosphere increases the destructive power of aircraft carbon emissions by a factor of 2.5 suggesting that 2050 emissions will be between 47.1 Mtc and 87.3 Mtc equivalent by 2050 against a UK Government policy aim of 60% carbon reduction by 2050. Meeting this target suggests the need for a reduction in road and air carbon emissions in the region of 45% by 2050.

The Cumbrian Dimension

Cumbria’s peripheral location in the UK and Europe, its sparse population, its topography, protected landscapes and the dispersed peripheral location of towns and settlements means that innovative solutions that differ from more conventional urban transport planning are required to persuade residents and visitors to use motor cars less frequently.

Cumbria is geographically distant from regional, national and European markets. This isolation is greater in the west of the County and the perception of poor access inhibits inward investment. Road and rail connections to M6 motorway and the West Coast Mainline from Furness and West Cumbria remain inadequate. Air travel to and from Cumbria is being promoted to overcome this at a time when the impacts of air travel on climate change are coming under closer scrutiny. Improved access is also required to the County’s seaports to exploit the facilities they offer for alternative freight transport, particularly unitised cargos and to attract cruise liners.

Geography dictates longer journeys, a high proportion of which are by car as bus services are generally commercially unviable outside the larger urban areas and public funding sources are constrained. Local rail services are only able to meet a limited proportion of demand again around the periphery of the county. This lack of public transport combined with Cumbria’s rurality and high fuel costs can cause social hardship. Car ownership and usage are high being necessary for work and leisure trips. Factor in tourism visits by car and all of this increases Cumbria’s carbon footprint. Increased world demand for petroleum is contributing to higher fuel costs. Coupled with relatively large distances from customers and suppliers, the competitiveness and viability of many local businesses reliant on road transport is significantly reduced.
Likely impacts of a changing climate on local transport

Cumbria’s coastal road and rail networks are vulnerable to rising sea levels and storm surges with consequent erosion and flooding. Rising temperatures may require road sanding/salting to stop road surfaces from melting with consequent increased run off and pollution of water resources and damage to wildlife. Both road and rail transport could be interrupted by landslide and landslip caused by increased rainfall.

If travel for leisure/holidays increases in cost, UK destinations could become more popular. The capacity of local transport infrastructure is inadequate to cope with this growth in visits. Rising temperatures and dryer summers are forecast to attract an influx of continentals who will choose to holiday here to escape punitive summer temperatures abroad. CO₂ emissions will continue to increase if tourists cannot arrive easily by train or coach and move around by public transport or under their own steam. Without significant change, congestion and localised pollution is likely to increase.

What is happening already?

The current Local Transport Plan (2006/12) focuses on developing transport infrastructure to support the local economy and improve accessibility to jobs, education and other services. Maintaining the existing road network, reducing the need to travel, helping people arrive safely and reducing the environmental impact of travel are all fundamental elements of the strategy.

Key measures include local highway improvements to support regeneration in Barrow and Whitehaven, the Carlisle Northern Development Route, localised improvements to the trunk road network, the High and Low Newton Bypass, Barton Lillyhall improvements and the Temple Sowerby Bypass.

Other programmes aim to introduce mobility plans for town centres to improve access on foot, by wheelchair or scooter; introduction of low floor buses and extension of demand responsive transport schemes like Rural Wheels and City Wheels. Accessibility planning is being taken forward with partners to improve access to jobs, education, shops and services without placing additional burdens on the transport network. Targets have been set to increase public transport use.

The LTP’s approach to climate change is to reduce the need to travel by car and encourage people to use public transport, cycling and walking as alternatives. Accessibility planning reinforces this.

What still needs to be done locally?

Efficient sustainable transport is needed to improve access to jobs, education, goods and services, to facilitate economic regeneration, improve public health and safety, tackle climate change and improve the urban environment and public realm. Enabling personal mobility and the movement of goods within Cumbria in a way that reduces vehicle movements is central to tackling climate change and meeting social and economic aspirations.

More needs to be done to improve footpaths and cycleways and provide better information on routes as part of a wider campaign to change attitudes and travel behaviour and reduce reliance on cars for access to facilities and services. More also needs to be done to increase the numbers of active workplace and school travel plans coupled with incentives/disincentives to encourage modal shift. Scope exists to promote web ‘liftshare’ schemes by large employers and the Local Transport Authority. More needs to be done to expand the public transport network and make the passenger experience more attractive combined with a policy shift to influence decisions on how trips are made.
‘Routes to a Prosperous Cumbria’ sets out a number of priority objectives including improved road and rail links between the West Coast and the M6 and West Coast Main Line; obtaining national investment to upgrade and secure the future of the Cumbrian Coast Rail Line; enhanced rail passenger services along the West Coast Main Line; improved access to Cumbria and improved links from Cumbria to the North-East and South; improved land access to ports for freight and better public transport options for visiting tourists disembarking for short stays from cruise liners; securing sufficient funds to maintain the existing highway network; reducing congestion in urban and tourist areas and greater use of public transport, walking and cycling. Two particular priorities: the Bridge across Morecambe Bay and associated major road improvements and the reopening of Carlisle Airport do not at first glance seem compatible with tackling climate change although it is recognised that the Bridge design will incorporate some form of tidal energy.

Investment is required for the Tyne Valley and the Carlisle to Settle rail lines to improve rolling stock, reduce journey times, improve stations and run more trains. Investment is also required to improve capacity between Windermere and Kendal and provide a more centrally located station in Kendal. More needs to be done within the Lake District to bring about a modal shift for access and movement within the park and to encourage cycling and walking. Existing national cycling routes often link to Cumbrian towns and are suitable for everyday trips. Work is being carried out to improve cycle routes in town that connect with the countryside around ‘key service centres’. In addition to this mobility plans are being developed in key service centres with improved walking routes linking rail and residential areas and improvements to bus transport. In Kendal additional coach parking is being investigated. Improvements to existing rights of way and new links to form linear and circular routes along with new strategic cycle routes through the centre of the National Park have considerable potential to improve sustainable movement in the central park area and contribute to the tourist economy. Overall the aim should be to encourage 40% of local trips by foot or by bicycle with a further 40% by a combination of public transport and walking. This would allow 20% of local journeys to be made by car reflecting the absence of public transport services outside the main towns.

Parking strategies will play an important role in reducing car dependence for penetration into urban areas. Parking provision linked to high quality bus services offer (particularly in Carlisle and Kendal) a useful approach for outlying settlements, commuting, long stay tourism movement and weekend shopping. The emphasis given to improved town and city centre car parking may well serve to undermine other improvements to bus services and the local economy and local environmental quality.

Other options include the usage of new fuel efficient vehicles by public and private sector and the introduction of car sharing clubs for rural settlements without public transport.

**Draft Recommendations**

CSP member organisations are asked to agree to the introduction of:

- Appropriate measures to reduce transport carbon emissions arising from their activities. This should include the introduction of employee travel plans to reduce commuting by car combined with a range of various incentives and disincentives relating to home and flexible base working, car sharing, car parking provision, cycle use and public transport use.
Business travel management systems to ensure car journeys are essential and shared with colleagues.

Internal working arrangements that commit meeting organisers to facilitate car sharing.

and to agree to:

- Review and reduce any employee car provision schemes to reduce GHG emissions including the use of alternative fuelled vehicles.

- Monitor Cumbrian CO₂ emissions from transport annually and also transport CO₂ emissions from CSP organisations.

- Consider ways of providing their services to consumers in ways which minimises the need for travel, including the travel of consumers through an accessibility planning approach.

- Support a campaign to encourage public transport use underpinned by improved public transport information.

- Lobby Arriva and Virgin West Coast to secure additional train stops at Penrith in the revised timetable due to be introduced in December 2007.

- Investigate the possibility of CSP organisations setting up and co-funding a transport demonstration project with the University of Cumbria to reduce fossil fuel use by substituting biofuels.

And to prioritise through Routes to a Prosperous Cumbria:

- Those schemes designed to increase the number of people walking, cycling, car sharing and using public transport.

- A review of existing car park provision and charging in conjunction with the development of park and ride facilities in major settlements in Cumbria.

- The development of an integrated sustainable transport strategy for Cumbria by 2009 to facilitate the sustainable movement of goods and people and to set CO₂ reduction targets from transport.
Waste

Around 272 million tonnes of waste is produced in Britain each year (household waste (9%), commercial and industrial waste (24%), construction and demolition waste (32%), mining and quarry waste (30%), agriculture (1%) and other waste (6%). Waste impacts on climate change. Household waste contains organic matter which breaks down readily to release carbon dioxide (when air is present) and methane (when air is excluded, usually by water) from landfill sites. As a greenhouse gas, methane is around 23 times more powerful than carbon dioxide. Landfill gas methane represents about 3% of all UK greenhouse gas emissions.

Waste policy focuses largely on household waste though new initiatives are beginning to focus on priority waste streams that have potential to reduce greenhouse gas emissions. All waste streams are responsible for flows of carbon and GHG into the atmosphere either from direct releases as waste is processed or from landfill or from fuel and energy as waste is processed or transported. Research indicates significant potential to reduce GHG emissions and energy use by a combination of resource recovery and energy recovery. Energy from waste is thought to have the potential to meet around 2% of the UK’s energy demand and along with resource recovery can save GHG emissions being generated elsewhere in the economy.

The Cumbrian Dimension

In Cumbria the dispersed location of settlements means that collecting and transporting waste for both recycling and disposal to landfill generates excessive transport GHG emissions. Cumbria’s remaining landfill sites are rapidly reaching their capacity. Estimated time remaining at current disposal rates is 20 years.

These are located in the West and North of Cumbria. Waste from South Cumbria is sent by road to landfill in Lancashire generating more GHG emissions. The amount of waste generated in Cumbria reflects the year round influx of some 15m visitors.

Household waste represented 86% of the 345,697 tonnes of municipal waste collected in 2006/07. 35% of household waste was recycled or composted. A municipal waste reduction target of 1% has been set for 2007/08 and the following 2 years. A combined recycling and composting target of 40% of municipal waste by 2010 has also been set along with a target to reduce weight of household waste generated by each resident to 576kg per person by 2010.

In 2004/05 541,944 tonnes of commercial and industrial waste was generated of which 54% was landfilled. A further 315,876 tonnes of inert construction and demolition waste was recorded in Cumbria in 2004/05 of which 72% was landfilled. 24,811 tonnes of hazardous waste was dealt with in 2004/05 of which 15% went to landfill.

Likely impact of climate change on waste?

Technically waste is not vulnerable to extreme weather events or rising temperatures other than possible flooding of old landfill sites which might exclude air and therefore increase methane production. Other possible impacts might include changes in agricultural wastes as new crops are introduced and an added emphasis on prompt collection and treatment of household kitchen and food industry wastes. The relationship is an inverse one. It is the way that waste is produced and managed that affects climate change.
What is happening already?

Resource Cumbria is the local public sector partnership driving forward municipal waste reduction and recycling. It has produced a draft municipal waste strategy which is currently out for consultation to help determine the best way to reduce reliance on landfill. Resource Cumbria is running a number of initiatives to increase home and community composting rates and reduce food waste; to reduce household waste and expand kerbside recycling; to involve the public in a range of practical projects to reduce waste; to improve the network of recycling facilities around the county and expand the range of materials that can be recycled; a marketing campaign to engage and inform the public coupled with a series of events and a sustained education programme. In addition the feasibility of a resource recovery park is being examined.

Considerable effort has gone into the selection of a preferred private sector partner to help provide and operate waste management facilities that will divert waste from landfill, meet waste reduction and recycling targets and avoid financial penalties associated with landfill.

Cumbria’s Waste Prevention Action Plan 2007-2012 and the Minerals and Waste Development Framework (MWDF) 2007-2018 (which aims to minimise waste and recover value from waste while managing the residues in an environmentally sensitive way) are both being developed to meet and reflect the objectives of the Government’s National Waste Strategy. Both plans by focussing on minimisation, recovery and recycling will help remove carbon and energy flows across all waste sectors.

The Waste Prevention Strategy has set definitive targets and how these will be achieved:

1. Reduce waste generated in Cumbrian households by 5% by 2012 (35kg/person reduction).
2. Divert 5-10% of materials from waste streams to reuse by 2012.
3. Recycle /Compost 60% of household waste by 2012.

In addition, under the Landfill Allowance Trading Scheme, the amount of biodegradable waste that can be sent to landfill is set at 110,331 tonnes by 2010, reducing progressively to 73,488 tonnes by 2013 and 35,282 tonnes by 2020. The growth in municipal waste is to be contained and reversed by 1% per annum over the 3 years to 2010.

The emerging MWDF is responding to national and regional climate change policies all of which stress the need for GHG emissions to be reduced. Policies are being developed to reduce GHG emissions and to encourage adaptation measures to deal with unavoidable consequences. Policies being developed include landfill gas collection and electricity generation; on site provision for biodegradable waste diversion from landfill; on site provision for recovery of value from waste including construction and demolition wastes; on the protection and regeneration of peat bogs; on woodland planting to trap carbon as part of reclamation schemes; to promote energy recovery from waste; to require a proportion of renewable energy generation in new waste developments; and to encourage increased energy efficiency in all operations including transport thereby reducing ‘waste miles’. Few targets have emerged other than the national waste strategy targets to halve construction and demolition waste from 227,741 tonnes (2004 baseline) by 2012 and to reduce industrial and commercial waste by 20% from the 2004 baseline. Additional regional targets exist to recycle 35% of commercial and industrial waste by 35% and to recover value from 70% of commercial and industrial waste by 2020.
What more needs to be done locally?

The Resource Cumbria Partnership has clear plans for improving waste collection, treatment and management that will reduce GHG emissions from municipal waste. The strategy can seem confusing to the outsider, given the range of national, regional, LAA and local targets. The strategy would benefit from a sharper focus on local targets that meet and exceed all other targets. This clarity would aid communication and public engagement and provide a basis for real, stretch targets.

Demolition and construction wastes are responding to market forces. The escalating cost of landfill is leading to greater recovery and recycling of these wastes. In addition Government is considering a target of halving amount of construction waste sent to landfill by 2012. This will require the provision of new waste management and recovery sites thought he MWDF.

Commercial waste represents about 11% of all wastes. Currently it is collected and managed in various ways. Essentially commercial waste is left to market forces and the market determines the proportion recovered, recycled and sent to landfill. The private sector provides some recycling services but the bulk of commercial waste goes to landfill. Some local collection authorities in Cumbria are offloading commercial waste services to the private sector to gain headroom with LATS allowances. Others still collect commercial waste. The key issue is: should local authorities intervene to ensure a higher proportion of commercial waste is diverted from landfill? This would require new commercial waste collection services being introduced where they had been withdrawn and for investment and expansion of existing services to compete with the private sector and deliver sustainable solutions. It would also require consideration to be given to the size and capacity of the ‘eco-deco’ waste plant being considered by the waste disposal authority to ensure that commercial waste could be diverted from landfill. The demand for this is expected to grow as commercial waste landfill costs escalate.

The amount of waste generated by tourists needs to be tackled. Currently this is either treated as household waste (in the case of small B&B’s) or commercial waste. In addition to the points made above Cumbria needs to divert tourism waste from landfill. This will require support for innovative partnership work, promotion, education and the provision of recycling facilities across a range of tourist facilities — including hotels, campsites, visitor centres and other tourism hubs. A strong, clear and positive message should reach tourists that valued environments need to be valued by residents and visitors alike.

All CSP member organisations need to lead by example in tackling waste internally and by communicating both internally and externally the measures that have been taken and the reductions achieved.

Waste processing provides an enormous opportunity for economic regeneration and job opportunities, whilst positive initiatives on commercial waste reduction can make our businesses more competitive through lowering costs. Advice for businesses through organisations such as Cumbria Business Environment Network should be enhanced and supported by new commercial waste recycling initiatives.

Efforts to reduce the harmful emissions produced by the transportation of waste needs to be supported through the establishment of more locally based reuse and recycling schemes. Community based recycling schemes provide additional sources of employment as well as recovery and recycling services and scope exists to expand this sector.
CSP member organisations are asked to:

- Put in place internal policies and facilities by June 2008 to reduce, reuse and recycle waste and achieve ‘buy in’ from all employees. This links closely to the need to review procurement policies to minimise waste, minimise packaging, minimise ‘product and waste miles’ and set up supplier take back arrangements for redundant office furniture and equipment.

- Ask the Resource Cumbria Partnership to simplify the current range of targets associated with waste management and build a set of local stretch targets that meet and exceed the new National Indicator Set waste targets.

- Request the Resource Cumbria Partnership to ensure that its waste minimisation programmes target commercial waste, including that generated by the tourist industry and small businesses, and that enhanced and extended facilities, including adequate sizing of the new ‘eco-deco’ plant, are introduced to enable recovery, recycling and composting of commercial waste.

- Request the Resource Cumbria Partnership to support the community/not for profit sector to set up new recycling initiatives and maintain existing projects through grant funding.

- Request the Resource Cumbria Partnership to develop and fund the introduction of a programme to minimise commercial waste arising in Cumbria working in partnership with Cumbria Rural Enterprise Agency, Cumbria Tourism and Conservation Partnership, Cumbria Green Business Forum and Cumbria Business Environment Network.
Climate change is driving changes in the water cycle. The latest modelling indicates that we can expect wetter winters and drier summers with higher temperatures all year round. We can expect increased storminess and extreme weather events will become more frequent and dangerous. In addition, sea level rise is expected due to thermal expansion of the oceans and melting of polar ice.

More flooding from rivers and the sea is predicted. The risk of flash flooding from intense localised rainfall will increase even in summer. This type of flash flooding is less predictable than river or coastal flooding and can take communities by surprise, posing a threat to life as well as people’s property. The impacts of flash flooding can be varied and long lasting, particularly the effect it can have on people’s mental health.

Demand for water in our homes, gardens, green spaces and for agricultural use is likely to increase as temperatures rise. Reservoir and aquifer recharge rates will become less predictable and more frequent periods of drought can be expected. Managing and meeting demand during prolonged periods of drought will become more challenging and may involve restricting supply to consumers. A warmer drier summer climate may increase tourist numbers which will further exacerbate the effects of drought.

Reduced river flows and higher temperatures will affect wildlife in wetlands, rivers and lakes. Less water in the environment may also affect recreational users. Treating drinking water to safe standards may become more difficult as increased rainfall (over short periods) can increase bacteria numbers in surface water and increased water temperature can increase algal blooms in reservoirs and lakes and decrease the efficiency of chemical removal of microbes from drinking water.

Prolonged low river levels will increase pollution since the volume of water to dilute and disperse effluent discharges is not there. If this coincides with high temperatures the stress on wildlife will be further increased.

The Cumbrian Dimension

Increased frequency of flooding from rivers and the sea will threaten many communities in Cumbria. Many Cumbrian rivers are ‘flashy’ and respond quickly to high amounts of rainfall thereby reducing the time available to give flood warnings and increasing the risk of communities being exposed to flooding. Quantifying this increased risk is difficult and requires the Environment Agency to build in contingency capacity into new flood defence schemes to take account of climate change scenarios.

In Cumbria climate change scenarios suggest that summer rainfall will reduce by as much as 15% in Cumbria by 2020’s. Winter rainfall is expected to increase by an equal amount over the same period and accelerate towards a 30% increase as the century progresses. Snowfall in Cumbria is predicted to decrease by 10% by 2020’s falling by a further 35%, possibly 55% from current levels by 2050’s.

Cumbria supplies drinking water to North West England from nationally protected important and sensitive habitats including Ullswater, Windermere, Haweswater and Thirlmere reservoirs. Conflict may arise between the need to maintain water in the environment to sustain species and habitats and the need to meet demand for drinking water. In Cumbria many rural communities and individual households and farms depend on boreholes for drinking water supplies.
The security and quality of these supplies will be put under pressure by climate change and may pose increased risks to health. Artic relic fish species of Vendace, Artic Charr and Shelly may perish as water temperatures rise. The tendency for warmer drier summers to dry out and accelerate the release of CO₂ from peatlands may not happen in Cumbria because of higher winter precipitation.

Freshwater and wetlands systems in Cumbria will be vulnerable to climate change but the precise outcomes are difficult to predict. River flows may increase in winter and spring increasing the risk of flooding, erosion and clogging of gravel spawning sites. Water temperature rise will follow atmospheric temperature rise but will be lower. Evaporation will occur but at lower rates than in southern areas of the country. Discolouration of lakes is likely. Historically combined sewer overflows have been prone to flooding during intense episodes of rainfall leading to foul flooding of property but considerable investment has reduced the risk.

**Likely impacts of a changing climate on water**

Rising temperatures, reduced snowfall and changes to precipitation will affect water quality and quantity requiring utility companies to incorporate climate change into forward planning and investment programmes.

In Europe, over the last century, river and lake temperatures have risen between 1° and 3°C . Rising water temperatures are likely to lead to reduced oxygen levels, changes to ecosystems and distribution of aquatic species with probable extinctions. Increased levels of bacteria and pathogens can be expected and these will require higher levels of treatment of drinking water sources. Climate change is likely to reduce mixing within lakes and reinforce thermal stratification and contribute to the earlier appearance of algal blooms.

Lower flow rates and lower water levels and droughts will affect agriculture, forestry, wetlands and hydro-electric electricity generation and may interrupt electricity generation by reducing the availability of water for cooling towers. Research suggests 20% increase in agricultural irrigation across England by 2020 with household demand for water up by between 2% to 5% over next 20-30 years. Recreational water use is also likely to increase with golf courses and swimming pools increasing demand. Freshwater fisheries will be affected with coarse fish expected to fare better than salmon and trout. Lower water flows mean less dilution and dispersion of pollutants affecting drinking water quality and recreational activities linked to water. Saline intrusion into coastal aquifers is likely to increase with sea level rise.

**What is happening already?**

The Environment Agency is producing catchment flood risk management plans. These put flood risk into context and allow everyone to plan for the implications. The percentage of Cumbria covered by catchment flood risk management plans will rise from 20% in 2007/08 to 90% by 2009/10. National planning guidance seeks to direct development away from areas where the risk from flooding is high to less riskier areas where the risk can be managed. Local Planning Authorities are producing Strategic Flood Risk Assessments which they will use to guide development in their areas.

The Environment Agency is directing its flood defence programme to areas of where the risk is highest and increasing the number of households registered with the Environment Agency flood warning service from 4800 in 2006/07 to 6000 by 2009/10.

Drought and water resource planning is carried out in Cumbria by the Environment Agency and United Utilities, the water supply company. Water companies are required to prepare, consult and publish 25 year water resource management plans.
These are reviewed yearly. All water companies must submit their draft plans to government by March 2008. They are expected to reflect climate change scenarios and ensure adequate water supply is maintained.

**What more needs to be done locally?**

The risk of flooding can be reduced by ensuring adequate flood defences are in place and by ensuring that future development is steered away from areas known to be at risk from flooding and that development is not located in areas that would increase flood risk to others. Urban development needs to incorporate sustainable drainage systems to help prevent flooding. Flood prevention needs to be supplemented by measures to minimise the impact of floods by ensuring adequate flood warnings are given in time and that effective emergency plans kick in to help people when they are flooded.

Current approaches to managing water resources need to factor in climate change. The key aim remains that of providing society and the economy with adequate water supplies without increasing the vulnerability of freshwater resources and wetlands.

Rivers need to be reconnected to their flood plains so that they act as natural flood defences. This means ensuring rivers have adequate natural flood plains and may mean allocating land within the development plan for water storage to alleviate flooding. It also means managing the whole catchment to ensure rainfall is held within the catchment rather than being encouraged to run off into the river as rapidly as possible.

Effective planning for droughts needs to be carried out so that action can readily be taken to minimise the impact on people and the environment. Part of this process will involve campaigns to minimise water use by households. This leaves more water in the environment for wildlife and people to enjoy. New development should incorporate water saving devices. Commercial and industrial users should be encouraged to adopt water saving measures. The water company will need to look carefully at water supply and demand scenarios and plan accordingly. In addition, treatment facilities may need to be upgraded to deal with potential changes in raw water quality.

There will need to be a cultural shift towards placing a higher value on water so that people use less of it. Society generally needs to realise that water is a precious commodity and accept that supply cannot be endlessly increased to meet demand. The aim must be to minimise waste in the distribution network and to minimise consumption and wastage at the point of use.

**Draft Recommendations**

**CSP member organisations are asked to:**

- Participate in the consultation process on the forthcoming water resource management plan to ensure arrangements for water resource planning and associated investment programmes will provide continuity of supply of high quality water to consumers and industry given the likely impacts of climate change on Cumbria’s water resources.

- Review the water consumption of their own organisations and introduce targets to reduce water consumption by 2009 and display this information prominently in the reception areas of their buildings.

- Open discussions with the Environment Agency and United Utilities to assess the need for further research into the effects of climate change on Cumbria’s water resources and water supply, including private borehole supplies and rates of leakage from the water supply network.