The Economic Implications of Climate Change Legislation for Cumbria

Summary Report for:
Cumbria Vision
Cumbria Strategic Partnership
North West Development Agency

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Executive Summary

Background

This investigation has been undertaken for the ***Cumbria Strategic Partnership*** (CSP) and ***Cumbria Vision*** and was funded by the ***North West Development Agency*** (NWDA) as part of the region's Climate Change Action Plan (CCAP). The aim was to assess the economic implications of EU and UK climate change policy and legislation on the Cumbrian economy through:

- A review of relevant legislation, policies and regulation and assessing how these may impact on Cumbria, particularly in relation to the key sectors identified in the Cumbria Economic Plan;
- Evaluating potential interventions at a sub-regional level and below, and which partners are best placed to lead on these interventions;
- Establishing the carbon footprint for Cumbria and how it can be monitored in the future;
- Identifying economic opportunities stemming from the new situation and the challenges in responding to these opportunities.

The full report includes background papers on:

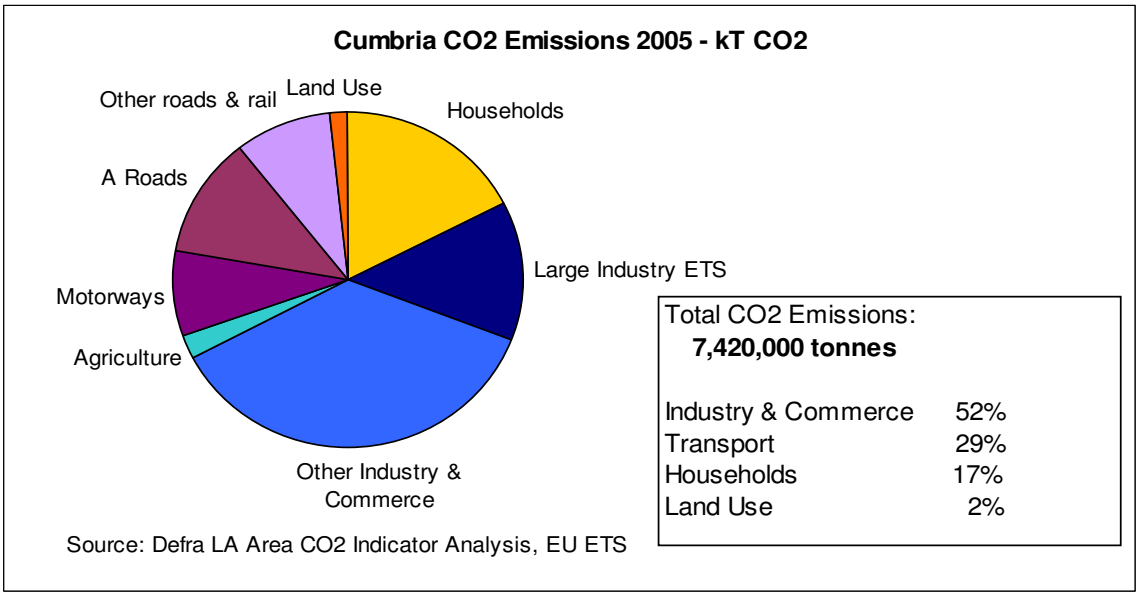
- Climate change legislation and policies, with a view to likely future legislation;
- Cumbria's economy and how each of the main sectors will be affected by climate change legislation;
- A review of current activity on climate change in the county;
- A review of activity in other similar regions in the UK and mainland Europe;
- Calculation of Cumbria's carbon footprint, taking account of the effects of tourism.

The research methodology also included extensive stakeholder consultation and the evaluation of potential interventions which will maximise the economic development potential stemming from climate change legislation.

Carbon Footprint

The breakdown of CO_2 emissions in Cumbria is shown in the following pie chart.

Total CO_2 emissions in the county amount to **7.4 million tonnes** per year, of which 607,000 tonnes (8%) is attributed to traffic on the M6 and so could be said to not 'belong' to Cumbria. Just over 3.8 million tonnes (52%) are due to industry and commerce and of this 988,000 tonnes are emitted by 14 large manufacturing sites. Tourism accounts for between 750,000 and 1,080,000 tonnes (10-15% of total emissions) in transport and buildings energy use and the contribution to retail, catering and recreation activities.



Methane is also an important greenhouse gas in Cumbria, stemming from the large amount of agricultural activity in the county as well as from landfill sites. Methane emissions are equivalent to 1.3 million tonnes per year of CO_2 but as yet there is no legislation which directly targets these emissions. These emissions are not included in the above diagram.

Results of Intervention Evaluation

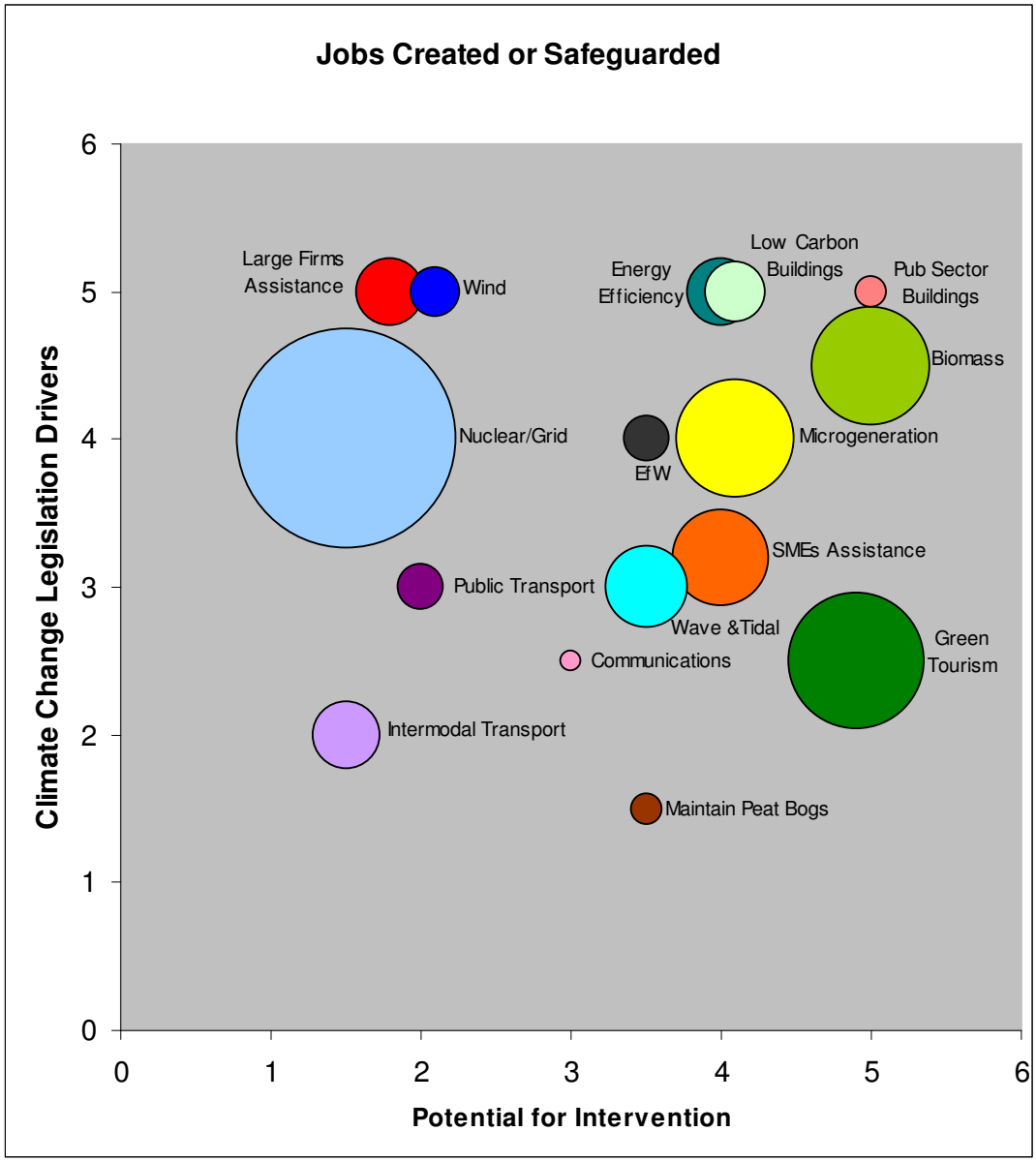
The results of the intervention evaluation are summarised in the following 'bubble diagram', where the size of each 'bubble' indicates the potential for creating or safeguarding jobs and the position of the bubble is determined by the strength of the climate change legislation drivers and the potential for intervention at a local level.

The largest 'bubble' is related to attracting a new nuclear power station and expanding the electricity transmission grid capacity, but the scope for further intervention (over and above what is already happening) is relatively small. The most promising areas for further intervention are:

- Developing the **biomass and biogas supply chains** based on woody wastes from under-managed woodlands and food & farm wastes respectively;
- Developing the **microgeneration** and local **energy efficiency supply chains** to take advantage of the move towards low carbon buildings;
- Promoting Cumbria as a **"Green Tourism Destination"** by providing low carbon accommodation and transport and using local produce;
- Providing more **assistance to businesses** (especially SMEs) to reduce their carbon footprints;
- Developing a capability to serve the emerging **wave and tidal** renewable energy sector.

To enable the first two of these interventions to be successful will require much more emphasis within the public sector in Cumbria on using the **planning system** to create demand (e.g. by requiring minimum or zero CO_2 emissions in new developments), and on **sustainable procurement** policies to support local firms. Both of these are included in

the Climate Change Action Plan but it should be emphasised that local authorities in Cumbria have some way to go to reach the levels of other public sector organisations elsewhere in the NW and the rest of the UK.



The whole programme also needs to be supported by targeted **R&D and innovation**, increased efforts on **skills development** and **raising awareness** of the climate change opportunities amongst policy makers, businesses and the general public (making use of the regional work in this area). These activities will produce few jobs in themselves but are important in supporting the sustainable energy supply chains and other initiatives.

Conclusions

The main threats in Cumbria from climate change legislation are rising costs of energy through direct or indirect pricing of carbon emissions. This will put pressure on the competitiveness of carbon intensive manufacturing businesses in Cumbria and eventually on logistics and transport operators. However, the effect will be no greater in Cumbria

than elsewhere in the UK and the threat is likely to be less than that from other economic pressures such as increasing raw material prices and skills shortages.

In contrast there is great potential in Cumbria for taking advantage of the opportunities provided by climate change legislation and responses to it. Foremost is the potential to build a new nuclear power station at Sellafield, with the associated upgrading of the electricity transmission grid. This must provide the capacity to accept small distributed sources of generation as well as nuclear and large scale wind installations. Cumbria has a long tradition in the energy sector and also has well-developed specialist engineering skills and, latterly, offshore experience. These can be harnessed to develop businesses and supply chains for 'new' energy activities in energy efficiency and renewable energy.

There is also significant scope for safeguarding jobs in existing businesses (including some of the carbon intensive ones) by helping them to reduce their carbon footprints, thus mitigating the effect of rising energy prices and increased supply chain pressures. This can be achieved by expanding the current CBEN offering, funded largely from the regional ENWORKS programme. There is also a need to assist larger firms in their carbon management activities, especially in influencing their supply chains.

Within the tourism sector there is an opportunity to promote Cumbria as a "green tourism destination", by providing low carbon alternatives for both accommodation and transport. Increasing the number of tourists will clearly benefit Cumbria's economy but, if not well managed, could also increase the carbon footprint. However if these tourists would otherwise have flown to more far-flung destinations, then Cumbria could claim the net carbon benefit.

We believe that these interventions could create or safeguard around **3000 jobs** in Cumbria. Of these:

- **1000 jobs** are associated with the nuclear supply chain, large scale wind farms and increasing the grid capacity along the west coast;
- **500** would be safeguarded in the manufacturing and tourism sectors;
- **1500** new jobs could be created, primarily in the tourism sector and the biomass, microgeneration and low carbon buildings supply chains.

The actions required in each of the key intervention areas are summarised in the following table:

Intervention Area	Actions Needed	Lead Organisation	Other Participants
Develop Biomass Supply Chain	Establish sources and quantities of woody waste available & build collection infrastructure	Forestry Commission	Cumbria Woodlands, Natural England, landowners
	Identify companies to produce woodchip & pellets; identify suppliers and installers of combustion plant (and persuade them to locate in Cumbria if not local)	Cumbria Vision	Forestry Commission, CAfS, Envirolink NW, equipment suppliers & installers
	Promote biomass heating, initially in public sector buildings. Also target other off gas grid building complexes	CSP	Local Authorities, LDNPA, Cumbria Tourism, CAfs, 3rd sector
	Support biomass heating via Procurement Policies	CSP	Other public sector bodies (esp LAs)
	Support local combustion plant manufacturers to gain Low Carbon Building Programme accreditation	Cumbria Vision	Equipment suppliers, CAfS
	Expand numbers of HETAS registered installers	CREA	Installers, CAfS
Develop Microgeneration Supply Chain	Discuss assistance needed to open up local markets with microgeneration companies	Cumbria Vision	CAfS, microgeneration companies
	Support microgeneration installations via (new) sustainable energy activities, local planning requirements and procurement policies	Local Authorities	CSP, Energy Saving Trust, CAfS, 3rd sector
	Target architects, developers & construction companies to persuade them to include microgeneration in new developments	Local Authorities	CEEAC, CAfS, property developers, architects
	Develop skill base in installations	Cumbria Vision	University of Cumbria, plumbing & heating companies
	Assist microgeneration companies to expand their activities & markets	Business Link NW	CAfS, Envirolink NW

Intervention Area	Actions Needed	Lead Organisation	Other Participants
Develop Energy Efficiency Supply Chain	Identify companies able to provide energy efficiency products & services	Invest in Cumbria	CEEAC, CAfS, equipment & service providers
	Discuss with utility companies mechanisms to increase the use of local installers for the CERT Programme	CEEAC	Energy utilities
	Promote energy efficiency improvements in existing homes and commercial buildings, using local suppliers where possible	CEEAC	Energy utilities, Local Authorities, West Lake Renaissance, CAfS, 3rd sector
	Improve levels of energy efficiency in public sector buildings, using local suppliers where possible	CSP	Local Authorities, other public sector bodies
	Target architects, developers & construction companies to persuade them to include high levels of energy efficiency in new developments	Local Authorities	CEEAC, CAfS, Local Authorities, property developers, architects
	Require low carbon buildings via local planning conditions and procurement policies	CSP	Local Authorities, other public sector bodies
	Develop local skill base in auditing & installation of insulation and other measures	Cumbria Vision	University of Cumbria, CEEAC, construction companies
Develop "Green Tourism" Offering	Provide assistance to tourism related businesses to calculate and reduce their carbon footprint	Cumbria Tourism	LDNPA, CREA, Cumbria Green Business Forum, hotels, guest houses etc
	Develop & promote public transport offerings, 'park & ride' schemes, walking & cycling routes etc	Cumbria Tourism	LDNPA, transport operators, 3rd sector
	Provide low emission vehicles for hire at strategic points	Cumbria Tourism	LDNPA, transport operators, vehicle hire companies, 3rd sector
	Promote Cumbria as a 'green tourist destination'	Cumbria Tourism	LDNPA

Intervention Area	Actions Needed	Lead Organisation	Other Participants
Assistance to Businesses to Reduce their Carbon Footprint	Expand sustainable energy activities for small firms to cover increased numbers and all of Cumbria, using ENWORKS funding plus local resources	CLEAN	ENWORKS, Cumbria Vision, West Lakes Renaissance
	Investigate requirement for assistance to large companies	Cumbria Vision	Carbon Trust, CLEAN, West Lakes Renaissance
	Organise & promote carbon management 'clubs' and supply chains to share knowledge and expertise	Cumbria Vision	CLEAN, Carbon Trust
	Develop local capacity for auditing & advice	Cumbria Vision	University of Cumbria
Develop Energy from Waste Facilities	Investigate quantities of residual waste from municipal and commercial & industrial sources	County Council	Shanks
	Identify suitable sites for EfW facilities to use heat and power	Envirolink NW	Shanks, Furness Enterprise, West Lakes Renaissance, large energy users
	Investigate potential for anaerobic digestion plants to process food waste and farm slurries	Cumbria Vision	CREA, food producers, catering establishments, farmers
Develop Wave & Tidal Energy Supply Chain	Build on existing engineering and offshore expertise to develop capability for wave & tidal installation & maintenance	Cumbria Vision	Furness Enterprise, Envirolink NW, engineering and offshore firms
	Promote deployment of wave & tidal devices around Cumbria coast; use ports as gateway for installation & maintenance	Cumbria Vision	Furness Enterprise, ports authorities, 'Bridge Across the Bay', Solway Gateway, Bendalls Engineering (SeaGen)
	Develop local skills base in wave & tidal engineering	Cumbria Vision	University of Cumbria, Lancaster University

Intervention Area	Actions Needed	Lead Organisation	Other Participants
Support R&D and Innovation in Sustainable Energy Technologies	Investigate EU, UK and regional funding to support innovation in microgeneration, wave/tidal and hydrogen & fuel cells	University of Cumbria	Westlakes Research Institute, Joule Centre
	Bring together suitable partners for R&D and demonstration projects. Stimulate knowledge & technology transfer	Cumbria Vision	ditto
Raise Awareness of Climate Change Issues in Cumbria	Summarise and publicise existing information on the specific impacts for Cumbria, especially the adaptation plans organisations will need to adopt	CSP	County Council, Local Authorities, LDNPA
	Link into regional programmes for climate change pledge schemes and communications programmes and tailor to Cumbria's needs.	County Council	Local Authorities, CSP
	Organise awareness programmes via major employers	CSP	Large public & private sector organisations

These real opportunities will only be realised through bold, coordinated action that combines efforts to simultaneously build supply capacity and stimulate demand for low carbon technologies and services. Cumbria needs to be focussed on what it wants to do and be ambitious in trying to achieve that. There are already sufficient organisations in Cumbria working in the field to take advantage of the opportunities presented and, for some areas, there is significant funding available (e.g. from the regional Climate Change Action Plan and national & EU R&D funds) to help take things forward. The Cumbria Strategic Partnership and Cumbria Vision are well placed to lead the coordination effort required to implement the actions summarised above.

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1 Introduction

1.1 Background

This investigation has been undertaken for the ***Cumbria Strategic Partnership*** (CSP) and ***Cumbria Vision*** and was funded by the ***North West Development Agency*** (NWDA) as part of the region's Climate Change Action Plan (CCAP). The aim was to assess the economic implications of EU and UK climate change policy and legislation on the Cumbrian economy through:

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- Establishing the carbon footprint for Cumbria and how it can be monitored in the future;
- Identifying economic opportunities stemming from the new situation and the challenges in responding to these opportunities.

The results will be used to inform the actions taken on climate change by the CSP and Cumbria Vision under Point 13 of the CCAP *"Develop and support sub-regional climate change partnerships and agencies to identify and deliver local action and provide the dissemination mechanism for the implementation of the NW CCAP"*. It should be noted that the study was intended to focus on the impacts of climate change legislation, rather than climate change itself (e.g. changing weather patterns). The report is therefore complementary to Cumbria's Climate Change Action Plan, which identifies mechanisms to reduce carbon emissions in the sub-region.

The project has been carried out by a team of consultants from three organisations:

- ***Quantum Strategy & Technology,*** who acted as Project Manager and provided expertise in sustainable energy and climate change issues;
- ***Regeneris Consulting***, who provided expertise on economic issues;
- ***Cumbria Action for Sustainability*** (formerly Eden LA21), who provided the local context together with expertise on the third sector and energy supply chains.

All three organisations have previously undertaken a number of economic and climate change studies in Cumbria and the NW region.

1.2 Methodology

The methodology used was determined both by the desired outcomes and the short timescale (2 months) for the investigation and included the following steps:

- Preparation of background reviews on Climate Change Policies and Legislation, Cumbria's Economy and Possible Impacts of Climate Change Legislation, Current

Climate Change Activity in Cumbria and What's Happening in Other (comparable) Regions. This section of the work was initially done through desk research but was later supplemented by interviews with stakeholders in Cumbria. The completed reviews are provided as Appendices to this report and a summary is provided in Section 2.

- Calculation of the Carbon Footprint for Cumbria, in particular separating out the contributions from tourism and road transport using the M6 motorway. This section of the work was informed by DEFRA's figures on CO_2 emissions for each district and the NW Greenhouse Gas Emissions Inventory. Details of the methodology used are given in Appendix 5.

- A programme of face to face and telephone interviews with key stakeholders in the county.

- Two workshops involving the whole project team to identify potential local interventions and then to evaluate and prioritise them using a consistent scoring methodology.

- A stakeholder workshop, attended by 70 delegates, where an opportunity was provided to discuss and comment on the interventions.

All of the findings were then brought together to produce a set of recommendations for action by the CSP and Cumbria Vision.

2 Background Reviews

2.1 Climate Change Legislation

This review provides a summary of UK climate change legislation, policy and regulation (current, pending and draft) affecting Cumbria and the North West highlighting where there are likely to be significant economic impacts. A summary is provided below.

2.1.1 Climate Change and Energy

The UK Government is developing a wide range of policies aimed at tackling climate change. The Department for the Environment, Food and Rural Affairs (Defra) has overall responsibility, but other government departments, including the Department for Transport (DfT) and the Department for Business, Enterprise and Regulatory Reform (BERR) have major interests as a number of policies and measures affect the energy sector (including renwables), transport and business.

The European Commission is also active in this field, and has introduced a number of Directives aimed at stimulating Member States to take domestic measures on carbon dioxide reduction. The EU's latest proposals (announced in January 2008) aim to reduce greenhouse gas emissions by 20% compared to 1990 (and by 30% if other major countries agree). There will also be a target of 20% of energy generated from renewable sources. The development of both EU and UK climate change policies and the national programmes to tackle the issues that are involved, has emerged over a period of several years.

The initiating point was the Kyoto Protocol, which was agreed in December 1997. The UK has a legally binding commitment under the Kyoto Protocol to reduce emissions of a basket of six greenhouse gases by 12.5% below 1990 levels over the period 2008-2012. Latest projections show that UK emissions should be around 23% below 1990 levels by 2010, around double this commitment.

2.1.2 Domestic Climate Change Goals

The 2000 UK Climate Change Programme confirmed a domestic policy goal of moving towards a reduction in emissions of carbon dioxide by 20% below 1990 levels by 2010.

The Energy White Paper 2003: "Our Energy Future - Creating a Low Carbon Economy" further developed the UK's climate change policy by adopting a longer-term goal of putting the UK on a path to reduce carbon dioxide emissions by some 60% by 2050, with real progress towards this goal by 2020.

In spring 2006, following a review, the government published an updated UK Climate Change Programme, which re-affirmed the earlier targets and introduced additional measures to ensure that they are achieved. One of the first of these measures has been to set targets for local authorities to reduce not just emissions from their own activities, but also the per capita CO_2 emissions from their locality. For Cumbria this target requires a reduction in emissions of 11.5% by 2010 compared with baseline figures from 2005.

The renewables market is set to receive a significant boost as a result of a new strategy which will be launched in spring 2009 and which aims to increase the proportion of energy from renewable sources to 15% by 2020 (compared to 1.5% in 2006). A consultation

document issued by the UK government in late June 2008[1] includes proposals on a range of measures (including economic incentives) which cover electricity and heat production as well as transport fuels. The total cost of achieving the target is estimated to be £5-6 billion per year by 2020 and there is a recognition that most of this investment needs to be kept in the UK. Of particular interest to Cumbria are proposed large expansions of on- and offshore wind generation and biomass heating.

A consultation document on energy efficiency is promised for later in 2008.

2.1.3 Economics of Climate Change

In October 2006 Sir Nicholas Stern published his review of the Economics of Climate Change the most comprehensive review ever carried out on this subject. The first half of the review focused on the impacts and risks arising from uncontrolled climate change and the costs and opportunities associated with action to tackle it. The second half examined the national and international policy challenges of moving to a low carbon economy. This review effectively put economics at the heart of climate change policy, by analysing the costs and benefits of climate change actions in the short term and in the longer term.

Many of the UK Government's current actions in new climate change legislation, regulation and other policy measures are built on the conclusions from the Stern Review.

2.1.4 Summary of Policies and Legislation

A summary of current policies and legislation and the sectors they will affect is shown in the following table:

Legislation/Policy Instrument	Sectors Affected
Energy White Paper – *"Meeting the Energy Challenge",* May 2007 and **Climate Change Bill** 2008	Potentially all energy supply and utilisation sectors
Nuclear White Paper, 2008	Nuclear Industry & Supply Chain Businesses
EU Emissions Trading Scheme (EU-ETS)	*Phases 1 & 2 (2005 – 2012)* – Electricity & Heat Generation (>20MW), Oil Refineries, Coke Ovens, Metals Smelting, Cement, Glass, Ceramics, Pulp & Paper Applies to 14 industrial sites in Cumbria (total 988,000 tonnes CO2 per year – approx 26% of Cumbria's business emissions) plus Roosecote power station *Phase 3 (post 2012)* under discussion. Will bring in other sectors including aviation.
Climate Change Levy (CCL) and Climate Change Agreements (CCAs)	Runs to 2012. CCL is effectively a tax on all business use of electricity, gas & coal, increasing energy costs by ~15%. CCAs apply to all "energy intensive sectors" – 43 in total, e.g. those above plus food & drink, textiles etc. Applies to around 100 sites in Cumbria.

[1] *"UK Renewable Energy Strategy – Consultation"* – BERR, June 2008

Legislation/Policy Instrument	Sectors Affected
Carbon Reduction Commitment (CRC)	From April 2009. Aimed at big energy users not already covered by EU-ETS or CCAs. Hence, supermarkets, banks, large hotels, hotel chains, water utilities, local authorities, health authorities, some industry sectors (e.g. plastics).
Renewables Obligation (to 2015)	*Directly* – Electricity Suppliers *Indirectly* – Renewable energy suppliers and supply chain (e.g. engineering)
Renewable Transport Fuel Obligation (from April 2008)	*Directly* – Fuel suppliers, transport operators *Indirectly* – Farming (energy crops – though probably not in Cumbria)
Carbon Emissions Reduction Target (CERT)	Been running as Energy Efficiency Commitment since 2001. CERT is 2008-11. Commits energy suppliers to invest in domestic energy efficiency & renewables schemes. *Directly* – Energy Suppliers *Indirectly* – Householders, Local Authorities (LAs), Housing Associations etc
Energy Performance Certificates (since July 2007)	*Directly* – householders (via Home Information Packs). From 2008 – commercial property developers/landlords, public buildings *Indirectly* – Auditors, sustainable energy equipment suppliers
Biomass Strategy	*Directly* – Forestry, farming *Indirectly* – Equipment suppliers & installers & supply chain; (mainly) public buildings
Code for Sustainable Homes, Zero Carbon Homes	*Directly* – Housing developers *Indirectly* – LAs, Housing Associations, equipment & materials suppliers
Planning Bill	*Directly* – LAs, Property developers, renewables developers *Indirectly* – Equipment suppliers
Local Government Performance Framework	*Directly* – LAs *Indirectly* – Equipment suppliers, housing developers, general public
Pledge, Offsetting Schemes etc	*Directly* – General public, companies *Indirectly* – Equipment & service providers, carbon offsetting companies

As is evident from the above, different policies and legislation affect different sectors directly but most have the indirect effect of stimulating the market for energy efficiency and renewables equipment suppliers and their supply chains.

Future legislation (say over the next ten years) is likely to be "more of the same", particularly incentivising energy efficiency and renewables. Additional sectors will also be directly affected (e.g. road transport and aviation in the post 2012 EU Emissions Trading Scheme) and additional legislation applying to smaller businesses. In the housing sector the scene is already set to 2016 through the Code for Sustainable Homes and higher sustainability standards for other new developments will be enforced via the planning system. The energy efficiency of existing buildings will be improved through responses to Energy Performance Certificates. In the transport sector there will be increasing pressure to move to lower emissions vehicles and for increased use of public transport, though legislation is likely to apply to vehicle manufacturers and transport operators rather than the general public.

The overall effect will be that legislation and policies on climate change will lead to increased costs for any economic activity that has significant carbon impacts.

2.2 The Cumbrian Economy and Potential Impacts of Climate Change Legislation

In this analysis of the key sectors of the Cumbrian economy, the focus was on the priority sectors defined in the Cumbria Economic Plan:

- Tourism
- Outdoor
- Food and drink (including agriculture)
- Digital and creative
- Specialist manufacturing
- Energy & environmental

To these were added three other sectors which are important in the climate change debate:

- Construction
- Public Sector
- Transport & Distribution

In carrying out this analysis we have considered the implications of climate change legislation both in the shorter term and longer term. By shorter term we mean the likely impacts of existing or known planned legislation. These impacts are likely to occur over the next 5-10 years (for instance the proposed zero carbon homes target for 2016). By longer term we mean considering the likely impacts of the next round of climate change legislation which we assume will need to be introduced at an EU and UK level to meet the challenging high level targets set for CO_2 emissions reductions, for instance the UK Government's target to cut the UK's man-made emissions of carbon dioxide by 60% by 2050. We have assumed that to meet these longer term goals there will have to be far higher costs attached to carbon emissions than under current legislation across all sectors including transport (and international air travel).

Although the focus of this study is on the impact of climate change legislation rather than climate change itself, in practice it is difficult to disentangle the direct effect of legislation from wider drivers, particularly the impact of changing consumer preferences for lower carbon goods and consumption patterns and methods of packaging, production and transport. These consumer preferences, coupled with legislation, are likely to drive major

retailers to put in place measures to reduce the carbon footprint of their supply chain. We have looked at all these effects in the round. It is also the case that changes in the real cost of energy and fuel, as at present, are likely to have greater impacts in economic terms in the short term than any effects from climate change legislation itself.

In the summary tables below, the key points from each sector are outlined. This analysis informs the discussion of the effects of proposed interventions. More detailed sectoral analysis is included in the separate background review (Appendix 2).

Sector	Sector information			Impact of Climate Change Legislation	
	Definition	*Scale of Sector*	*Direction of Travel (jobs)*	*Shorter Term*	*Longer Term*
Tourism	All the economic activity generated directly or indirectly by tourism spend	**LARGE** • 36,000 jobs (15% of total) • £1.1bn GVA	**Growing**. CTB forecast possible 30% jobs growth in 10 years	**Low impact, slightly positive** • Little affected. Small impacts of legislation on tourism businesses from buildings legislation. • If air travel impacted further by legislation likely to benefit Cumbria as very few visitors arrive by air, few overseas visitors and opportunity to draw back more of natural market travelling overseas.	**Medium/high impact, overall positive** • Higher cost of travel likely to impact most strongly on air travel and so propensity to take overseas holidays (especially short breaks). This will benefit Cumbria. • However, Cumbria tourism very dependent on arrival and travel round by car. Potentially vulnerable if real cost of motoring becomes exorbitant.
Outdoor	Small niche part of tourism sector included in overall tourism totals	**SMALL** • Around 2,000 jobs	**Fast Growing**. CTB estimate 50% in 10 years	**Low impact, slightly positive** • As for tourism generally	**Medium impact, overall positive** • As for tourism generally
Food and Drink	Covers both the agriculture sector and manufacture and wholesaling of food/drink	**MEDIUM** • c. 15,000 jobs - majority in agriculture (6%) • c. £0.4 -0.5bn GVA	**V. modest growth**. F+D sector manuf. sector likely to grow. Agriculture likely to see employment decline.	**Low/medium impact, mixed positive and negative** • Legislation likely to lead to increased costs for larger and medium sized manufacturers (although true through UK) • Consumers/supermarkets may push for more local sourcing likely to benefit Cumbria	**Medium impact, some positives, but potential large negative** • Supply chain drivers from supermarkets and consumer pressure expand local sourcing and reduce food miles. On balance likely to benefit Cumbria (but it is not well placed for largest South East markets). • Uncertainty over future role of agriculture in CC legislation and impact on economics of livestock production in particular
Digital and Creative	Covers a wide range of activities from IT software, to creative industries and cultural production (theatres etc).	**MEDIUM** • 11,000 employees and up to 4,000 self employed • c. £0.4 -0.5bn GVA	**Growing.** National forecasts are for significant growth in these sectors, likely to happen in Cumbria as well	**V. low impact** • There are some business opportunities for digital and creative sector in supplying the growing ETS sector. • Direct impact on businesses minimal	**Low impact, slightly positive** • Overall increase in cost of car and air travel likely to further encourage use of remote working (may benefit Cumbria)

Sector	Sector information			Impact of Climate Change Legislation	
	Definition	*Scale of Sector*	*Direction of Travel (jobs)*	*Shorter Term*	*Longer Term*
Specialist Manufacturing	Covers most manufacturing except F+D and some other sectors	**LARGE** • 21,000 jobs (9%) • £1.3-£1.4bn GVA	**Slow Decline**. Many parts of the sector facing major challenges, plus continued productivity growth	**Low/medium impact, overall negative** • More businesses face increase in energy costs. For most firms small compared to other commercial pressures, but important for the larger energy using sectors already affected by current high energy costs. • Opportunities from supplying the ETS sector	**Medium/large impact, overall negative** • Similar issues as per shorter term but extended • Opportunities from supplying the ETS sector
Energy and Environmental Technology (ETS)	Difficult sector to define and measure precisely. Some included in specialist manf.	**MEDIUM/LARGE** • 17,000 jobs (7%); of which 12,000 at Sellafield and around 5,000 other ETS jobs • £1.2bn in GVA	**Growing**. Overall sector has excellent growth prospects; although run-down at Sellafield will have negative impacts.	**Large impact, positive** • In short term the main impacts relate to the market opportunities opened up by the new legislation and also anticipation of future legislation (and higher energy costs)	**Very large impact, positive** • Scale of impact depends in part on the opportunity to develop new nuclear activity in West Cumbria in response to the new energy strategy • Rest of ETS sector has very significant opportunities in supplying the construction sector, renewables sector etc.

Note: GVA figures for 2004 from ONS except tourism (2006) from STEAM model; employment figures for 2006 (estimates based on the ABI and Census of Population 2001). Note some GVA estimates based on assumed shares of GVA based on employment numbers and so are broad brush only. We have assumed total employment in Cumbria in 2006 was 250,000. In line with the recently published Cumbria Economic Assessment, March 2008.

Sector	Sector information			Impact of Climate Change Legislation	
	Definition	*Scale of Sector*	*Direction of Travel*	*Definition*	*Scale of Sector*
Construction	Clearly defined sector. Dominated by lots of small firms.	**MEDIUM** • 13,000 jobs (6%) • £0.4bn in GVA	**Growing.** Significant future growth on back of 33,000 new homes by 2021, Housing Market renewal work.	**Medium impact, mixed positive and negative** • New building requirements will have major effect on sector, producing opportunities (insulation, renewable energy etc) but also threats to local firms if they do not adjust	**Large impact, mixed positive and negative** • As for the short term but amplified, especially as new commercial building low/zero carbon requirements come on stream

Transport and Distribution	Covers road haulage and other travel, definition does not include warehousing and other logistics	**MEDIUM** • 17,000 jobs (7%); of which 12,000 at Sellafield and around 5,000 other ETS jobs • c. £0.3bn in GVA	**Has been growing, likely to be static.** Distribution patterns have driven growth of sector, this is likely to change in the future	**Low impact at present** • To date CC legislation having relatively little impact on the sector (in contrast to energy costs).	**Large impact, negative** • Assuming that CC legislation introduces higher costs for use of fossil fuels in transport likely to increase transport costs and may reduce long-haul HGV traffic, an important part of the sector in Cumbria
Public Services	Covers public administration, health and education.	**LARGE** • 53,000 (22%) • GVA £0.9bn	**Has been growing,** growth largely linked to future population growth.	**Low/medium impact at present** • To date CC legislation having relatively little impact on the sector (in contrast to energy costs). • However, new building regulations will impact as will new LA carbon reduction targets	**Medium impact** • Public sector is large energy user, it is also major procurer of goods and services • Scope to reduce its carbon footprint
Note: GVA figures for 2004 from ONS; employment figures for 2006 (estimates based on the ABI and Census of Population 2001). Note some GVA estimates based on assumed shares of GVA based on employment numbers and so are broad brush only. We have assumed total employment in Cumbria in 2006 was 250,000. In line with the recently published Cumbria Economic Assessment, March 2008.					

2.3 Climate Change Activity in Cumbria

There are a number of key strategies within Cumbria which have direct relevance to climate change. These include:

- Cumbria and Lake District Joint Structure Plan 2001-2016
- Cumbria Economic Plan 2007
- Local Transport Plan for Cumbria 2006-2011
- Cumbria Housing Strategy (2006-2011)
- Cumbria Climate Change Strategy (draft for consultation).

While they may address climate change related issues indirectly, the first four of these strategies do not have climate change as a central theme. This lack of focus on climate change issues is being redressed to some extent. The draft Climate Change Strategy in particular has the potential to influence a major policy shift. In addition, the Energy & Environmental Technologies section of the Cumbria Economic Strategy 2008-2028 sets out a vision for Cumbria to be "*the UK's leading county for the development and deployment of low-carbon technology, and to become a net exporter of sustainable energy. Through positive exploitation of its natural assets creating jobs and wealth for the county, it will be internationally recognised as an exemplar of sustainable production and consumption.*" The strategy outlines a number of key actions including:

- Saving energy to reduce costs and increase competitiveness
- Developing cleaner, more secure & reliable energy (including nuclear and renewable energy sources)
- Creating jobs & wealth from the development of a low carbon economy
- The public sector playing a leading advocacy and facilitation role.

Below the regional level there is activity that directly tackles climate change such as the plans of the Lake District National Park Authority (LDNPA) to bring about a "*Low-Carbon Lake District".* A current project is under way to shape the Authority's response to climate change, help to lead thinking and action on climate change management and chart the way ahead. The study will look at what is already being done to cut carbon, anticipates the effects of climate change and identifies Lake District case studies where people are already making a difference. The report was launched at a conference on 16 June 2008. This work is closely linked to a study into Sustainable Transport for the LDNP which will be published later this year.

These actions clearly demonstrate a much higher awareness of climate change issues than in the recent past and should stimulate activity in the sustainable energy supply chain in the county.

2.3.1 Cumbria Climate Change Strategy

Developed by the Cumbria Strategic Partnership (CSP) the draft Cumbria Climate Change Strategy aims to *"reduce greenhouse gas emissions and enable people, organisations and industry to adapt to unavoidable impacts of climate change"*. The strategy focuses on nine areas:

- Energy Generation
- Housing & Buildings
- Industry & Commerce

- Natural Environment
- Procurement
- Spatial Planning
- Transport
- Waste
- Water Resources

Health is likely to be added as a separate topic in the next draft.

For each area the strategy discusses the Cumbrian dimension, the likely impacts of climate change, what is happening already, and what more needs to be done locally. It then sets out some draft recommendations for each area.

2.3.2 What's Happening Already?

Our review draws on the draft Climate Change Strategy and stakeholder interviews to highlight a number of actions which are already being taken at a sub-regional level to combat climate change. These include the following:

Energy

Actions and plans in the energy area include:

- Data for 2007 indicates that renewable energy generation capacity in Cumbria currently stands at 81.5MW of on-shore wind and 288MW off-shore wind. Earlier figures suggest an additional 800kW for small scale hydro and 3.1MW for landfill gas. Two further large offshore wind farms and a number of onshore installations are also at the planning stage.
- The Masterplan for West Cumbria has set out a vision for the area to become *'Britain's Energy Coast'*. The proposals aim to release £500m of public sector spending matched by an equal contribution from the private sector. This aims to build on the existing nuclear assets in the area and expertise in related areas, and includes lobbying for a new nuclear power station at Sellafield. Whilst the original version of the plan was concentrated on the nuclear sector, it is now being expanded to include more emphasis on the sustainable energy supply chain.
- Increasing the electricity transmission grid serving the west coast is also part of the Masterplan. This is a prerequisite for a new nuclear power station and would also facilitate the connection of more on and offshore windfarms and, in the future, wave and tidal devices.
- *"Bridge Across The Bay"* – whist not exclusively an energy project (it would also improve connectivity), this proposal for a road bridge across Morecambe Bay is planned to incorporate wind turbines and tidal generation devices.
- *"Solway Energy Gateway",* which is a plan to build a mile-long barrage across the estuary along the route of an old railway connection. It would generate 200MW and could become a tourist attraction.

Both of the last two proposals are dependent on overcoming other potential environmental impacts.

Microgeneration

Activity in this area, effectively a sub-set of the Energy sector, includes the following:

- A number of isolated installations across a range of small scale renewable energy types (solar thermal, solar PV, biomass, wind, hydro, ground & air source heat pumps, chp and biogas). The number of installations in Cumbria continues to grow, mirroring national growth.
- Cumbria has 13 small companies focussed on microgeneration with a combined employment of 50-70 staff, and with almost all operating on a local scale within Cumbria. Several Cumbrian microgeneration installers operate nationally, including Sundog Energy Ltd and Turbine Services Ltd. Gilbert, Gilkes and Gordon of Kendal produce hydro turbines (100KW-20MW) on a larger scale for the international market, employing 120+ employees.
- A growing number of small operators are being born out of local plumbing and electrical companies which now offer services to install solar thermal units, ground and air source heat pumps. This local market for small enterprises seems likely to grow as the industry skills up, concentrating on domestic scale microgeneration.
- The community sector in Cumbria tends to be amongst the keenest 'pioneers' to use microgeneration, with village halls, community groups, youth hostels and not-for–profit organisations using the enhanced grant schemes to overcome the high installation costs. Perhaps due to these incentives, this 'third' sector provides particularly strong opportunities for the expansion in microgeneration.

The Public Sector

- CSP leading on development of Climate Change Strategy.
- LDNPA work on *"Low Carbon Lake District";* committed to being carbon neutral by 2012.
- Most local authorities taking action on own operations, staff awareness etc; three have signed the Nottingham Declaration and the County Council has signed the NW Climate Change Charter. All Districts plus the County Council and LDNPA have electricity supplied from renewable sources.
- Natural England aims to cut organisational CO_2 by 50% from 2006 level by 2010. Also currently restoring Wedholme Flow peat bog - work which should ensure that it remains a sink for carbon.
- Public sector bodies can have major influence on sustainable energy supply chain via Planning and Procurement policies. There is scope for much more emphasis on these aspects in Cumbria, following the lead of other local authorities in the NW and elsewhere in the UK.

Housing

- The draft regional spatial strategy proposes a net increase in the housing stock in Cumbria of 33,340 in the period 2003-2021.
- In addressing the 'Decent Homes' standard and requirements of the Home Energy Conservation Act, districts are working with the Cumbria Energy Efficiency Advice Centre (CEEAC) to access funding from utility companies to provide subsidised energy efficiency measures.

- The CEEAC provided advice to 28,000 householders in the last year in four Cumbrian districts. CEEAC is also involved in developing an affordable warmth strategy with district councils. It is about to extend its activities under a new contract from the Energy Saving Trust which will enable it to cover all of Cumbria and include work on renewables, transport and waste.
- An annual *"Green Build Fortnight"* is run to show case best practice examples including homes already reaching Level 3 of the Code for Sustainable Homes (designed by local architects using local contractors).

Business

- Larger businesses are regulated under the EU Emissions Trading Scheme or Climate Change Agreements – many have taken action on reducing carbon emissions, some using assistance from the Carbon Trust. Other business will be covered by the Carbon Reduction Commitment, which comes into force in 2009.
- Through the Cumbria Rural Enterprise Agency (CREA) the Cumbria Business and Environment Network (CBEN) provides free advice to businesses on a range of environmental issues including reducing energy use. CBEN operate a bronze, silver and gold award scheme with guidance provided to help businesses progress through the levels.
- Furness Enterprise has been working with the larger companies in their locality (especially those with head offices elsewhere) to cement their presence in Cumbria. This has included pressing for investment in energy schemes such as combined heat and power (CHP).

Transport

- One of the key priorities of the Local Transport Plan is to improve accessibility through locating development in key service centres and encouraging cycling and walking – the result should be a reduced need to travel by car.
- A number of improvements to the transport infrastructure are in progress or planned. Many related to improved road infrastructure, with some focused on public transport. Network Rail has just published its Lancashire & Cumbria network strategy which highlights capacity constraints.
- The development of Carlisle airport with a view to starting scheduled flights is planned.
- The *"Rural Wheels"* scheme, provides demand responsive, door-to-door transport for people. It aims to help address the lack of public transport provision in rural areas.
- *"Routes to a Prosperous Cumbria"* sets out a number of priority objectives covering public transport, road transport, walking and cycling.
- Continuing broadband expansion opens up new business opportunities and should contribute to reducing the need to travel to work.

Clearly there is a lot to build on here and the current activities need to be taken into account in developing new or expanded interventions.

2.4 What's Happening in Other Regions

This review provides information on what other similar regions in the UK and elsewhere in Europe are doing to develop their economies around the climate change agenda. The purpose was to identify what lessons can be learned from these other regions, and what modifications might be needed in the proposed intervention options for Cumbria in the light of these findings.

The UK regions examined are the North East, Northumberland, Yorkshire and Humber, South West, North Wales, and a Scottish authority. These regions were chosen because they are mainly rural but have some industrial clusters, and hence have a similarity to Cumbria. In addition brief overviews are given of two other European countries – Germany and Sweden – due to the importance given to climate change activities by these Governments. A specific review of the biomass supply chain development in Upper Austria is also included since this has particular relevance to Cumbria (see box below).

From the case studies in the UK and in Continental Europe, it was evident that the main focus is on combating climate change rather than stimulating the local economy per se (though this may occur as a by-product of the actions being taken). There are several different types of locally-based interventions which are being used including support for new technology development and deployment; use of local regulations and planning to stimulate low carbon developments; financial incentives for low carbon investments; business support schemes; and communications campaigns.

Nevertheless, the broad approach to climate change appears to be similar in each region and country, using a cross-cutting strategic policy to set out the general requirements for climate change mitigation, whilst acknowledging the need for local policies to help the region meet national targets to reduce carbon emissions. Local authorities recognise that they can have a significant influence over emissions in their local areas, particularly through how they exercise their functions and discharge their statutory duties, e.g. via the planning system, procurement policies and building climate change actions into their own operation to show leadership. Many of these interventions provide a useful model for the LAs in Cumbria to follow.

Case Study - Upper Austria

Upper Austria is a region in the northern part of Austria, bordering Germany and the Czech Republic, and has 1.4 million inhabitants. Heavy industry plays an important economic role with the steel, chemicals and engineering sectors, but it is also a very rural area with a strong agricultural focus. Tourism forms an important economic sector. There are, therefore, some strong similarities with Cumbria.

The biomass sector is long established in Upper Austria, and there is a tradition of wood fuel use for space heating in individual homes, and in district heating. At present there are a total of over 20,000 modern automatic wood heating systems in operation, including:

- 30% of all Austrian wood chip installations
- 7,500 wood pellets installations
- more than 220 biomass district heating plants.

Biomass covers 14% of the total primary energy consumption in this sub-region.

One reason for the relatively quick and successful market start in Austria was that both the "supply side" (pellets and equipment) and the "demand side" (building owners willing to invest in wood pellet systems) were in place. To build up a market for pellet heating system locally or regionally several factors have to coincide at the same time:

- the production or import of good quality pellets and boilers
- the local distribution network for pellets (by trucks or bags)
- installers willing and able to install and service the equipment
- customers willing to buy and use pellet heating systems.

One of the most important instruments in the promotion of wood pellets is a cluster of green energy companies, the Ökoenergie-Cluster, managed by the local energy agency of Upper Austria. Around 140 companies and institutions are presently partners of the cluster, representing the different renewable energy source sectors. In total, these companies achieve an annual turnover of about £270 million; they employ more than 2,600 people and their export share amounts to 50%, of which a third is in the biomass sector.

This forms a useful example for Cumbria as a means of promoting the development of the microgeneration supply chain generally, and biomass in particular.

3 Cumbria's Carbon Footprint

The recent *NWRA Energy and Greenhouse Gas Emissions Inventory* sets out the challenge facing Cumbria on climate change. Relevant headlines from this work include:

- Of the 5 sub-regions, Cumbria has the lowest overall emissions (measured as CO_2 equivalent).
- Cumbria has the highest *per capita* emissions (CO_2 equivalent) of the 5 sub-regions, due mainly to its dispersed population and the need to travel more than in other areas;
- CO_2 represents the greatest source of greenhouse gas emissions in Cumbria at 75%, but this figure is considerably lower than in other sub-regions (Greater Manchester – 91%, Merseyside 91%, Cheshire – 90%, Lancashire – 86%). This is due to a much higher contribution in Cumbria of methane (17%) and nitrous oxide (6%) emissions arising from agriculture and natural processes.
- Cumbria is the only sub-region where transport is the largest contributing sector with emissions representing 28% of the total.

The purposes of undertaking further work on the carbon footprint for Cumbria were two fold:

- To inform potential interventions to stimulate the economy via actions on climate change (focussing on those areas with the most significant emissions);
- To establish a baseline figure of CO_2 emissions for 2005.

The latter aim is important because DEFRA has just introduced two new indicators for Local Authorities for reducing CO_2 emissions:

- NI 185 CO_2 emissions from the authorities' own activities (buildings, transport etc);
- NI186 CO_2 emissions per head of population, excluding motorway traffic and large industrial sources that are covered by the EU Emissions Trading Scheme.

For Cumbria the second indicator may be skewed by the effect of the visitor economy which increases emissions in buildings and transport and from waste production. The CSP therefore wanted to understand these effects within the overall figures in order to be able to monitor changes in the future.

Whilst there is no legislation currently aimed at methane production, it is likely that there will be in the future so it is also useful to understand these emissions from the outset.

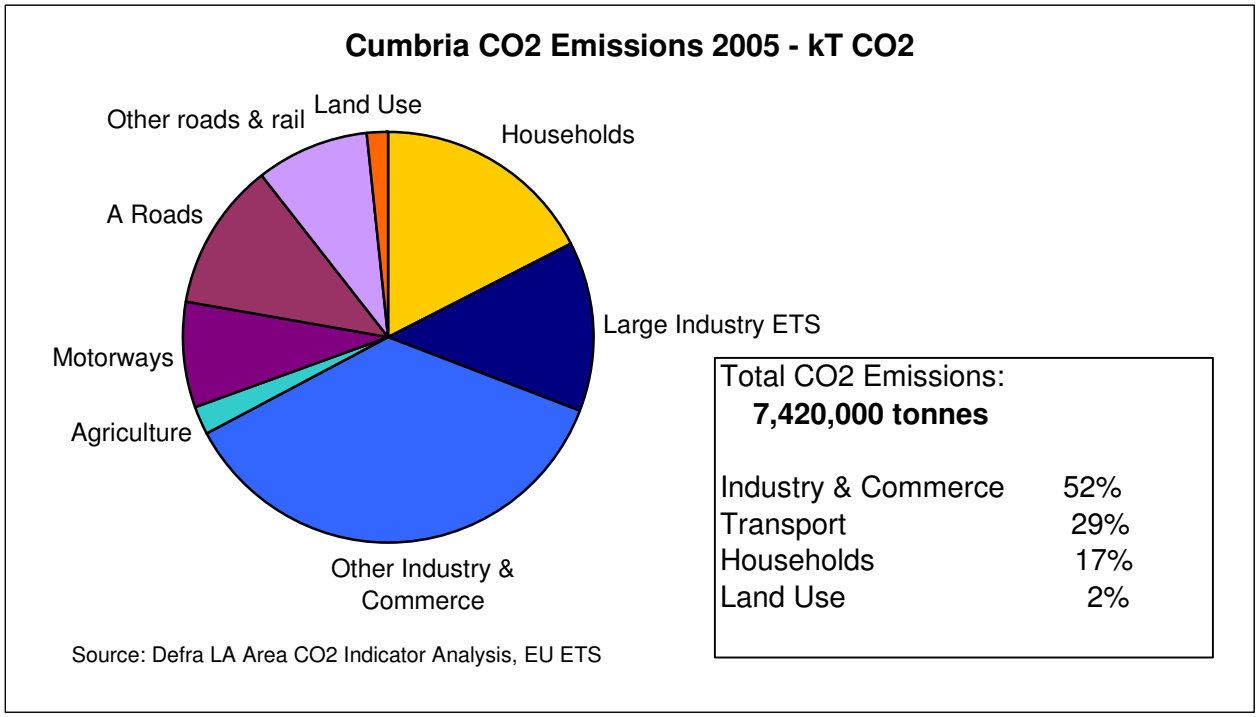
3.1 Baseline Emissions

3.1.1 Carbon Dioxide (CO_2)

We estimate that the total emissions of CO_2 related to activities within Cumbria in 2005 were **7.42 million tonnes**. This includes emissions from households, industry and commerce and road and diesel rail transport within the county, but excludes shipping,

electric rail transport and emissions from Roosecote Power Station. The latter is accounted for in the electricity consumption of end users. This total figure is based on the data used by Defra for the indicators, and differs only in that we have re-introduced emissions from the large industrial energy users included in the EU ETS scheme. More detailed information on the methodology is given in the Appendix.

The breakdown of CO_2 emission is shown below.



Cumbria CO_2 Emissions 2005

Sector	kT CO_2	%
Households	1,290	17%
Large Industry ETS	988	13%
Other Industry & Commerce	2,700	36%
Agriculture	179	2%
Motorways	608	8%
A Roads	873	12%
Other Roads	611	8%
Diesel Rail	47	1%
Land Use	124	2%
Total	**7,420**	**100%**

3.1.2 Methane (CH_4)

Methane emissions related to activities within Cumbria were estimated as part of the NW Greenhouse Gas inventory produced for the NWRA for 2004. Methane is predominantly produced by the agricultural sector and from the decomposition of waste. There are also relatively small amounts produced in combustion processes for heating, electricity generation and transport.

The breakdown of methane emissions for Cumbria is given below, in terms of total quantity and Global Warming Potential (GWP), which translates the impact of the various greenhouse gases into equivalent tonnes of CO2 (CO2e).

Cumbria CH_4 Emissions 2004

Sector	kT CH_4	CH_4 as ktCO_2e
Residential	0.3	7
Industrial	0.2	5
Transport	0.1	3
Agriculture	42.2	886
Waste	18.6	390
Total	**61.4**	**1,290**

3.2 Sub-Sectoral Emissions

The Defra CO_2 emissions dataset allocates emissions to sectors as shown above, and further splits these down by fuel type. To gain a deeper understanding of the emissions of different industry sectors it is necessary to either;

- Estimate the sector emissions from survey data of a sub-set of that sector; or
- Allocate the overall industrial/commercial emissions based on a proxy such as output (GVA), space (m^2) or employees.

The first option is likely to give more accurate data and provide a valid basis for long-term monitoring. Using the second option holds significant risks. One of the purposes of emissions reductions activities is to de-couple emissions generation from economic indicators, so using these as a basis for allocation of data defeats the object, and will not show improvements in local emissions but only changes in the national data from which it is derived.

One of the key sub-sectors for Cumbria is Tourism, which impacts on emissions from households (holiday lets, second homes and small guesthouses), industry and commerce (larger hotels) and transport (travel to and within the county by visitors). Although data is collected by Cumbria Tourism on the size and economic position of that sector, no survey data is available on the energy consumption or emissions directly related to this sector. We have therefore used a mix of national survey data on emissions from hotels and national allocations of emissions from trip types, combined with local data on bed-spaces and visitor numbers, and local data on emissions from typical Cumbrian homes, to give an estimate of the CO_2 and CH_4 impacts of tourist travel and accommodation. We must stress that this is only an estimate and cannot be used for monitoring purposes. Indirect

emissions from activities linked to the tourist trade such as retail and catering establishments and tourist attractions have been estimated by scaling up from the accommodation emissions based on both employees and revenue in these other sectors. Neither of these proxies is particularly valid, and a proper estimate of emissions due to tourism in these other sectors would need to be based on more detailed survey data.

Details of the methodology used are given in Appendix 5.

Estimated CO_2 and CH_4 Emissions related to Tourism in Cumbria

	kT CO_2	
Direct CO_2		
Serviced Accommodation	153	5.7% of Non-ETS Industry CO_2
Non-serviced Accommodation	34	2.7% of Domestic CO_2
Travel	353	16.9% of Transport CO_2
Total Direct CO_2	540	7.3% of Total CO_2
Indirect CO_2	210-540	
Total CO_2	750-1080	10 - 15% of Total CO_2
Methane	**kT CO_2e**	
Waste CH_4 (as CO_2e)	17	1.3% of Total CH_4

Overall, these figures show that tourist accommodation and travel accounts for 7.3% of total CO_2. If the associated emissions in retail, catering and recreation are included, our estimate is that tourism accounts for around 10-15% of the total CO_2 emissions in Cumbria. We estimate that tourists generate 14% of the total municipal waste in the county, accounting for around 1.3% of the methane emissions.

4 Intervention Evaluation

The information gathered from the background reviews and the stakeholder consultation was then brought together and considered by the project team. Taking into account:

- Economic indicators for the nine key sectors
- Climate change legislation impacts and responses
- Cumbria's strengths and weaknesses
- What is happening already

a list of potential interventions in each sector was drawn up. These were then evaluated on a consistent basis using a scoring matrix which included the following factors and weightings:

- *Economic Impacts* – primarily GVA and jobs created/safeguarded *(weighting = 15)*
- *Environmental Impacts* – especially those related to climate change *(9)*
- *Social Impacts* – alleviating fuel poverty and creating rural and social employment *(9)*
- *Strength of Climate Change Drivers* – EU, UK and NW *(12)*
- Potential for *Local & Sub-regional Intervention (15).*

The weightings were deliberately chosen to emphasise the potential economic impacts and scope for local intervention to reflect the aims of this particular study. Had the main aim been to select interventions to reduce greenhouse gas emissions, the weightings would have been different and would have led to a different order of priority (though some interventions would be high on both lists).

Each intervention was then scored on a scale of 1 to 5 (where 5 is the highest impact) against each of the above factors to give an overall score, with 300 being the maximum possible.

4.1 Primary Interventions

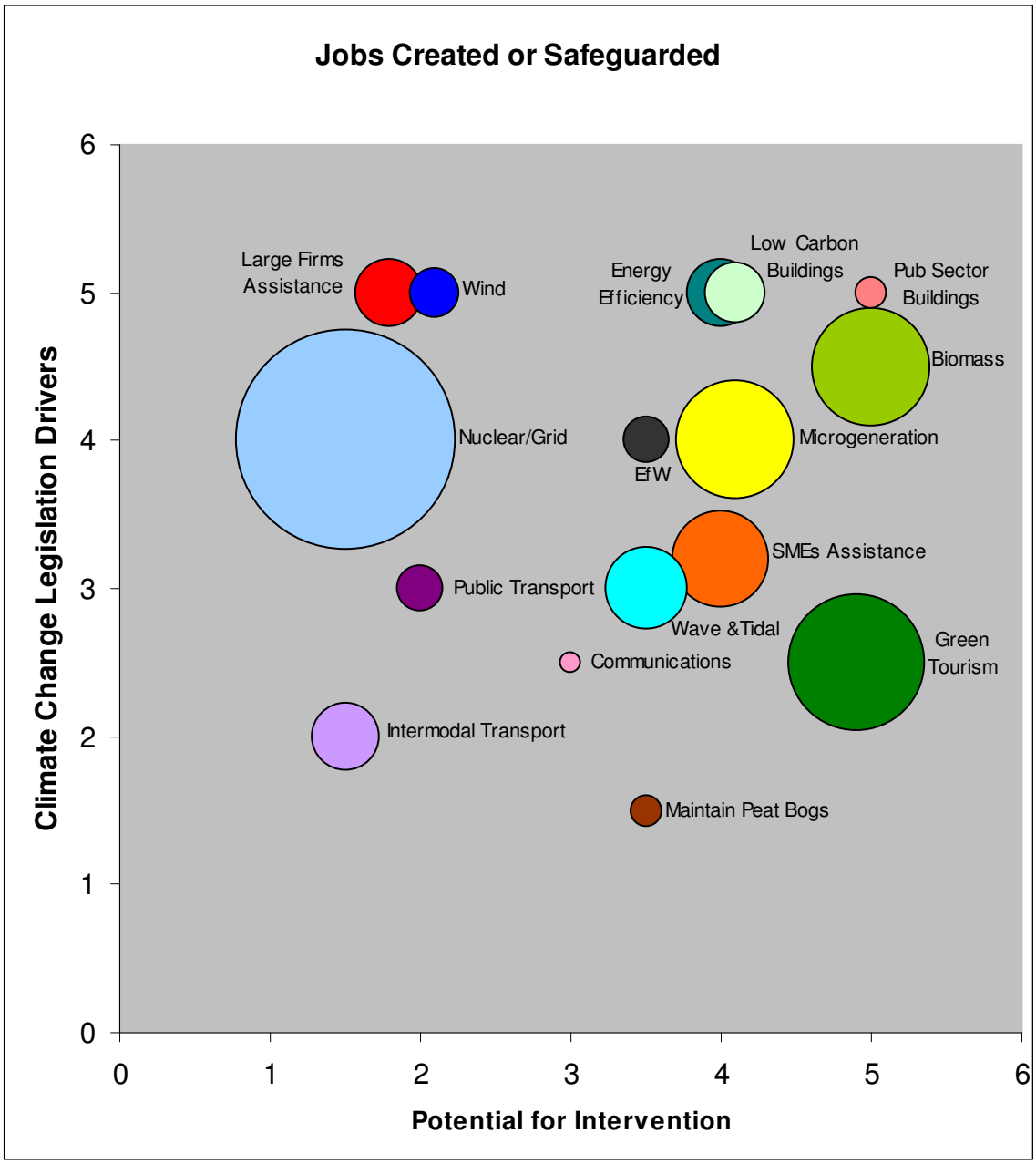
The evaluation resulted in the following scores for intervention in each sector:

Sector	Potential Interventions	Evaluation Score
Food & Drink incl. Agriculture/Forestry	**Large firms**: Links to local energy technology & service suppliers; help with alternative energy supplies	**147**
	SMEs: Upgrade and extend CBEN to focus on carbon reductions; sector focus; link with 'Distinctly Cumbria'	**201**
	Maintenance of peat bogs/uplands: increase carbon sink capacity and avoid carbon release	**161**
Specialist Manufacturing	**Large firms**: Links to local ETS suppliers; carbon management 'clubs'; help with alternative energy supplies	**171**
	SMEs: Upgrade and extend CBEN to focus on carbon reductions	**195**
Tourism & Outdoor	**Green tourism capital**: advice & assistance to tourism firms to reduce carbon footprints & market as green tourism destination	**225**
Energy & Environmental	**Wind**: further development of the wind supply chain - new round of offshore developments	**162**
	Biomass: development of the supply chain	**242**
	Energy-from-waste: municipal waste**;** farm biogas; AD of mixed food/farm waste; biofuel supply	**183**
	Micro-generation: potential to stimulate local projects and to promote local suppliers + other micro-renewables especially for off-gas grid applications	**213**
	Wave & Tidal: exploit existing offshore & engineering expertise (e.g Sea Gen); exploiting tidal resources (inc Bridge Across the Bay, Solway Energy Gateway); R&D Centre	**176**
	Energy efficiency: potential to develop local supply chain including installers	**270**
	Energy networks: address grid capacity constraints	**173**
Digital & Creative	**Support for communications intitiatives** e.g. Cumbria pledge/offset and marketing Cumbria	**102**

Sector	Potential Interventions	Evaluation Score
Public Sector	**Own buildings/estates**: energy efficiency/micro-gen, scope to take the lead and innovate	**180**
	Sustainable procurement: link to local suppliers	**198**
	Planning: be more proactive on buildings policies and zero carbon targets	**213**
Construction	**Low Carbon Homes**: bring together local expertise and products; demonstration projects, upskilling the industry	**201**
Transport	**Public transport:** improve access to and use of public transport; make transport more sustainable	**159**
	Develop/promote intermodal freight transport: rail/sea	**89**

The highest scoring interventions (>200) are highlighted in green and the second rank (170-199) are highlighted in purple. Clearly there is some overlap between some of the interventions (e.g. tourism and public transport) and others need to be undertaken in parallel to achieve the optimum results (e.g. public sector planning and procurement to support the microgeneration supply chain).

Taking these factors into account, and estimating the potential for creating new jobs or safeguarding existing ones leads to the following bubble diagram to further indicate the most fruitful areas for intervention, i.e. those to the top right of the grid.



Some further explanation of this diagram is warranted.

The ***Biomass Supply Chain*** is important for Cumbria because there are large wood resources from forestry operations and numerous potential applications for biomass fuelled boilers because many properties are not on the mains gas grid. We estimate that there is potential to create several hundred jobs in the supply chain including forestry, fuel preparation, equipment supply, installation and maintenance. Biomass heating is set to receive a significant boost as a result of the forthcoming Renewable Energy Strategy. The experience in Upper Austria is instructive in what can be achieved with a concerted support programme.

Closely linked to this is the wider ***Microgeneration Supply Chain***, again with particular relevance to Cumbria because of the lack of a mains gas supply to many properties. Also there are several important microgeneration equipment suppliers in Cumbria who would

benefit from a more secure local market. Small hydro installations in particular have great potential in the county because of the topography and weather. Again it should be possible to create several hundred jobs over a 10 year period in this supply chain, though some of the equipment would inevitably be sourced from outside of Cumbria.

Linked again is the ***Energy Efficiency Supply Chain***. For housing this would be mainly installation of loft and cavity wall insulation and draughtproofing, with some scope for low energy lighting and appliances. We believe there is less scope for local job creation here because there are already many insulation companies operating in the NW, NE and South Scotland who would provide services in Cumbria if the demand increased. However, there may be scope for developing specialist companies to deal with hard to treat homes (e.g. with solid walls). For industry and commerce the needs are often more specialised (e.g. for control systems) and would again be mainly satisfied by existing companies from elsewhere. There could, however, be more scope for local auditors and advice (e.g. for Energy Performance Certificates).

The ***Low Carbon Buildings*** 'bubble' represents the additional jobs created (or re-skilled) in the construction sector rather than the sustainable energy supply chain, whilst the ***Public Sector Buildings*** 'bubble' represents jobs within the public sector which are directly related to reducing carbon emissions, e.g. energy managers and designers.

For all of these interventions to bear fruit will require much more emphasis within the public sector on using the ***Planning System*** to create demand (e.g. by requiring minimum or zero CO_2 emissions in new developments), and on ***Sustainable Procurement*** policies to support local firms. All of the local authorities in Cumbria have some way to go to catch up with other LAs in the NW region in these areas and some joint actions, led by the CSP, would certainly be beneficial. These interventions do not warrant their own 'bubbles' because they would not create new jobs in the LAs (but would require working in a different way).

The ***Green Tourism*** intervention includes providing advice to firms in the sector to reduce their carbon footprints, promote public transport and provide low emission vehicles for hire (e.g. at main line railway stations and tourist attractions). Cumbria would then be marketed as a "Green Tourism Destination". There is already a considerable amount of ongoing work in this area (e.g. by Cumbria Tourism, LDNPA and the Cumbria Green Business Forum) but there is scope for more concerted activity. Increasing tourist revenues could lead to several hundred new jobs as well as safeguarding existing jobs and this is reflected in the size of the 'bubble'. In this case the 'bubble' is relatively low on the "climate change drivers" scale because as yet there is little climate change legislation which directly affects small businesses or transport.

Assistance to Small Businesses relates to helping small companies to identify and to reduce their carbon footprints. In this case the size of the 'bubble' relates to jobs safeguarded in these businesses rather than new jobs (though new jobs would appear in the energy efficiency and microgeneration supply chains which are accounted for elsewhere). CREA is already active in this area through their CBEN award scheme but there is considerable scope for expanding the number of auditors and for placing more emphasis on energy and climate change issues. The regional ENWORKS programme has received additional funding from the Climate Change Action Plan to do just this and already has CREA as its delivery agent in Cumbria. This initiative includes the special case of companies in the food & drink sector, where there is the additional dimension of linking to the *"Distinctly Cumbrian"* brand for local produce.

Energy from Waste (EfW) includes the potential for plants to deal with the non-recyclable components of municipal waste, possibly sited close to industrial complexes to provide heat and power. The 'bubble' also covers anaerobic digestion facilities which process food wastes and farm slurries to produce methane for heating, power generation or possibly transport fuels. This intervention area is closely linked with the biomass supply chain but the job creation potential is significantly lower.

The final 'bubble' in the top right hand segment of the diagram, ***Wave & Tidal,*** relates to the opportunities to develop the supply chain for tidal stream, tidal range and wave devices. None of these technologies are yet fully proven so there may be scope for some R&D activity (though most of this is taking place elsewhere). Some of these devices could potentially be deployed off the Cumbrian coast (e.g. the *"Bridge Across the Bay"* and *"Solway Energy Gateway"* projects, tidal stream devices in the Dudden estuary and wave generators in the Irish Sea), providing the opportunity to develop existing skills in offshore engineering for installation and maintenance of the systems. The job creation potential with a ten-year time horizon is lower than for microgeneration because the marine technologies are less developed.

The remaining interventions either have less scope for additional local intervention or will create fewer economic benefits.

Upgrading the ***Electricity Transmission Grid*** in West Cumbria could potentially create and/or safeguard over 1000 jobs because it would enable new nuclear power station and large offshore and onshore windfarms to be connected to transmission lines to the south of England. It should also be capable of connecting multiple microgeneration installations. However, this would be a very expensive project and the scope for local intervention is limited to lobbying the government and supply authorities, which is already happening. The need to resolve grid constraints to accommodate all types of renewable generation is highlighted in the current Renewable Energy Strategy consultation.

In addition to a new nuclear power station at Sellafield, building the local ***Nuclear*** capacity could also include using the shipyards in Barrow for module manufacturing for nuclear power plants outside of Cumbria. This is already being actively pursued by Furness Enterprise.

Although there is some potential for ***Assistance to Large Firms*** in their climate change activities (e.g. with alternative energy sources such as biomass) most of them have already taken action to improve their energy efficiency because of legislation and rising energy prices. Also, they have access to national assistance programmes via the Carbon Trust so the scope for additional local interventions is relatively small, though the experience of Furness Enterprise is that local assistance van be beneficial for some companies.

There are already a number of local jobs in the ***Wind Supply Chain*** but this sector is now relatively mature and the scope for creating more employment is felt to be limited. The recent experience in Furness is that new (offshore) wind farms have generated only very modest levels of local employment in support activities.

The scope for local intervention in ***Improving Public Transport*** and promoting ***Intermodal Freight Transport*** is limited, with most of the decisions being taken by organisations outside of Cumbria. The scope for new job creation in these areas is also relatively small.

There will be an increasing need for better ***Communications*** around climate change issues but most campaigns will be designed and delivered from a regional level by firms who already have considerable experience in the sustainable energy field. Cumbria has no great expertise in this area of communications and so is unlikely to see many new jobs.

Finally, ***Maintaining Peat Bogs*** and upland areas as carbon sinks, whilst very important in climate change terms, is not subject to legislation at present and would support only a limited number of jobs.

4.2 Cross-cutting Interventions

In addition to the direct interventions outlined above, there are a number of cross-cutting actions which need to be taken to ensure success. Mention has already been made of ***Planning Policies*** and ***Public Sector Procurement*** but other important areas include:

- Skills Development
- R&D and Innovation
- Awareness Raising.

These will produce few jobs in themselves but are important in supporting the sustainable energy supply chains and other initiatives.

Skills Development

The proposed Nuclear Academy will be the NW hub for developing skills related to the nuclear sector. Its activities need to be extended to other areas of the energy supply chain, e.g. to ensure that the construction sector is able to deal with low carbon buildings and that plumbers, electricians and other trades have the skills to install and maintain microgeneration technologies. The University of Cumbria should have responsibility for training the next generation of entrepreneurs and engineers for sustainable energy companies, whilst schools can highlight opportunities in the sector as part of their enterprise training.

R&D and Innovation

The European Strategic Technology Action Plan highlights the need to accelerate the development and implementation of low carbon technologies to achieve 2020 and 2050 CO_2 reduction and renewable energy targets. This will require a substantial investment in R&D and innovation to improve the performance and reduce the costs of existing technologies and to bring new technologies to market. To achieve this, both the EU and UK governments are increasing the funding available for R&D and demonstration of sustainable energy technologies and we estimate that around £500 million per annum will be provided through a variety of programmes. In addition, private sector funding sources are focussing more and more on the low carbon energy sector.

There is great scope to support the development of local R&D and technology expertise in Cumbria (e.g. in the nuclear and sub-sea/marine fields) to address the technical and commercial goals which have been identified in the technology road maps which have been produced. There is a need now to select the priority areas for focus, based on local strengths, and to access EU, UK and regional funding sources. It will be important to link into initiatives such as the national Energy Technologies Institute and the Joule Centre in the North West. The main target areas in the short term are likely to be those already

identified for intervention in this report. However, there is also potential to address technologies which are currently further from market such as hydrogen and fuel cells.

Innovation within individual companies is also important and can be supported via various regional grants and support mechanisms available via NWDA.

Awareness Raising

There is also a pressing need to raise awareness of climate change issues and what can be done to reduce emissions amongst public and private sector organisations and the general public. A considerable amount of work is being done at a regional level in this area. This includes developing a climate change 'pledge' scheme and a Climate Change Fund which will use money donated by businesses and individuals to offset their carbon emissions to invest in selected low carbon projects in the region. These initiatives will be underpinned by a widespread communications campaign.

The challenge in Cumbria is to use the regional programmes to best advantage in the county by tailoring them to local needs. The public sector organisations are best placed to lead on this.

5 Stakeholder Consultation

During the course of the investigation, a large number of stakeholders in Cumbria were consulted via either face to face discussions or telephone interviews. The organisations they represent included a wide range of public and private sector organisations, the third sector and individual businesses. Their inputs provided an invaluable insight into what actions are happening already and what more could or should be done to maximise the opportunities for Cumbria's economy. This then informed the intervention evaluations.

Towards the end of the project a Stakeholder Workshop was held at the University of Cumbria Newton Rigg Campus. This was attended by 70 delegates. The programme included an overview of the study findings and an introduction to several of the most promising interventions. An opportunity was also provided for delegates to discuss all of the potential interventions in the 'bubble diagram' with the project team, to indicate which they thought were the highest priority and whether they would like to be involved in taking the action forward.

The results showed that there was widespread support for several of the intervention areas, particularly:

- Building the ***Biomass Supply Chain*** - the Forestry Commission have already done a considerable amount of work and they, together with Cumbria Woodlands, are well placed to take the lead on further activity; a number of other stakeholders also expressed interest in being involved. It was also pointed out that improving under-managed woodlands will have a positive effect on biodiversity.

- Building the ***Microgeneration*** and ***Energy Efficiency Supply Chain***, together with ***Low Carbon Homes*** – Cumbria Action for Sustainability have a good overview of the situation and they and the *"Britain's Energy Coast"* team are keen to take action. The point that these interventions need to be supported by appropriate planning and procurement policies from the County Council and the Local Authorities and should also include non-domestic buildings was made strongly.

- ***Improving Public Transport*** – including better connectivity, low emission vehicles, more provision for cycling and providing public transport as a community service.

- ***R&D and Innovation*** – which must extend beyond the nuclear sector to include sustainable energy technologies, marine renewables and hydrogen. The need to support innovation in individual companies as well as academic based research was also highlighted.

- Developing a ***Wave & Tidal Capability*** – building on existing skills and promoting initiatives such as *"Bridge Across the Bay"* and *"Solway Energy Gateway".*

There was a medium level of support for the ***Green Tourism, Maintaining Peat Bogs, Improving the Energy Performance of Public Sector Buildings*** and ***Assistance to SMEs*** interventions (perhaps lower in this case because there were few small business representatives present). Assistance to large businesses received almost as much support as that for SMEs, indicating that national schemes can benefit from local interventions.

The remaining interventions were not thought to have as high a priority as those mentioned above.

Overall the comments were very constructive and thoughtful and generally supported and added to the project team's analysis. A full summary of the comments made on each potential intervention is available from the authors or via Cumbria Vision.

6 Conclusions

Cumbria's economy is relatively small with around 220,000 employed and a gross value added (GVA) of some £7 billion. Recently it has performed poorly in terms of GVA but has done better in terms of employment. The largest sectors are Tourism (17% of jobs), Specialist Manufacturing (10%), Energy & Environmental (9%) and the Public Sector (24%).

Total CO_2 emissions in the county amount to **7.4 million tonnes** per year, of which 607,000 tonnes (8%) is attributed to traffic on the M6 and so could be said to not 'belong' to Cumbria. Just over 3.8 million tonnes (52%) are due to industry and commerce and of this 988,000 tonnes are emitted by 14 large manufacturing sites. Tourism accounts for between 750,000 and 1,080,000 tonnes (10-15% of total emissions) in transport and buildings energy use and the contribution to retail, catering and recreation activities.

Climate change legislation will not affect all sectors equally, with some (such as large manufacturing companies) already directly affected by a number of measures and others (such as transport) subject to few legislative pressures at the moment. However, the responses to legislation from organisations directly affected, coupled with an increasing expectation on behalf of the general public that action will be taken on climate change issues, means that all sectors of Cumbria's economy are already being affected to a greater or lesser degree. These pressures will increase over the next few years as more legislation is enacted and responses gain momentum.

The main threats in Cumbria from climate change legislation are rising costs of energy through direct or indirect pricing of carbon emissions. This will put pressure on the competitiveness of carbon intensive manufacturing businesses in Cumbria and eventually on logistics and transport operators. However, the effect will be no greater in Cumbria than elsewhere in the UK and the threat is likely to be less than that from other economic pressures such as increasing raw material prices and skill shortages.

In contrast there is great potential in Cumbria for taking advantage of the opportunities provided by climate change legislation and responses to it. Foremost is the potential to build a new nuclear power station at Sellafield, with the associated upgrading of the electricity transmission grid. This must provide the capacity to accept small distributed sources of generation as well as nuclear and large scale wind installations. Cumbria has a long tradition in the energy sector and also has well-developed specialist engineering skills and, latterly, offshore experience. These can be harnessed to develop businesses and supply chains for 'new' energy activities in energy efficiency and renewable energy as well as new activities related to the nuclear industry. The 'new' energy activities include:

- Development of the **biomass supply chain**, based on woody wastes from undermanaged woodlands, together with the **biogas supply chain** based on food manufacturing and farm wastes;
- Development of the **microgeneration** and **energy efficiency supply chains** and local capability in insulation of buildings;
- Development of a capability to serve the emerging **wave and tidal** renewables sector, based on existing skills.

To enable the first two of these interventions to be successful will require much more emphasis within the public sector in Cumbria on using the **planning system** to create demand (e.g. by requiring minimum or zero CO_2 emissions in new developments), and on

sustainable procurement policies to support local firms. Both of these are included in the Climate Change Action Plan but it should be stressed that local authorities in Cumbria have some way to go to reach the levels of other public sector organisations elsewhere in the NW and the rest of the UK.

All of the interventions need to be supported by targeted **R&D and innovation**, a programme of **skills development** and **raising awareness** of the climate change opportunities amongst policy makers, businesses and the general public (making use of the regional work in this area).

There is also significant scope for safeguarding jobs in existing businesses (including some of the carbon intensive ones) by helping them to reduce their carbon footprints, thus mitigating the effect of rising energy prices and increased supply chain pressures. This can be achieved by expanding the current CBEN offering, funded largely from the regional ENWORKS programme. There is also a need to assist larger firms in their carbon management activities, especially in influencing their supply chains.

Within the tourism sector there is an opportunity to promote Cumbria as a "green tourism destination", by providing low carbon alternatives for both accommodation and transport. Increasing the number of tourists will clearly benefit Cumbria's economy but, if not well managed, could also increase the carbon footprint. However if these tourists would otherwise have flown to more far-flung destinations, then Cumbria could claim the net carbon benefit.

We believe that these interventions could create or safeguard around **3000 jobs** in Cumbria. Of these:

- **1000 jobs** are associated with the nuclear supply chain, large scale wind farms and increasing the grid capacity along the west coast;
- **500** would be safeguarded in the manufacturing and tourism sectors;
- **1500** new jobs could be created, primarily in the tourism sector and the biomass, microgeneration and low carbon buildings supply chains.

A considerable amount of activity is already taking place in the county to address many of these issues, not least to secure a new nuclear power station on the west coast, but this study has demonstrated that more needs to be done to maximise the opportunities presented by the new situation.

The actions required in each of the key intervention areas are summarised in the following table:

Intervention Area	Actions Needed	Lead Organisation	Other Participants
Develop Biomass Supply Chain	Establish sources and quantities of woody waste available & build collection infrastructure	Forestry Commission	Cumbria Woodlands, Natural England, landowners
	Identify companies to produce woodchip & pellets; identify suppliers and installers of combustion plant (and persuade them to locate in Cumbria if not local)	Cumbria Vision	Forestry Commission, CAfS, Envirolink NW, equipment suppliers & installers
	Promote biomass heating, initially in public sector buildings. Also target other off gas grid building complexes	CSP	Local Authorities, LDNPA, Cumbria Tourism, CAfs, 3rd sector
	Support biomass heating via Procurement Policies	CSP	Other public sector bodies (esp LAs)
	Support local combustion plant manufacturers to gain Low Carbon Building Programme accreditation	Cumbria Vision	Equipment suppliers, CAfS
	Expand numbers of HETAS registered installers	CREA	Installers, CAfS
Develop Microgeneration Supply Chain	Discuss assistance needed to open up local markets with microgeneration companies	Cumbria Vision	CAfS, microgeneration companies
	Support microgeneration installations via (new) sustainable energy activities, local planning requirements and procurement policies	Local Authorities	CSP, Energy Saving Trust, CAfS, 3rd sector
	Target architects, developers & construction companies to persuade them to include microgeneration in new developments	Local Authorities	CEEAC, CAfS, property developers, architects
	Develop skill base in installations	Cumbria Vision	University of Cumbria, plumbing & heating companies
	Assist microgeneration companies to expand their activities & markets	Business Link NW	CAfS, Envirolink NW

Intervention Area	Actions Needed	Lead Organisation	Other Participants
Develop Energy Efficiency Supply Chain	Identify companies able to provide energy efficiency products & services	Invest in Cumbria	CEEAC, CAfS, equipment & service providers
	Discuss with utility companies mechanisms to increase the use of local installers for the CERT Programme	CEEAC	Energy utilities
	Promote energy efficiency improvements in existing homes and commercial buildings, using local suppliers where possible	CEEAC	Energy utilities, Local Authorities, West Lake Renaissance, CAfS, 3rd sector
	Improve levels of energy efficiency in public sector buildings, using local suppliers where possible	CSP	Local Authorities, other public sector bodies
	Target architects, developers & construction companies to persuade them to include high levels of energy efficiency in new developments	Local Authorities	CEEAC, CAfS, Local Authorities, property developers, architects
	Require low carbon buildings via local planning conditions and procurement policies	CSP	Local Authorities, other public sector bodies
	Develop local skill base in auditing & installation of insulation and other measures	Cumbria Vision	University of Cumbria, CEEAC, construction companies
Develop "Green Tourism" Offering	Provide assistance to tourism related businesses to calculate and reduce their carbon footprint	Cumbria Tourism	LDNPA, CREA, Cumbria Green Business Forum, hotels, guest houses etc
	Develop & promote public transport offerings, 'park & ride' schemes, walking & cycling routes etc	Cumbria Tourism	LDNPA, transport operators, 3rd sector
	Provide low emission vehicles for hire at strategic points	Cumbria Tourism	LDNPA, transport operators, vehicle hire companies, 3rd sector
	Promote Cumbria as a 'green tourist destination'	Cumbria Tourism	LDNPA

Intervention Area	Actions Needed	Lead Organisation	Other Participants
Assistance to Businesses to Reduce their Carbon Footprint	Expand sustainable energy activities for small firms to cover increased numbers and all of Cumbria, using ENWORKS funding plus local resources	CLEAN	ENWORKS, Cumbria Vision, West Lakes Renaissance
	Investigate requirement for assistance to large companies	Cumbria Vision	Carbon Trust, CLEAN, West Lakes Renaissance
	Organise & promote carbon management 'clubs' and supply chains to share knowledge and expertise	Cumbria Vision	CLEAN, Carbon Trust
	Develop local capacity for auditing & advice	Cumbria Vision	University of Cumbria
Develop Energy from Waste Facilities	Investigate quantities of residual waste from municipal and commercial & industrial sources	County Council	Shanks
	Identify suitable sites for EfW facilities to use heat and power	Envirolink NW	Shanks, Furness Enterprise, West Lakes Renaissance, large energy users
	Investigate potential for anaerobic digestion plants to process food waste and farm slurries	Cumbria Vision	CREA, food producers, catering establishments, farmers
Develop Wave & Tidal Energy Supply Chain	Build on existing engineering and offshore expertise to develop capability for wave & tidal installation & maintenance	Cumbria Vision	Furness Enterprise, Envirolink NW, engineering and offshore firms
	Promote deployment of wave & tidal devices around Cumbria coast; use ports as gateway for installation & maintenance	Cumbria Vision	Furness Enterprise, ports authorities, 'Bridge Across the Bay', Solway Gateway, Bendalls Engineering (SeaGen)
	Develop local skills base in wave & tidal engineering	Cumbria Vision	University of Cumbria, Lancaster University

Intervention Area	Actions Needed	Lead Organisation	Other Participants
Support R&D and Innovation in Sustainable Energy Technologies	Investigate EU, UK and regional funding to support innovation in microgeneration, wave/tidal and hydrogen & fuel cells	University of Cumbria	Westlakes Research Institute, Joule Centre
	Bring together suitable partners for R&D and demonstration projects. Stimulate knowledge & technology transfer	Cumbria Vision	ditto
Raise Awareness of Climate Change Issues in Cumbria	Summarise and publicise existing information on the specific impacts for Cumbria, especially the adaptation plans organisations will need to adopt	CSP	County Council, Local Authorities, LDNPA
	Link into regional programmes for climate change pledge schemes and communications programmes and tailor to Cumbria's needs.	County Council	Local Authorities, CSP
	Organise awareness programmes via major employers	CSP	Large public & private sector organisations

These real opportunities will only be realised through bold, coordinated action that combines efforts to simultaneously build supply capacity and stimulate demand for low carbon technologies and services. Cumbria needs to be focussed on what it wants to do and be ambitious in trying to achieve that. There are already sufficient organisations in Cumbria working in the field to take advantage of the opportunities presented and, for some areas, there is significant funding available (e.g. from the regional Climate Change Action Plan and national & EU R&D funds) to help take things forward. The Cumbria Strategic Partnership and Cumbria Vision are well placed to lead the coordination effort required to implement the actions summarised above.