Aberdeenshire COUNCIL

The Bigger Issue

A report on climate change

by the Scrutiny and Audit Committee

February 2007 **SAC Report No. 13**

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SUMMARY

This report sets out the process, conclusions and recommendations of the thirteenth investigation undertaken by Aberdeenshire Council's Scrutiny and Audit Committee. The subject of the investigation was the issue of climate change its implications for Aberdeenshire and Aberdeenshire Council.

The investigation took place during November and December 2006. The Committee heard evidence from both Aberdeenshire Council staff and external witnesses during eight sessions, all advertised and open to the public. Committee Members also conducted two site visits. The Committee considered all the evidence gathered and drew up its conclusions and recommendations at a meeting on 20 December 2006.

The Macaulay Land Use Research Institute in Aberdeen assisted the Committee, both by providing an independent expert to support the investigation and by providing the Committee with an introduction to the science behind climate change. The Committee learned that climate change is a well-understood phenomenon that has been known about for a long time. Data sets going back over 400,000 years confirm that there is a close relationship between temperature and the concentration of greenhouse gases, notably carbon dioxide, in the atmosphere. Recent studies show that the atmospheric concentration of greenhouse gases has risen to unprecedented levels and has increased at an unprecedented rate over the last few decades.

Greenhouse gases are released into the atmosphere through natural processes and human activities. Burning of fossil fuels, in particular coal and oil, the draining and cultivation of land, and livestock-farming are major anthropogenic sources of greenhouse gases. During the drafting of this report, the Intergovernmental Panel on Climate Change, which comprises 2,500 of the world's leading climatologists, announced its conclusion that it is now more than 90% certain that human activities are responsible for increasing atmospheric concentrations of greenhouse gases.

Increased greenhouse gas concentrations will change, and indeed already are changing, global climate patterns. Increased temperatures will drive changes with consequences ranging from desertification to increased flooding, and from melting of significant ice sheets to more frequent, more powerful hurricanes.

The Committee heard that observed data show that climate change is real and happening already in Aberdeenshire. Since 1961, Aberdeenshire has experienced a rise in average summer and winter temperatures, fewer days with air frost and more autumn and winter days with heavy rain. Such changes to the local climate are consistent with the predictions of sophisticated computer models, which suggest that in future Aberdeenshire is likely to have warmer and drier summers; warmer and wetter autumns and winters; and more powerful storms, more often. The impacts of such changes could include increased pressure on fresh-water supplies, increased risk of flooding, a rise in sea level and increased weather damage to infrastructure and buildings.

However, the Committee heard that it is not necessarily all bad news. Many witnesses stated that early action to respond to the challenges of climate change brings with it tremendous opportunities. For example, action to improve energy

efficiency can help tackle fuel poverty. The North-east is especially well-placed to take advantage of economic development opportunities arising from climate change in, for example, the fields of renewable energy, forestry, construction and agriculture. Such statements back up the findings of the Stern Review on The Economics of Climate Change, which were released in the week the investigation began. This authoritative document concluded that alongside environmental, social and moral reasons to reduce greenhouse gas emissions, there is a sound economic basis to do so too.

Deciding what Aberdeenshire Council should do about climate change comes down to risk management. Is it more risky to take strong, early action to reduce greenhouse gas emissions and adapt to the projected impacts of climate change, or is it more risky to carry on with 'business as usual' and hope that climate change goes away? Having heard all the evidence the Committee is convinced that climate change is an incontrovertible fact, with serious implications for Aberdeenshire, Aberdeenshire Council and the rest of the world. 'Business as usual' is not a rational option. Significant change is required to 'future proof' Aberdeenshire and this needs to happen quickly.

Having concluded that the balance of risk shows that bold and urgent action is the most prudent course, the Committee strongly recommends that Aberdeenshire Council take the following two strategic decisions:

1. Commits itself to becoming a carbon neutral organisation in the short to medium term e.g. by the year 2020. This will make it one of the first local authorities in the UK to do so. The Council will need to examine the feasibility of achieving carbon neutrality within 10, 15 or 20 years, but should aim at the shortest practicable timescale.
2. Instigates an urgent dialogue with local partners – Community Planning partners, businesses, educational and research institutes and citizens – to agree the actions, process and resources needed to achieve the aim of Aberdeenshire becoming a carbon neutral region in the medium term, e.g. by 2030. The possibility of a similar commitment by neighbouring councils and their partners should be explored.

Clearly further action at all levels of the Council will need to follow to achieve such far-reaching ambitions. The evidence from a large number of witnesses shows that such ambitious aims are a logical extension of the good work already undertaken at both corporate level and at the level of individual Services within Aberdeenshire Council to prepare for climate change and mitigate greenhouse gas emissions. Examples include signing up to the COSLA Declaration on Climate Change and the Carbon Trust's Carbon Management programme, as well as work in the field of energy efficiency and transport planning. The Committee has made a number of suggestions for further action based on the evidence heard during the investigation, but this list is not, and is not meant to be, exhaustive.

The Committee's investigation took place against the background of intense media interest in and public concern about climate change. Many witnesses stated that the time has never been better for action. Climate change presents an opportunity for Aberdeenshire Council to play a leading role in Scotland and the UK by living up to its new Vision of being the best Council, serving the best area, in Scotland.

1 INTRODUCTION

1.1 The Scrutiny and Audit Committee

1.1.1 Within Aberdeenshire Council's Scheme of Delegation, the Scrutiny and Audit Committee is empowered to:

- Review the effectiveness of Council policy implementation and Council service delivery and to identify potential improvements;
- Undertake an annual programme of reviews; and,
- Make recommendations regarding improvements to the performance of Services.

1.1.2 In carrying out its reviews, the Scrutiny and Audit Committee is able to:

- Call upon any officer of the Council or Chair/Vice-chair of the Council's committees to give evidence or provide written reports, as appropriate; and,
- Call upon expert witnesses or members of the public to give evidence, where necessary.

1.1.3 The Committee operates according to the following principles of working:

Deliberative	Outward-looking
Investigative	Inclusive
Open	Influencing
Evidence based	Proactive
Transparent	Flexible
Accountable	Non-partisan
Responsive	

1.2 This investigation

1.2.1 The Scrutiny and Audit Committee, at its meeting on 6 September 2006, approved an investigation into Aberdeenshire Council's response to climate change. The Committee chose this topic because of the growing realisation that climate change is a major threat with potentially very serious consequences. The Committee was aware of actions by the Council intended to reduce greenhouse gas emissions and to prepare for climate change, and wanted to assess the effectiveness and adequacy of these measures. Given recent scientific findings, the Committee considered that it was time to examine whether there were further steps the Council should be taking to reduce the risks arising from climate change.

1.2.2 It was agreed that the purpose and objectives of the investigation should be to establish:

- What steps the Council has taken to prepare for expected changes in climate.
- The contribution the Council is making to reducing the emissions of pollutants that are causing climate change.
- The adequacy of the adaptation and mitigation measures adopted.

The detailed brief for the Committee's investigation is attached as Appendix A.

1.2.3 Because of the high level of public awareness and concern about climate change, for this investigation the Committee decided to conduct all interviews with witnesses in public. The nature of the topic was such that it was considered unlikely that witnesses would need to disclose any confidential information in order to answer the questions put.

1.2.4 The Scrutiny and Audit Committee members who were involved in this investigation were Councillors P J Argyle, G Barnes, D Cameron, J C Davidson, D S Duthie, T A Fleming, M A Ford (Chair), W Howatson, A Leitch, B J Luffman, A M Ritchie and J J Strathdee.

1.2.5 It has been agreed that the Scrutiny and Audit Committee should appoint independent external experts to assist with its investigations where appropriate. For this investigation, Professor Bill Slee of the Macaulay Land Use Research Institute in Aberdeen provided independent expert advice to the Committee. Professor Slee is Science Group Leader of the Socio-economics Research Group at the Macaulay Institute and Visiting Professor of Rural Economy at the Countryside and Community Research Unit at the University of Gloucestershire. His core research interests are the socio-economic adaptation of rural areas, the diversification of the rural economy and sustainable rural development.

2 HOW THE INVESTIGATION WAS PROGRESSED

The Committee undertook a range of different activities to enable it to carry out this investigation.

2.1 Documentation

2.1.1 A range of background documentation was provided to the Committee at the commencement of the investigation. This included information from both within and outwith Aberdeenshire Council:

(a) Climate Change Frequently Asked Questions – Friends of the Earth.
(b) Changing Our Ways: Scotland's Climate Change Programme – Scottish Executive.

(c) Selected information for local authorities – the European Climate Alliance:
- The Climate Alliance Methodology.
- Activities and Outcomes in the Climate Alliance Spheres of Action.
- Ten Golden Rules of Monitoring for CO_2.
- The Adaptation and Mitigation Integrated Climate Policy Approach (AMICA) Mitigation Scan.
- Members of the European Climate Alliance.

(d) Glossary of Climate Change Terms – Intergovernmental Panel on Climate Change.

(e) Aberdeenshire Council Sustainability Charter Report 2006.

(f) Update On Biomass, Biofuels And Sustainability Initiatives In Aberdeenshire – confidential report to Aberdeenshire Council's Senior Management Team, 28 August 2006.

2.1.2 Coinciding with the start of the Scrutiny and Audit Committee's investigation, on 30 October 2006 Sir Nicholas Stern published his report 'The Economics of Climate Change'. The Executive Summary of 'The Stern Review' was provided to Councillors at the Committee's meeting on 8 November 2006.

2.1.3 Additional written information was provided to the Committee during the investigation by witnesses:

(1) Waste Management in Scotland (CD) – from Tom Anderson, Environment Partnership Officer, Scottish Environment Protection Agency.

(2) Report on performance of wind turbines versus energy saving techniques – from Brian Smith, Engineering Services Manager, Aberdeenshire Council.

(3) List of energy saving opportunities and payback times – from Brian Smith, Engineering Services Manager, Aberdeenshire Council.

(4) One Planet Living: An Agenda for Scotland (WWF Scotland) – from Debbie Burroughs, Natural Heritage Environment Team Leader, Aberdeenshire Council.

2.1.4 Shortly before this investigation began, Aberdeenshire Council adopted a new Vision, committing it to be the best council in Scotland (Appendix C). The content of this Vision was referred to a number of times during the investigation.

2.1.5 During the drafting of this report, Aberdeenshire Council signed the Convention of Scottish Local Authorities (COSLA) Climate Change Declaration (Appendix D). Signatories to the Declaration commit themselves to achieving significant reductions in greenhouse gas emissions.

2.2 Witnesses and evidence gathering

2.2.1 Members of the Committee met a cross-section of Aberdeenshire Council officers involved in delivering services impacting on or impacted by climate

change. The Committee sought their views on how well the Council was addressing climate change issues and how they considered the Council could improve its performance in this field. Officers interviewed included: the Chief Executive, the Director of Transportation and Infrastructure, the Head of Roads, the Head of Planning Policy and Environment, the Corporate Finance Manager, the Developer Contributions Co-ordinator and the Engineering Services Manager. The full list of Aberdeenshire Council staff who appeared as witnesses during the investigation is given in Appendix B. The Council's Head of Personnel responded in writing to questions from the Committee.

2.2.2 Individuals with relevant expertise from a wide range of organisations were invited to give evidence to the Committee. Amongst those who appeared before the Committee were: the Chief Executive of the Macaulay Land Use Research Institute, the Communications Officer of Friends of the Earth Aberdeen, the Convener of Aberdeenshire Environmental Forum, the Emerging Issues Team Leader of the Scottish Environment Protection Agency and a Reader in Architecture at The Robert Gordon University. A full list of the external witnesses interviewed during the investigation is given in Appendix B.

2.2.3 Members of the Committee visited Alford Academy to take evidence from pupils and teachers. As well as being an Eco School, Alford Academy is one of only six schools in Scotland participating in the Sustainable Secondary Schools Project.

2.2.4 Members of the Committee visited Kintore Primary School to see at first hand a brand new building featuring many energy-saving measures. Aberdeenshire Council's Principal Architect for Public-Private-Partnership (PPP) projects and the contractor responsible for the school took Members on a guided tour and answered questions. A report on this visit is attached as Appendix E.

2.2.5 Members of the Committee also visited the Belmont Cinema in Aberdeen to attend a screening of the Al Gore film on climate change, 'An Inconvenient Truth'.

2.2.6 Full details of the evidence given to the Committee by witnesses are contained in the agenda papers for the Scrutiny and Audit Committee meeting on 1 February 2007 and those of subsequent meetings. These are located on the Council's Arcadia intranet system. These are public documents and can be made available on request.

3 THE REALITY OF CLIMATE CHANGE

3.1 The science

3.1.1 Professor Richard Aspinall, Chief Executive of the Macaulay Land Use Research Institute, outlined to the Committee the physical and chemical

processes responsible for 'global warming'. He explained that the basis of the phenomenon was well understood and had been known about for a long time.

3.1.2 The molecules of certain gases ('greenhouse gases') retain some of the sun's energy in the Earth's atmosphere. In so doing, they keep the temperatures on Earth suitable for life. Amongst these gases are methane, nitrous oxide and, notably, carbon dioxide (CO_2). Very long-term data sets confirm there is a close relationship between temperature and the amount of CO_2 and other greenhouse gases in the atmosphere. Over many hundreds of thousands of years, fluctuations in atmospheric CO_2 concentration have been paralleled by changes in climate.

3.1.3 For more than 400,000 years prior to the industrial revolution the concentration of CO_2 in the Earth's atmosphere remained close to 300 parts per million. Since then, the concentration has been increasing. In the second half of the twentieth century, the rate of increase accelerated. Recent studies show that the concentration had risen to around 375 parts per million and has increased at an unprecedented rate.

3.1.4 Professor Aspinall outlined how greenhouse gases were released into and absorbed from the atmosphere through many natural processes. He also listed human activities that resulted in the release of greenhouse gases into the atmosphere. The burning of fossil fuels, in particular coal and oil, is a major source of CO_2. The draining and cultivation of land also results in CO_2 emissions. Livestock are a source of methane. Professor Aspinall said there was a clear scientific consensus that anthropogenic (i.e. human generated) greenhouse gas emissions were contributing to climate change. Human activity, not some natural cycle, was the cause of the steady rise in atmospheric CO_2 concentration from one decade to the next. During the drafting of this report, the Intergovernmental Panel on Climate Change announced its conclusion that it is now more than 90% certain that human activities are responsible for increasing atmospheric concentrations of greenhouse gases.

3.1.5 Professor Aspinall explained to the Committee that The Stern Review categorised the anthropogenic sources of greenhouse gases as 'energy related' or 'non-energy related'. Energy-related emissions come from power generation (24% of the global total), from transport (14%), from industry (14%) and from buildings (8%), with a further 5% from other sources. Non-energy-related emissions come from land use (18%), agriculture (14%) and waste (3%). The amount and sources of emissions will vary from area to area depending on such things as land use, climate and the economy.

3.1.6 Professor Aspinall stressed that climate change caused by increased atmospheric concentrations of greenhouse gases is not expected to affect all parts of the planet equally. Sophisticated computer models have been built and shown to be able to predict changes that have now actually happened. So, while there is uncertainty attached to the predictions of climate change models, the results from them have to be taken seriously. Warming is expected to be greatest at the poles (especially the north pole) and least in

the tropics. Weather patterns will change as a result. Some regions are predicted to become warmer and drier, leading to desertification. Heat waves are expected to become more frequent across Europe. There may be an increase in the frequency and intensity of storms, for example hurricanes in the Caribbean. The north pole is likely to become ice-free in summer. However, Professor Aspinall stated that the scientific consensus was that the Gulf Stream would not be 'switched off'. If this did happen, it would leave North-west Europe, including Scotland, with a much colder climate.

3.1.7 The consequences of changes in climate and weather are bound to be far-reaching. Retreating glaciers, as shown in Al Gore's film, will cause sea levels to rise, leading to the inundation of populous coastal areas. More people will be killed by heat waves. Damage to buildings and other property as a result of storms is likely to increase. In some regions, the range of crops that can be grown will change. Some pest species and diseases will be able to expand their range. The disappearance of sea ice may result in polar bears becoming extinct. The Stern Review concluded that, in the long term, the impact of rising temperatures on global economic output could be to reduce it by as much as 20%.

3.1.8 It is clear that climate change is already happening. Even since the Kyoto Protocol, progress has been made towards securing further international agreements to cut greenhouse gas emissions and bring the situation under control. The latest report from the Intergovernmental Panel on Climate Change projected that global average temperature will probably rise by between 1.8^{o}C and 4^{o}C over the next century, although increases as small as 1.1^{o}C or as large as 6.4^{o}C are within the range of possibilities. Sea level is expected to rise by about 40 centimetres by 2100. Global warming is forecast to continue to contribute to melting of the Greenland ice sheet beyond 2100, perhaps eventually leading to its total disappearance. If that were to happen, the resultant rise in sea level would be around 7 metres.

3.1.9 The Stern Review focused on the feasibility and cost of stabilising greenhouse gas concentrations in the atmosphere in the range 450–550 parts per million carbon dioxide equivalents (CO_2e[1]). Stabilising at or below 550 parts per million CO_2e would require global emissions to peak in the next 10–20 years, and then fall at a rate of at least 1–3% per year. By 2050, global emissions would need to be around 25% below current levels. These cuts will have to be made in the context of a world economy in 2050 that may be 3–4 times larger than today – so emissions per unit of world GDP would need to be just one quarter of current levels by 2050. To stabilise at 450 parts per million CO_2e, without overshooting, global emissions would need to peak in the next 10 years and then fall at more than 5% per year, reaching 70% below current levels by 2050.

[1] CO_2e is a metric measure used to compare or sum the effect of different greenhouse gases based on their global warming potential (GWP), usually expressed in 'million metric tonnes of carbon dioxide equivalents'. For example, the GWP for methane is 21 and for nitrous oxide 310. This means that emissions of 1 million metric tonnes of methane and nitrous oxide respectively are equivalent in effect to emissions of 21 and 310 million metric tonnes of CO_2.

3.2 The implications of climate change for Aberdeenshire

3.2.1 Climate change is going to make the world a different place. Clearly, central to this investigation was what the consequences might be for Aberdeenshire and for Aberdeenshire Council.

3.2.2 Computer models predict that climate change will result in the North-east having higher mean annual temperatures, changed precipitation patterns and increased intensity and frequency of violent storms. In essence, Aberdeenshire is expected to have:

- Warmer and drier summers;
- Warmer and wetter autumns and winters; and
- More powerful storms more often.

3.2.3 Professor Aspinall showed the Committee climate data from the period 1961–2004. These data confirmed that the climate of the North-east has already changed, in line with the predictions of climate change models:

- All seasons have, on average, become warmer. In 2004, maximum temperatures in summer were 1.0–1.3^{o}C warmer than in 1961. In winter, they were 1.3–1.6^{o}C warmer. By 2004, the number of days per year with air frost had fallen by 20–30 since 1961.
- Precipitation patterns have changed. Summers have become drier whilst both autumn and winter have become 20% wetter. The number of days with heavy rain (10 millimetres or more) has increased in both autumn and winter.

3.2.4 Aberdeenshire Council's Head of Roads provided anecdotal evidence that also indicated there had been a change in the climate. In 2005, no gritting of roads had been required in Aberdeenshire during the month of October. The Head of Roads said this was the first time that this had occurred in his 30 years of council service. He thought it was highly likely that no gritting had been required in October 2006 either.

3.2.5 Professor Aspinall stated that, in the short term, there are likely to be both winners and losers as a result of climate change. In the medium and longer term, there are only losers. Some regions of the world – around the latitude where Aberdeenshire sits – may, for a time, have an improved climate. The Stern Review forecast that for northern latitudes, short-term benefits might include a net increase in agricultural yields, lower winter mortality, lower heating requirements and a possible increase in tourism. On the downside, however, these latitudes will experience the most rapid rates of warming with consequent longer term impacts on infrastructure, human health, rivers, soils, land use, transport and biodiversity. All of this will impact on local livelihoods and have major implications for the delivery of public services.

3.2.6 As an example of what might happen, Professor Aspinall outlined the predicted impact of climate change on rivers in Aberdeenshire. He told the Committee that there was likely to be both increased flooding in autumn and lower water levels and higher water temperatures in summer. Such changes would have consequences for fish populations, with knock-on effects for tourism, jobs and the economy. Because of low river levels, shortages of water for industrial, agricultural and domestic use could become all too common.

3.2.7 Professor Aspinall described other ways climate change might affect Aberdeenshire. Higher temperatures could change the range of crops, or the varieties of crops, that farmers could grow. Demand for bio-fuels could open up new opportunities for agriculture. Some pests and diseases of crops could spread north – aphids (which transmit plant viruses) being a particular threat to the seed-potato industry. Invasion by non-native species could also be a threat to the area's native plants and animals. Any increase in storms would create problems for forestry. Decreased amounts of snow could wipe out the ski industry and cause the loss of some montane species from the Cairngorms. Higher summer temperatures may make conditions unsuitable for some previously common species, impacting on biodiversity. However, better summers may boost tourism, and there was some evidence of this already happening. Rising sea temperatures could cause fish stocks to move away northwards, threatening the viability of Aberdeenshire's fishing fleet.

3.2.8 The Committee heard that the expected increase in the incidence of storms and heavy rain would bring problems for Aberdeenshire Council of several kinds. Officers from the Council's Transportation and Infrastructure Service expressed concern that the worst and most expensive impacts would be in areas that were their responsibility. Damage to buildings and roads was likely to be more frequent and/or severe. Flooding would become a bigger problem, landslides more frequent. Insurance costs would inevitably rise as more claims were made because of damage to buildings. The increased frequency of extreme weather events would result in all kinds of public services being disrupted more often. There would probably be a rise in the number of incidents needing an emergency response.

3.2.9 While warmer winters would lead to a reduction in winter road maintenance, a longer growing season would increase the requirement for grass cutting and other grounds maintenance. More ventilation or even air conditioning may be required in Council buildings, as summers get warmer. Air conditioning would be expensive to install and run, as well as using energy. Increased greenhouse gas emissions would result, unless the energy needed was generated from renewable sources. Increased summer temperature could mean that road surfaces melt, disrupting the movement of people and goods, with knock-on social and economic costs.

3.2.10 Any significant rise in sea level would cause problems for Aberdeenshire Council in relation to its harbours and some other coastal properties. Additional expenditure may be necessary on coastal defence works.

3.2.11 Future legislation to force councils and other organisations to take action to tackle climate change could cause budgetary problems for the Council and threaten its financial well being – unless the Council anticipates measures of this kind and prepares for them, or acts in advance.

4 RESPONSIBILITY FOR EMISSIONS

4.1 Aberdeenshire

4.1.1 As part of this investigation, the Committee commissioned the Macaulay Land Use Research Institute to produce an estimate of the share of Scotland's total greenhouse gas emissions attributable to the area of Aberdeenshire. The idea of an 'Aberdeenshire share' follows the Scottish Executive example set out in the document 'Changing Our Ways', in which the Scottish Share of UK greenhouse gas emissions is calculated. The full results of the work carried out by Peter Shannon of the Macaulay's Socio-Economics Research Group are attached as Appendix F to this report.

4.1.2 The Macaulay Land Use Research Institute used a number of different datasets to explore carbon dioxide and other greenhouse gas emissions from Aberdeenshire. The work undertaken showed that greenhouse gas emissions totalled close to 7 million tonnes CO_2e from Aberdeenshire in 2003, representing 11.4% of the Scottish total. This places Aberdeenshire as the second highest emitting local authority area in Scotland. Such a high proportion of emissions may seem somewhat surprising given Aberdeenshire's relatively low population density, but it can be explained by the methodology used to estimate emissions. This is based on emissions at source, so power generation is attributed to the area where it takes place rather than where the electricity is used. Emissions from combustion in the energy production sector, specifically the power station at Peterhead, account for over half of Aberdeenshire's total output. Fife, Falkirk and East Lothian also have high emission figures because of the presence of power stations.

4.1.3 In spatial terms, the area around Peterhead accounts for over half of Aberdeenshire's emissions (one km^2 grid square contributes over 3 million tonnes of CO_2 annually). This is because of the presence there of Peterhead power station, and illustrates the potential of the planned carbon capture and storage project to greatly reduce Aberdeenshire's greenhouse gas emissions[1]. Otherwise, the distribution of emissions in Aberdeenshire generally reflects the locations of the transport infrastructure and major towns. Areas of low population density in the west of Aberdeenshire have a low level of greenhouse gas emissions. This is attributable to the lack of transport infrastructure, industry and the upland character of these areas.

4.1.4 The intensity of Aberdeenshire's farming systems leads to higher than average emissions for the farm sector. There is a marked central Buchan concentration of emissions, which is attributed to high livestock density and consequent methane and nitrous oxide emissions. The relatively light industrial emissions from Aberdeenshire reflect the overall structure of the

area's employment. The higher level of rurality in Aberdeenshire, when compared with the Scottish average, accounts for the lower levels of emissions from residential and commercial sources. The overall contribution of the transport system to the total emissions is low over the majority of Aberdeenshire, but there is a high level of impact along the major transport corridors.

4.2 Aberdeenshire Council

4.2.1 The greenhouse gases produced as a result of Aberdeenshire's Council's activities come from different sources and are on a different scale to the emissions from the area as a whole. So, Aberdeenshire Council is not in the business of power generation, although during the investigation the Committee did hear of pilot studies into the possibility of generating power at Council buildings for the Council's own use. However, the Council does use a large amount of energy in providing its services and that energy must be generated somewhere on the Council's behalf. The Council already purchases its electricity from renewable sources – which produce little or no CO_2. By doing this the Council is helping to encourage the market for renewable electricity. Arguably, though, the Council is not, in the short term, preventing CO_2 emissions, merely shifting them onto other purchasers of grid electricity. The Council uses gas and oil for heating purposes, and these do, of course, produce CO_2 when burnt.

4.2.2 The Council owns and operates a large number of buildings. Together, these buildings constitute a major source of CO_2 emissions. The Council's 13,500 houses were mostly built before 1970. Some still have poor insulation levels and resultant low energy efficiency. The Council has almost 38,000 street lights.

4.2.3 All waste management practices impact on climate change, with the exception of waste prevention. Greenhouse gas emissions arise in two main ways from waste management. Firstly, landfill sites produce CO_2 and methane. Secondly, the combustion of fossil fuels by vehicles used in waste collection and transportation produces CO_2 and other greenhouse gases.

4.2.4 The Council's Head of Transportation and Fleet Manager explained to the Committee that the main climate change issue in the field of transportation is the emission of greenhouse gases (mainly CO_2) from vehicles. Staff from all the Council's Services travel on Council business, some long distances. Many Council staff commute to work by car. Greenhouse gas emissions arise from the Council's own vehicle fleet, from vehicles providing services bought in by the Council and from private vehicles using the roads maintained by Aberdeenshire Council. In terms of the Council's own fleet, the Fleet Manager highlighted the main issues as the number and age of vehicles, the specification of emission standards, the fuels used and driver behaviour. For contracted services, the main issues were the specification of emission standards and whether there were contractors available to meet those standards.

4.2.5 Projected population figures show that Aberdeenshire's population will increase by around 7% over the next 20 years as many people currently living in Aberdeen City choose to move out to Aberdeenshire. The projections show that many will, however, continue to work in Aberdeen City and will commute every day. According to Aberdeenshire Council's Chief Executive, it is vital that land use planning – starting with the new structure plan – works more effectively to manage these changes in a way that does not increase environmental impacts. In his view, the current level of commuting is unsustainable. The Head of Planning Policy and Environment supported this view by stating that if we must get one thing right to make an impact on greenhouse gas emissions, it will be the new structure plan which will guide where people live, work and enjoy leisure opportunities.

5 HOW WELL IS ABERDEENSHIRE COUNCIL DOING?

5.1 Commitments and actions so far

5.1.1 During the investigation, the Committee heard evidence from both internal and external witnesses about steps that Aberdeenshire Council was already taking to adapt to climate change and reduce its greenhouse gas emissions. The initiatives described included both broad policies at corporate level and specific actions at the operational level of individual Services.

5.1.2 The Council's Chief Executive told the Committee that the Council had both a statutory obligation and a moral responsibility to show leadership. The Council should seek to influence others. It had a duty to plan for the future prosperity of Aberdeenshire. He considered that the Council had already done much good work to reduce greenhouse gas emissions. In support of this view, he cited a recent visit by representatives of the Carbon Trust who had come to help the Council start its Carbon Management Programme. They had given examples of actions that Aberdeenshire Council could take to achieve early successes – but the Council had already done them all. In the view of senior management, conditions were now right within the Council to move on and do more. However, progress would also depend on national political will and on wider society.

5.1.3 Aberdeenshire Council's Head of Policy advised the Committee that environmental issues and climate change featured strongly in key, overall, Council policies including:

- The new Council Vision – which includes the words 'sustain' and 'special environment'.
- The Strategic Plan – which includes a 'sustainable environment' theme and measures of success that include becoming carbon neutral.
- The Sustainability Charter – which sets out what the Council will do to make itself more sustainable. Alongside actions such as 'reduced use of resources' and 'raising awareness', an overarching theme within the Charter is reducing greenhouse gases'. The long-term goal is to 'significantly reduce the [Council's] production of greenhouse gases by 2050.'

The Head of Policy also mentioned two recent initiatives that were highly relevant to the Committee's investigation and important for future policy development and implementation across the Council. These were the Council's signing of the COSLA Climate Change Declaration (see Appendix D) and the establishment of the Council's Carbon Management Programme. Other officers confirmed that the Carbon Management Programme was an important initiative. It was expected to deliver a clear list of priority actions for cutting CO_2 emissions, based on cost and effectiveness.

5.1.4 The Aberdeenshire Community Plan, agreed by the Council and its public sector partners, sets out a plan for the Council and other major public service agencies to work together to deliver better, more coordinated services and encourage communities to play a more important role in local decision making. The aim of the Aberdeenshire Community Plan is to improve quality of life for everyone in the area. One of its six underlying principles is 'sustainability' and one of its five key themes is 'sustainable environment'. Specific mention of "combating climate change" is made under this theme.

5.1.5 Aberdeenshire Council was a partner with Aberdeen City Council and WWF Scotland in the North East Global Footprint Project. If the Earth's resources were fairly divided over the global population, everyone on Earth would have a 'fair Earth share' of 1.9 hectares to sustain their lifestyle, i.e. grow their food, build their home, generate their energy and absorb their waste. The North East Global Footprint Project showed that residents of Aberdeen City and Aberdeenshire have an average Global Footprint of around 5.8 hectares, i.e. three times their fair Earth share. In other words, the current North-east lifestyle requires not one but three planets to sustain it. Main areas of concern for the North-east were transport, buildings and energy, with much of the impact of these being due to greenhouse gas emissions.

5.1.6 The Head of Planning Policy and Environment described his Service's Council wide remit for sustainability. Specific initiatives mentioned included undertaking Strategic Environmental Assessment work, producing the Council's Sustainability Charter and its annual progress report and managing the Council's participation in the North East Global Footprint project. His Service also co-ordinates the Council's involvement in the Carbon Trust's Carbon Management Programme through the Environment Team. The Service has organised and delivered a training programme on sustainability for a small number of staff and hope to extend this.

5.1.7 The Purchasing Manager of the joint purchasing arrangement at Whitemyres with Aberdeen City Council told the Committee about Aberdeenshire Council's Sustainable Purchasing Policy. In accordance with the requirements of Best Value, the Council's purchasing policy took into account sustainability, including climate change. So, for example, the Council specified that some items must be made using recycled materials. Tough energy efficiency standards were set for electrical goods. To try to reduce the long-distance transport of goods, a lot of work had been done with local suppliers to advise them on what the Council was looking for. Items were sent out from the depot

at Whitemyres grouped so as to minimise the number of trips by delivery lorries. By adopting these measures, the Council was reducing the impact of its operations on the environment and climate change. It was also influencing what manufacturers bought and produced, and how they behaved. The Council was still able to procure goods and services at attractive prices. The Council's joint procurement initiative with other public sector organisations, currently Aberdeen City Council, the Moray Council and Grampian Police and Fire Boards, with investigations underway into cross-sectoral opportunities with NHS Grampian and local colleges and universities, offered – with the right specification – further opportunities to reduce environmental impact and develop the market for greener products.

5.1.8 Aberdeenshire Council's Head of Information and Communication Technology informed the Committee that since 2001 his Service had specified that Council computers and printers must conform to the energy saving 'Energy Star' standard. He also drew attention to the recent 'Energy Savings from Aberdeenshire Council Computers' report by the Council's Energy Management Team. This report concluded that, as there was limited scope to make more savings, "no further attempts to reduce energy consumption by computers should be carried out". The 'Nomad' and 'Gateway' projects underway within different Services of the Council were mentioned as examples of initiatives to identify how Information and Communication Technology could play a part in re-designing Council processes to facilitate remote, mobile and flexible working. This might reduce the need for staff to travel and thus save money, save energy and reduce greenhouse gas emissions. Such use of Information and Communication Technology to reduce need to travel was also seen as an important issue by the Council's Head of Personnel. However, she admitted that greenhouse gas emissions were not a priority for Personnel, whose focus was on helping staff implement their duties. The Council has tele-working policies that, insofar as is possible, encourage employees to minimise their need to travel.

5.1.9 The Committee was told by the Head of Transportation about the Council's green travel initiative for staff and Councillors described in the policy document, 'A Travel Plan for Aberdeenshire'. The Travel Plan outlines approaches and measures to enable the Council to manage its travel needs in a more environmentally sustainable manner. Through a mixture of advice, information, and incentives, the Travel Plan seeks to reduce the need to travel and encourages alternatives to single occupancy car use, such as car sharing, public transport, cycling and walking.

5.1.10 As regards Aberdeenshire Council's own fleet of vehicles, the Fleet Manager informed the Committee that using alternative fuels in the form of Liquified Petroleum Gas had already been trialled but had not proved popular with users. Inconvenience and poorer vehicle performance were cited as the main complaints. Electric vehicles had also been tried but had a poor range so were of limited use in rural areas but continued to be used in Fraserburgh and Peterhead. The Council's fleet included specialist vehicles such as refuse collection lorries and snow ploughs, but over a third were standard models of vans and minibuses. Generally, individual vehicles were used exclusively by

one Service and some were needed for fewer than five days a week. The Fleet Manager saw this as inefficient. If vehicles were shared across Services, the Council would not need so many. Opportunities for increased vehicle sharing and better utilisation were being examined through a Kaizen performance improvement process.

5.1.11 Aberdeenshire Council had a wide variety of buildings of different ages and quality, according to the Head of Property. Some were well constructed and had efficient heating and lighting. A large number were older and were less energy efficient. The Asset Management process had confirmed that many of the Council's buildings required significant investment. The Council's Energy Management Team had a rolling programme of action funded by the Central Energy Efficiency Fund which was expected to save 2.8 million kWh, or £85,000 per year. Between January and December 2005, Aberdeenshire Council's energy consumption for all buildings was 181.4 million kWh. The Engineering Services Manager explained that the energy conservation projects to be funded were agreed with individual Services. Projects had to have a payback period of 3–5 years to be eligible for funding. In addition to energy saving measures, research had been undertaken on the potential for energy generation – for example, through installing wind turbines on buildings. Payback times were often lengthy, but pilot projects were likely. In general, given that the Council had so many buildings that were not very energy efficient, energy conservation was a better option, both financially and environmentally. Heating and lighting offered the greatest scope for savings because they accounted for the bulk of energy use in buildings. Relatively, consumption by computers and other equipment was insignificant. The Head of Property confirmed that low-energy light bulbs were in general use in Council buildings. However, more needed to be done to raise awareness amongst staff that lights and most equipment should be switched off when not in use. The Council was purchasing its electricity for non-residential properties from accredited new renewable energy sources. For its housing stock, the Council was buying electricity generated by large scale hydro schemes. This had been secured through a specific agreement with the supplier.

5.1.12 Aberdeenshire Council's Head of Environmental Health and Waste Management informed the Committee that his Service had undertaken an audit of waste arising from the Council's operations, including office waste and that produced by schools. The findings of the waste audit would be published early in 2007. Staff and pupils at Alford Academy, one of many Eco Schools across Aberdeenshire, indicated that they would be keen to recycle more of their waste, for example, plastic bottles, but due to lack of facilities this had proved impossible. The commitment, enthusiasm and knowledge of the children and teachers at Alford Academy impressed the Committee. Pupils and teachers alike said they were aware of climate change and most were concerned about it.

5.1.13 Aberdeenshire Council's Head of Housing and the Principal Policy Officer for Stock Renewal informed the Committee that the Council owned 13,500 houses. Most were built before 1970 and their condition varied. External

drivers such as the Scottish Executive's Fuel Poverty Eradication Strategy and Scottish Housing Quality Standards were driving energy efficiency improvements to existing Council housing stock, but that there was also a commitment to reducing CO_2 emissions for environmental reasons. The Housing representatives informed the Committee that Aberdeenshire Council was "ahead of the game" by deciding, after "quite a bit of thought", to future-proof its properties to some extent, by going beyond the minimum standards required for insulation and double glazing. Under Best Value procurement, sustainable, local materials were consciously sourced even though they were not always the cheapest. A training scheme for apprentices has been established with local contractors. Innovative technologies, like ground- and air-source heat pumps, were being tested on Council properties. Energy-efficiency training had been given to 120 housing staff.

5.1.14 Aberdeenshire Council's Head of Environmental Health and Waste Management spoke of the changes affecting the Council's household waste collection service. These changes were being driven very much by environmental concerns, though not necessarily climate change. In line with the European Landfill Directive, the Council had to reduce the amount of biodegradable waste going to landfill. The Scottish Executive was preoccupied with targets for increasing the percentage of waste being recycled. The Council itself had adopted a Sustainable Waste Management Strategy, based on the accepted hierarchy of 'reduce, reuse, recycle'. This recognised that the best approach to dealing with waste was to try to avoid producing it in the first place. Educating and advising the public was, accordingly, a major focus. The Head of Environmental Health and Waste Management said that it was not known what impact the Council's new waste collection arrangements would have on greenhouse gas emissions. However, he was confident the increase in recycling would, overall, result in emissions being reduced. This was because so much less energy was required to make items such as bottles and tins if the materials used were being recycled, compared with the same items made from new raw materials. The Head of Environmental Health and Waste Management accepted that decision-making needed to be based on environmental 'hard facts' rather than 'gut feeling'. On the issue of methane escaping from landfill sites, the Head of Environmental Health and Waste Management said that in constructing landfill sites, care was taken to control any gas produced. Flaring of methane can prevent this potent greenhouse gas being released into the atmosphere. If sufficient methane is produced, it can be captured as an energy source and tests were ongoing at Aberdeenshire's two landfill sites to ascertain if levels of methane were sufficient for energy production. The Committee questioned the Head of Environmental Health and Waste Management about energy from waste and whether this was something that could help reduce greenhouse gas emissions. He said the need for energy from waste plants was under active consideration.

5.1.15 Sustainability had been a key consideration in developing planning policy. So, land use allocations had been made with the aim of reducing the need for people to travel by car. New housing was mainly going to places where there were employment opportunities. With very limited exceptions, planning

policies opposed the building of new housing in rural locations remote from shops, schools and other facilities. Developers were generally required to contribute to the provision of infrastructure made necessary by their developments. Contributions had been secured from developers towards a wide range of environmental measures intended to reduce greenhouse gas emissions from new developments. Successes described included public transport interventions such as cycle racks at rural bus shelters and contributions towards a future station at Kintore. In some developments additional energy efficiency measures were being incorporated into the housing.

5.1.16 Aberdeenshire Council's Head of Transportation outlined the contents of the Council's draft Local Transport Strategy 2006–2009. The new Strategy sets out the policies that will be implemented by Aberdeenshire Council over the next few years to ensure the Council meets its overall transport vision. This is "to develop an integrated transportation system for Aberdeenshire which contributes to the development of an inclusive and safe society, a sustainable economy and which reduces environmental damage caused by transport". A major theme of the Strategy is reducing CO_2 emissions from transport and the "tough choices" that will be needed to accomplish this. Many of the proposals contained in the new Local Transport Strategy relate to encouraging modal shift from private cars to other less-polluting forms of transport. Initiatives mentioned include removing the need to travel altogether (e.g. by facilitating more videoconferencing), measures to encourage walking and cycling (e.g. through assisted cycle purchase schemes, bike racks and showers) and promotion of public transport (e.g. by providing better passenger information, introducing 'smart cards').

5.1.17 Aberdeenshire Council's Economic Development Service was already working to help businesses take advantage of opportunities arising from climate change. The Rural Development Officer told the Committee that the Council had led on a study on producing bio-diesel from oilseed rape with a view to developing a bio-fuels industry. According to the Industry Sector Manager, the Council had gone some way to recognising the economic opportunities presented through increased awareness of climate change issues in that three of the six aims in the Economic Development Strategy related to climate change:

- To lead the UK in biomass/bio-fuels production and related technology.
- To be known as the location for innovative energy related and hydrogen fuel technology.
- To be nationally recognised for the self sufficient and inclusive communities in its area.

In addition, activities targeting European funding recognised the opportunities arising from climate change. These were in 'innovation', 'self sufficient and inclusive communities', 'sustainable transport' and 'sustainable energy'.

5.1.18 The Committee heard relatively little about what the Council was doing to prepare for the changes in climate that were now anticipated. However, such work is important to prepare for the impacts of flooding and the potential

damage to buildings through storms. The Head of Roads stated that his Service had established a Flood Prevention Section, progressed a number of flood prevention schemes and was actively involved in the North East Scotland Flood Liaison and Advice Group. The Roads Service had made proactive arrangements with Planning and Environmental Services to review all planning applications to see if there was a flooding issue. The Head of Planning Policy and Environment was aware that his Service needed to develop design policies to cope with the projected changes in climate.

5.1.19 External witnesses commended the Council for some of the actions it had already taken, but also put these into context. The representatives of Friends of the Earth and Aberdeenshire Environmental Forum recognised the measures taken by the Council in its energy efficiency work, the content of the draft Local Transport Strategy and the very existence of a Sustainability Working Group comprised of Councillors and external representatives. However, both stated that compared with other countries and given the urgency of the problem, there was a very long way to go.

5.1.20 The Scottish Environment Protection Agency's Emerging Issues Team Leader stated that his organisation's flood management section viewed Aberdeenshire Council as one of its most favoured local authorities. Further, he considered that Aberdeenshire was at the forefront of Scottish councils in facing up to the issue of climate change.

5.2 Further measures the Council could take

5.2.1 The Committee also heard much evidence about how and where the Council should go about improving its environmental performance, reducing its greenhouse gas emissions and preparing for the expected impacts of climate change. The Committee heard from several witnesses that the single best way for the Council to reduce its greenhouse gas emissions would be to include the 'social cost of carbon' in its decision-making. Current Council financial and investment decisions (like those in most organisations) do not reflect wider social and environmental costs of carbon (or any other input). These costs are therefore effectively left 'off the balance sheet' and form no part of any cost:benefit analysis. Carbon accounting overcomes this deficiency by building the wider social and environmental factors into the equation, hence giving a more robust expression of full cost. Procurement and Finance representatives stated that carbon accounting would remove the subjectivity surrounding 'Best Value'. Until the cost of carbon is taken into account, the procurement equation will still always focus primarily on financial cost (narrowly defined). Such a holistic system would also help those (e.g. the Developer Contributions Co-ordinator, the Head of Environmental Health and Waste Management, officers in the Property Service) who were often convinced that they were 'doing the right thing' in terms of minimising the wider environmental impact of their actions but had no firm basis on which to confirm these intuitive decisions. The Stern Review concluded that carbon pricing is one of the three essential elements of climate change policy and according to Stern: "The next 10-20 years will be a period of transition, from a

world where carbon-pricing schemes are in their infancy, to one where carbon-pricing is universal and is automatically factored into decision-making."

5.2.2 Council staff must undergo a culture change in how they approach environmental issues, according to the Environment Team Leader. The vast majority of Council workers do not see it as their job to reduce greenhouse gas emissions, a view backed up by the representative of the Friends of the Earth, and through the written evidence from Personnel. A first step in raising awareness of the need for all within the Council to do more to combat climate change would be to make a summary version of the results of this investigation available in a forthcoming edition of Accent.

5.2.3 A number of witnesses mentioned that the Council should learn more from best practice available elsewhere. Specific examples mentioned were:

- Waste management, in particular energy from waste (Denmark);
- Building standards, driver behaviour training, use of alternative fuels (Sweden);
- Cycling provision and streetlighting (The Netherlands); and,
- Monitoring resource use across dispersed offices and creating a culture of change (the Scottish Environment Protection Agency).

5.2.4 With a Council energy bill of £6–7million per annum, the Corporate Finance Manager would welcome anything further that can be done to encourage energy saving. As the Council has little influence over the unit price of energy, the key to making any financial savings is to reduce the number of units used. Reducing energy consumption will also be a key element of any future strategy to reduce the Council's greenhouse gas emissions.

5.2.5 Several witnesses argued that the Council should enforce its planning conditions and building warrants more strictly. The Committee heard that in a recent study of thermal loss from buildings in Aberdeen the worst performers were some of the newest houses. The Council should rigorously monitor all new buildings to ensure that they meet current standards for thermal efficiency before a completion certificate is issued. Similar issues of enforcement arise in terms of travel plans presented by developers as part of planning applications. The Council should monitor implementation of these plans to ensure that the applicant does all they have promised to encourage travel by sustainable modes. According to The Head of Planning Policy and Environment, we have to get the new structure plan right as this offers the biggest chance to make a real impact on emissions. Until then, the Council should develop stricter supplementary planning guidance on energy efficiency so that it can enforce insulation levels comparable with the best in Europe, and promote renewable energy.

5.2.6 The Head of Housing stated that energy efficiency measures can be taken relatively easily and cheaply in new housing, so we need to do more to ensure we get any new builds 100% right in terms of energy efficiency. However, as 95% of the buildings (housing and other functions) that will be in Aberdeenshire in 20 years' time are already here, we have to increase the focus on improving existing stock, both public and private. Bringing these

buildings up to standard will be harder and more expensive than it is in new builds. Moving away from fossil fuels and adopting renewable energy for space heating presents a huge opportunity to reduce fuel poverty and benefit the environment. This can be achieved in part by substituting electricity with biomass and heat pumps.

5.2.7 The Information and Communication Technology Service does not currently advise on the computers used for teaching in secondary schools (approximately 60% of the Council's 10,000 computers). These may therefore not comply with Energy Star standards and there is no overview of the situation. There is clearly scope for reducing energy use by requiring schools to come into line with the rest of the Council.

5.2.8 The Head of Property stated that his service needs to do more to develop and implement sustainable construction practices for improved management of Council properties. These included developing brownfield rather than greenfield sites, (re-)using existing buildings rather than demolishing and constructing anew and improved waste, water and energy management.

5.2.9 The Fleet Manager stated that the Council owns too many vehicles and uses them inefficiently. In his view, the Council should reduce the number of vehicles it owns and be more critical about the need for people to travel. The Head of Transportation stated that, despite the successful introduction of travel plans and other measures, the Council had failed to meet traffic reduction targets and road traffic was still increasing. The increasing number of people moving to Aberdeenshire while continuing to work in the City and the high level of single occupancy vehicle use meant that this remained a challenging problem.

5.2.10 The Strategy and Lighting Officer shocked the Committee by informing them that, over the last three years, power consumed by street-lighting across Aberdeenshire had increased by 11.3%. Of equal concern to the Committee was that this increase also surprised his Service. The explanation for the increase was to be found partly in better record-keeping and partly in the many new housing developments being built and lit across Aberdeenshire. According to the Strategy and Lighting Officer, these new developments are likely to continue over the next ten years and over that period he projects an increase in energy usage for street-lighting of around 3% per annum.

5.2.11 The representatives from Economic Development told the Committee that the North-east is very well placed to take advantage of the many economic development opportunities that the need to respond to climate change offers. These include:

Renewable energy:

- Woodchips and pellets from forestry and agriculture for biomass plants and combined heat and power installations.
- Offshore and onshore windfarms, wave, tidal and micro-renewable technology for engineering sector.

- Hydrogen related developments in combination with the power station at Peterhead.

Biofuels:
- Energy crops, e.g. oilseed rape cultivation and processing.

Agriculture:
- Research into alternative crops for particular uses, such as *Miscanthus* for fibre (biomass), and wheat with high starch content for bioethanol.
- Sheep's wool insulation (a high value product in the construction sector)

Forestry:
- Adding value to sawmill and felling co-products, e.g. production of wood-wool insulation. Development of the torrefaction process and provision of sustainable timber for the construction sector.

Construction industry:
- Aberdeenshire Council could help develop a timber frame building 'cluster of excellence' through insisting on tighter building standards than elsewhere providing our builders with competitive advantage.

Energy from waste:
- Waste from agriculture (slurries), fish and meat processing. (Aberdeenshire is home to 25% of the Scottish beef herd and, with Moray, 70% of the Scottish pig population). Domestic waste from remote areas.

Food:
- Promotion of local food adds value and reduces transport emissions.

Tourism:
- Outdoor activity opportunities in the coastal and mountain areas, e.g. the Cairngorms National Park. Also, professional tourism opportunities in the form of conferences, eco-visits to examples of best practice.

The Industry Sector Manager stated that many of these opportunities reflect localisation of supply and consumption of energy, which contributes to the target of self-sufficient communities in the Aberdeenshire Council Vision. Such an approach is not only more efficient from an energy perspective, in that distribution losses are reduced, but it was also true that local heat networks using local energy sources keep money in the local economy. In countries that take a more holistic view of energy and the environment, the import of fossil fuels is viewed as export of money. Studies in Austria show that in a settlement of 10,000 people, oil-fired heating systems typically generate 7 jobs but the wood fuel supply chain generates 35 jobs. Local employment through energy distribution networks can help reduce the need to travel. These steps will also help reduce our Global Footprint.

5.2.12 Adopting a more self-sufficient regional development model offers solutions to some of the challenges facing Aberdeenshire identified earlier in this report:

- Increased commuter transport and greenhouse gas emissions as more people move out to the Aberdeenshire but continue to work in the City.
- Employment creation to retain young people in Aberdeenshire.
- Upgrading of existing housing stock and eradication of fuel poverty.

5.2.13 The Industry Sector Manager outlined to the Committee two examples of how other areas of Europe (Navarra in Spain and Styria in Austria) have capitalised on a long-term commitment to more environmentally-friendly economic development. These are summarised in the Box below. Key to success in both cases was:

- Agreement between government, research and educational institutions and industry of a shared vision; and
- Commitment to long-standing collaboration.

Successful regional economic development by choosing to 'go green'

Case study 1: Styria, Austria
The region of Styria in Southern Austria covers 16,388 km^2 and is home to some 1,200,000 people. (By comparison Aberdeen City and Aberdeenshire together cover approximately 6,500 Km^2 and are home to around 450,000 people).

Styria established an energy agency in 1980 and developed its energy policy according to four principles:

- reduce demand through efficient design
- minimise the impact on the environment
- adopt a presumption against the use of fossil fuels for heating
- prefer local solutions to national or international solutions

This policy has contributed to:

- economic growth in the region without an increase in fossil fuel consumption
- a very strong timber-based economy
- energy efficient homes and other buildings
- Styria being the world leader in pellet boilers and stoves and the world leaders in building efficiency
- development of Europe's solar capital in Kirchdorf
- an international reputation for research and development in renewables at the University of Graz

The regular review of building standards in Styria leads to continuing improvements in environmental performance and to economic opportunities. Buildings being refurbished are required to meet the same standards as new builds. All of this has resulted in Styrian homes typically having 8 kW boilers in comparison to 35kW boilers in Scotland (for the same building size) despite the Austrian winter being far more severe than here. This offers tremendous comfort and savings for residents, as well as environmental benefits.

Case study 2: Navarra, Spain
The region of Navarra is located in Northern Spain, covers an area of 10,400 km^2 and is home to a population of 560,000. In 1990, Navarra committed itself to focus on a regional energy policy. It produced its first energy plan in 1995, which contained the ambitions to be a leader in energy efficiency, a leader in renewables and to benefit the environment. The area has focussed its energy work on wind turbines, solar photovoltaics, bio-diesel and hydro power. The results have been spectacular. Navarra:

- is now a knowledge-led economy with expertise and equipment being exported
- enjoys a per capita income 120% of the Spanish norm
- made CO_2 savings of 10.7 million tonnes between 1995 and 2003
- generates 48% of its electricity and 15% of its total energy requirement from renewable sources
- has seen 40 new companies start up, creating 1,600 direct and 2,400 indirect jobs

6 A SWOT ANALYSIS

6.1 At the investigation's 'wrap-up' session, Professor Slee led the Committee in an exercise to determine Aberdeenshire Council's strengths, weaknesses, opportunities and threats in dealing with climate change. The main conclusions of this exercise are shown in the table below and have informed the Committee's recommendations in the following section.

Strengths	Weaknesses
▪ The Council has already developed policies, introduced structures and taken action to reduce the environmental impact from its own operations.	▪ Currently tackling climate change and wider environmental issues depends on commitment and awareness of individuals rather than Council corporate culture.
▪ New work e.g. Carbon Management Programme, signing of the COSLA Climate Change Declaration put the Council at forefront of efforts in Scotland to combat climate change	▪ Lack of knowledge of where 'big hits' can be achieved within the Council and profusion of urban myths make it hard to know what is environmentally best in particular situations. This encourages despair, indifference and inaction.
▪ Cross-party support for step change in tackling climate change.	▪ Cost of carbon is not included in Council decision-making meaning wider social and environmental costs of our decisions are left 'off balance sheet'.
▪ In a strong position to influence others e.g. as Planning Authority it can promote and facilitate more environmentally friendly development and as an education authority influence the teaching of children.	▪ Enforcement of existing building regulations and planning conditions is inadequate to address energy efficiency issues.
▪ Physical nature of Aberdeenshire provides great potential for the renewable energy industry e.g. forest products, agricultural crops, wind, sea and river resources.	▪ Physical nature of Aberdeenshire makes it difficult for the Council to provide services without contributing to climate change e.g. travel between locations, difficult to provide good quality public transport.
▪ Involvement with a wide range of local partners e.g. SCARF, NESTRANS, ACSEF, and links with other Scottish and European local authorities.	▪ Much of Council's own building stock is old with low energy efficiency. Retro-fitting energy saving measures into these buildings is difficult and expensive.
▪ Residents' surveys show Aberdeenshire Council is trusted as an organisation.	▪ Current target of reducing carbon emissions significantly by 2050 is too distant.

Opportunities	Threats
▪ Climate change provides a good opportunity to prove vision of being the "best council" and strengthening dialogue and engagement between the Council and the public.	▪ Physical threats: flooded rivers and sea level rise leading to inundation of buildings and harbours. Rising temperatures may eventually render impossible cultivation of our staple crops and damage our infrastructure.
▪ Taking measures to combat climate change presents an opportunity for the Council to save money without reduction in service delivery, e.g. increased energy efficiency, cutting the number of Council vehicles.	▪ Financial threat: increased energy prices, carbon taxes and having to deal with consequences and costs of increased storms e.g. repairs, higher insurance premiums.
▪ Existing partnerships, new strategic alliances and European projects can provide Council with access to knowledge about new and existing technologies and non-technological green solutions.	▪ Economic threat: other areas get in ahead of the North-east and snap up opportunities. Security of energy supply as we become an ever greater importer of energy and thus ever more vulnerable.
▪ Climate change is a huge business opportunity for the North-east. Aberdeenshire has a tremendous opportunity to lead the way on renewable energy issues by building on oil-based engineering skills and technology.	▪ Cultural threat: organisational inertia as a lack of urgency delays structural/cultural changes necessary. Employee morale may be threatened if the Council introduces too severe (financial) incentives to change behaviour.
▪ Council's housing stock can be greatly improved to deliver significant financial, energy and greenhouse gas emissions savings.	▪ Credibility threat: Council fails to get its own house in order in time thus undermining its chance to lead by example.
▪ New development plan presents a great opportunity to make land-use planning more sustainable.	▪ If we get the new development plan wrong transport emissions will continue to rise.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 General issues

7.1.1 This examination of Aberdeenshire Council's response to climate change has been one of the most wide-ranging investigations that the Committee has carried out. All aspects of the Council's service delivery rely in various ways on energy and materials. Virtually everything the Council does therefore results in some greenhouse gas emissions and hence has an impact on climate change. In turn, many services delivered by the Council are influenced by weather and climate. Given the forecast changes in our climate, the impacts on service delivery are bound to increase.

7.1.2 The Committee heard evidence from a wide variety of witnesses during the investigation: Council officers, representatives of partner organisations, environmental groups, scientists, school pupils and a former Vice-President of the United States. In addition, in arriving at its conclusions the Committee had the benefit of the findings of The Stern Review and, latterly, those of the latest report by the 2,500 scientists of the Intergovernmental Panel on Climate Change.

7.1.3 Not once did the Committee hear it said that climate change is an unimportant issue. Not once did Members hear that Aberdeenshire Council should not be doing more to prepare for its expected impacts and to reduce greenhouse gas emissions. On the contrary, there were witnesses who urged the Council to do far more than it is already doing, given:

- the urgency of the problem and its potential impact;
- the unique obligation on the Council to plan for the benefit of Aberdeenshire both now and for the longer term;
- the opportunities climate change presents for the Council to show leadership, enhance its reputation and improve its efficiency; and
- the significant economic opportunities that could be opened up for the North-east through tackling climate change.

7.1.4 The evidence presented to the Committee has convinced members that whilst climate change may be seen as 'an inconvenient truth', it is also an incontrovertible reality. A range of scientific evidence all confirms that climate change is happening and is significantly affected by human activity. Whilst it is not possible to be certain exactly how much change will actually materialise and what the effects will be, it is clear that the implications for both Scotland and the rest of the world are extremely serious. The Committee agrees with the Prime Minister and Al Gore that climate change is the biggest challenge facing mankind.

7.2 The way ahead

7.2.1 Taking a view on what Aberdeenshire Council should do about climate change comes down to risk management. Is it more risky to take strong, positive and early action to reduce our greenhouse gas emissions and adapt to the projected consequences of climate change, or is it more risky to carry on with business as usual and hope that the issue of climate change goes away?

7.2.2 The Committee is convinced that 'business as usual' is not a rational option. Significant change is required to 'future proof' Aberdeenshire and this needs to happen quickly. The Committee has arrived at this conclusion based on the following factors.

7.2.2.1 ***A readjustment is coming anyway due to huge changes at global level***

Analysis of social, technological, economic, environmental and political trends in the world around us show that readjustment to a lower carbon lifestyle is required – whether we like it or not. The projected increase in global population from its current 6.3 billion to around 9 billion by 2050 will bring with it huge changes. This population growth is forecast to be highest in countries with rapidly developing economies like China, India and Brazil. As the economies and populations of these countries grow, the results are likely to be threefold. Firstly, the political power of these rapidly developing countries will increase and they will be able to exert more and more pressure to obtain access to natural resources. As happened last year, that pressure can be exerted on importers of energy, like the UK, through price rises, or, as in Ukraine and Georgia, through supplies being switched off altogether. Secondly, the availability of cheap, natural resources will decrease both through high levels of demand and the fact that in some cases they are finite, and will effectively run out. For example, many experts state that 'peak oil' will be with us in the next decade or two. Some analysts argue it has already happened. Thirdly, the increasing scarcity of and competition for natural resources will lead to market-driven price increases. The Committee heard from several witnesses that over the medium- to long-term energy prices are likely to rise significantly as access to low-cost fossil fuels declines. As the Council has little control over energy prices, prudent financial management suggests cutting energy usage to save the Council money. In short, the Committee consider that it is better to take early and positive action to capture opportunities than to be 'dragged kicking and screaming' into changes that are almost certainly going to happen anyway.

7.2.2.2 ***Tighter legislation and higher standards are on the way too***

Throughout its investigation, the Committee heard evidence that, in response to wider trends, there is a move at all levels of government to tougher environmental legislation and higher environmental standards. For example, in the waste field, the volume of biodegradable waste going to landfill is being curtailed, with a reduction of 50% (compared with 1995 levels) being required by 2013. The Emerging Issues Team Leader of the Scottish Environment

Protection Agency stated that National Government is "moving in the direction of regulating CO_2 emission". The 'Euro 5' vehicle emission standard to be introduced in 2008 is approximately three and six times stricter for petrol and diesel engines respectively compared with the 'Euro 1' standard introduced in 1992. The European Commission has also recently proposed introducing a maximum limit for CO_2 emissions from cars. The Scottish Housing Quality Standards and UK Fuel Poverty Eradication Strategy are already in place while new, tougher, building standards are widely expected to be announced by the Scottish Executive in the near future. It is the Committee's view that the relentless trend to higher standards and tougher regulation, in response to environmental imperatives, should be treated as a given. There will often be advantage in anticipating higher standards, rather than trying to retro-fit a non-compliant Council.

7.2.2.3***There is a moral obligation***

The results of the recent North East Global Footprint Project show that if everyone on Earth lived as we do in Aberdeenshire, three planets would be required, i.e. two more than we actually have. Hence our current lifestyle depends on utilising natural resources that should properly be for others – those in less developed countries, other species and future generations. This is clearly morally indefensible, as well as practically and politically unsustainable.

7.2.2.4***The Council's reputation is at stake***

The Committee noted the Scottish Executive's statement: "We want Scotland to become recognised as the best small country in the world and one of the ways we can do that is through our actions to tackle climate change". Aberdeenshire Council aspires to be the best council. One of the ways the Council can achieve that is through its actions to tackle climate change. It is the Committee's view that an essential part of "being the best council" is taking a strong lead in tackling climate change.

7.2.2.5***Early action can limit economic damage***

Scientific projections indicate that we are faced with significant and expensive challenges to our economy, environment and society as a result of changes to our climate. For example, how will towns like Inverurie and Kintore deal with the increased incidence of flooding? How will our coastal towns and harbours cope with projected rises in sea level? What will be the effects on Aberdeenshire fishing fleets if fish stocks (continue to) migrate to cooler water? How will the Council raise the money to pay its energy bills as energy prices rise? And could Aberdeenshire cope with increases in migration driven by climate refugees coming to more northerly latitudes as life further south becomes unbearable? The Stern Review states that: "Mitigation – taking strong action to reduce emissions – must be viewed as an investment, a cost incurred now and in the coming few decades to avoid the risks of very severe consequences in the future. If these investments are made wisely, the costs

will be manageable…". The Committee fully accepts this view and believes the Council must adopt this approach to spending decisions.

7.2.2.6 ***Early action can create economic development opportunities***

Climate change has the potential to generate a new industrial revolution, spurring invention and enterprise and the development of technologies to enable mankind to live within planetary limits. Aberdeenshire Council can help create the conditions to foster the development of new industries and businesses in the North-east to exploit the economic opportunities that will flow from tackling climate change. Importantly, the Council can do this by being a customer of firms supplying products or services that will reduce CO_2 emissions. The Stern Review makes the point well; by taking action on climate change, it says, "there will be a wide range of opportunities for growth and development along the way". While the Committee's investigation was in progress, Marks and Spencer declared its ambition to be carbon neutral in 20 years time. When such leading private companies take this sort of far-reaching step, we can be sure that they see economic benefit. The need to tackle climate change presents enormous economic development opportunities, which the North-east is well placed to capture if we establish a strong, early, leadership position.

7.2.3 Having concluded that the balance of risk shows that bold and urgent action is the most prudent course, the Committee strongly recommends that Aberdeenshire Council takes the following two strategic decisions:

1. Commits itself to becoming a carbon neutral organisation in the short to medium term e.g. by the year 2020. This will make it one of the first local authorities in the UK to do so. The Council will need to examine the feasibility of achieving carbon neutrality within 10, 15 or 20 years, but should aim at the shortest practicable timescale.
2. Instigates an urgent dialogue with local partners – Community Planning partners, businesses, educational and research institutes and citizens – to agree the actions, process and resources needed to achieve the aim of Aberdeenshire becoming a carbon neutral region in the medium term, e.g. by 2030. The possibility of a similar commitment by neighbouring councils and their partners should be explored.

7.3 Why should Aberdeenshire Council go first?

7.3.1 The question 'why should Aberdeenshire Council go first?' is a legitimate one. After all, it is said that conventional wisdom in the world of local authorities is 'go second, and learn from the mistakes of others'. There are several answers to this and at the end of the day it is no more than a logical step for Aberdeenshire Council and the North-east to 'go first':

- Aberdeenshire Council should not be concerned about taking a leading role in such a challenge. It is, after all, in the words of the Director of Transportation and Infrastructure, "The right thing to do". The issue could hardly be more serious. As shown by the examples earlier in this report, Aberdeenshire Council has already taken important steps to 'green' itself as an organisation and has gone some way to recognising

the economic opportunities presented through increased awareness of climate change.

- Becoming a carbon neutral organisation and helping to make Aberdeenshire a carbon neutral region fits well with Aberdeenshire Council's Vision for both itself as a local authority and its area becoming "the best in Scotland". These ambitions also reflect other elements of the Council Vision, namely:
  - an enterprising and adaptable economy;
  - our special environment and diverse culture;
  - finding new and more efficient ways of doing things;
  - providing elected leadership for our area;
  - working with our partners in the North-east and beyond;
  - always looking to the future.
- In truth, Aberdeenshire Council would not be going first. Many other local authorities, especially in mainland Europe, are already ahead of us. We can and should learn from their experiences to fast-track our own carbon neutral aim as a Council, and lead the way in Scotland and the UK.
- As the Council's Chief Executive explained, Aberdeenshire Council has a moral duty to plan for the best interests of Aberdeenshire in the longer term. Given the balance of risks, the Committee considers that the Council should not wait any longer to take stronger action. If others want to wait, that is up to them.
- Time and again, witnesses made the point that if the Council expects to be credible and influence wider society in the North-east to take action – businesses, citizens and Community Planning partners – it needs to lead by example. As a large organisation, employing some 13,000 staff, owning and occupying numerous buildings and operating many vehicles, the Council can make a big difference in helping develop the market for 'greener' products and services. By continuing and intensifying its work to 'get its own house in order' the Council will be able to assert the right to leadership on this important issue.
- For the North-east, there is the wider economic argument. In a world in which clean, reliable and inexpensive energy is likely to become more and more difficult to find, the North-east is in a unique position to establish competitive economic advantage in Europe (and the world) in the renewable energy field. The physical characteristics of our region, with traditional but innovative forestry and farming industries, the presence of international oil and gas engineering know-how and the expertise of local research and educational institutions means we have a strong combination of academic and practical skills on our doorstep.

7.3.2 The Committee is under no illusion that it will be easy to achieve carbon neutrality either for Aberdeenshire Council as an organisation or for the North-east as a region. Further, the Committee understands that the consequences of its recommendations will be far-reaching. However, it takes the view that such an approach not only makes good economic sense but it is consistent with good risk management and application of the precautionary principle. The benefits of such a decision may well be visible in the short-term, e.g. in

reduced energy bills for the Council, and provide an additional argument to attract the UK government's energy institute to the region. The Committee is also convinced that the medium- to long-term benefits of such an approach will be in the best interests of Aberdeenshire and Aberdeenshire Council, as well as the rest of the world.

7.3.3 The time has never been better for Aberdeenshire Council to take strong action to combat climate change both in terms of its internal processes and in influencing wider change with its partners in wider society. A number of witnesses, including the Director of Transportation and Infrastructure, told the Committee that the general level of awareness of the climate change issue is high. The Head of Transportation stated that many businesses with whom he works operate in the energy field and they are keen to be seen to be doing the right thing. The Council's Chief Executive stated: "The world is up for the new agenda."

7.3.4 Awareness of the issue of climate change is an important first step, but public-sector leadership is required to turn this awareness into understanding and action. Thus the Council has been involved in raising awareness of the need for change – for example, in the areas of waste management and transport. But the Council has also been involved in providing new services, from additional recycling facilities to park and ride – to allow people to behave in less environmentally damaging ways.

7.3.5 The Council is uniquely placed to facilitate this. In fact, the 1992 Rio Summit (the United Nations Conference on Environment and Development) concluded that two-thirds of the measures needed to make sustainable development happen are the responsibility of local governments. Professor Aspinall emphasised that people identify with action taken at local level within 'meaningful boundaries'. This is the level at which the Council operates. Its Area structure and presence in individual communities makes the Council a visible presence to which the public can relate. Several internal and external witnesses also made the point that the Council is perceived as a trustworthy partner and source of information, which should aid its efforts to effect change.

7.3.6 Several witnesses called for the Council to develop and provide information required to help Aberdeenshire businesses and residents reduce their environmental impact. Whilst the Committee sees the logic of this given the Council's perceived objectivity, it is reluctant to agree this as a recommendation as it feels that this may well duplicate work already carried out by other organisations, e.g. SCARF. The Council should direct queries to these organisations and/or work together with them on joint awareness-raising initiatives. Where there is a clear gap in information provision that the Council is best placed to fill, e.g. guidance on planning requirements to consumers at do-it-yourself stores purchasing wind turbines or solar panels, then the Council should do this.

7.3.7 Although they are closely intertwined, for the sake of clarity, in the rest of this report the two high level ambitions - Aberdeenshire Council as a carbon

neutral organisation and Aberdeenshire or the North-east as a carbon neutral region - are dealt with separately. Firstly, the internal process of Aberdeenshire Council becoming a carbon neutral organisation in the short to medium term is discussed. Thereafter the wider North-east situation is considered.

7.4 A carbon neutral Aberdeenshire Council in the short to medium term

7.4.1 The Committee recognises that if Aberdeenshire Council is to achieve the challenging aim of becoming carbon neutral in the short to medium term it must place combating climate change at the very heart of its policy-making, both at corporate level and at the level of individual Services. To make real its increased commitment to reducing greenhouse gas emissions, the Council will need to agree and deliver strong early actions from operations across all of its Services. The Council will therefore urgently need to establish a pathway to carbon neutrality with clear targets, milestones and allocation of resources. This will require leadership from both Councillors and senior officers.

7.4.2 The Committee is aware that resources available to the Council are limited. During the investigation the Committee received many suggestions for improvements to Council processes but little feedback on their level of impact or where the really 'big hits' could be achieved. Given the reality of limited resources, it is important that the Council focuses its action where it can get the biggest reward for its investment and avoids actions that are expensive in terms of money or effort, but deliver little in the way of savings on emissions. A concrete example heard during the investigation was that information and communication technology is a small contributor to overall energy use and that, as no substantial further savings are achievable, the Council would be sensible to concentrate its efforts to reduce energy consumption elsewhere. Expressed in graphical form the Council should be seeking solutions in the top right hand corner of the figure below.

Cost / effort	Impact: Low	Impact: High
Low	Encourage	Target as priority actions
High	Avoid	Consider as appropriate

Figure 1. A framework for deciding on priority actions to reduce greenhouse gas emissions.

7.4.3 The Committee was assured that the Council's participation in the Carbon Trust's Carbon Management Programme will help identify priority projects, and thus guide informed future action. The Committee recommend that the level of ambition of the Carbon Management Programme be reviewed given the challenging target proposed of becoming a carbon neutral council.

7.5 Specific recommendations

7.5.1 *Set out a plan to achieve carbon neutrality in the short to medium term*

The Council should establish, as a matter of urgency, a strategy to achieve the challenging target of becoming a carbon neutral council in the short to medium term, e.g. by no later than the year 2020. This should include targets, indicators of success, resources required and a plan for regularly reviewing progress. The ongoing work of the Carbon Management Programme should provide a good basis upon which to build but its level of ambition should be reviewed in line with the new target.

7.5.2 *Introduce carbon accounting to improve the basis of decision-making*

The Council should agree to investigate as a matter of urgency how best to introduce carbon accounting into its decision-making processes. The Committee accepts the view of the Director of Transportation and Infrastructure that whilst introducing such a new system across the Council in one go could cause difficulties, and perhaps affect service delivery, a test of a 'shadow' carbon accounting system as a first step would be worth undertaking.

7.5.3 *Build the Global Footprint into Council decision-making*

The Council should build the Global Footprint into decision-making on relevant policies, including the next strategic plan and the new development plan. This will make clear the wider impacts of policy choices. The Council should focus its attention on the areas of transport, buildings and energy, as these are the main sectors contributing to Aberdeenshire's Global Footprint.

7.5.4 *Promote a change of culture – the environment is everyone's business*

The Council should promote a change of culture within the organisation so that all staff see it as their job to reduce greenhouse gas emissions and the other environmental impacts of their work. The issue of sustainability should be placed on the agenda of Service Management Teams so that it is discussed throughout the organisation and should be included at Employee Development and Review. Care should be taken to ensure that, in the words of Ex Vice-President Gore, "people do not go straight from denial to despair." This means providing simple, constructive, practical advice as to what individuals can do.

7.5.5 ***Promote a stronger learning culture***

Building on existing initiatives, the Council should promote a culture of actively seeking to identify best practice available elsewhere from which it can learn. Such an attitude is reflected in the Council's Vision of being an outward looking organisation that looks to the future. Specific examples mentioned were:

- waste management, in particular energy from waste (Denmark);
- building standards, driver behaviour training and use of alternative fuels (Sweden);
- cycling provision and streetlighting (The Netherlands); and,
- monitoring resource use across dispersed offices and creating a culture of change (the Scottish Environment Protection Agency).

In the same vein, the Council should build closer links to local educational and research institutions in order to access their skills and knowledge, and provide these organisations with real-life case study material. The benefits of such a collaborative approach are illustrated by the examples from Styria and Navarra described in paragraph 5.2.13. Representatives of the Council should travel to these locations, and others demonstrating real best practice, to hear at first hand how such initiatives were established, what problems needed to be overcome, what has been achieved and what their plans are for the future.

7.5.6 ***Beware of offsetting***

No one approach can deliver the reduction in greenhouse gas emissions that is required. A combination of measures is needed including, amongst other things, increased energy efficiency, more energy generated from renewable sources and behaviour change. However, the Council should be wary of entering into offsetting schemes that claim to compensate for emissions through, for example, planting trees. The market in offsetting has been unregulated and the efficacy of such schemes has not yet been proven. It is claimed that in some cases planting trees in the wrong place can actually cause increased carbon emissions, and offsetting may actually provide a perverse incentive to polluters who can then earn money from subsequent emissions 'savings'. In short, the Committee consider that carbon offsetting should be used at most sparingly and with care on the way to carbon neutrality, at least until more is known about its benefits and drawbacks.

7.5.7 ***Consider these points***

If the Council agrees the Committee's overarching strategic recommendations contained in paragraph 7.2.3 above to (1) become a carbon neutral organisation in the shortest feasible timescale and (2) instigate dialogue with partners to explore the agree the actions, processes and resources needed to achieve Aberdeenshire, as a geographic locality, becoming a carbon neutral region in the medium term, a significant number of actions will need to be pursued. The Committee has not determined, or even attempted to

determine, in exhaustive detail, all of what the adoption of the recommendations in paragraph 7.2.3 would imply. However, the undernoted are points, highlighted in the evidence gathering sessions, which illustrate the range of matters that the Committee would wish the Council to consider :

- Review the rationale for the payback period required for 'spend-to-save' initiatives in the field of energy. (This rationale is likely to change anyway with introduction of carbon accounting.)
- Do more to encourage Services to come forward with 'spend-to-save' initiatives in the field of energy conservation, e.g. review the perverse 'reward' of having the service budget cut due to successes in saving energy.
- Ensure any future public-private partnership contracts include incentives to facility managers to minimise energy use and costs.
- Advise contractors with whom we deal well in advance that we will be seeking stricter environmental standards at the next round of contracts e.g. bus contractors. This will give them time to adapt and preserve delivery of Council services at a higher environmental standard.
- Enforce planning conditions and building warrants more strictly. The Committee were shocked to hear the outcome of the study into the thermal loss from buildings in Aberdeen. The Council should monitor all new buildings to ensure that they meet current standards for thermal efficiency before a completion certificate is issued.
- Enforce travel plans presented by developers as part of planning applications.
- Ensure that the new development plan has curbing carbon emissions as its central concern. In the words of Head of Planning, Policy and Environment, "The new structure plan offers us the biggest chance to make a real impact on emissions in the next 25 years."
- Develop stricter supplementary planning guidance until the new structure plan is in place, so that the Council can enforce insulation levels comparable with the best in Europe, promote renewable energy and ensure better use of water in all buildings.
- Develop the design policies required to increase the resilience of our built environment to cope with the likely extra demands brought on by extreme weather events expected as a result of climate change, e.g. robust construction, adequate rainwater capacity and good temperature management.
- Consider making more use of the energy potential from waste e.g. investigate establishing an energy-from-waste plant, making more use of agricultural and industrial waste and captured methane from landfill sites.
- Provide a copy of the DVD of 'An Inconvenient Truth' to all Aberdeenshire schools.
- Develop educational resources for use by all secondary pupils to increase awareness of personal and household impacts on climate change and to encourage personal recognition of responsibilities and increased scope for mitigation.

- Ensure any new Council buildings achieve the maximum possible standard in energy efficiency.
- Develop a plan to ensure that the Council's existing housing stock can contribute effectively to the Council's carbon neutral target.
- Maximise understanding of effective retrofitting to improve the energy efficiency of old buildings.
- Examine opportunities to incentivise 'green' behaviour by staff.
- Ensure that the Information and Communication Technology Service has an advisory role on the computers used for teaching in secondary schools to ensure that (a) the computers comply with Energy Star standards and (b) the Service has an overview of the computers the Council owns/leases.
- Lead or participate in European projects on tackling climate change e.g. carbon accounting, incentives for sustainable transport and sustainable building refurbishment.
- Promote energy generation from Council buildings.
- Continue the successful work started on travel plans and bring forward new proposals to combat increased road traffic.
- Bring forward urgently a plan to stabilise and subsequently reduce energy consumption by street-lighting across Aberdeenshire.

8. A CARBON NEUTRAL CITY AND SHIRE – A MUCH BRIGHTER OUTLOOK

8.1.1 The Committee fully appreciates that whilst becoming a carbon neutral organisation is very much a challenge for Aberdeenshire Council, the transition of the wider North-east to a carbon neutral region requires the Council to work closely with its many partners across different sectors. The Council has limited room for manoeuvre in trying to achieve this wider aim but is in the position to influence, facilitate and encourage collaboration between the public and private sectors, educational and research institutions and the area's citizens. The Committee recognises that such a process, whilst undoubtedly challenging, presents the Council with an excellent opportunity for wider community engagement. It also presents the business sector and educational and research institutions with tremendous opportunities.

8.1.2 The Committee realises that Aberdeen City Council has an important contribution to make towards achieving a carbon neutral North-east. The City Council has taken a number of important actions in recent time to reduce its environmental impact and promote itself as an Eco City. Joint working between the two councils has been central to the North East Global Footprint project. Continued co-operation between the two Councils is both logical and desirable. It is, however, up to Aberdeen City Council, and indeed all other North-east partners, to take their own decision about becoming carbon neutral.

8.1.3 To explore the ambitious aim of the wider North-east becoming a carbon neutral region in the medium term e.g. by 2030, the Committee recommends that Aberdeenshire Council should, in the near future, instigate a dialogue with its local partners in the public and private sectors, together with local educational and research institutes and its citizens

8.1.4 Aberdeenshire Council, and any other organisation joining them in this initiative, will have to display sustained commitment towards the aim of achieving a carbon neutral North-east, and not only in the short-term when it may be fashionable to do so. Only action over a number of years will provide the investment security that the private sector needs to make the changes required of them.

9. THANKS AND INVITATION FOR FEEDBACK

9.1 The Scrutiny and Audit Committee would like to record its appreciation of the co-operation and assistance it received from internal and external witnesses, the contribution made by the independent external expert, Professor Bill Slee, and the support provided by Council officers, notably Alison Cumming. The help given by the Macaulay Land Use Research Institute is gratefully acknowledged.

9.2 The lead officer for this investigation was Donald Boyd. The Committee would like to record its appreciation and thanks for Donald's input to this investigation.

9.3 Each investigation that is undertaken is part of a learning experience for the Committee and it would welcome any feedback or comments from participants or interested individuals on the investigation process and this report.

Cllr Martin Ford
Chair,
Scrutiny and Audit Committee

Cllr Bruce Luffman
Vice-Chair,
Scrutiny and Audit Committee

APPENDIX A – INVESTIGATION BRIEF

Scrutiny and Audit Committee – Investigation Brief		
Subject to be reviewed	**Investigation No**	**13**
Audit of the Council's Response to Climate Change		
Purpose and objectives of investigation		
To establish: 1. What steps the Council has taken to prepare for expected changes in climate. 2. The contribution the Council is making to reducing the emissions of pollutants that are causing climate change. 3. The adequacy of the adaptation and mitigation measures adopted.		
Investigation methodology		
Background documents/ evidence/ research	Sustainability Charter, relevant Council policies, relevant national guidance	
Witnesses to be invited to provide evidence	**External** The Macaulay Institute Friends of the Earth Aberdeenshire Environmental Forum Relevant units of the Scottish Executive SEPA **Chief Officers** Chief Executive Head of Policy Head of Planning Head of Waste Management Head of Property Head of Transport **Staff** Planning Policy & Environment (Sustainability Co-ordinator and Environment Team Leader) Education (Science & Technology Development Officer) Property (Energy Services Manager) Housing (Principal Housing Policy Officer for Stock Renewal)	
Site Visits	Waste Management, Building, Renewable Energy Installations	
Consultation process with users	Not applicable	
Trade Unions Contribution	Trades Union representatives will be advised of the investigation and asked if they want to be involved	
Project Team (officers)	Donald Boyd	
Other estimated costs	£1,500	
External expert	Professor Bill Slee, Macaulay Land Use Research Institute	
Investigation Timetable	October – December 2006	
Agreed by Committee	6 September 2006	

APPENDIX B – INVESTIGATION PROGRAMME AND WITNESSES HEARD

Date	Time	Location	Theme	Interviewee & organisation (if not Aberdeenshire Council)	Position
01-Nov	13.30-14.00	Committee Room 2, Woodhill House Westburn Road Aberdeen	Introduction	Professor Richard Aspinall, Macaulay Land Use Research Institute	Chief Executive
	14.00-15.30		Status quo & direction of travel	Ken Morrison & Robert Gray & Roger White	Head of Roads & Head of Planning Policy and Environment & Head of Policy
08-Nov	10.15-11.00	Council Chamber Gordon House Blackhall Road Inverurie	ICT	John Mackenzie	Head of ICT
	11.15-12.30		Procurement & finance	Craig Innes & Alan Wood	Purchasing Manager & Corporate Finance Manager
	13.45-14.45		Waste	Ian Robertson & Helen Anderson & Tom Anderson, SEPA	Head of Waste Management & Scientific Officer & Environment Partnership Manager
15-Nov	10.30-11.30	Alford Academy, Alford	Education	Site visit & pupil presentations. Sheila Tough, Linda Park	Eco School leaders and pupils
	11.30-12.30		Transport	Ewan Wallace & Ian Paisley	Head of Transportation & Fleet manager
	13.45-14.45		Property management	Syd Gray & Brian Smith	Head of Property & Engineering Services Manager
20-Nov	11.15-12.30	Council Chamber Viewmount Arduthie Road Stonehaven	Planning & energy in buildings	Robert Gray & Stuart Robertson	Head of Planning Policy and Environment & Developer Contributions Co-ordinator
	13.45-14.45		Economic development	Vicky Thomson & Roddy Matheson	Rural Development Officer & Industry Sector Manager (Renewable Energy Champion)
	14.45-15.15		Mid-point evaluation	Where are we now session?	
29-Nov	13.30-14.30	CR 2, Woodhill House	Environmental organisations	Gregor McAbery, Friends of the Earth & Jackie Cumberbirch, Abdnshire Environmental Forum	Communications Officer & Convener
	14.45-15.45		Sustainability	Debbie Burroughs & Anne Laird	Environment Team Leader & Sustainability Co-ordinator
04-Dec	13.15-15.00	Belmont Cinema, Aberdeen		Screening of 'An Inconvenient Truth'	
13-Dec	13.30-14.20	CR 2, Woodhill House	External view of issues	Peter Singleton, SEPA	Emerging Issues Team Leader
	14.20-15.20		Housing	Douglas Edwardson & Dave Thomson	Head of Housing & Principal Policy Officer, Stock Renewal
	15.30-16.00		Transport & Streetlighting	Ewan Wallace & Brian Strachan	Head of Transportation & Strategy/lighting officer

Date	Time	Location	Theme	Interviewee	Position
15-Dec	13.30-14.15	CR 2, Woodhill House	Senior management perspective	Alan Campbell & Iain Gabriel	Chief Executive & Director, Transportation and Infrastructure
	14.30-15.30		Ecohousing	Gokay Deveci, Robert Gordon University	Reader in Architecture
20-Dec	10.30-15.30	CR 2, Woodhill House	Wrap up session	Professor Bill Slee, Macaulay Land Use Research Institute Roddy Matheson	External Expert Industry Sector Manager Renewable Energy Champion)

APPENDIX C - ABERDEENSHIRE COUNCIL NEW VISION

(Adopted 5 October, 2006)

ABERDEENSHIRE COUNCIL

Serving Aberdeenshire from mountain to sea – the very best of Scotland

The best area

Helping to create and sustain the best quality of life for all through . . .

- **happy, healthy and confident people**
- **safe, friendly and lively communities**
- **an enterprising and adaptable economy our special environment and diverse culture**

The best council

Aiming to provide excellent services for all by . . .

- **involving, responding and enabling**
- **finding new and more efficient ways of doing things**
- **providing elected leadership for our area**
- **working with our partners in the North- east and beyond**
- **always looking to the future**

Serving Aberdeenshire from mountain to sea

The very best of Scotland

APPENDIX D - COSLA DECLARATION ON CLIMATE CHANGE

Scotland's Climate Change Declaration

We acknowledge that

- Climate change is occurring and human activities are having a significant negative and potentially dangerous influence.
- Climate change will have far reaching effects on Scotland's people and places, impacting on our economy, society and environment.
- There are significant social, economic and environmental benefits in taking action to combat and prepare for climate change.
- We all in Scotland have duties and responsibilities to take action to both mitigate and adapt to climate change, and to promote the sustainable development and well-being of our local communities.

We welcome the

- Scottish and UK Climate Change Programmes and targets for the reduction of greenhouse gas emissions.
- Opportunity for local government in particular and other agencies, businesses, voluntary and community organisations and individuals to show leadership at a local level to respond to climate change.
- Opportunity to address climate change by promoting the sustainable development of our local communities.

We commit *Aberdeenshire Council*

from this date *18 January 2007*

Aberdeenshire COUNCIL

to

- Work with the Scottish Executive and the UK Government to contribute to the delivery of Scotland's and the UK's Climate Change Programmes, including to reduce greenhouse gas emissions and to adapt to future climate change scenarios.
- Produce and publicly declare a plan, with targets and time-scales, to achieve a significant reduction in greenhouse gas emissions from our own operations. This will include our energy use and sourcing, travel and transportation, waste production and disposal, estate management, procurement of goods and services, and improved staff awareness.
- Ensure that greenhouse gas reduction and climate change adaptation measures are clearly incorporated into our new and existing strategies, plans and programmes, in line with sustainable development principles.
- Assess the risks and opportunities for our services and our communities of predicted climate change scenarios and impacts, and take action to adapt accordingly and in line with sustainable development principles.
- Encourage and work with others in our local community to take action to adapt to the impact of climate change, to reduce their own greenhouse gas emissions and to make public their commitment to action.
- Publish an annual statement on the monitoring and progress of our climate change response, detailing targets set, actions taken, outcomes achieved and further actions required.
- Collaborate with other organisations to promote good practice on climate change mitigation and adaptation.

We acknowledge the increasing impact that climate change will have on our community, Scotland and other countries during the 21st Century and commit to tackling the causes and effects of a changing climate within our local area.

Signatories

Council Leader

Chief Executive

Scottish Ministers welcome this declaration and will work in partnership with the signatories and their representatives to support the delivery of these commitments.

Minister for Environment and Rural Development

SCOTTISH EXECUTIVE

Minister for Finance and Public Service Reform

APPENDIX E – REPORT ON VISIT TO KINTORE PRIMARY SCHOOL

Aberdeenshire Council Scrutiny and Audit Committee

Visit to Kintore Primary School - 8th November 2006

Joe Humphrey (JH), Principal Architect PPP Projects
Allan Michie (AM), Project Manager, Robertson Capital Projects
David West (DW), Area Manager, Robertson Facility Management

Aberdeenshire Council's Scrutiny and Audit Committee (SAC) visited Kintore Primary at the end of the evidence-taking session on Wednesday 8th November. JH welcomed the group and provided a brief introduction to the development of the school (that opened in February 2006) and how it is managed. The group were then shown around the school premises and received background documentation prepared by JH.

The key points to emerge from the visit were:

1. Kintore Primary School contains a number of interesting sustainable construction techniques that could be readily incorporated into future Aberdeenshire Council new build developments. These include:

- Site selection: the fact that the school has been built on the site of the former school i.e. not on a greenfield site on the edge of town. This reduces the need to travel.
- Sharing of the school premises with the wider community e.g. the library, sports hall and computer facilities.
- Natural daylight: attempts have been made to maximise the use of natural daylight by creation of shallow classrooms, with natural light entering through ceilings and windows onto corridors. (Very) small roof light tubes in the central corridors off the flat roofs have also been used.
- Floor is of linoleum throughout. This is hard-wearing, and easy to maintain and replace.
- A large number of bicycle racks near the front door.

2. The school is heated by a gas-fired boiler system as at the time the gas-fired system was selected this was felt to be a secure fuel in terms of supply and the system would not require a back-up. The recent rise in gas prices and the questions about security of supply were not anticipated then. The source of heat for the wet heating system can be altered without affecting the distribution network i.e. a biomass boiler could replace the gas one and plug straight into the underfloor distribution network.

3. Use of rain- and greywater had been considered in the design process but rejected in this case. (cf. Strathburn School in Inverurie where a different decision was taken).

4. Travel to school by parents and staff is probably the major environmental impacts over the life of the building. Action to reduce this travel will have greater benefit than e.g. installing photovoltaic panels on the school's roof.

5. The PPP contract does not incentivise the Facility Managers to reduce energy costs. They view it as part of their service to Aberdeenshire Council that these costs are minimised whilst still providing comfort to users.

In conclusion, the committee members were very impressed with the great number of sophisticated decision-making tools used in the design and development of such buildings e.g. the Schools Environmental Assessment Method (SEAMS) contained in the handbook prepared by JH. The fact that such criteria are used at all, and the general principles behind them, needs to be communicated more widely.

APPENDIX F - ABERDEENSHIRE'S SHARE OF GREENHOUSE GASES

Appendix: Estimation of Aberdeenshire's Greenhouse Gas Emissions

Peter Shannon, Socio-economics Research Group, Macaulay Institute

1 Introduction

This investigation is a contribution to Aberdeenshire Council's Scrutiny and Audit Committee's Investigation into the Council's response to climate change. It presents the data for the major sources of emission in tabular and spatial form, enabling the spatial identification of both the degree of variation and the overall amount of greenhouse gas (GHG) emissions, where data allow.

2 Data

The emissions data were sourced from the UK National Atmospheric Emission Inventory (NAEI) which is compiled by the National Environmental Technology Centre (Netcen) on behalf of the Department for Environment, Food and Rural Affairs, Air and Environment Quality Division and the Devolved Administrations. Emissions are estimated and mapped for the UK at 1km resolution, providing a source of national and regional data on a yearly basis. The most recent year for which all data is available is 2003.

The inventory estimates emissions of 25 pollutants include Carbon Dioxide, Methane and Nitrous Oxide which account for 98.4% of the total Greenhouse Gas (GHG) emissions. The F-Gases (HFCs, PFCs and SF6) make up the other half of the six direct greenhouse gases, but are not available spatially and so could not be included in this study. Also, due to data availability problems, Methane emissions were unavailable for: Sector 1 Combustion in energy production and transfer; Sector 4 Production forces and Sector 6 Solvent use. As these particular sectors have low emissions this does not have a great impact on final figures and does not affect the total. The proportion of GHGs estimated by this study can be observed in table 1 below.

UNECE Sector	***Availability of data***				***GHGs included in estimation***
	CO_2	***CH_4***	***N_2O***	***F Gases***	
1 Combustion in energy production and transfer	Yes	No	Yes	No	91.6%
2 Combustion in commercial, institutions, residential and agricultural sectors	Yes	Yes	Yes	No	98.4%
3 Combustion in industry	Yes	Yes	Yes	No	98.4%
4 Production processes	Yes	No	Yes	No	91.6%
5 Extraction / Distribution of fossil fuels	Yes	Yes	Yes	No	98.4%
6 Solvent use	Yes	No	Yes	No	91.6%
7 Road transport	Yes	Yes	Yes	No	98.4%
8 Other transport and machinery	Yes	Yes	Yes	No	98.4%
9 Waste Treatment and disposal	Yes	Yes	Yes	No	98.4%
10 Agricultural, forests and land use change	Yes	Yes	Yes	No	98.4%
11 Other Sources and Sinks (Nature)	Yes	Yes	Yes	No	98.4%
12 Total (including point data)	Yes	Yes	Yes	No	98.4%

Table 1: Proportion of Greenhouse Gases included in estimations

Emissions are compiled from a combination of reported and estimated emissions. Reported emissions are obtained from the regulators of industrial processes: the Environment Agency, the Scottish Environmental Protection Agency (SEPA) and the Department of the Environment Northern Ireland (DOENI), while the estimates are made for UNECE Emissions Sectors (table 2) each with its own methods for estimation (see NAEI Methodology Report 2003[2]).

Table 3.1 Mapping Methods used to map emissions in each of the 11 UNECE source sectors

1 Combustion in energy production and transfer points offshore IDBR employment	**6 Solvent use** population points IDBR employment landuse
2 Combustion in commercial, institutions, residential and agricultural sectors points domestic fuel use IDBR employment IDBR agriculture IDBR commercial and public fuel use	**7 Road transport** road transport
3 Combustion in industry points IDBR employment IDBR industry fuel use	**8 Other transport and machinery** agriculture airports other rail shipping IDBR employment population
4 Production processes points IDBR employment shipping road transport population other	**9 Waste Treatment and disposal** landfill landuse offshore points IDBR employment
5 Extraction / Distribution of fossil fuels points offshore other domestic fuel use population	**10 Agricultural, forests and landuse change** agriculture landuse
	11 Other sources and sinks landuse population

Table 2: Mapping Methods used to map emissions of the UNECE course sectors (NAEI 2003 p7)

The geographical distribution of emissions across the UK is built up from distributions of emissions from each sector, and a derived set of statistics appropriate to the sector. There are two types of data collected: 'point' and 'area'. For large industrial 'point' sources, emissions are compiled from a variety of official UK sources (Environment Agency, Scottish Environmental Protection Agency, Local Authority data). For sources that are distributed widely across the UK ('area' sources), a distribution map is generated using appropriate methodology for that sector.

3 Methods

The NAEI data was imported into ESRI's ArcGIS 9, and prepared for extraction of the relevant emissions data (Figure 1). The preparation was required to convert all emissions to a value of Global Warming Potential (GWP) of the greenhouse gas expressed in CO_2 equivalent. This was achieved using ArcGIS raster calculator and factors taken from the Greenhouse

2 http://www.airquality.co.uk/archive/reports/cat07/0606231101_NAEIMappingMethodReport2003Final.pdf

Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990 – 2003 report[3] (C02=1, CH4=21 and N2O=310).

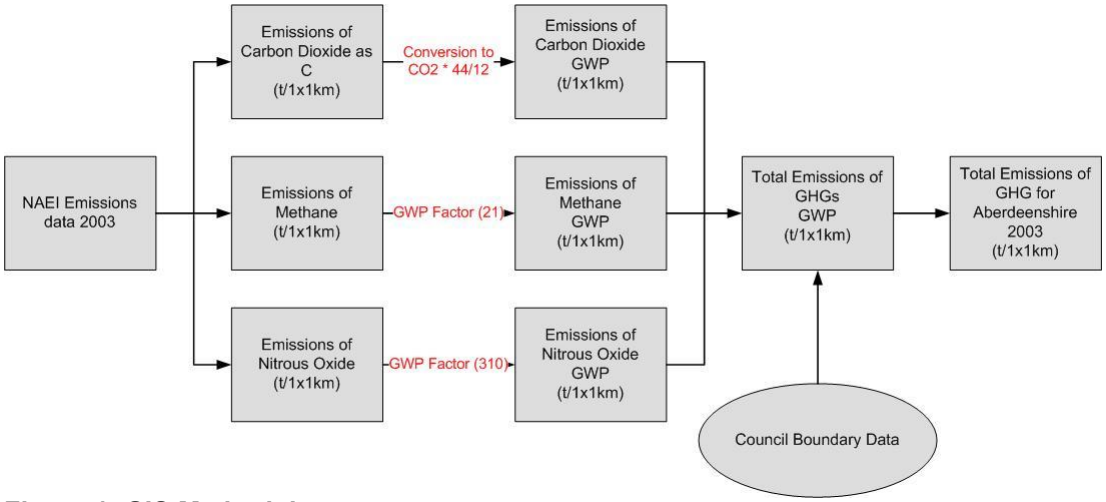

Figure 1: GIS Methodology

Once the data were in a comparable form, the GHG grids were combined for each of the sectors using ArcGIS Spatial Analyst. The last stage of the process involved combining the emissions grids with council boundaries spatial data and extracting and summing the values within.

4 Results

4.1 Comparison with Scotland

A total of approximately 6.99m tonnes (CO2 equivalent) of GHGs was emitted from Aberdeenshire in 2003, representing 11.4% of the Scottish total (Table 3). This places Aberdeenshire as the second highest emitting local authority in Scotland. This may seem somewhat surprising given Aberdeenshire's relatively low population density, but can be explained by the methodology used by the NAEI to estimate emissions. This is based on emissions at source, so power generation is attributed to the area it takes place rather than where it is consumed. Fife, Falkirk and East Lothian also have energy-generating power stations and associated high emission figures, as can be observed in table 3.

3

http://www.airquality.co.uk/archive/reports/cat07/0509211321_Reghg_report_2003_Main_Text_Issue_1.doc

Local Authority	Total Emissions of GHGs	Proportion of Scotland's Emissions	Proportion of Scotland's Population	Proportion of Scotland's Area
Aberdeen City	887,372	1.4%	4.2%	0.2%
Aberdeenshire	6,987,330	11.4%	4.5%	8.1%
Angus	1,109,720	1.8%	2.1%	2.8%
Argyll & Bute	842,509	1.4%	1.8%	8.9%
Clackmannanshire	366,601	0.6%	0.9%	0.2%
Dumfries & Galloway	2,784,170	4.5%	2.9%	8.2%
Dundee City	574,658	0.9%	2.9%	0.1%
East Ayrshire	1,009,520	1.6%	2.4%	1.6%
East Dunbartonshire	477,913	0.8%	2.1%	0.2%
East Lothian	4,525,670	7.4%	1.8%	0.9%
East Renfrewshire	383,788	0.6%	1.8%	0.2%
Edinburgh, City of	1,827,900	3.0%	8.9%	0.3%
Eilean Siar	415,388	0.7%	0.5%	3.9%
Falkirk	5,154,430	8.4%	2.9%	0.4%
Fife	13,628,900	22.2%	6.9%	1.7%
Glasgow City	2,296,170	3.7%	11.4%	0.2%
Highland	4,143,570	6.7%	4.1%	32.9%
Inverclyde	256,042	0.4%	1.7%	0.2%
Midlothian	432,727	0.7%	1.6%	0.5%
Moray	738,350	1.2%	1.7%	2.9%
North Ayrshire	1,128,180	1.8%	2.7%	1.1%
North Lanarkshire	1,593,920	2.6%	6.3%	0.6%
Orkney Islands	270,630	0.4%	0.4%	1.3%
Perth & Kinross	1,664,250	2.7%	2.7%	6.8%
Renfrewshire	867,135	1.4%	3.4%	0.3%
Scottish Borders	1,674,160	2.7%	2.1%	6.1%
Shetland Islands	637,435	1.0%	0.4%	1.9%
South Ayrshire	907,786	1.5%	2.2%	1.6%
South Lanarkshire	1,830,140	3.0%	6.0%	2.3%
Stirling	729,781	1.2%	1.7%	2.8%
West Dunbartonshire	309,507	0.5%	1.8%	0.2%
West Lothian	1,023,360	1.7%	3.1%	0.5%
Scotland	887,372	100.0%	100.0%	100.0%

Table 3: Scotland's Total Emissions by Local Authority (NAEI data)

Figure 2 displays the contrast between the Aberdeenshire and Scotland at sectoral level. By far the largest emitting sector in Aberdeenshire was from the point data, which was responsible for 61.6% of the total; this is higher than the national average of 46.6%. While the point data is not broken down by sector, it is possible to assume with a high degree of certainty that the majority of the emissions come from energy generation. Within Aberdeenshire, the point data can almost all be attributed to the Peterhead area in the location of the power station, while at a Scottish level, the majority can also be traced to power generation, as well as other industrial processes. Following this, much of the point total for Aberdeenshire could arguably be moved to the Combustion in Energy Production and Transformation sector. The other main deviance from national figures can be observed in four sectors, with Aberdeenshire having a greater proportion of emissions from:, Agriculture, Forestry and Land Use Change (Aberdeenshire 14.93%, Scotland 10.10%); and Other Sources and Sinks (Nature) (Aberdeenshire 6.16%, Scotland 4.85%); while a smaller proportion of emissions was estimated in Road Transport (Aberdeenshire 8.69%, Scotland

16.8%); and Combustion in Commercial, Institutional, Residential and Agriculture (Aberdeenshire 5.29%, Scotland 14.21%). The full breakdown of Aberdeenshire and national emissions can be observed in table 4.

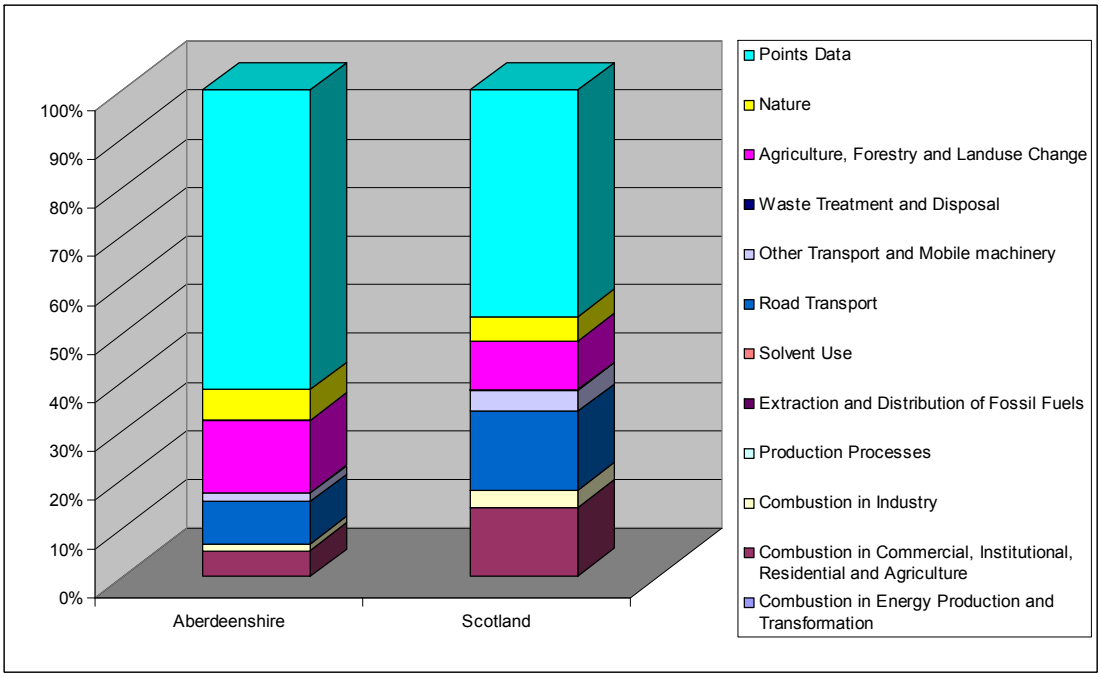

Figure 2: Graph comparing emissions of Aberdeenshire and Scotland by sector (NAEI data)

	Aberdeenshire			Scotland		
	CO2 t (000)	**Excluding point data**	**Including point data**	**CO2 t (000s)**	**Excluding point data**	**Including point data**
Combustion in Energy Production and Transformation	4.2	0.16%	0.06%	60.9	0.19%	0.10%
Combustion in Commercial, Institutional, Residential and Agriculture	369.4	13.77%	5.29%	8,738.9	26.63%	14.21%
Combustion in Industry	100.2	3.73%	1.43%	2,179.9	6.64%	3.55%
Production Processes	0.5	0.02%	0.01%	15.4	0.05%	0.03%
Extraction and Distribution of Fossil Fuels	-	0.00%	0.00%	0	0.00%	0.00%
Solvent Use	-	0.00%	0.00%	0	0.00%	0.00%
Road Transport	607.3	22.64%	8.69%	9,885.2	30.12%	16.08%
Other Transport and Mobile machinery	118.3	4.41%	1.69%	2,619.4	7.98%	4.26%
Waste Treatment and Disposal	9.3	0.35%	0.13%	128.4	0.39%	0.21%
Agriculture, Forestry and Land Use Change	1,043.4	38.89%	14.93%	6,211.8	18.93%	10.10%
Other Sources and Sinks (Nature)	430.2	16.03%	6.16%	2,981.5	9.08%	4.85%
Total	2,682.9	100.00%	38.40%	32,821.5	100.00%	53.39%
Point data	4,304.4		61.60%	28,657.5		46.61%
Total (including point data)	**6,987.3**		**100.00%**	61,479.0		**100.00%**

Table 4: Comparing emissions of Aberdeenshire and Scotland by sector

4.2 Spatial pattern of Aberdeenshire's emissions

Total Emissions

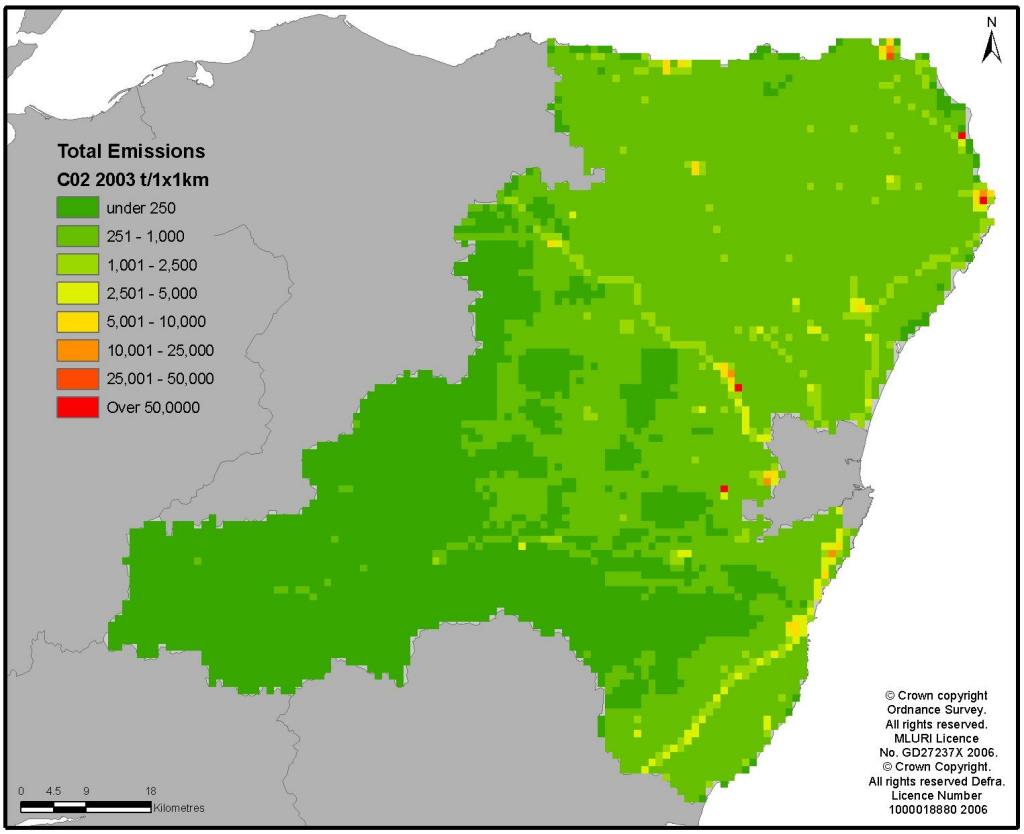

Figure 3: Total Emissions of Greenhouse Gases for Aberdeenshire (including point data)

- The distribution of emissions generally follows the transport infrastructure and population centres of Aberdeenshire.
- As can be observed, there are high emissions along the A90 to the south of Aberdeen, and along the A96 as far as Inverurie.
- Settlements such as Stonehaven, Portlethen, Peterhead, Fraserburgh, Westhill and Huntly can also be identified as areas of high emissions.
- Areas of low population density such as in the southwest of Aberdeenshire have a low level of estimated emissions of GHGs attributable to the lack of transport infrastructure, industry and presence of upland areas.
- The area around Peterhead accounts for over half of Aberdeenshire's emissions (one km^2 grid square accounts for over 3m tonnes of CO2). This can be attributed to the presence of Scottish & Southern Energy's Peterhead Power Station[4].

The next Section displays the GHG emissions by the UNECE sectors and summarises the main observations. The following sectors have been omitted from analysis due to low and zero emissions in the Aberdeenshire region (as can be observed in Table 3); Production Processes, Extraction and Distribution of Fossil Fuels, Solvent Use, Waste Treatment and

[4] In the next few years Peterhead Power Station will become the world's first industrial-scale hydrogen power project and is designed to reduce greenhouse gas emissions by capture and storage of CO_2. It is planned to store 1.2m tonnes of $CO_{2\ (as\ C)}$ off-shore.

Disposal and combustion in Energy Production and Transformation (offshore). The figures quoted include point data.

Combustion in Commercial, Institutional, Residential and Agriculture

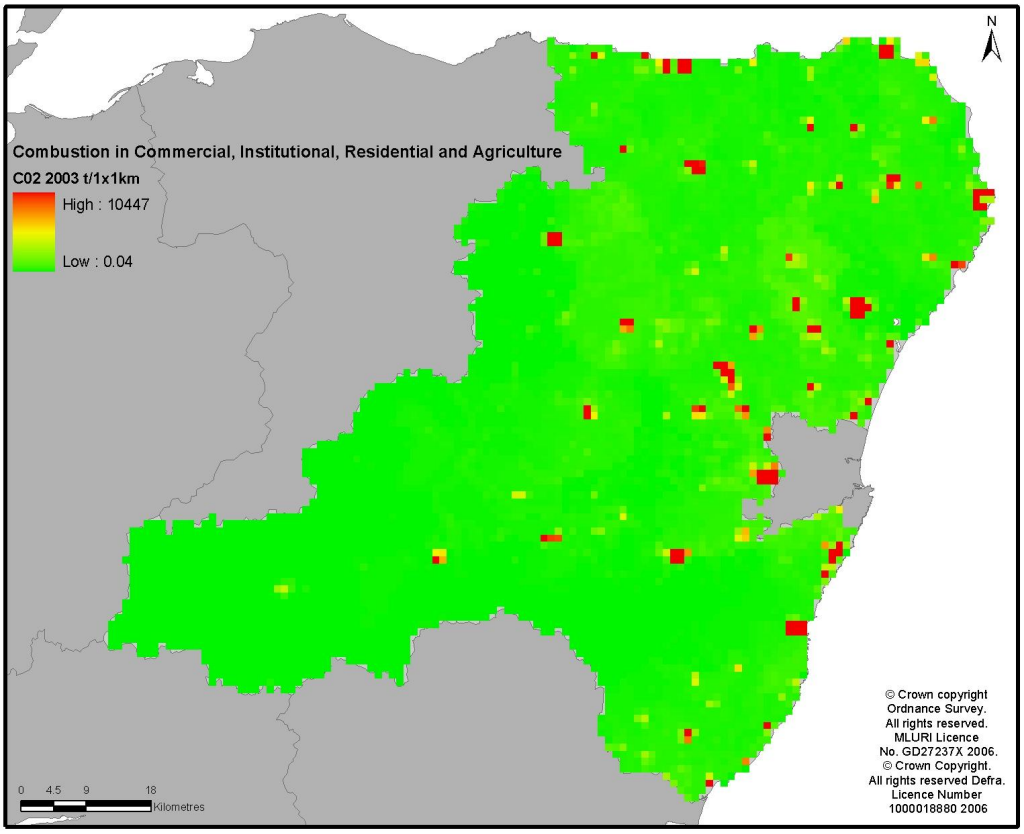

Figure 4: Total Emissions of Greenhouse Gases from Combustion in Commercial, Institutional, Residential and Agriculture for Aberdeenshire (excluding point data)

- Responsible for 5.29% of Aberdeenshire's Emissions
- The spatial distribution of emissions closely follows the pattern of settlements in Aberdeenshire.

Combustion in Industry

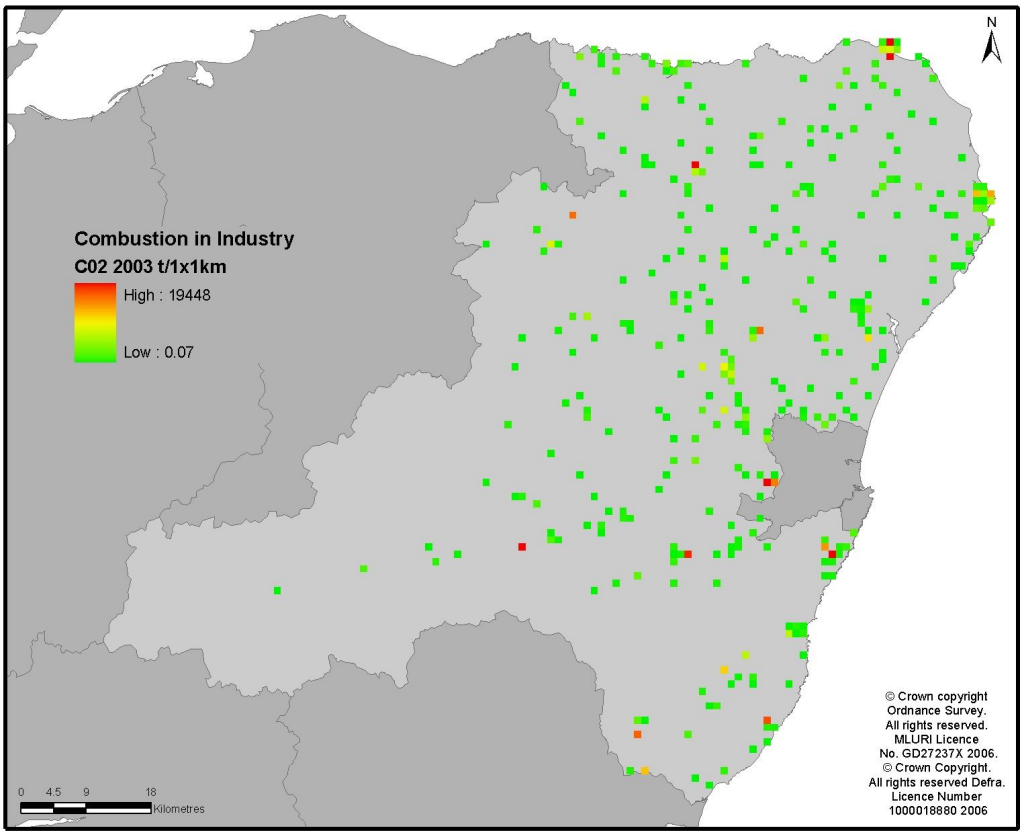

Figure 5: Total Emission of Greenhouse Gases from Combustion in Industry for Aberdeenshire (excluding point data)

- Responsible for 1.43% of Aberdeenshire's Emissions
- Emissions from industry are fairly well spread through Aberdeenshire, following the transport routes and settlement pattern
- Emissions are highest in the south-easterly settlements of Stonehaven, Portlethen, Westhill and the northern settlements of Fraserburgh, Peterhead and Turriff.

Road Transport

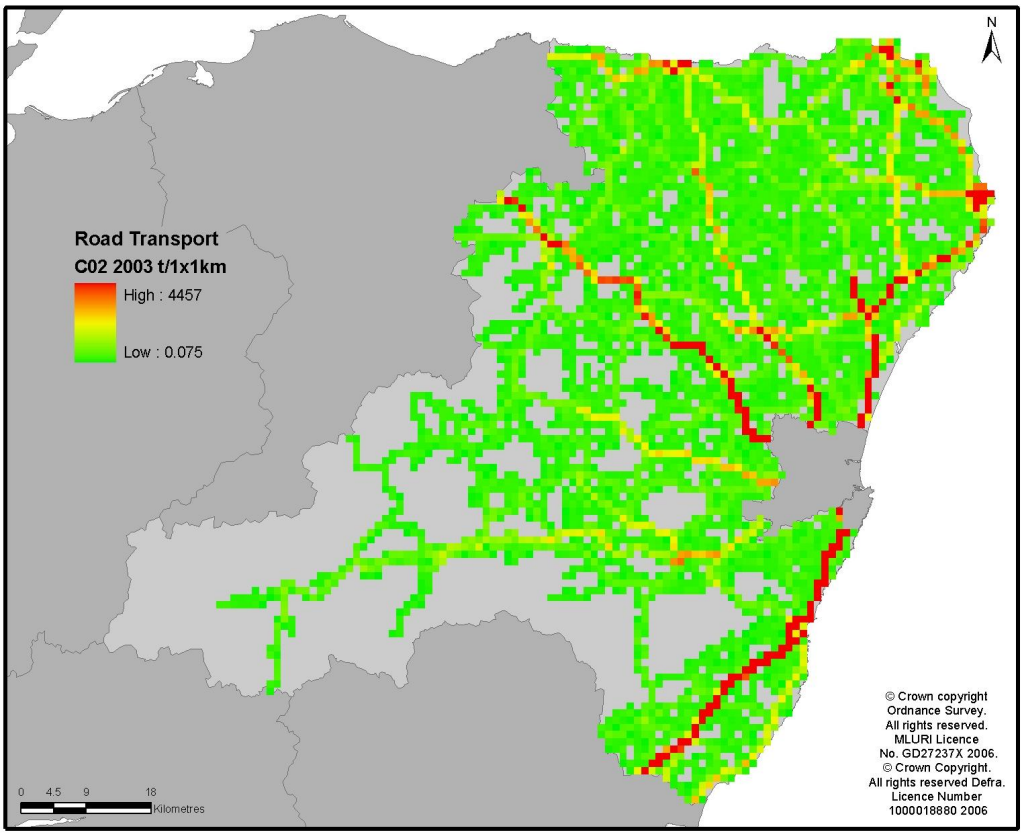

Figure 6: Total Emission of Greenhouse Gases from Road Transport for Aberdeenshire (excluding point data)

- Responsible for 8.69% of Aberdeenshire's Emissions
- Emissions from road transport follow the main transport arteries, reflecting the traffic numbers using the routes.
- In particular the A90 north and south of Aberdeen and the A96 have a large impact on Aberdeenshire's overall GHG emissions.
- Additionally the larger towns (Banchory, Stonehaven, Peterhead, Fraserburgh and Banff) have a significant impact on emissions.

Other Transport and Mobile machinery

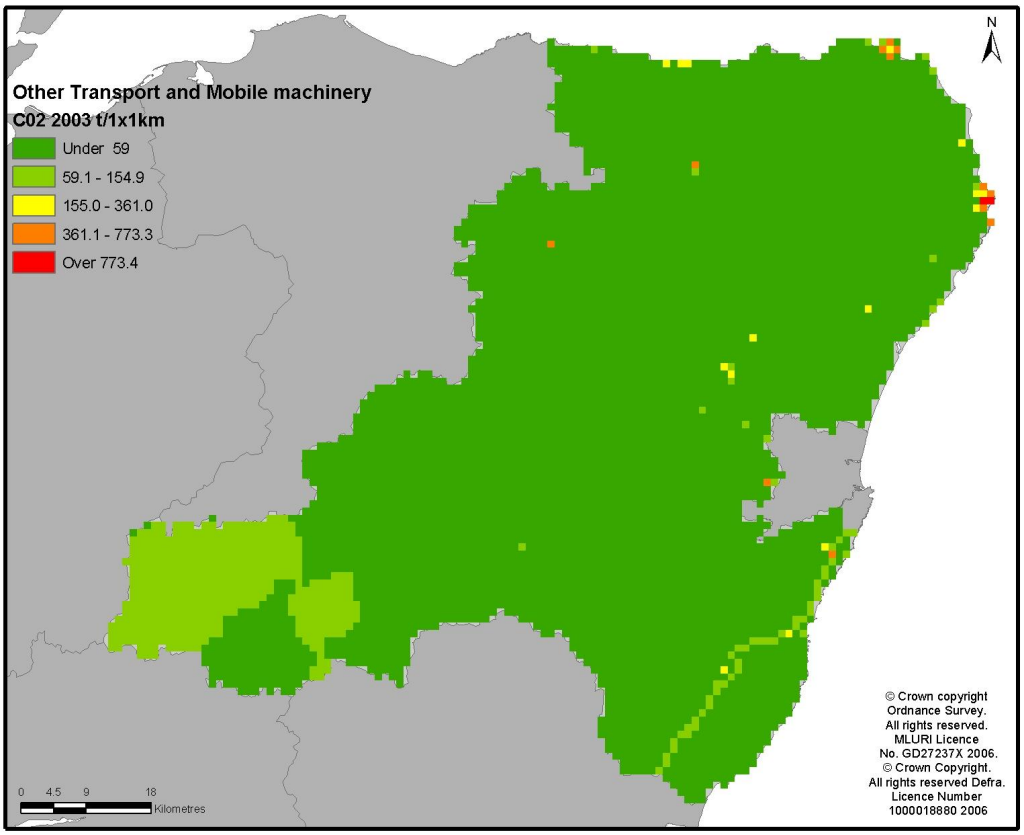

Figure 7: Total Emission of Greenhouse Gases from Other Transport and Mobile machinery for Aberdeenshire (excluding point data)

- Responsible for 1.69% of Aberdeenshire's Emissions
- The distribution for emissions broadly follows the non road transport system in the region (rail and shipping).
- Emissions from rail transport can be observed to the southeast of Aberdeenshire following alongside the A90 and continuing through Inverurie to Huntly.
- The presence of the large ports in Peterhead and Fraserburgh can also be clearly observed through the emission patterns for Aberdeenshire[5].
- It is unclear why there is a relatively high area in the hills and mountains of West Aberdeenshire, but the pattern is similarly observed across the other upland areas of Scotland.

[5] This study excluded off and close to shore emissions. If included these are likely to greatly increase the total emissions from the other transport sector.

Agriculture, Forestry and Land Use Change

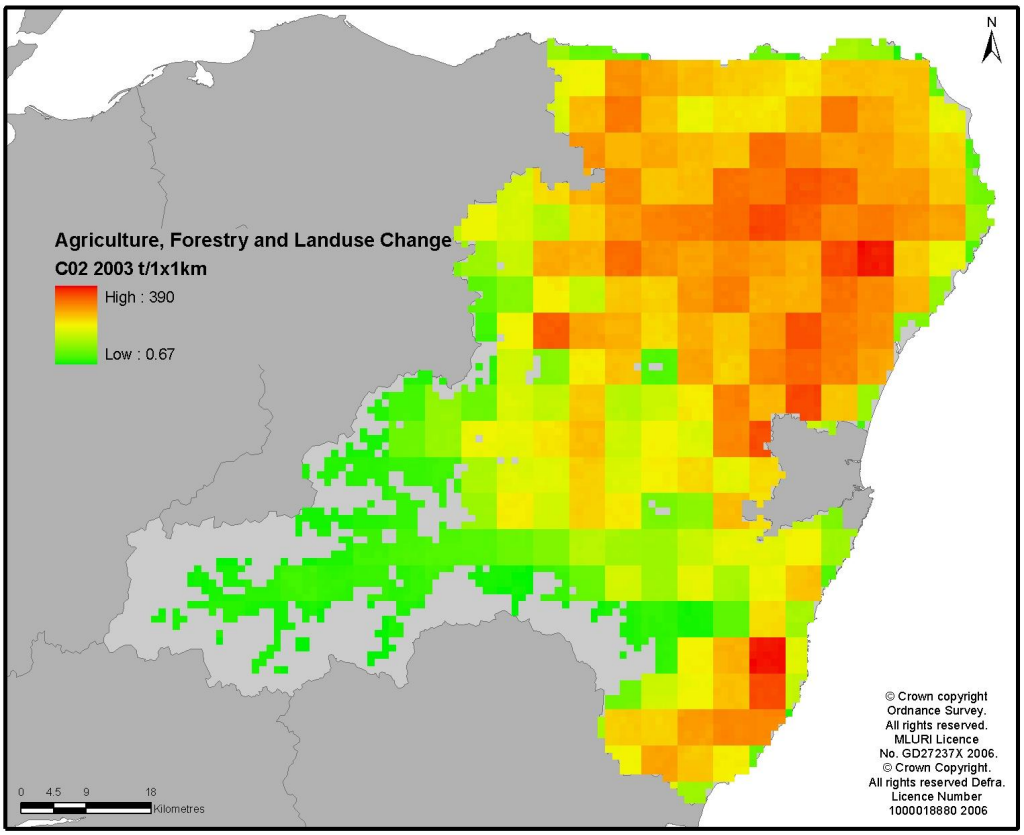

Figure 9: Total Emission of Greenhouse Gases from Agriculture, Forestry and Land Use Change for Aberdeenshire (excluding point data)[6]

- Responsible for 14.93% of Aberdeenshire's Emissions
- Emissions from the Agriculture, Forestry and Land Use Change sector are high in the northeast core of the region, and in the southeast corner. This can be attributed to the use of the land, with high emitting areas containing the more intensively farmed areas of mixed and livestock farming.
- The southwest of the region has areas of low to no emissions from this sector reflecting the extensive systems of agriculture (mainly upland sheep), level of forestry activities in this area and the substantial area of sporting dominated land with grouse moor and deer forest.

[6] NAEI have based this estimation on data at a 5x5km grid scale as can be observed in the block appearance of the map.

Other Sources and Sinks (Nature)

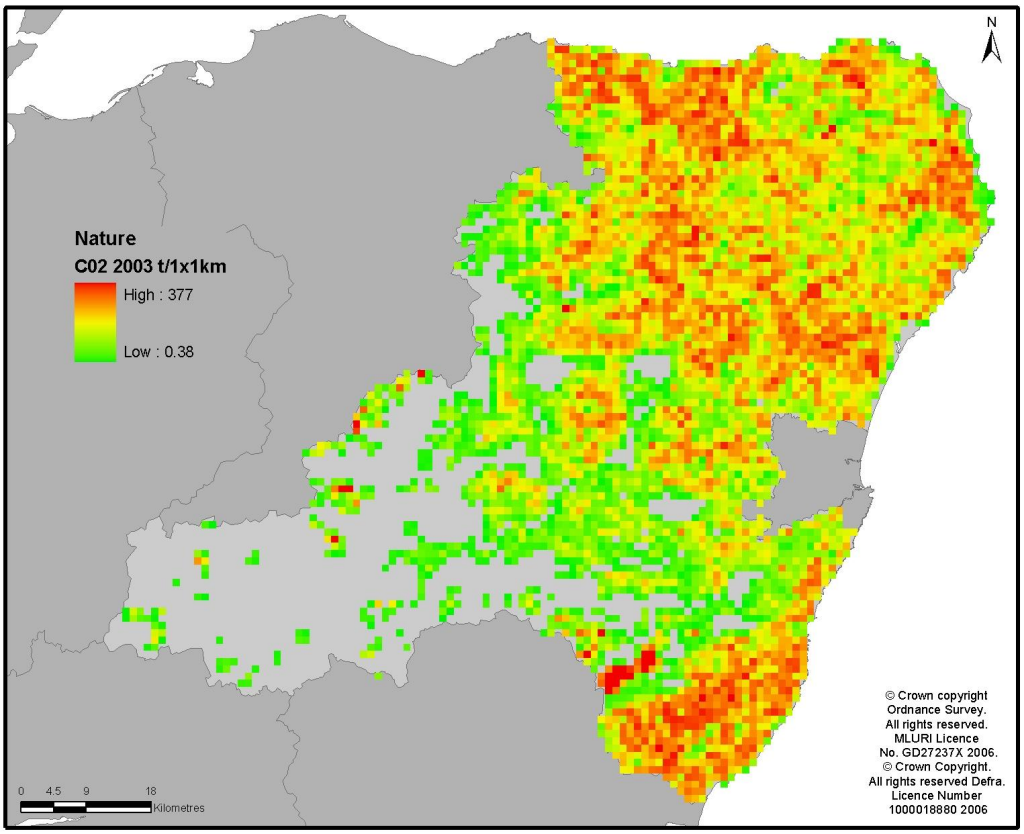

Figure 10: Total Emission of Greenhouse Gases from Other Sources and Sinks (Nature) for Aberdeenshire (excluding point data)

- Responsible for 6.16% of Aberdeenshire's Emissions
- Emissions from this sector are high in the south-east and north of Aberdeenshire.
- There is no obvious explanation for this map other than its tendency at least in lowland Aberdeenshire to be the reverse of the agriculture image. Where agriculture is high, nature is lower. This may reflect a relationship between more intensive agriculture and less 'nature', which is broadly predictable. The lower levels of biological activity and productivity in the hills and mountains account for the low levels in the west of the area.
- The anomalies in some upland areas in the west of the county may reflect the presence of peaty soils, some of which are rather eroded.

4.3 Other Datasets

The analysis in the previous section was undertaken with the NAEI estimated data to enable a spatial analysis of emissions throughout Aberdeenshire. NETCEN has undertaken further work to disaggregate the national CO^2 emissions at local level and regional levels[7], providing an alternative view of emissions in Aberdeenshire. However, it is important to note that the two datasets are not comparable due to their methodology and remit. Firstly, the analysis in the previous section was an attempt to estimate GHG emissions while the figures in the Goodwin (2005)[6] focus solely on CO^2. Secondly the methodology is different; focusing on disaggregating of national figures rather than using specific points and sources. Additionally and importantly for Aberdeenshire and other local authorities with energy generation plants, emissions from energy are allocated based on where it was consumed rather than produced. Accordingly, the total emissions are considerable less than the previous method, even accounting for the omission of CH^4 and N^2O (see table 5).

Using the data from the consumption-led method Aberdeenshire drops from the second largest emitter to the 6th, a drop from 11.4% to 5.3% of the national emissions. This gives a figure of 11.6 (tonnes CO2) per capita compared to a Scottish average of 10. Analysis of the sectoral split reveals several departures from the national average with Landuse Change (Aberdeenshire 16.1%, Scotland 5.9%), Transport (Aberdeenshire 24.0%, Scotland 21.0%) being more prominent in Aberdeenshire (see figure 11). The sectoral data also shows differences in fuel consumption in residential and industrial sectors, with domestic customers in Aberdeenshire more reliant on oil and less so on gas than the average for Scotland.

[7] Goodwin et al (2005)Local and Regional CO2 Emissions Estimates for 2003: A report produced For Defra by NETCEN
http://www.defra.gov.uk/environment/statistics/globatmos/galocalghg.htm

Local Authority	CO2 emissions (t 00s)	Proportion of Scotland's Emissions	Rank	NAEI Proportion of Scotland's Emissions	NAEI Rank
Aberdeen City	**1,731.5**	**3.44%**	**12**	**1.40%**	**18**
Aberdeenshire	2,667.6	5.30%	6	11.40%	2
Angus	**1,046.0**	**2.08%**	**18**	**1.80%**	**14**
Argyll and Bute	**912.1**	**1.81%**	**23**	**1.40%**	**20**
Clackmannanshire	**480.7**	**0.95%**	**30**	**0.60%**	**29**
Dumfries and Galloway	**1,852.9**	**3.68%**	**9**	**4.50%**	**6**
Dundee City	**1,160.0**	**2.30%**	**17**	**0.90%**	**24**
East Ayrshire	**954.7**	**1.90%**	**21**	**1.60%**	**16**
East Dunbartonshire	**608.6**	**1.21%**	**25**	**0.80%**	**25**
East Lothian	**1,422.7**	**2.82%**	**13**	**7.40%**	**4**
East Renfrewshire	**504.6**	**1.00%**	**29**	**0.60%**	**28**
Edinburgh, City of	**3,205.5**	**6.36%**	**5**	**3.00%**	**9**
Eilean Siar	**357.3**	**0.71%**	**31**	**0.70%**	**27**
Falkirk	**4,596.7**	**9.13%**	**1**	**8.40%**	**3**
Fife	**3,469.3**	**6.89%**	**3**	**22.20%**	**1**
Glasgow City	**4,039.4**	**8.02%**	**2**	**3.70%**	**7**
Highland	**3,315.0**	**6.58%**	**4**	**6.70%**	**5**
Inverclyde	**516.8**	**1.03%**	**28**	**0.40%**	**32**
Midlothian	**544.2**	**1.08%**	**27**	**0.70%**	**26**
Moray	**1,028.8**	**2.04%**	**20**	**1.20%**	**21**
North Ayrshire	**1,816.4**	**3.61%**	**10**	**1.80%**	**13**
North Lanarkshire	**2,560.7**	**5.08%**	**7**	**2.60%**	**12**
Orkney Islands	**197.8**	**0.39%**	**32**	**0.40%**	**31**
Perth and Kinross	**1,751.1**	**3.48%**	**11**	**2.70%**	**11**
Renfrewshire	**1,303.9**	**2.59%**	**15**	**1.40%**	**19**
Scottish Borders	**1,279.4**	**2.54%**	**16**	**2.70%**	**10**
Shetland Islands	**670.3**	**1.33%**	**24**	**1.00%**	**23**
South Ayrshire	**933.6**	**1.85%**	**22**	**1.50%**	**17**
South Lanarkshire	**2,414.0**	**4.79%**	**8**	**3.00%**	**8**
Stirling	**1,037.7**	**2.06%**	**19**	**1.20%**	**22**
West Dunbartonshire	**575.3**	**1.14%**	**26**	**0.50%**	**30**
West Lothian	**1,408.7**	**2.80%**	**14**	**1.70%**	**15**
TOTAL SCOTLAND	**50,363.4**	**100.00%**	**N/a**	**100.00%**	**N/a**

Table 3: Scotland's Total Emissions by Local Authority (Goodwin et al 2005 data)

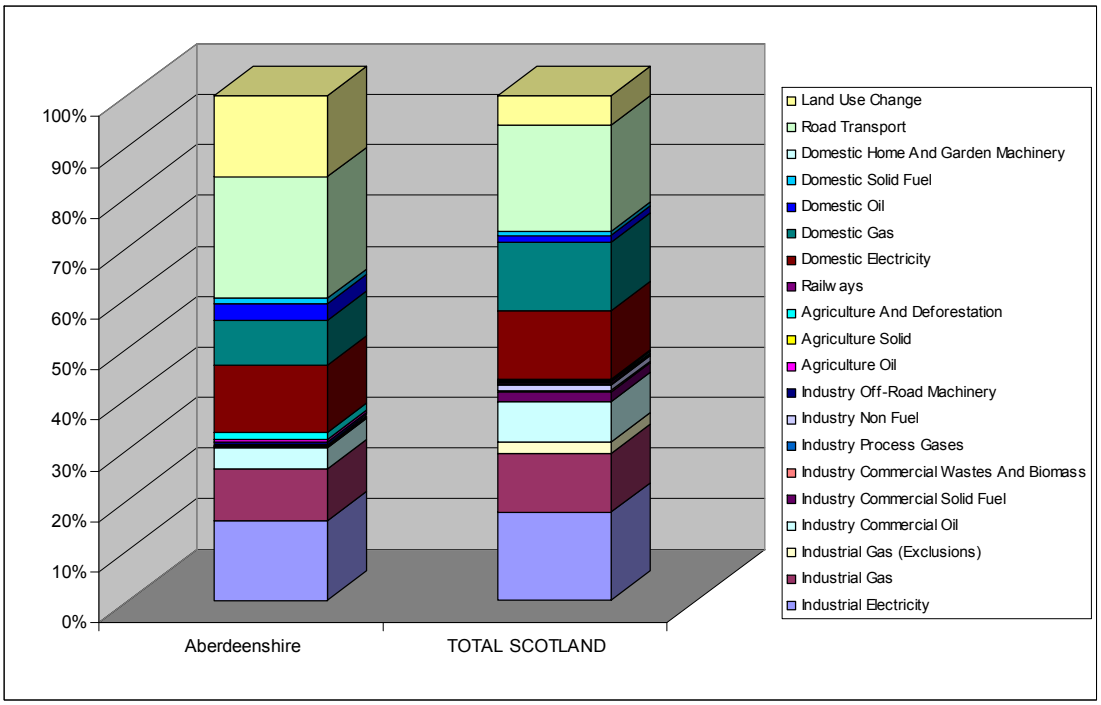

Figure 11: Graph comparing emissions of Aberdeenshire and Scotland by sector (Goodwin et al 2005 data)

5 Summary

Different datasets can be used to explore carbon dioxide and other GHG gas emissions in Aberdeenshire. In this study we have focussed on the spatial datasets, although these methods do not enable disaggregation of some elements of the data. Other approaches to GHG emissions estimates are based on points of consumption rather than production and reveal a different picture, although these data are not available in spatialised form but are disaggregated from the Scottish total.

Emissions from combustion in the energy production sector dominate Aberdeenshire's total, with the gas power station at Peterhead accounting for over half of all emissions. However, the future carbon capture and storage project will have a major impact with the potential to greatly reduce Aberdeenshire's GHG emissions.

The greater intensity (and in particular livestock component) of farming systems leads to a higher than average figure for the farm sector and the relatively light industrial emissions reflect the overall structure of employment. In general, there is a marked variation in land-based emissions between the more productive lowlands and the hill and montane areas of west Aberdeenshire, with much greater emissions arising from the lowlands. In the lowlands there is a marked central Buchan concentration of emissions which we anticipate is caused by high livestock density and methane and nitrous oxide emissions.

The higher level of rurality in Aberdeenshire when compared to the Scottish average accounts for the lower levels of emissions from residential and commercial sources. The emissions from this sector clearly follow the settlement patterns as observed on the maps.

The overall contribution of the transport system to the total emissions is low over the majority of Aberdeenshire, but a high level of impact from the major transport corridors is evident on the maps.

In summary, the official datasets on GHG emissions need careful interpretation. Nonetheless they provide a knowledge platform on which a better understanding of the break-down of GHG emissions by industrial sector and by location.