

# **Aberdeen City and Shire Strategic Development Plan**

## **Main Issues Report**

## **Climate Change Study**

**September 2011**

## **1 Introduction**

- 1.1 A Strategic Development Plan (SDP) is being prepared by the Aberdeen City and Shire Strategic Development Planning Authority to replace the current structure plan. The structure plan was approved by Scottish Ministers in August 2009 and set out a long-term strategy for the future development of the area to 2030. Sustainable development in general and climate change in particular were core components of that plan.
- 1.2 The SDP is required to address issues of climate change as part of public body duties under the Climate Change (Scotland) Act 2009 and Scottish Government Planning Policy.
- 1.3 The Climate Change study has been prepared to inform the SDP being put together by Aberdeen City and Shire SDPA. As such, it identifies both areas of strength and weakness in the current structure plan and makes recommendations to inform the SDP's main issues report and subsequent proposed plan.
- 1.4 Following a brief review of climate change generally and the international and national response to it, the report goes on to consider the potential changes to the climate locally. This is followed by a consideration of the policy context within which the SDP sits before considering options for mitigation and adaptation measures in more detail and making recommendations to inform the Main Issues Report.
- 1.5 This study has been prepared by staff from the SDPA as well as planning and sustainable development officers from both councils. Contributions have also been received from SEPA and partners of the North East Scotland Climate Change Partnership, who took part in a workshop.

## **2 Overview**

- 2.1 Climate change is a significant threat and demands an urgent response. The Stern Review – 'The Economics of Climate Change' (2006) found that climate change will affect the basic elements of life for people across the globe, with the world population experiencing hunger, water shortages, coastal flooding and more extreme weather patterns as the world temperature rises. Climate change is not just an environmental issue.
- 2.2 The UK Government's Sustainable Development Strategy – 'Securing the Future' (2005) states that, "The effects of a changing climate can already be seen. Temperatures and sea levels are rising, ice and snow cover are declining. The consequences could be catastrophic for the natural world and society. The scientific consensus is that most of the warming observed over the last fifty years is attributable to human activity, through emissions of greenhouse gases – such as carbon dioxide and methane – into the atmosphere".
- 2.3 If no action is taken it is estimated that the overall costs of climate change will be equivalent to losing at least 5% of global GDP (Gross Domestic Product) each year. The Stern Report (2006) issues a harsh warning, if no action is taken to reduce current emissions; the concentration of greenhouse gases in our atmosphere could double its pre-industrial level as early as 2035. This

would lead the world to experience a global average temperature rise of over 2°C. All countries would be affected. The most vulnerable and poorest countries would suffer the earliest through water shortages and droughts while richer countries will experience more and more extreme weather conditions, including floods and storms.

- 2.4 Following a substantial review of evidence, the Stern Report (2006) concluded that the benefits of strong and early action far outweigh the economic costs of doing nothing. The investment that takes place over the next 10-20 years will have an unquestionable effect on the climate that we experience over the next 70 years. Action is required now. Climate change is a global issue and so must be the response. Action and policy must be based on long term, shared goals that follow an agreed vision. This vision must be reinforced at the international, national, regional and local level.
- 2.5 Being prepared for, and minimising the impact of climate change requires both adaptation and mitigation measures to take place. Changing our behaviour to respond to the impacts of climate change is known as 'adaptation'.

The Intergovernmental Panel on Climate Change (IPCC) define adaptation as the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

- 2.7 Adaptation to climate change involves making decisions that are sustainable, that are made at the correct time and that maximise benefits while minimising costs. Adaptation needs to be built into planning now to ensure the continued and improved success of international, national, regional and local policies.
- 2.8 Mitigating against climate change involves taking strong action to reduce emissions.

The Intergovernmental Panel on Climate Change (IPCC) define mitigation as human intervention to reduce the sources or enhance the sinks of greenhouse gases.

- 2.9 The aim of mitigation is to avoid the adverse impacts of climate change in the long term. Although the focus was initially on mitigation, adaptation is now seen as fundamental to the package of measures required to deal with climate change.

### **3 International Response**

- 3.1 As noted above, an international response to climate change is essential if substantial cuts in greenhouse gases are to be achieved.
- 3.2 Countries across the world united in 1997 and took action against climate change through the formation of the Kyoto Protocol. The Kyoto Protocol is the only global international agreement on climate change. The Protocol came into force in 2005 and commits all signatories to reducing their combined emissions of the main greenhouse gases (Carbon Dioxide CO<sub>2</sub>, Methane CH<sub>4</sub>, Nitrous Oxide N<sub>2</sub>O and Fluorinated Gases such as Hydrofluorocarbons

HFC's, Petrofluorocarbons PFC's and Hexafluoride SF6) by 5.2% below 1990 levels over the period 2008-2012. The UK share of the Kyoto Protocol is to reduce emissions by 12.5% by 2012.

- 3.2 Scotland was one of the first countries to sign up to the Montreal Declaration of Federated States and Regional Governments on Climate Change. This Declaration commits all 43 signatories to work together to tackle climate change and resulted in the 2006 establishment of a Climate Change Alliance. The Alliance includes Scotland, California, Quebec, Manitoba, Bavaria and South Australia, amongst others.
- 3.3 In 2007, all European Union member states agreed to cut greenhouse gas emissions by 20% by the year 2020. This historic agreement signified a huge step forward in the international battle against climate change.

## **4 National Response**

- 4.1 The UK Climate Change Act came into force in 2008. The Act sets a legal requirement for the whole of the UK to reduce greenhouse gas emissions by at least 80% by 2050 and establishes a framework for shared responsibility and action. As part of this framework, the Committee on Climate Change (CCC) was created. The CCC will assess how the UK can successfully achieve its emissions targets for both 2020 and 2050.
- 4.2 In Scotland, the Scottish Parliament unanimously passed The Climate Change (Scotland) Act 2009 which legally requires Scotland to reduce emissions by at least 80% by the year 2050 with an interim target of a 42% reduction by 2020. Other targets include generating the equivalent of 100 per cent of Scotland's own electricity demand from renewable resources by 2020.
- 4.3 The Planning etc (Scotland) Act 2006 introduced a requirement relating to the preparation of the National Planning Framework by Scottish Ministers and development plans by planning authorities. This requirement states that these documents must be prepared and implemented with the objective of contributing to sustainable development. The 2006 Act requires planning authorities to have regard to guidance on this subject that has been issued by Scottish Ministers in Scottish Planning Policy.
- 4.4 The Flood Risk Management (Scotland) Act 2009 aims to deliver a more sustainable and modern approach to flood risk management than previously followed. The Act has been written to take account of the needs of modern society and the potential impacts of climate change.
- 4.5 Specific measures within the Flood Risk Management (Scotland) Act 2009 include:
  - A framework for coordination and cooperation between all organisations involved in flood risk management
  - Assessment of flood risk and preparation of flood risk management plans
  - New responsibilities for SEPA, Scottish Water and local authorities in relation to flood risk management

- A revised, streamlined process for flood protection schemes
- New methods to enable stakeholders and the public to contribute to managing flood risk, and;
- A single enforcement authority for the safe operation of Scotland's reservoirs

## 5 Climate Change Projections

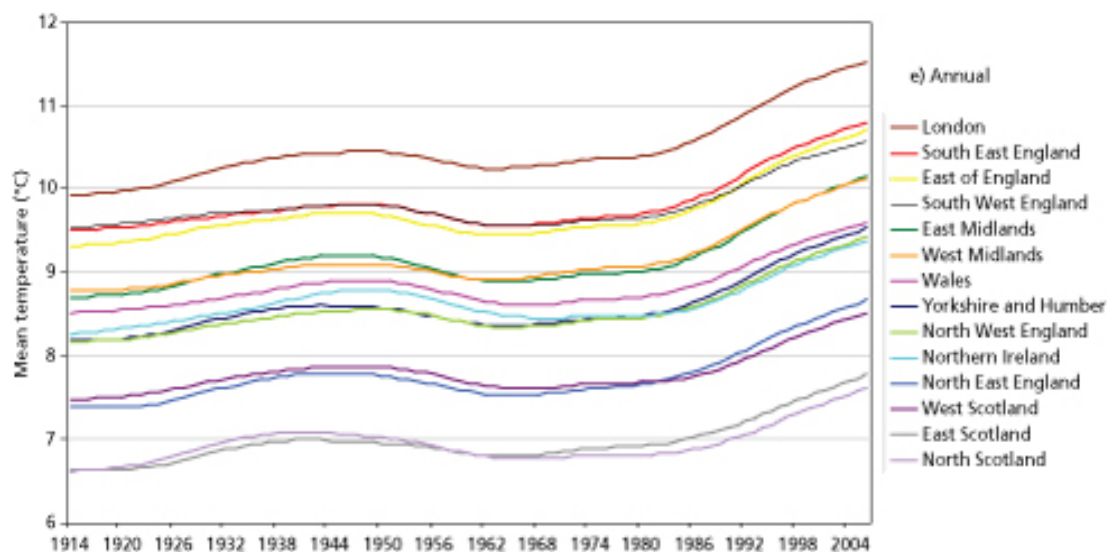
5.1 Climate Change projections should help local authorities and other organisations prepare for a changing climate by looking at what the climate has been like in the past over a long period and what it is likely to be like in the future. This will allow building standards, design, businesses, agriculture and flooding and sea defences to be amended to reflect these likely changes in order to adapt to a changing climate.

5.2 The Met Office has developed UK climate projections (UKCP09) which is the fifth generation of climate change information for the UK. UKCP09 has been purposefully designed to meet the needs of a wide range of people who will want to assess potential impacts of the projected future climate and explore adaptation options to address those impacts. UKCP09 reflects scientists' best understanding of how the climate system operates, how it might change in the future, and allows a measure of the uncertainty in future climate projections to be recognised.

5.2 Below is a selection of graphs to illustrate the past trend and projected future climate in Scotland East area which covers Aberdeen City and Shire.

### UKCP09 – Annual Mean Temperature Trend

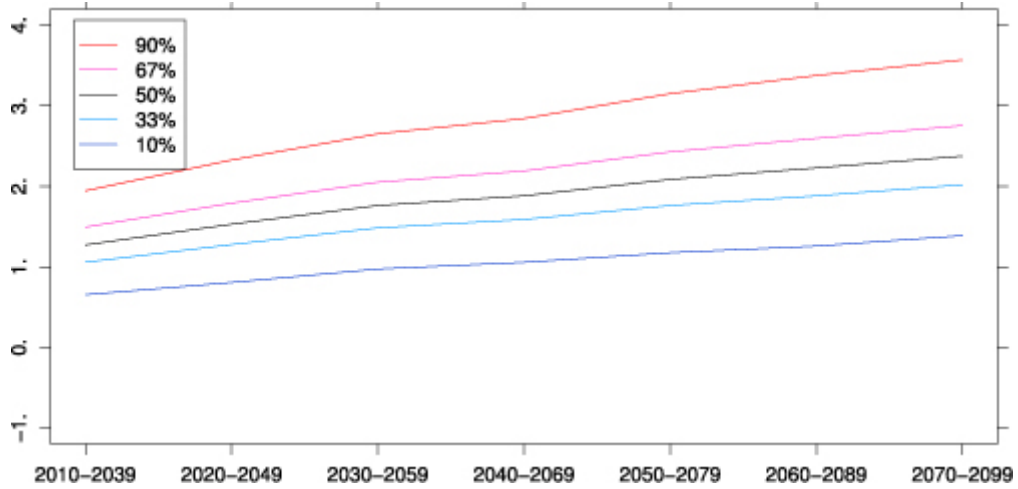
5.4 Figure 1 shows a graph of the annual mean temperature trend from 1914 to 2004. All areas including the East of Scotland have seen a rise in annual mean temperatures over this period.



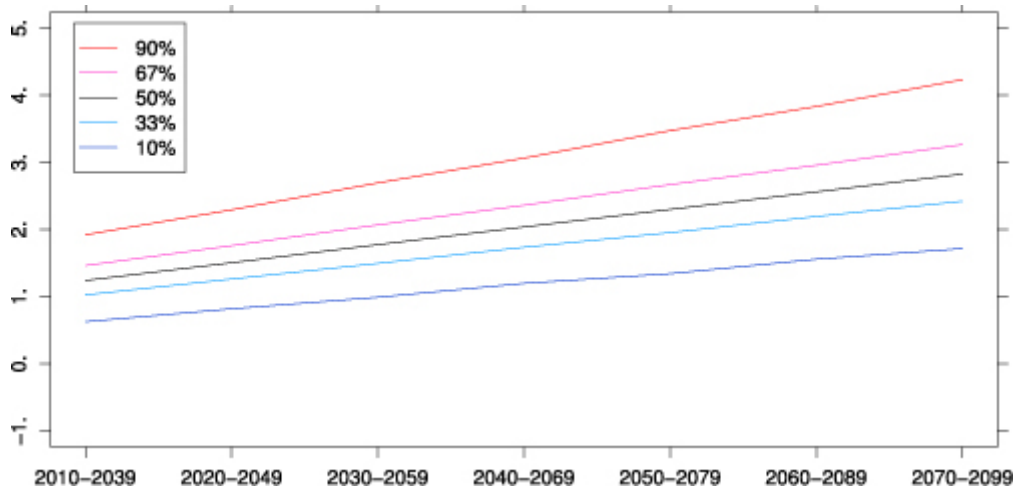
5.5 For the projections for the future, UKCP09 has done these on the basis of three emission scenarios, low, medium and high, based on the amount of green house gases emitted.

5.6 Figure 2 below show three graphs, of low, medium and high emissions

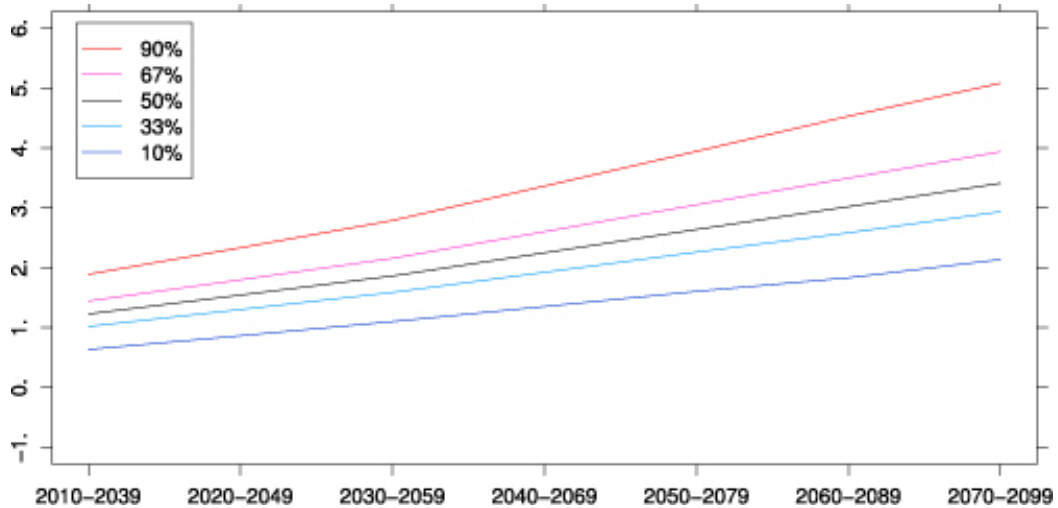
Low emissions scenario – Change on annual mean temperature (°C)



Medium emissions scenario – Change on annual mean temperature (°C)

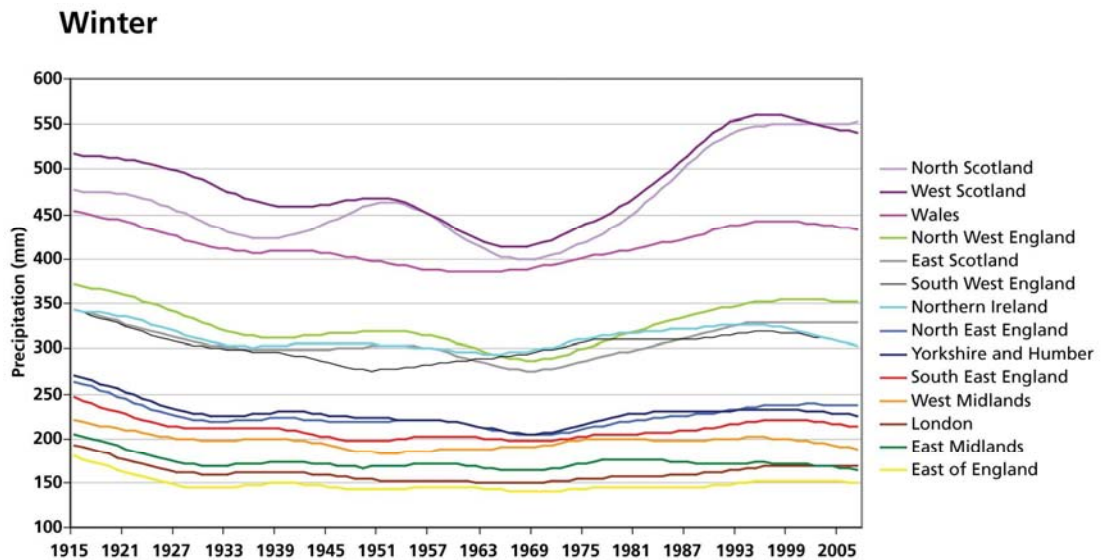


High emissions scenario – Change on annual mean temperature (°C)

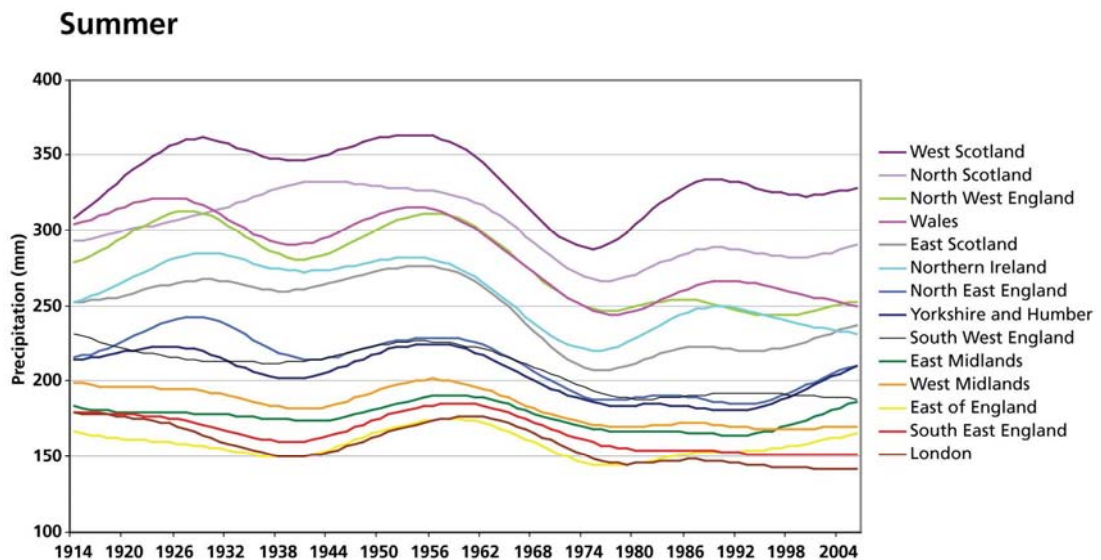


5.7 In all the emissions scenarios shown it looks likely that the annual mean temperature in Scotland East is likely to increase by between 2°C and 3°C by the end of the century.

5.8 Figure 3 is a graph which shows the trend in winter rainfall levels since 1915. The East of Scotland trend line has been fairly level.



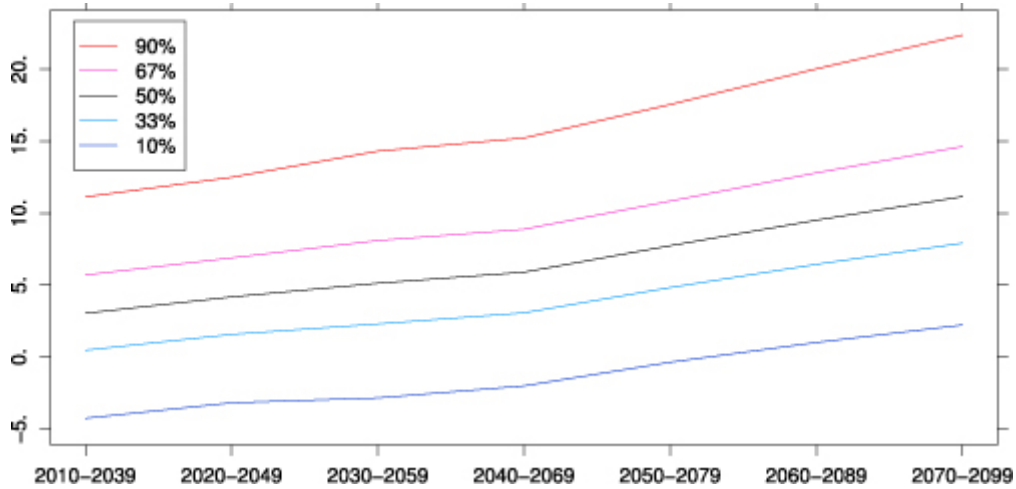
5.9 Figure 4 shows the trend for precipitation in East Scotland between 1914 and 2006 for summer.



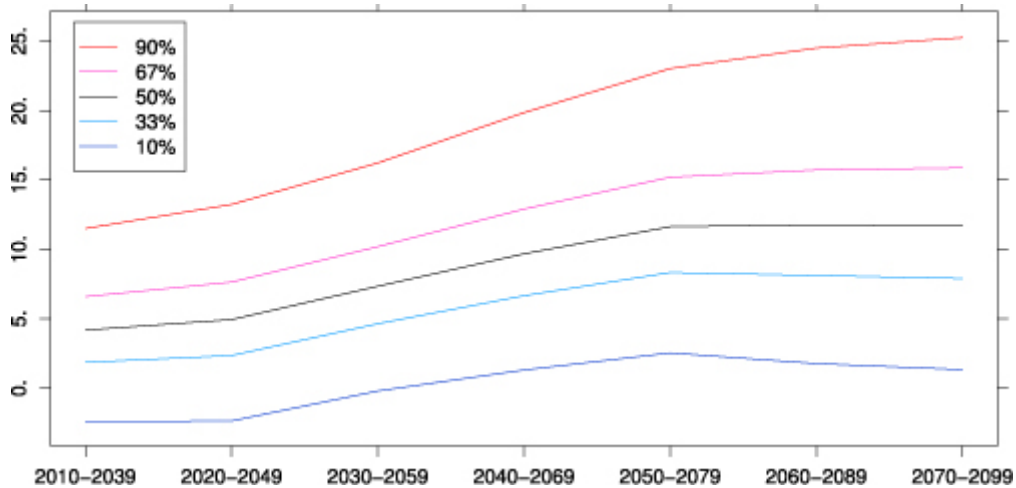
5.10 Again the total precipitation for East Scotland from 1914 to 2006 shows a fairly level trend with lower rain during the 1970's and it increasing again since then.

5.11 Figure 5 show the low, medium and high emission scenarios for winter precipitation for East Scotland, while figure 6 does the same for summer precipitation.

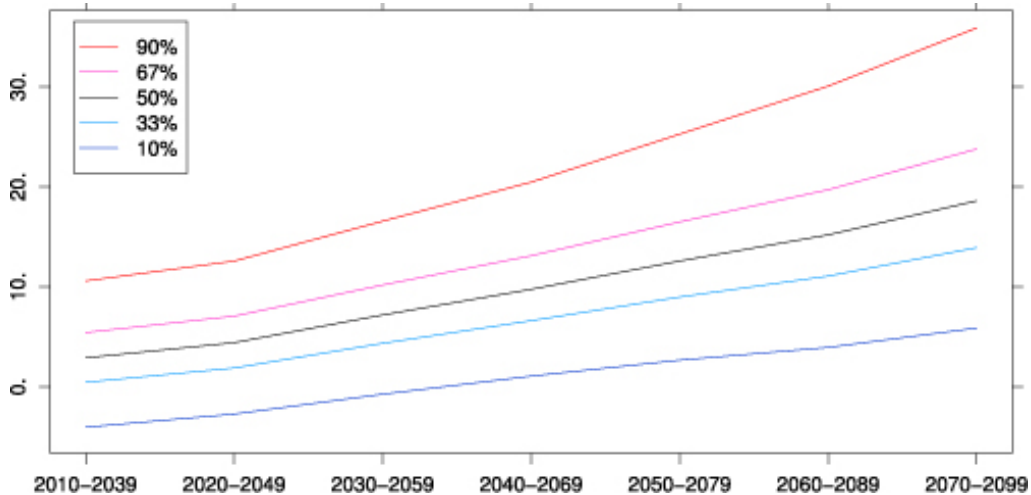
Low emissions scenario – Change in winter mean precipitation (%)



Medium emissions scenario – Change in winter mean precipitation (%)

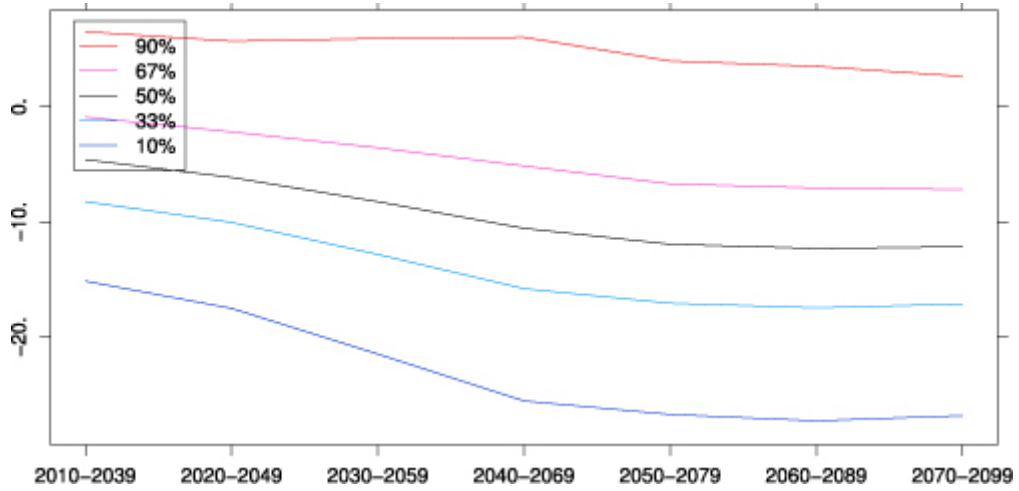


High emissions scenario – Change in winter mean precipitation (%)

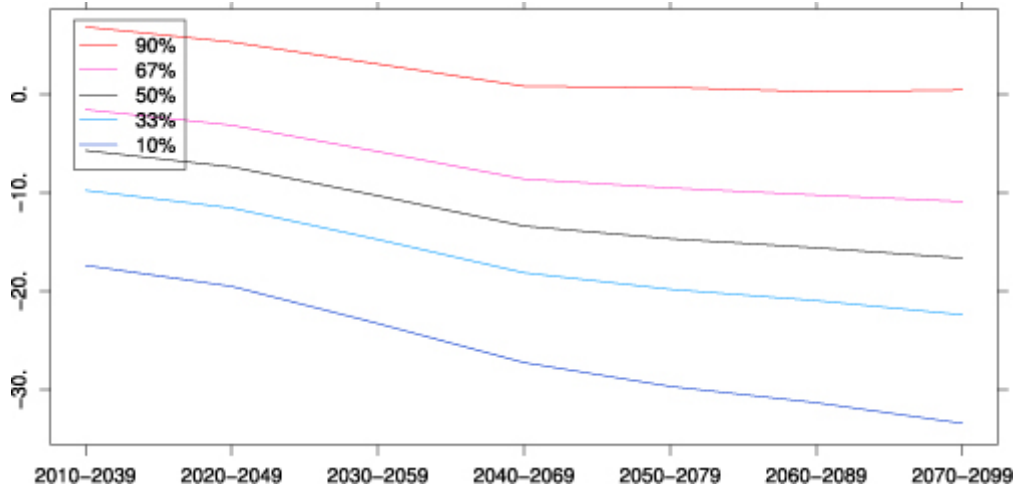




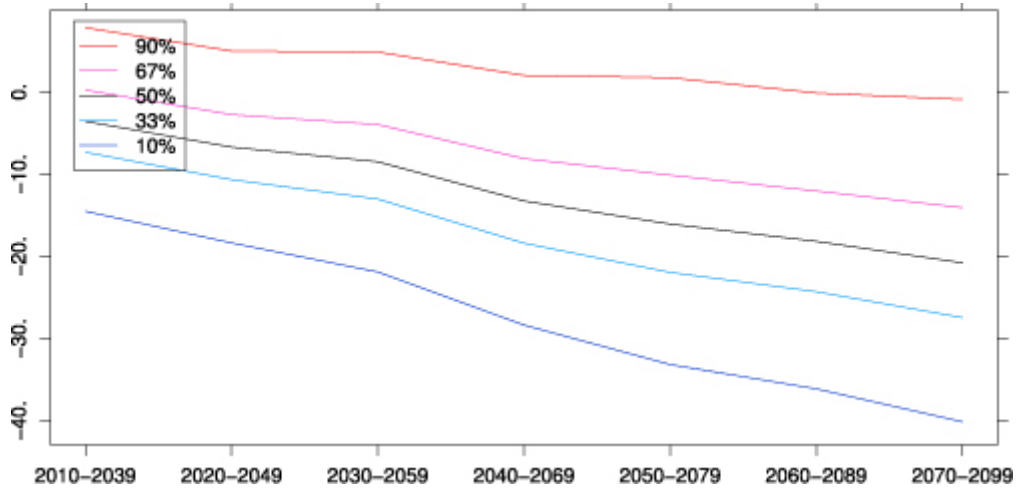
Low emissions scenario – Change in summer mean precipitation (%)



Medium emissions scenario – Change in summer mean precipitation (%)



High emissions scenario – Change in summer mean precipitation (%)



- 5.12 In all emissions scenarios used for the projections it is likely that the mean precipitation levels in winter in the East of Scotland area are likely to increase.
- 5.14 In all emission scenarios used it is likely that mean summer precipitation for the East of Scotland is likely to reduce particularly from the 2040's onwards.
- 5.15 The above graphs which show the past trends and likely probability for temperature and rainfall in the future for our area, show that it is a probability that Aberdeen City and Shire will become slightly warmer and have more rainfall in the winter and less in the summer.

## **6 Policy Context**

- 6.1 The National Planning Framework 2 (NPF2, 2009) lists 'Climate Change' as one of the key challenges which must be addressed over the next 20 years. NPF2 highlights the challenges that Scotland will face in reducing greenhouse gas emissions which contribute to climate change and adapting to the changes in our environment which are already taking place. NPF2 acknowledges that even with strong policies in place to reduce emissions, some degree of climate change is unavoidable as past and present emissions impact over the next 30 to 40 years.
- 6.2 As already shown in section 5 above, NPF2 suggests that in the future Scotland will experience climates that are wetter in the winter and warmer in the summer. Scotland is likely to experience an increase in the frequency of severe weather, a rise in sea level, stronger tidal surges and less snow. The water environment and water infrastructure will also be challenged by changes in the climate. To the west of Scotland the volumes of water available for hydro-power generation may increase, while in the east droughts may lead to reduced water volumes available for abstraction and agricultural irrigation purposes. Scotland's landscape and historic sites may be at risk of flood damage, rising sea levels and coastal erosion. However, the changes in Scotland's climate may also bring about opportunities to increase tourism, forestry and certain forms of agriculture.
- 6.3 Scottish Planning Policy (SPP 2010) highlights the statutory duty that is placed on Development Plans to contribute to sustainable development. The consolidated Planning Policy document states that the design of new development should address the causes of climate change by minimising carbon and other greenhouse gas emissions. Design and masterplanning should include features that provide effective adaptation to the predicted effects of climate change.
- 6.4 SPP also recognises the significant role that the planning system must play in promoting a pattern of development which helps to reduce Scotland's carbon footprint and facilitates adaptation to climate change. This role should aim to facilitate the generation of power and heat from low carbon sources and to achieve waste management targets. Planning authorities should support the development of a diverse range of renewable energy technologies, guide development to appropriate locations and provide clarity on the issues that will be taken into account when specific proposals are assessed.

- 6.5 PAN 69: Planning and Building Standards Advice on Flooding (2004) sets out background information on the water environment and the various factors which influence flooding. The advice covers watercourses, coastal areas, sewer surcharging, groundwater and the affects of climate change. It is advised that local authorities make use of the UK Climate Impacts Programme (UKCIP2 – an earlier version of the model used in section 5 above) to help assess how areas might be affected by climate change so they can prepare for its impact.

## **7 Scottish Government Strategies and Action Plans**

- 7.1 The Scottish Climate Change Adaptation Framework was published in 2009 and sets the strategic direction for Scottish Government actions in terms of climate change. The Framework calls for effective, co-ordinated planning in order to ensure that Scotland is as prepared and resilient as possible to the future impacts of climate change. As many adaptation decisions are taken at a local level, the Framework calls for action across all sectors. The Framework outlines the key challenges and activity required to address adaptation within the sectors of Water Resource Management, Agriculture, Forests and Forestry, Spatial Planning and Land Use, Biodiversity and Ecosystem Resilience, Transport, The Built Environment, Energy, Business and Industry, Marine and Fisheries, Health and Wellbeing and Emergency and Rescue Services.
- 7.2 The Climate Change Delivery Plan (2009) sets out how Scotland will meet the statutory targets required by the Climate Change (Scotland) Act 2009. The Plan sets out the action that must be taken in the short, medium and long term to achieve the required emission reductions.
- 7.3 In 2010 annual targets for emissions reductions until 2022 were published by the Scottish Government. Several publications, strategies and guidance were also produced in 2010. These include Scotland's Zero Waste Plan, Low Carbon Economic Strategy for Scotland, Low Carbon Scotland: Public Engagement Strategy, Sustainable Procurement, Getting the Best from our Land: A Land Use Strategy, and the Report on Proposals and Policies (RPP) were published by the Scottish Government in relation to the Climate Change (Scotland) Act 2009. The RPP is an explanation of how the proposals and policies will contribute to meeting the annual 2020 and 2050 targets, and the timescales over which they are expected to take effect; This includes a:
- description of how the proposals and policies will contribute to meeting the domestic effort target in each target year;
  - Identification of the contribution which should be made by energy efficiency, energy generation, land use, transport, and waste (as key sectors identified within the 2009 Act); and
  - Consideration of how the proposals and policies are expected to affect different sectors of the Scottish economy.
- 7.4 In 2011 the Scottish Government published this Public Bodies Climate Change Duties: Putting them into Practice, which outline what public bodies should be doing. The duties include mitigation, adaptation and public engagement.

## **8 Other Sources of Guidance and Good Practice**

- 8.1 The Planning Advisory Service (PAS) recently published the advice note, Using supplementary planning documents to address climate change locally (2010). This document sets out the many roles and responsibilities that the planning system has to play in tackling climate change. Planning has a central role to play in addressing climate change through various activities, including:
- setting out appropriate strategies and policies;
  - supporting the development of renewable, decentralised and low-carbon energy schemes;
  - ensuring that development proposals have minimal negative impact on the environment; and
  - reducing the vulnerability of communities to the effects of climate change.

## **9 Aberdeen City and Shire Plans, Policies & Strategies**

- 9.1 All of Aberdeen City Council and Aberdeenshire Council plans, policies and strategies undergo a Strategic Environmental Assessment (SEA) to look at their impact on the environment, including climate change. The process is regulated by the EU Directive 2001/42/EC, the Environmental Assessment of Plans and Programmes (Scotland) Regulation 2004 and the Environmental Assessment (Scotland) Act 2005.
- 9.2 There are many Council strategies, policies and reports which make specific provision for climate change. Following Aberdeen City Council's Climate Change Action Plan 2002, climate change and carbon reduction measures are increasingly included in council plans, policies and strategies. City Council progress in mitigating and adapting to climate change is recorded in Scotland's Climate Change Declaration Annual Report. From Aberdeenshire Council these include The Bigger Issue (2006), the Sustainability Charter (2008-2012), Scotland's Climate Change Declaration Annual Report and the Climate Change Action Plan (2011-2015)
- 9.3 Both Aberdeen City Council and Aberdeenshire Council have committed themselves to several climate change projects, campaigns and declarations.

## **10 Mitigating Climate Change**

- 10.1 The Intergovernmental Panel on Climate Change (IPCC) define mitigation as human intervention to reduce the sources or enhance the sinks of greenhouse gases. The aim of mitigation is to avoid the adverse impacts of climate change in the long term.
- 10.2 Both Aberdeen City Council and Aberdeenshire Council have signed up to the European Union's Covenant of Mayors and Scotland's Climate Change Declaration, which report annually on progress of climate change mitigation. Both Councils also have their own internal plans; for example carbon

management and climate change action plans which outline projects and initiatives being undertaken to mitigate climate change and reduce their green house gas emissions. Initiatives include looking at ways to reduce emissions and reduce resource use in waste, energy and travel.

- 10.3 The Strategic Development Plan (SDP) will have a role in seeking to reduce the causes as well as limit the consequences of climate change. In addressing the causes the SDP should aim to reduce green house gas emissions. This can be done by reducing the impact of travel and transport through reducing the need to travel and model shift away from private car use, reducing energy use by increasing energy efficiency and helping towards moving towards low carbon and renewable energy generation, reducing the use of finite resources and dealing with waste through reducing, reuse and recycling.
- 10.4 Following an analysis of national legislation, policies, strategies and action plans as well as looking at good practice guidance from across Scotland and further afield, a Climate Change Mitigation and Adaptation Workshop was held. The Workshop session invited representatives from the SDPA, City and Shire Local Development Plan teams and Waste and Sustainability teams, Nestrans, SEPA, SNH and Scottish Enterprise to discuss potential mitigation and adaptation measures which could be suitable within the North East of Scotland.
- 10.5 Appendix 1 has a table of potential mitigation measures which have been highlighted through either the literature analysis or the Climate Change Workshop. Each measure is assessed in terms of its relevance to the North East of Scotland and to the Strategic Development Plan.
- 10.6 The SDPA has also supported a workshop session in partnership with Scottish Enterprise and the North East Scotland Climate Change Partnership which looked at options for reducing greenhouse gas emissions to meet the Scottish Government's 2050 target. The facilitated workshop used the 'Greenhouse Gas Regional Inventory Protocol' (GRIP) software to model emissions to 2050, along with policy measures that could be taken to reach the 80% reduction target.
- 10.7 The range of policy measures extended far beyond the land use planning system but the workshop clearly indicated the scale of change required to get close to these ambitious targets.
- 10.8 A report of this workshop is attached at appendix 2.

## **11 Adapting to Climate Change**

- 11.1 While mitigation measures, as previously discussed, are designed to avoid the adverse impacts of climate change in the long term, adaptation measures are designed to lessen the unavoidable impacts of climate change in the short and medium terms. Even if levels of emissions are drastically reduced now, the world is already tied in to an eventual warming of at least 2°C (Committee on Climate Change 2008). Strategies and policies need to be in place so that the world can adapt to this rise in temperature and cope with the affects that such a rise will bring.

- 11.2 The Scottish Government has produced Scotland's Climate Change Adaptation Framework and 12 sector action plans. The Framework sets the strategic direction for Scottish Government actions but, because many adaptation decisions are taken at a local level by individual organisations, action from across all sectors is needed. The Sector Action Plans look to existing sources of information and research to identify the key impacts of climate change on each sector and appropriate actions which can build resilience to these impacts. <sup>1</sup>
- 11.3 Following an analysis of national policies, strategies and action plans as well as looking at good practice guidance from across Scotland and further afield, a Climate Change Mitigation and Adaptation Workshop was held as detailed above.
- 11.4 Appendix 1 has a table of potential adaptation measures which have been highlighted through either the literature analysis or the Climate Change Workshop. Each measure is assessed in terms of its relevance to the North East of Scotland and to the Strategic Development Plan.

## **12 High Relevance Measures**

- 12.1 The Current Structure Plan covers a lot of the measures in the tables in appendix 1 but not all. New legislation and guidance has emerged over recent years and the Plan now needs to be strengthened and revisited. Below is a table of the measures that were deemed as of highest relevance. These include, waste, energy, travel and water.
- 12.2 Below is a table which shows the measures that could be taken to mitigate and/or adapt to climate change, whether or not these measures are in the current structure plan and if they are whether they are adequately dealt with within the current plan or what additional work is required.

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<sup>1</sup> <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/adaptation/AdaptationFramework>

**Table 1 High relevance measures**

Measure	In current structure plan	
Energy from Waste	Yes	Indirectly mentioned, although more sustainable methods of waste management will need to be considered in more detail in the main issues report.
Reducing the need to travel through appropriate location of homes, employment etc.	Yes	This was fundamental to the determination of the spatial strategy in the current plan.
New developments to incorporate sustainable transport options from the outset.	Yes	The current plan made it clear that sustainable travel options had to be an attractive choice from new development.
Carbon capture and storage (CCS).	No	A widespread retrofitting and implementation programme of carbon capture technology to existing and new power stations would require central government/Scottish government support. The SDP could implement strategic policies which would assist in achieving this. Scotland has an advantage in it's proximity of emitters to storage sites in the North Sea, which make it an ideal location to demonstrate CCS.
Planning for and adapting to coastal erosion	Yes	The SDP can set out a strategic view on where development

		should/should not go in terms of coastal management.
Require all developments to demonstrate how water consumption will be reduced.	Yes	The mechanisms for dealing with this are now available and the main issues report could consider whether to take one approach across the two council areas.
Planning for and adapting to areas of flood risk	Yes	Strategic Flood Risk Assessment has been prepared as part of the supporting documents for the main issues report.
Encourage connectivity between habitats	Yes	A stronger statement could be made to make it clear that green networks are important.
National Grid Upgrade	Yes	Two linked proposals were included in the structure plan, although this should be added to in the strategic development plan.
Energy efficiency in new buildings	Yes	The mechanisms for dealing with this are now available and the main issues report could consider whether to take one approach across the two council areas.



## **13 Conclusions**

- 13.1 This study has explored the issue of climate change in the context of the preparation of the strategic development plan main issues report.
- 13.2 It has highlighted the scale of the challenge presented by climate change as well as some of the measures which it is appropriate to consider in the strategic development plan, relating to both adaptation and mitigation.
- 13.3 While the current structure plan already covers climate change issues quite comprehensively, a number of areas have been highlighted which would benefit from further refinement. In addition, a number of new areas have been identified which will be explored further in the main issues report and subsequent strategic development plan.

## Appendix 1

**Table 1: Potential Mitigation Measures**

Name of Measure	Definition	Reference	Assessment of Relevance to SDP	Assessment of Relevance to North East	
<b>Waste</b>					
Community Recycling Treatment Centre	Community recycling treatment centres promote community based sustainable waste management as a practical and effective way of reducing the amount of waste going to landfill.	Workshop Discussions / Scotland's Zero Waste Plan (2010)	Low relevance (1) – The SDP could identify any strategic context for sites.	Medium relevance (2)	
Organic Waste Treatment Centre	Organic waste treatment centres aim to recycle source separated organic waste (mostly kitchen/green waste) to useful products, reducing the need for landfill.	Workshop Discussions	Low relevance (1) – The SDP could identify any strategic context for sites.	Medium relevance (2)	
Energy From Waste	A centre or facility that produces fuel or energy from municipal waste, reducing the need for landfill and the requirement for fuel/heat	Workshop Discussions / Scotland's Zero	High relevance (3) – The SDP can identify appropriate site/s or highlight the need for	High relevance (3) – The SDP should set the context for the	

	<p>production from fossil fuels. These sites should be located in areas that allow for links to be made to potential users. Energy from waste could contribute up to 31% of Scotland's renewable heat target and 4.3% of our renewable electricity target. This should only be used for resource streams which cannot practicably offer greater environmental and economic benefits through reuse or recycling.</p>	Waste Plan (2010)	LDP's to do this.	<p>provision of waste management facilities and could be area or site specific if appropriate, which LDP's could implement.</p>	
Underground Waste Bins	<p>Many European countries employ a proprietary collection system known as Envac, which conveys refuse via underground conduits using a vacuum system. Waste is deposited into hatches, called portholes. Waste is then pulled through an underground pipeline by winds created by large industrial fans, in response to porthole sensors that indicate when the waste needs to be emptied. The pipelines converge on a central processing facility that uses software to direct the waste to the proper container, from there to be trucked to its final location, such as</p>	Workshop Discussions	<p>Low relevance (1) – The SDP can identify the need for such an underground system and highlight the requirements of the LDP's in delivering such a system on the ground.</p>	<p>Low relevance (1) - A similar system is used in London. Investigations would have to be carried out as to whether this was suitable within the North East of Scotland.</p>	

	a landfill or composting plant. Thus reducing the time and distance and emissions related to the transportation of waste.				
All Developments to be covered by a Site Waste Management Plan including the reuse of soils and materials on site from development.	Requirement for developers to submit a Site Waste Management Plan (SWMP) as part of planning applications for all development types. Not limited to but including waste management facilities. SMWPs provide developers, their clients and designers with cost saving opportunities and a structured approach to implementing efficient and sustainable waste management. The reuse of soils and materials from new developments on site would assist significantly in reducing levels of transport emissions.	Workshop Discussions/Scotland's Zero Waste Plan (2010)/Public Bodies Climate Change Duties Consultation Paper (2010) Annex I	Low relevance (1) – The SDP can place a requirement on all developers to submit a Site Waste Management Plan and require LDP's to formalise this process through policy and supplementary guidance.	Medium relevance (2)	
Energy					
De-carbonisation of heating sources.	One of the key targets within the Climate Change Delivery Plan for Scotland's is for the heat sector to be largely de-carbonised by 2050	Workshop Discussions/Climate Change Delivery	Medium Relevance (2) – Achieving this outcome will require the replacement of	Medium Relevance (2)	

	with significant progress by 2030 through a combination of reduced demand and energy efficiency, together with a massive increase in the use of renewable or low-carbon heating.	Plan (2009)	the natural gas network with low-carbon heat, this would require Scottish Government action/policy which the SDP could then implement. The SDP can place a requirement on LDP's to write specific policies/supplementary guidance on heating requirements for new builds. Although this issue would ultimately be dealt with through Building Standards/ Masterplanning.		
Promoting energy efficiency through building design.	Commercial buildings, including shops, hotels and offices, are responsible for a significant proportion of Scotland's carbon emissions. Improving the energy efficiency of commercial buildings, both existing and new stock, needs action alongside improvements to residential properties. Difficult to	Workshop Discussions/Climate Change Delivery Plan (2009)	Medium relevance (2) - The SDP can place a requirement on LDP's to write specific policies/ supplementary guidance on energy efficient design for new builds/	Medium relevance (3)	

	<p>achieve in existing stock although improvements can include improving thermal performance through replacement of windows and reducing energy use through more effective insulation and more efficient lighting and heating systems. In addition to refurbishment options, the replacement of obsolete commercial buildings provides important opportunities for improving energy performance. New developments should have high energy efficiency standards, consider solar gains and wind shelter, through layouts and tree planting and encourage district heating systems and provision of renewable energy generation.</p>		<p>refurbishment of existing stock. The Scottish Government have recently published draft guidance on Sustainability Labelling (2010). This guidance when adopted will encourage more demanding sustainability standards through the inclusion of at least two new enhanced building standard levels. The draft proposals on sustainability promote the more efficient use of carbon and energy as well as water.</p>		
<p>Ensure new buildings avoid a proportion of projected emissions through microgeneration.</p>	<p>Permitted development rights related to micro-renewables will be in place by April 2011. Micro renewables include micro wind turbines, solar photovoltaics, solar</p>	<p>Conserve and Save: The Energy Efficiency Action Plan for Scotland (October</p>	<p>Low relevance (1)</p>	<p>Medium relevance (2)</p>	

	thermal technology, biomass and heat pumps.	2010)/Climate Change (Scotland) Act 2009			
Transport					
Reduce the need to travel through appropriate location of facilities, employment etc.	Identify sites for new development which facilitate and encourage sustainable modes of transport such as walking, cycling and public transport. The creation of mixed communities with appropriate local facilities and employment opportunities to offer people a real alternative to travel by private car and to help reduce private car use.	Workshop Discussions/Climate Change Delivery Plan (2009).	High relevance (3) - The SDP can identify appropriate strategic growth areas and levels of appropriate residential/employment development for the North East of Scotland. LDP's will be required to identify specific sites to meet these requirements that are within appropriate locations. SDP's can also place a requirement on LDP's to contain policy/ supplementary guidance on the creation of sustainable mixed communities and minimum distances to	High relevance (3)	

			facilities/public transport infrastructure.		
Electric car use and appropriate infrastructure.	The Climate Change Delivery Plan has a transformational outcome for the transport sector to become almost completely decarbonised by 2050 with significant progress by 2030 through wholesale adoption of electric cars and vans. Public sector vehicle procurement policies will be key in leading by example in making the transfer from conventional to hybrid and electric cars and priming the demand for electric charging infrastructure.	Workshop Discussions/Climate Change Delivery Plan (2009).	Low relevance (1) – Achieving this outcome will require widespread installation of electric car charging infrastructure. The SDP can identify locations for this infrastructure or require LDP's to do so either through policy or supplementary guidance.	Medium relevance (2)	
Re-opening of disused railway lines.	The re-opening/re-instatement of currently unused railway lines such as the Deeside railway line, Aberdeen to Peterhead line for the transportation of freight and passengers offers a more sustainable option than road transportation.	Workshop Discussions	Medium relevance (2) – Issues of transport strategy should remain in the domain of the Regional Transport Strategy and Local transport Strategies. The SDP can identify the need for land for transport	Medium relevance (2)	



			to be identified and safeguarded through LDP's.		
New developments to incorporate sustainable transport options from the outset.	New development should be designed in order to support and improve access to services and promote healthy lifestyles by encouraging active travel. Access to, and movement between new and existing developments should reflect the modal hierarchy set out in National planning policy. This can be challenging to from the outset of development as certain services require a critical mass to be viable.	Workshop Discussions/Climate Change Delivery Plan (2009).	Medium relevance (2) - The SDP can place a requirement on LDP's to write specific policies/supplementary guidance on sustainable transport options. The current Structure Plan already does this. This issue is ultimately dealt with through the Masterplanning and design process and through the negotiation of developer contributions.	High relevance (3)	
Implement measures to monitor and enforce Travel Plans.	Travel Plans should be site-specific and measures and objectives should reflect the individual characteristics of a site as well as	Workshop Discussions	Low relevance (1) – Issues such as Transport Assessments and	High relevance (3)	

	<p>the trips likely to be generated by that development. Travel Plans should identify effective monitoring techniques and these should be agreed with the Local Authority. Regular updates should be provided on the implementation of the Travel Plan. Legal Agreements may be imposed through conditions on planning applications to bind the targets set out in the Travel Plan and set the arrangements for monitoring, enforcement and review.</p>		<p>Travel Plans should be dealt with principally through the Regional Transport Strategy and Local transport Strategies. The SDP can place a requirement on LDP's to prepare appropriate policy/supplementary guidance which reflect the principles in the RTS/LTS. The assessment and monitoring of Travel Plans is dealt with at the Local Authority level.</p>		
Other					
<p>Tree planting and creation of carbon sinks.</p>	<p>Planting trees helps to offset existing and future carbon emissions and helps to create carbon sinks – an area that absorbs more carbon than it releases. The extent to which trees</p>	<p>Workshop Discussions/Climate Change Delivery Plan (2009)/The Right Tree in the</p>	<p>Low relevance (1) – Any significant afforestation programme would require Scottish Government/Forestry</p>	<p>Medium relevance (2)</p>	

	can help prevent run off should also be considered.	Right Place (2010)	Commission level action and policy guidance, which the SDP could then implement. The SDP can require LDP's to write policy/ supplementary guidance on tree preservation/required levels of open space in new development.		
Protection of carbon rich soils.	Scotland has very large areas of carbon rich soils, which are likely to require careful management to ensure they remain carbon sinks rather than becoming carbon sources. Research should be carried out into the impact of soil loss, movement and chemical change on buried structures and artefacts.	Workshop Discussions/Climate Change Delivery Plan (2009)/Climate Change Scotland Act 2009/ Scottish Climate Change Adaptation Framework (2009)	Low relevance (1) – The SDP can require the LDP to identify carbon rich soils and provide policy/ supplementary guidance in relation to how impacts will be taken into account in determining planning applications. The Scottish Government will identify the research priorities in relation to soil	Medium relevance (2)	

			changes.		
Carbon capture and storage (CCS).	Carbon capture and storage refers to the capture, transport and storage of carbon dioxide from emissions to prevent it from entering the atmosphere. Applying carbon capture technology to Scotland's energy industry would have the greatest affect on reducing emissions. Carbon capture technology could be retrofitted to existing power stations as well as applied to new developments. The National Grid believes that CCS could be a key tool to meeting Climate Change targets whilst ensuring security of supply and a diverse energy mix going forwards. They are keen to progress new technology and recognise that the next step towards commercial deployment is end-to-end process demonstration at scale.	SEPA Website (2010)/National Grid Website (2010)	High relevance (3) – A widespread retrofitting and implementation programme of carbon capture technology to existing and new power stations would require central government/Scottish government support. The SDP could implement strategic policies which would assist in achieving this. Scotland has an advantage in it's proximity of emitters to storage sites in the North Sea, which make it an ideal location to demonstrate CCS.	High relevance (3)	

**Table 2: Potential Adaptation Measures**

Name of Measure	Definition	Reference	Assessment of Relevance to SDP	Assessment of Relevance to North East
Planning for and adapting to coastal erosion	Direct development away from areas that are at risk of coastal erosion and defend areas at risk of coastal change where it is sustainable and affordable to do so. Aberdeenshire Council is currently working to produce a Coastal Erosion Management Plan, which will identify areas across the North East which are at risk. A River Basin Management Plan for Scotland has been completed and is published on the SEPA website.	Workshop Discussions	Medium relevance (2) – the SDP can set out a strategic view on where development should/should not go in terms of coastal management. The SDP can place a requirement on LDP's to write specific policies/supplementary guidance on the protection and management of coastal areas.	High relevance (3)
Planning for and adapting to areas of flood risk	Direct development away from areas at risk of flooding and consider climate change implications within Strategic Flood Risk Assessments. The role of managed retreats	Workshop Discussions/Flood Risk Management (Scotland) Act 2009	Medium relevance (2) – the SDP can set out a strategic view on where development should/should not go in terms of flooding	High relevance (3)

	within flood adaptation should also be considered.		which would be guided by the SEPA Flood Risk Map. Development Plans are required to take account of Flood Risk Management Plans as set out in the Flood Risk Management (Scotland) Act 2009.		
Implementation of physical infrastructure such as flood barriers or reservoirs.	Infrastructure can be implemented or modified in response to area based climate changes, for example, increased drainage capacity or building higher sea walls.	Stern Review (2006)	Medium Relevance (2) – The SDP could identify areas where new strategic infrastructure is required.	Medium relevance (2)	
Improve early warning systems, i.e. emergency response technology	The advancement of early warning systems can provide communities with time to prepare and take necessary steps to reduce the impacts of emergency situations, for example flood and drought.	Stern Review (2006)	Low relevance (1) – Advancement in early warning systems is likely to be facilitated through Government level research or private industry. This is not a direct planning issue.	Medium relevance (2)	

<p>Planning for a different climate.</p>	<p>The UK Climate Projections (UKCP09) provide climate information (historical trends and projections for the future) designed to help those needing to plan how they will adapt to a changing climate.</p>	<p>UKCP09 Climate Change Projections</p>	<p>Low relevance (1) – UKCP09 offers projections of the future climate that is based on the current understanding of the climate system – there may be scientific unknowns that would affect the information provided. Hence UKCP09 should be seen as providing possible projections rather than absolute predictions or forecasts of future climate.</p>	<p>Medium relevance (2)</p>
<p>Planting of different crops/alteration of timing of planting to suit warmer/wetter climate</p>	<p>Farmers can switch crops and postpone or bring forward planting dates in response to forecasts about the forthcoming growing season.</p>	<p>Stern Review (2006)</p>	<p>Low relevance (1) – The alteration of crop rotations and timing are decisions which are likely to be made at the very local level. Such decisions are likely to be influenced by Scottish Government Land Use</p>	<p>Medium relevance (2)</p>

			Strategy and by commercial opportunities.		
Identify priorities for research to support Scottish farmers in adapting to anticipated changes to climate change	Work to identify priorities for research to support Scottish farmers in adapting to anticipated changes to climate change, for example long term implications to appropriate crop selection.	Scottish Climate Change Adaptation Framework (2009)	Low relevance (1) – The Scottish Government will identify the research priorities and funding mechanisms required to support Scottish farmers in adapting to climate change. This will be influenced by the Scottish Government Land Use Strategy.	Medium relevance (2)	
Developments must provide sustainable drainage systems and flood resilient design techniques	All developments (with limited exceptions) are now expected to implement sustainable drainage systems and flood resilient techniques into their design.	Planning Advisory Service: Using Supplementary Planning Documents to Address Climate Change Locally (2010)	Low relevance (1) – The SDP can place a requirement on LDP's to write specific policies/supplementary guidance on standards of sustainable drainage systems and flood resilient technology which must be included in new	High relevance (3)	



			developments. This issue would ultimately be dealt with through masterplanning/building standards process.	
Encourage connectivity between habitats	Green networks can improve the viability of previously isolated habitats and ecosystems, supporting the adaptation of certain species to climate change, whilst also offering flood storage and active travel options.	Scottish Planning Policy (2010)	Medium relevance (2) - The SDP could place a requirement on LDP's to identify and promote green networks where this will add value to the provision, protection, enhancement and connectivity of open space and habitats.	High relevance (3)
Require all developments to demonstrate how water consumption will be reduced.	Increasing levels of development can create areas that are become highly water stressed. In areas where water consumption is higher than average a progressive reduction in water use resulting ultimately in water neutrality in developments is a key challenge in adapting to	Planning Advisory Service: Using Supplementary Planning Documents to Address Climate Change Locally (2010)	Medium relevance (2) – The SDP can place a requirement on LDP's to write specific policies/supplementary guidance on the reduction of water consumption in new developments. The Scottish Government have recently published draft	High relevance (3)

	changes in water availability.		guidance on Sustainability Labelling (2010). This guidance when adopted will encourage more demanding sustainability standards through the inclusion of at least two new enhanced building standard levels. The draft proposals on sustainability promote the more efficient use of carbon and energy as well as water. This issue would ultimately be dealt with through masterplanning.		
Reduce water leakages from the distribution network	Reducing the levels of leakages from the water distribution network. Leakage reduction targets are set in agreement between Scottish Water, SEPA and the Water Commission.		Low relevance (1) – Meeting leakage reduction targets will be agreed and met by Scottish Water, SEPA and the Water Commission.	Medium relevance (2)	

Increase street planting within new developments	Street planting can trap particulate pollutions and assist in the cooling of areas in periods of hot weather by absorbing heat, providing shade and releasing moisture through transpiration.	Planning Advisory Service: Using Supplementary Planning Documents to Address Climate Change Locally (2010)	Low relevance (1) – The SDP can place a requirement on LDP's to write specific policies/supplementary guidance on appropriate levels of street planting in new developments. This issue would ultimately be dealt with through masterplanning.	Low relevance (1)	
Identify key locations vulnerable to landslides	The identification of locations that are vulnerable to landslide allows local site management strategies to combat slope instability to be initiated, ultimately reducing the impact of localised landslide incidents.	Scottish Climate Change Adaptation Framework (2009)	Low relevance (1) – the SDP can set out a strategic view on where development should/should not go in terms of potential landslide. Transport Scotland would lead on this work.	High relevance (3)	
Upgrade National Grid	Upgrading the national grid is vital for Aberdeen City and Shire, in order for renewable energy to be able to be connected to the grid.	National Grid	High relevance (3)	High relevance (3)	