

Low Carbon Scotland: Meeting the Emissions Reduction Targets 2010-2022

The Report on Proposals and Policies



**The Scottish
Government**

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Ministerial Foreword

Climate change is one of the most serious threats we face. This Government is serious about fulfilling its responsibility to reduce emissions and we have set ambitious, world-leading statutory targets to reduce emissions by 42% by 2020 and by at least 80% by 2050. In preparing this Report on Proposals and Policies to deliver annual targets to 2022, we have drawn together ideas to reduce emissions from different sources, and from different sectors of society.

This Government's purpose is to focus government and public services on creating a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth. Emissions reduction targets will drive new thinking, new technologies, new solutions and new investment that will ensure Scotland is an early adopter at the forefront of a sustainable, modern, low-carbon economy. The current global economic situation should be a spur and not a hindrance to that effort. A low carbon society will deliver on our Purpose, enabling prosperity while ensuring sustainability.

The publication of this Report on Proposals and Policies for 2010-2022 rounds off a period in which we have prepared a number of publications in part to fulfil specific requirements of the Climate Change (Scotland) Act 2009, and more generally to provide a clear strategic direction on how we will tackle climate change.

Our Low Carbon Economic Strategy sets the policy direction for low carbon economic opportunities, and strengthens business confidence in exploiting those opportunities. Our Public Engagement Strategy explains our approach to informing people about what they can do to help Scotland take action on climate change. Our Energy Efficiency Action Plan sets out in detail the actions the Scottish Government is taking to achieve a step change in energy use. Our Draft Electricity Generation Policy Statement provides evidence on recent important developments in Scottish electricity generation. Climate change is not a one-portfolio issue, and there are many other plans and strategies which contribute to this programme.

This Report on Proposals and Policies identifies a range of proposals and policies that continue momentum in 2011-12 and show how annual targets can be met each year to 2022. This Report has been considered by Parliament, and improvements arising from the Parliamentary scrutiny process have been incorporated into this final version.

The Climate Change (Scotland) Act 2009 received unanimous cross-party support when it was passed by Parliament. The package of proposals and policies in this Report also received cross-party support in 2010, with no suggested amendments to the suite of measures required to deliver annual targets. This Report therefore sets the agenda for action on climate change for the next decade.

But we cannot deliver those targets alone. Everyone needs to play their part: government, business, individuals. At home, at work, and in our travel choices. Saving money on household bills makes sense for Scotland. Positioning ourselves at the forefront of new economic opportunities makes sense for Scotland. Protecting our natural environment makes sense for Scotland. And the opportunity for a healthier lifestyle make sense for Scotland.

A low carbon society makes sense for Scotland.



Richard Lochhead

RICHARD LOCHHEAD

Cabinet Secretary for Rural Affairs and Environment



R. Cunningham

ROSEANNA CUNNINGHAM

Minister for Environment and Climate Change

Executive Summary



Executive Summary

This Report sets out how Scotland can deliver annual targets for reductions in emissions to 2022, including a 42% reduction in emissions by 2020 compared to 1990.

The Climate Change (Scotland) Act 2009 requires Ministers to lay a report in Parliament setting out their proposals and policies for meeting annual emissions reduction targets. This Report covers the period from 2010-22, and sets out Ministers' proposals and policies to meet annual targets, including the 2020 target of 42%, over that period. This Report was laid in draft in Parliament on 17 November 2010, and was subject to a 60-day period for Parliamentary consideration. This final Report incorporates Ministers' changes to the draft Report following Parliamentary consideration, and was laid in Parliament in March 2011. The Report is set in the context of Scotland's role in leading the way to a low carbon society. The Report explains what is meant by a low carbon society, and a low carbon economy, and why Scotland is ideally placed to be at the forefront of this transition. It sets out the wider economic and social benefits that would arise from action to reduce emissions, and what that might mean for the way that we all live and work.

The Report also highlights that, under the current devolution framework, Scotland is constrained in the policy, fiscal and economic levers available to support Scotland's specific strengths in the transition to a low carbon economy. The report highlights specific examples where further powers are required, and where decisions taken by the UK have placed at risk Scotland's competitive advantage, such as the current rules preventing Scottish Ministers immediate and unrestricted access to Fossil Fuel Levy monies which currently stand at almost £200 million.

The Report is structured around a number of chapters covering energy supply, homes and communities, business and the public sector, transport, rural land use and waste. In each chapter, a number of policies are identified. A number of proposals are also identified for further consideration. When considered together, both policies and proposals would meet annual emissions reduction targets. Proposals have been identified from a number of different sources, and do not necessarily reflect current Government policy.

Each chapter explains the trends in each sector, the split between reserved and devolved powers and identifies a range of supporting and enabling measures. These supporting and enabling measures do not generally lead directly to a reduction in emissions themselves, but play an important role in working through the full range of actions and decisions required to implement proposals and policies to deliver emissions reductions. This Report does not go into detail on each sector, but provides a number of links and references to identify where more information can be found on each topic. The costs and benefits arising in each sector are also outlined in the chapters.

The Report also outlines the essential elements for monitoring progress towards meeting targets, and monitoring progress on the implementation of proposals and policies. The importance of a thorough and robust approach to delivery and monitoring of the policies and proposals identified in this Report was a key feature of Parliamentary scrutiny of the Report.

Full details of up-front costs and cost-effectiveness of proposals, as far as it has been possible to quantify, are contained in tables in the appendix to this Report. The abatement potential of each policy and proposal identified is also contained in the appendix.

The analysis shows that current policies will deliver a 38% cut in emissions by 2020 compared to 1990. This progress is encouraging but it will not be enough to meet the interim target in the Climate Change (Scotland) Act to reduce emissions by 42% by 2020, the major staging post towards the long term target of an 80% reduction by 2050.

The challenge for the next ten years is to achieve a substantial reduction in Scotland's greenhouse gas emissions through a faster decarbonisation of activities. In doing so, there will be opportunities for investment, innovation and cost savings to contribute to boosting Scotland's prosperity. Sustainability and prosperity need to go hand in hand, and that challenge is at the heart of this document.

The analysis in this Report shows that it is possible to meet the annual targets each year from 2010 to 2022. Meeting the targets will require a range of actions throughout Scotland's economy and society – central government, local government and the public sector, businesses, individuals and communities alike. Some of these actions will be strategic, such as new energy, agriculture or planning policy; others will be targeted, such as increasing the number of homes with insulation. Innovation will be essential in all that we do. We will gather knowledge as we go.

Changes in how energy is used, and decisions made about travel, will be at the heart of Scotland's move to a low carbon society. In order to assist the wider understanding of how Scotland can rise to this challenge, the Scottish Government published a Public Engagement Strategy on 30 December 2010.

The transition to a low carbon society is already underway, and with pace. It will only accelerate in the future. Scotland's Climate Change Delivery Plan was published in June 2009, and described the four transformational outcomes needed in order to meet the 2050 target:

- A largely decarbonised electricity generation sector by 2030;
- A largely decarbonised heat sector by 2050, with significant progress by 2030;
- Almost complete decarbonisation of road transport by 2050 with significant progress by 2030;
- A comprehensive approach to ensure that carbon (including the cost of carbon) is fully factored into strategic and local decisions about rural land use.

These transformational outcomes have guided the development of this Report, as have a series of related policy initiatives. Taken together they will enable Scotland to achieve its world leading targets.

A Low Carbon Scotland: The Vision



A Low Carbon Scotland: The Vision

i. A low carbon society will use less energy and fewer resources: at home, at work, on the move and across the public sector. It is a society where more of the energy that we do use comes from cleaner and renewable sources such as water, wind, wave and solar power. It is a society that is ready and able to realise the economic opportunities that come from producing fewer carbon emissions, from improved energy and resource efficiency, and from reducing the level of reliance on carbon-based fuel. And it is a society in which we act responsibly, mindful of future generations, and where our actions lead by example across the world.

ii. Working and living in a low carbon society will mean doing less of some things and more of others. We will have to become better at conserving and saving energy in the home and in the workplace, and we will have to “green up” the sources of our energy. And here lie the great opportunities – from efficiencies, from new technologies and from saving carbon. It is revolutionary.

iii. It is now widely accepted that an increase in greenhouse gases in the atmosphere leads to climate change, and that climate change presents a major threat to the planet. It is also widely accepted that we cannot continue to rely heavily on diminishing oil and gas reserves. UK dependence on energy imports could rise from 27% to around 50% within 10 years, a level of dependency last seen in the 1970s. While there are different views on timescales, it is clear that we need alternative fuel supplies which are safe and secure. We need to begin to live differently.

iv. Climate change is already happening, and we are already adapting to its unavoidable impacts. We can act further to prevent even greater changes as a result of human activities, and we must not avoid the responsibility to lead the transition to a low carbon society.

The challenge

v. Scotland's people have always been resourceful, skilled and industrious in harvesting natural resources and generating wealth. We were pioneers in building a modern economy based on a combination of ingenuity, innovation and abundant natural assets; in generating electricity from our lochs and rivers, and in overcoming the physical, technological and engineering challenges of releasing deep sea oil and gas. We can be pioneers again. Increasingly, Scotland's wealth will rest not in depleting finite reserves but in conserving and promoting our valuable assets, reducing consumption and redeploying expertise to develop new economic opportunities based on our rich renewable resources.

vi. Natural resourcefulness is a defining Scottish trait – it's in our nature; in the disproportionate richness of our landscapes and habitats and in the way we reuse and recycle everyday commodities. It defines our environment through the winds and waters of our hills and glens and the wind, waves and tides of our islands and our coast. We have won the natural lottery. That is why Scotland is ideally placed to grasp the opportunities of a new industrial age.

vii. By re-focusing our energies on building a cleaner, more sustainable future we can all benefit from increased employment and a stronger economy – by building a low carbon economy which harnesses renewable resources and reduces energy consumption with better, more efficient homes and workplaces, and by protecting those assets that make Scotland an outstanding destination for visitors and investment. Scotland is now uniquely placed to become a world leader in building a low carbon future: and reaping the economic and community benefits of a low carbon society.

viii. We also have a moral obligation, as an industrialised country, to act on climate change and influence others worldwide to do the same. Many countries are less fortunate than Scotland, and do not share our wealth of natural resources and renewable energy potential. We are, however, in the business of sharing knowledge and information, creating partnerships between academic institutions, and working with countries who are likely to be disproportionately affected by climate change, such as the Maldives. This action supports our overall approach to international development, and assists developing world countries to progress towards a low carbon economy suited to their own strengths.

ix. Like our previous energy revolutions, the “greening up” of our economy and our society will represent a major challenge. But it is an environmental imperative, and an economic opportunity. It is a time of tight budgets. But, as history teaches us, problems and difficulties have been a spur, rather than an obstacle, for economic innovation and success in Scotland.

Prosperity in a low carbon Scotland

x. The development of a low carbon economy is the greatest opportunity for Scotland to develop and maintain a key competitive advantage in the long-term, and to lead Scotland out of recession. Low carbon sits at the nexus of the Scottish Government’s long-term economic strategy, encompassing the strategies for physical capital, human capital and competitive advantage. The actions set out in this Report, and in the Scottish Budget for 2011-12 which was considered by Parliament in the same timescale as the draft of this Report, will fundamentally shape the market towards the development of a low carbon economy.

xi. The oil and gas sector has played a vital role in the economic and social story of Scotland in recent decades and has made a substantial contribution to the UK public finances with over £269 billion in tax receipts to the UK Exchequer (2008 prices) since 1976-77. In addition, the skills and expertise developed in Scotland also bring about considerable economic benefits from export sales. The natural advantage given to us by the North Sea from oil and gas can be maintained and secured for the long term by the natural advantage which the North Sea also offers for the storage of carbon dioxide (CO₂) as part of the carbon capture and storage process. Scotland’s CO₂ storage research study in 2009 estimated that Scotland has significant carbon storage potential. The North Sea has the potential to store over 200 years of Scotland’s emissions, and preliminary studies suggest that Scotland’s offshore CO₂ storage capacity is comparable with that of offshore Norway and greater than the Netherlands, Denmark and Germany combined. This could potentially generate revenue from storage of several billion pounds per annum.

xii. In Scotland, we have 25% of Europe's wind and wave resource, 10% of Europe's potential for tidal power, and a wealth of energy engineering expertise, which together offer great potential for establishing new industries for future generations. Our aim is to become one of Europe's leading renewables centres, creating many thousands of new jobs. Another significant Scottish advantage is the international reputation of our universities and research institutions. The expansion of their expertise in renewables and climate change will attract investors, overseas partners and students seeking world-class education in this field. Our Climate Change Centre of Expertise will provide a focal point to draw on this expertise.

xiii. Across the economy, jobs in Scotland's more traditional industries can also take advantage of new economic opportunities, with increased demand for low carbon construction and transport. Businesses who can demonstrate that they follow a low carbon route will secure a competitive advantage over those that do not, and will save costs with efficiencies along the way. There will be a benefit in highlighting good practice in energy use and the low environmental impact of operations, products and services, and so workplaces and public buildings will increasingly display information for employees and visitors about energy consumption. And reduced operational costs in the public sector will help to protect public services.

xiv. There will be an imperative to reduce the need for unnecessary travel and unnecessary costs. Video and tele-conferencing, social media and other web-based communications will become increasingly commonplace in business, industry and the public sector. Sharing transport, driving less and prioritising low carbon means of

public and private transport will become standard practice for employees. Low carbon vehicles will begin to replace fleets as technology develops, and power points for charging electric vehicles will become commonplace. Walking and cycling to work will become routine.

xv. Scotland is poised to become the international destination of choice for low carbon investment. Many of Scotland's businesses have already responded seriously and positively to the challenge of climate change, and the Climate Change (Scotland) Act was passed unanimously by the Scottish Parliament with the strong support of business. Improving the efficiency of our energy use is often the most cost effective way to cut emissions and is rightly where businesses at the vanguard are focusing their attention, saving money in the economic downturn and lowering their carbon footprint at the same time.

xvi. Increasing energy efficiency will help to create and sustain jobs in sectors such as insulation and, in the short term, provides the simplest way to protect businesses from increasing and volatile fuel prices. The Energy Saving Trust and the Carbon Trust provide energy efficiency support to all sizes of Scottish business, from sole traders right up to large, energy-intensive manufacturing companies. The work of Scottish Business in the Community, through their operation of the Mayday Network in Scotland, is key to getting businesses to the right and consistent sources of advice and offers businesses the opportunity to see what other companies have done and what has already worked in their industries. The 2020 Climate Group, convened by Ian Marchant of Scottish and Southern Energy, has membership that goes wider than the business sector and the Group's main aim is to help ensure that all sectors of

Scotland's economy and civic society contribute fully to achieving emissions reductions. Some examples of what Scottish businesses are doing to reap the rewards of moving to a low carbon Scotland can be found at the 2020 Climate Group's website¹.

The potential of the low carbon economy

xvii. There are a number of potential economic benefits arising from a low carbon economy:

- Scotland's low carbon market was worth around £8.8 billion in 2008-09 (within a GDP of around £100 billion), and is forecast to rise to around £12 billion by 2015-16;
- Scotland can secure a position as the international destination of choice for low carbon investment, and for the development of the financial architecture for a global low carbon economy;
- Jobs in the low carbon sector in Scotland could grow by 4% a year to 2020, rising from around 70,000 to 130,000, over 5% of the Scottish workforce;
- Scotland is already an exporter of low carbon technologies, with £845 million exported in 2009-10;
- Scotland can be the green energy capital of Europe, and offshore wind alone could bring an estimated £30 billion of inward investment, and support over 20,000 jobs;
- Scotland now generates over 27% of its gross electricity consumption from renewables and is comfortably on course to meet targets of 31% by 2011 and 80% by 2020;
- Harnessing just a third of our offshore

renewable energy potential could meet Scotland's electricity needs seven times over by 2050, with a net value, in terms of electricity sales, of £14 billion by 2050, the equivalent of £2,700 for each person in Scotland;

- Household energy efficiency could save consumers a cumulative £8.5 billion in their fuel bills by 2050;
- Motorists could save £300 million a year in reduced fuel costs by "eco-driving";
- Farmers could save up to £464 million by 2022 in business efficiencies.

More examples of particular economic benefits of moving to a low carbon economy are given in Chapter 2.

Living in low carbon Scotland

xviii. Living in low carbon Scotland will mean doing more of some things and less of others. At home, we will become better at conserving energy. Home energy efficiency levels will become a high priority for anyone buying or selling a home. Efficient boilers, and effective roof, wall and window insulation will become increasingly desirable features in the housing market. Commuting to work and personal travel will no longer be so dependent on petrol or diesel cars, as hybrid and electric cars become cheaper and efficient. Walking or cycling to work or school will become increasingly popular. Changes in travel habits and other actions to tackle climate change go hand in hand with important health, social and environmental benefits: reducing the incidence and economic costs of heart disease, obesity, diabetes, depression, and local pollution.

¹ Scotland's 2020 Climate Group, case studies: <http://2020climategroup.org.uk/resources/casestudies.php>

xix. Young people will continue to learn the importance of low carbon living and environmental awareness and carry it through to practice in adulthood, changing the nature of consumer demand across the economy. An understanding of low carbon living will be seen as an advantage for young people entering the workplace, and skills in relevant science, technology, modern engineering and social disciplines will be in high demand. The education sector will continue to have a strong advocacy role in this area, and inspire young people through the new Curriculum for Excellence.

xx. Communities across Scotland will increasingly make sure their buildings are energy efficient and use their own sources of renewable energy. This will build on the knowledge and experience of existing community pioneers in different parts of the country who have developed and managed their own energy companies and district heating initiatives. Scotland will have more small community-owned energy companies, more district heating systems and a recognised expertise in independent community-led low carbon living. Individuals who live low-carbon lives will no longer be a minority, as more and more people take action to save money and make healthy choices.

The benefits of a low carbon society

xxi. Among the potential benefits arising from a low carbon society are:

- More opportunities for walking and cycling in a safe and pleasant environment;
- Less pollution from transport and industry, resulting in better air and water quality;
- Lower levels of fuel poverty, as energy efficiency measures reduce household energy bills, and warmer homes for those who can't currently afford sufficient heating;
- General health and lifestyle benefits, with fewer missed days at work or school;
- Reduced incidence of asthma and respiratory problems, and improved mental health;
- Reduced incidences of obesity, from increased walking, cycling and use of public transport;
- A healthier natural environment, with improved air and water quality helping biodiversity;
- Reduced congestion and reduced travel times from fewer cars on the road;
- Lower running costs for school, college and university estates through efficiencies in energy use; and
- Less pressure on health services.

Realising the potential - leading the way towards low carbon Scotland

xxii. Business and industry leaders in Scotland have recognised the opportunities and benefits for the economy and backed this legislation. They are now ready to respond and lead the way for others. People and communities across Scotland recognised the financial, health and social benefits of a change in lifestyle and backed this legislation. They are now ready to take the next steps, and encourage others to follow suit.

xxiii. Government can lead the way and support change through its different roles: in providing information, developing policies, making regulations and in taking decisions that support low carbon activities. Our public sector – national government, councils, the health service and other publicly funded services - will increasingly demonstrate how its own operations are driving down emissions.

xxiv. There is a role and a responsibility for everyone - from national governments to individuals - to play their part and take action.

xxv. Scotland has already established strong incentives for the development of renewables, using the powers that we currently have. But our success depends upon the right economic and taxation conditions for development. With Full Financial Responsibility we could complement our current actions by using the ability to direct tax relief and credits to those engaged in producing renewable energy. This could include using energy tax policies such as more generous capital allowances for infrastructure investment

and schemes to better link current and future tax payments (when production becomes more profitable). Full Financial Responsibility would also ensure that Scotland received a fair share of rents generated from the Crown Estate and be able to invest our proceeds from the Fossil Fuel Levy in a manner which was in Scotland's best interests.

Challenging others to match Scotland's ambition

xxvi. A global low carbon economy is inevitable. Scotland is demonstrating the benefits of a low carbon economy to other countries, and many countries are already beginning to seize the opportunities. The Scottish Government plays a key role in preparing and participating in international climate change negotiations as part of the UK delegation. Within the EU, Scotland has a prominent position on key issues on the international climate agenda: renewable energy, marine energy, grids, carbon capture and storage, forestry and peatlands. A key task is to convince the EU to raise its own targets for emissions reductions from 20% to 30% by 2020, and it is imperative that every opportunity is taken to reinforce the message that, based on the Scottish experience, a low carbon Europe is feasible and affordable, and that investment in low carbon technologies and industries can bring new jobs and opportunities for economic growth.

Achievements since 2007

- Scotland's emissions have fallen by 21.2% from 1990: we are over half way to achieving our Climate Change Act target of reducing emissions by 42% by 2020 (these figures include international aviation and shipping and our participation in the EU Emissions Trading System).
- The Scottish Government is showing the way on renewable development and since May 2007, Ministers have approved 39 large-scale renewable energy projects contributing to a total consented and installed renewables capacity for Scotland of just over 7 gigawatts (GW).
- The pace and momentum set by the Scottish Government continues with a further 48 large scale renewable energy projects currently under consideration.
- The Crown Estate's announcement in 2010 of the world's first commercial scale leasing round for wave and tidal energy in the Pentland Firth and Orkney Waters has the potential to deliver as much as 1.6 GW of marine energy off Scotland's north coast, with significant associated economic benefits.
- The Scottish Government launched the £10 million Saltire Prize and has tripled funding for micro and community generation, with £13.5 million available per year over the three financial years 2008-2011. The £2 million Energy Saving Scotland Home Loans pathfinder ran from October 2009 to June 2010. It has helped 701 Scottish households to save £97,000 per year on fuel bills.²
- The Scottish Government is supporting area-based schemes offering free or low cost insulation measures to 500,000 households. This includes a new universal-access area-based scheme launched by the First Minister in October 2010 that will support 27 projects delivered by local councils across Scotland.
- In 2010-11 the Scottish Government introduced a Green Bus Fund, Scotland's first low carbon vehicle procurement scheme, and the first Cycling Action Plan.
- The £27 million Climate Challenge Fund has helped 261 communities reduce their emissions.
- The Scottish National Renewables Infrastructure Fund (N-RIF) was launched in November 2010, with a budget of at least £70 million over four years to support port infrastructure projects for the Scottish offshore wind sector.

² Based on an average house type (three bed, gas heated semi-detached).

1. Background to this Report



1. Background to this Report

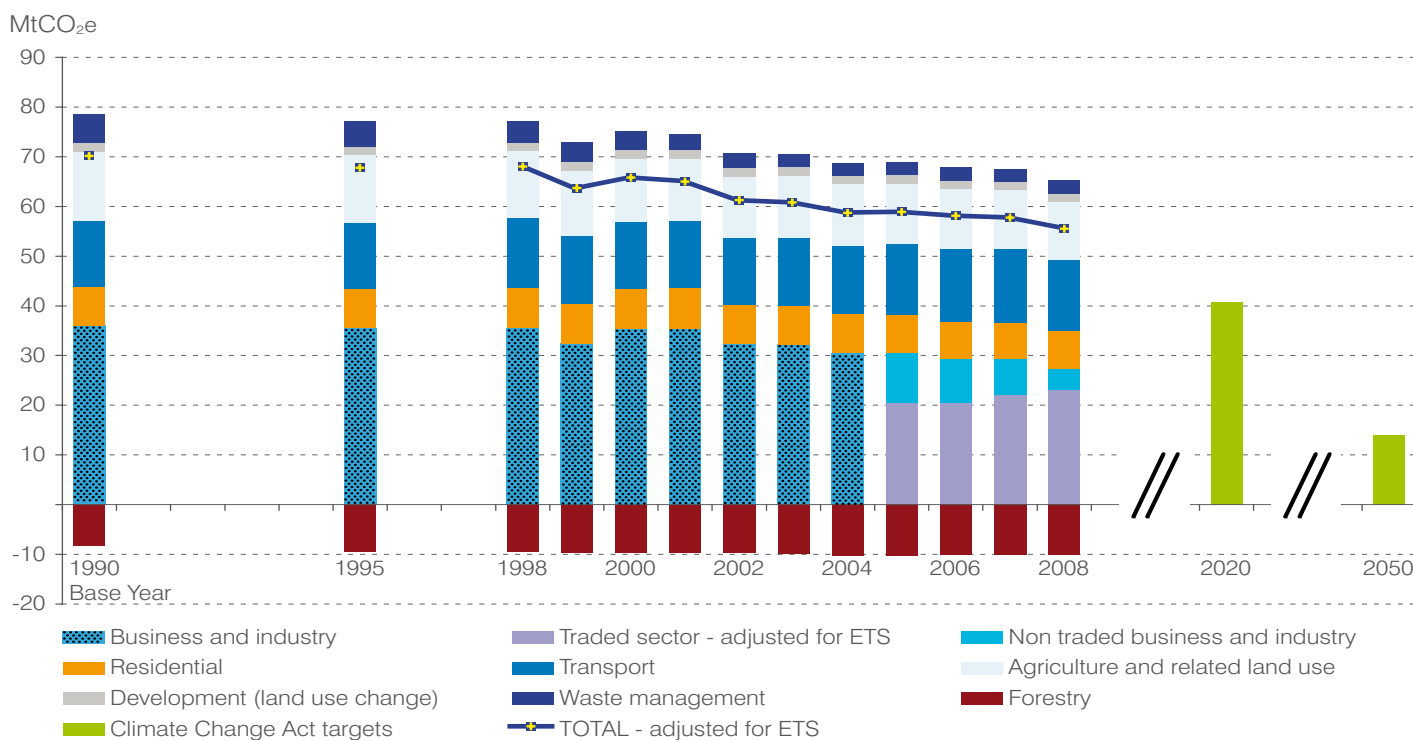
1.1 This Report on Proposals and Policies (RPP) for meeting Scotland's emissions reduction targets is part of the Scottish Government's **Scotland – A Low Carbon Society** suite of publications that describe the benefits and opportunities of building a low carbon Scotland.

1.2 The other documents in this suite are **A Low Carbon Economic Strategy for Scotland**³, which focuses on economic opportunities and ways to strengthen business confidence in exploiting those opportunities; **Low Carbon Scotland: Public Engagement Strategy**⁴, which explains our approach to informing people about what they can do to help Scotland take action on climate change; and **Conserve and Save:**

The Energy Efficiency Action Plan for Scotland⁵ which was published in October 2010. The Government's **Draft Electricity Generation Policy Statement**⁶ supplements and supports this suite.

1.3 This Report on Proposals and Policies sets out specific measures for reducing greenhouse gas emissions to meet Scotland's ambitious statutory targets. Scotland has already made considerable progress. Figure 1 shows net Scottish emissions from the base year to 2008, the most recent year for which figures are available. Scotland's emissions declined by 21% over this period.

Figure 1: Net Scottish emissions, 1990 to 2008, and Climate Change Act Targets



³ A Low Carbon Economic Strategy for Scotland:

<http://www.scotland.gov.uk/lowcarboneyconomicstrategy>

⁴ Low Carbon Scotland: Public Engagement Strategy:

<http://www.scotland.gov.uk/Topics/Environment/climatechange/scotland-action/lowcarbon/engagement>

⁵ Conserve and Save: The Energy Efficiency Action Plan for Scotland:

<http://www.scotland.gov.uk/Publications/2010/10/07142301/0>

⁶ Draft Electricity Generation Policy Statement:

<http://www.scotland.gov.uk/egps>

1.4 The challenge for the next ten years will be to achieve the same level of reduction through a greater decarbonisation of our activities. Many measures are already in place to drive this change. Projections show that current policies will help to deliver a 38% cut in emissions by 2020. This progress is encouraging but it will not be enough to meet the interim target in the Climate Change (Scotland) Act to reduce our emissions by 42% by 2020, the major staging post on the journey towards the long term target of reducing emissions by 80% by 2050.

1.5 In fulfilment of the duty placed on Scottish Ministers by section 35 of the Climate Change (Scotland) Act 2009, this Report details the policies that are already in place to cut emissions and also sets out further proposals for ways in which we can make the additional reductions to take us to 42% in 2020 and even further in the future.

- The rest of Chapter 1 provides some background about Scotland's emissions targets and how we are going to measure progress. It also puts this Report in context with previous climate change work published by the Scottish Government;
- Chapter 2 describes how the proposals and policies for reducing emissions have been presented and their impact quantified;
- Chapters 3 to 8 set out the proposals and policies in more detail; and
- Chapter 9 describes the next steps following publication of this Report and the process for monitoring progress;
- Annex A presents a summary diagram of the proposals and policies in this Report in relation to the interim target of 42% by 2020; and
- Annex B shows the year-by-year breakdown of the anticipated abatement from and costs of each proposal and policy. It summarises briefly

the analysis that has been undertaken to arrive at the figures presented in this Report.

- A Technical Appendix is also available that describes the analysis undertaken for this Report in more detail⁷.

Scotland's emissions targets

1.6 The Climate Change (Scotland) Act 2009 sets targets to reduce Scotland's emissions of the basket of six Kyoto Protocol greenhouse gases by 42% by 2020 and 80% by 2050, compared to the 1990/1995 baseline⁸. As well as domestic emissions, Scotland's share of emissions from international aviation and shipping are included in the targets.⁹ The Scottish interim target is more challenging than the UK interim target on two counts: (1) the UK target is for a 34% reduction in emissions by 2020; and (2) the UK target does not include emissions from international aviation and shipping.

1.7 The Act also requires Scottish Ministers to set annual targets for emissions at least 12 years in advance. In October 2010 the Scottish Parliament passed legislation setting the first batch of annual targets, for the years 2010 to 2022¹⁰. The annual target for 2020 is equal to the interim target. From 2020 onwards each annual target must be at least 3% lower than the previous year.

⁷ Low Carbon Scotland: Technical Appendix:

<http://www.scotland.gov.uk/rpptechn>

⁸ The basket of Kyoto Protocol greenhouse gases comprises carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), for which the baseline is 1990; and hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆), for which the baseline is 1995.

⁹ The Act also requires Ministers to apply a "multiplier" to aviation emissions to take into account the fact that emissions at high altitude are thought to have a bigger impact on the climate. The Committee on Climate Change recommended that this multiplier is set to a neutral value until more conclusive evidence is available to show what the multiplier should be, and Scottish Ministers took this advice when setting secondary legislation. Ministers will introduce new legislation when more evidence becomes available, but it should be noted that any increase to the multiplier used will make the 42% target more difficult to meet.

¹⁰ The Climate Change (Annual Targets) (Scotland) Order 2010, SSI 2010 no. 359: <http://www.legislation.gov.uk/ssi/2010/359/contents/made>

Measuring progress

1.8 Achievement of Scotland's targets will be measured against the level of the Net Scottish Emissions Account (NSEA). This will account for the greenhouse gas emissions from sources in Scotland, Scotland's share of emissions from international aviation and international shipping, the effect of any relevant emissions sequestration (e.g. "carbon sinks" such as woodland) and the effect of the sale and purchase of relevant emissions allowances. The Act limits the quantity of emissions allowances that may be used by Scottish Ministers. Scotland's emissions are disaggregated from UK data and are reported annually in the Greenhouse Gas Emissions Inventory for England, Scotland, Wales and Northern Ireland¹¹. The Carbon Accounting Scheme (Scotland) Regulations 2010¹² set down in detail how the NSEA will be calculated from the disaggregated Inventory.

1.9 Section 37 of the Climate Change (Scotland) Act 2009 requires that the Scottish Ministers report, in so far as is reasonably practicable, the emissions of greenhouse gases (whether in Scotland or elsewhere) which are produced by or otherwise associated with the consumption of goods and services in Scotland. These reports must be laid before the Scottish Parliament in respect of each year in the period 2010-2050.

1.10 Consumption-based emissions reporting is a complex and evolving field and the Scottish Government is currently working to determine the most suitable methodology on which to base its reports. However, in October 2009 the Scottish Government made available a time series (1992-2006) of the Scottish greenhouse gas footprint,

including consumption estimates, which reflect this developing work¹³.

1.11 This Report therefore focuses on policies to reduce emissions as measured against the annual targets by the NSEA. While the impact of the proposals and policies on Scotland's wider international emissions footprint has not been quantified here, the measures have been developed with consumption-based emissions in mind. Policies that would result in a transfer of emissions to other countries rather than a genuine reduction (such as decreasing the numbers of Scottish livestock, which would be unlikely to affect the amount of meat consumed in Scotland, and would therefore result in meat being imported) have been avoided.

Previous and related work

The Climate Change Delivery Plan

1.12 Scotland's Climate Change Delivery Plan¹⁴ was published in June 2009, shortly before the Climate Change (Scotland) Act was passed. The Delivery Plan described the four transformational outcomes needed for the 2050 target to be met:

- **A largely de-carbonised electricity generation sector by 2030**, primarily using renewable sources for electricity generation with other electricity generation from fossil fuelled plants utilising carbon capture and storage;
- **A largely de-carbonised heat sector by 2050 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;

11 Greenhouse Gas Emissions Inventory for England, Scotland, Wales and Northern Ireland: 1990-2008: http://www.naei.org.uk/report_link.php?report_id=620

12 The Carbon Accounting Scheme (Scotland) Regulations 2010, SSI 2010 no. 216: http://www.opsi.gov.uk/legislation/scotland/ssi2010/ssi_20100216_en_1

13 Production of a Time Series of Scotland's Ecological and Greenhouse Gas Footprints: <http://www.scotland.gov.uk/Publications/2009/10/28101012/0>

14 Climate Change Delivery Plan: <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotland-action/EmissionsReductions>

- **Almost complete decarbonisation of road transport by 2050 with significant progress by 2030** through wholesale adoption of electric cars and vans, and significant decarbonisation of rail by 2050;
- **A comprehensive approach to ensure that carbon (including the cost of carbon) is fully factored into strategic and local decisions about rural land use** through: appropriate protection for Scotland's carbon rich soils; minimising emissions from agricultural and other land use businesses; encouraging the sequestration of carbon, for example, through woodland planting; and the use of natural resources to generate renewable energy.

1.13 Achieving these outcomes will require a step-change in the efficiency with which energy is used in all sectors, reducing overall energy consumption in order to minimise the capacity needed and therefore the cost for decarbonising supply.

1.14 The action taken now and over the next decade will set the foundation for achieving Scotland's long-term emissions reduction targets. The proposals and policies identified in this Report will contribute not only to the achievement of the interim target for 2020, but also towards the transformational outcomes. These proposals and policies will place Scotland on the path to delivering the 80% target by 2050.

Sectoral policy documents and research

1.15 Many of the measures identified draw on existing Scottish Government policies and research.

1.16 In Energy:

- The Scottish Government published initial results from its housing carbon model in October 2009¹⁵, identifying the types of measures that could be applied to the existing housing stock and associated emissions reductions;
- Conserve and Save: The Energy Efficiency Action Plan for Scotland¹⁶ sets out in detail the actions the Scottish Government is taking to achieve a step change in reducing energy consumption;
- The Renewables Action Plan¹⁷ and the Renewable Heat Action Plan¹⁸ sets out what the Scottish Government is doing to pursue Scotland's vast potential for renewable electricity;
- The Draft Electricity Generation Policy Statement provides evidence on the recent important developments in renewable electricity generation, thermal electricity generation, energy efficiency and transmission and interconnection, and outlines the role that the Scottish Government intends for each of these areas;
- Energy standards in building regulations will be reviewed for 2013. Research is underway following the recommendations of the Sullivan report: A Low Carbon Building Standards Strategy for Scotland¹⁹, published in December 2007.

15 Modelling Greenhouse Gas Emissions from Scottish Housing: Final Report:

<http://www.scotland.gov.uk/Publications/2009/10/08143041/0>

16 Conserve and Save: Energy Efficiency Action Plan:

<http://www.scotland.gov.uk/Publications/2010/10/07142301/0>

17 Renewable Energy Action Plan:

<http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/19185/17612>

18 Renewable Heat Action Plan for Scotland:

<http://www.scotland.gov.uk/Publications/2009/11/04154534/0>

19 A Low Carbon Building Standards Strategy for Scotland (The Sullivan Report):

<http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/publications/sullivan>

1.17 In Transport, the main options presented are based largely on the research report *Mitigating Transport's Climate Change Impact in Scotland*²⁰, published in August 2009.

1.18 In Rural Land Use:

- Agriculture policies are designed to encourage all the measures identified by the Scottish Agricultural College in their 2008 report to the Committee on Climate Change²¹;
- Forestry Commission Scotland's *Woodland Expansion Strategy*²², published in February 2009, sets out the rationale for increasing Scotland's woodland cover.

1.19 In Waste, the Scottish Government published Scotland's *Zero Waste Plan*²³ in June 2010. Analysis of the emissions reduction potential of policies in the plan is based on the *Eunomia* report to the CCC in 2008²⁴.

1.20 This Report on Proposals and Policies focuses on the potential for particular measures to reduce greenhouse gas emissions. Often, however, the proposals and policies identified offer additional benefits such as the potential to save money from energy and resource efficiency, or opportunities to improve people's health by getting involved in active travel. In many cases, specific policy documents and research reports provide more information about these additional

benefits. References and internet addresses have been provided throughout this report to help readers find more information.

Funding

1.21 The Scottish Government aligned the development of the draft of this Report on Proposals and Policies with the preparation of the draft Scottish Budget for 2011-12. The draft Report was laid before the Scottish Parliament on the same day as the Budget (Scotland) (no.5)²⁵ Bill for 2011-12 to give Parliament the opportunity to consider both documents in parallel. This Report covers a period which extends significantly beyond the timeframe covered by the Budget for 2011-12, and which will encompass at least three future sessions of the Scottish Parliament. Budget provisions for 2011-12 which are relevant to the delivery of the policies and proposals in this Report have been recorded in written and/or oral statements to Parliament which accompanied the publication of this Report in March 2011.

²⁰ *Mitigating Transport's Climate Change Impact in Scotland: Assessment of Policy Options*:

<http://www.scotland.gov.uk/Publications/2009/08/26141950/0>

²¹ *UK Marginal Abatement Cost Curves for the Agriculture and Land Use, Land-Use Change and Forestry Sectors out to 2022, with Qualitative Analysis of Options to 2050*:

<http://www.theccc.org.uk/pdfs/SAC-CCC:%20UK%20MACC%20for%20ALULUCF:%20Final%20Report%202008-11.pdf>

²² *Woodland Expansion Strategy*:

<http://www.forestry.gov.uk/woodlandexpansion>

²³ *Scotland's Zero Waste Plan*:

<http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy>

²⁴ *Development of Marginal Abatement Cost Curves for the Waste Sector*:

<http://www.theccc.org.uk/pdfs/Eunomia%20Waste%20MACCs%20Report%20Final.pdf>

²⁵ Scottish Parliament webpage for the Budget (Scotland) (No.5) Bill: <http://www.scottish.parliament.uk/s3/bills/62-Budget5/index.htm>

1.22 The Scottish Government's submission to the Independent Budget Review panel in June 2010 estimated the cost to the Government of implementing all of the proposals and policies identified at that point to be £8 billion to 2022, an average of around £800 million each year²⁶. This submission did not consider the significant financial, economic and social benefits that would result from such spend.

1.23 The Scottish Government will focus on finding mechanisms to deliver emissions reductions during this period of financial austerity. The Low Carbon Economic Strategy describes the work that is underway to raise finance for research and innovation in new technologies such as offshore and marine renewables, carbon capture and storage, smart grids and low carbon vehicles. Government is also exploring new business models with the private sector whereby companies can charge for a service that ultimately saves money for the customer (for example, eco-driving training), or attract investment from socially-responsible companies on the basis of the carbon benefits of their work (for example, carbon sequestration by forestry).

1.24 The Scottish Ministers recognise the importance of supporting the development of innovative approaches to financing emissions reduction. On 28 and 29 September 2010, the Scottish Government, in partnership with Scottish Enterprise, Highlands and Islands Enterprise, Scottish Development International, Edinburgh Chamber of Commerce, the Scottish Futures Trust and Arup, hosted the first Scottish Low Carbon Investment Conference in Edinburgh. This event brought together projects and investors, to identify and debate the risks, rewards, opportunities and challenges within the low

carbon arena and to provide innovative funding solutions to maximise the economic impact of this emerging sector.

1.25 The Scottish Government also recognises the need to use every tool available to achieve the necessary scale of change, including regulation where voluntary approaches prove unsuccessful. The Climate Change (Scotland) Act introduced enabling powers in many areas including domestic and non-domestic buildings, microgeneration and waste. The Government aims to keep the regulatory burden to a minimum, and where regulation is deemed necessary it will consult on proposals with those who it will affect.

Powers

1.26 The approach to the proposals and policies in this Report reflects the limitations in the powers available to Scotland. In a number of important areas such as energy and agriculture, legislative competence is retained at UK or EU level. In these circumstances, Scottish Ministers will continue their policy of pursuing and influencing decisions at UK and EU level, in accordance with existing practice. Decisions taken in the UK Comprehensive Spending Review in 2010 demonstrate, however, that without the same financial and economic powers as other nations, Scotland has limited flexibility when it comes to implementing measures to reduce emissions. This means that more options need to be identified from within existing powers, and there is therefore a need to consider more radical options than might be required if Scotland had a full complement of fiscal and policy responsibilities.

²⁶ Details of the provisional estimates of costs of climate change actions, provided by the Scottish Government to the Independent Budget Review Panel: <http://www.scotland.gov.uk/About/FOI/Disclosures/2010/08/IndependentBudgetReview/IndependentBudgetReview1>

Partners

1.27 Local government in Scotland has a clear role to play in supporting the transition to a low carbon economy, and in the preparation for and delivery of action on climate change. Scottish councils have a position of influence both as organisations in their own right and as members of Community Planning Partnerships, and have already demonstrated consistent commitment and political leadership on climate change with the signing of their Climate Change Declarations and the inclusion of local outcomes related to climate change in the Single Outcome Agreements. Local government will continue to work towards the delivery of the new statutory obligations of the Climate Change (Scotland) Act, including the public bodies climate change duties, and to provide leadership to wider civic society as Scotland moves to a low carbon economy.

1.28 The Scottish Government and COSLA are working together, alongside business, communities and others, to map out what needs to be done to achieve Scotland's emissions reduction targets, determine priorities for action, and identify policy and financial approaches. This will ensure that, wherever possible, we maximise the benefits of what can be delivered at a time of significantly constrained public spending and build upon the strong foundations already established at national and local level to take action on climate change.

1.29 Action is required by local government to fulfil its part of the public sector's contribution to Scotland's statutory emissions reduction targets both within its own right, and through influencing wider area emissions. Progress is already being made through Scotland's Climate Change Declaration, Single Outcome Agreements and the CRC Energy Efficiency Scheme. However, more detailed consideration is required of the potential contribution, and associated opportunities and other issues such as public engagement, support to businesses and individuals, regulatory roles (nationally and locally) and enforcement powers. These will therefore form part of the work to map out the route towards achievement of the emissions reduction targets and wider climate change action. The approach to that work is addressed in more detail in Chapter 9.

1.30 The third sector also has a central role to play in the transition to a low carbon economy. There are already numerous community-based initiatives throughout Scotland demonstrating how lower carbon living can be achieved through e.g. community renewable energy generation, local food production and markets, community transport initiatives and various reuse and recycling schemes. This sector is also ideally placed to assist with the public engagement required to enable behaviour change to reduce emissions.

2. Proposals and Policies



2. Proposals and Policies

2.1 For the purposes of this Report:

- A 'policy' is considered to be a course of action which has been wholly or largely decided upon. In many cases, policies will have committed funding and/or legislation and timescales. Some policies can be implemented directly by the Scottish Government. Others are clear policies to support and campaign for others, especially the UK and EU, to take action. Wherever possible, the contribution of policies to the achievement of annual targets have been quantified.
- A 'proposal' is considered to be a suggested course of action, the details of which might change as this course of action is explored and evidence is gathered. Some proposals in this document have been initiated by Scottish Ministers, and are set to become firm policies once development work is complete and/or financial resources allow. Many other proposals have been put to Scottish Ministers as options to consider, and this report sets out the analysis which would assist Ministers in future to take decisions on the way forward. Wherever possible, the contribution of proposals to the achievement of the annual targets, and the costs of doing so, have been quantified. There are inevitable uncertainties in aspects of these estimates.
- A "supporting and enabling measure" is a measure that does not directly lead to a reduction in emissions, but which can work towards removing barriers or maximising the success of the other policies. In some cases the supporting measures will indirectly affect emissions.

2.2 The above definitions have been provided to assist in articulating where measures lie on the spectrum of the policy-making process between full implementation and early ideas which require further development. Inevitably, some measures will fall in the middle of this spectrum, for example where a clear direction has been set on policy, but details of certain elements of that policy have yet to be decided.

2.3 Chapter 9 sets out how the content of this Report, in terms of both policies and proposals, will be taken forward. The schedule of work to develop and or/implement each policy and proposal in this document will start from the position that the policy or proposal presently occupies in the Government's programme.

The trajectory

2.4 A full year-by-year breakdown of the estimated emissions impact of proposals and policies is shown in Annex B of this Report, which gives some background on assumptions, uncertainties and the sources of data.

2.5 The analysis shows that:

- all of the **policies** that have been introduced since 2006 are expected to result in 38% reduction in emissions by 2020 compared to 1990;
- if the EU were to move to a 30% target for 2020 and tighten the EU Emissions Trading System (ETS) cap from 2013 accordingly, Scottish emissions would be reduced by a further 4 percentage points in 2020, with similar effects in surrounding years. It is the Scottish Government's firm policy to press the EU to move to 30% and to press the UK Government to match Scotland's target of 42%;

- these policies would ensure that annual targets were met in some years. But these policies alone provide insufficient assurance that all annual targets can be met;
- if all of the **proposals** for the non-traded sector delivered the abatement expected, emissions would meet and exceed the annual targets in all years, and be well over 42% lower in 2020 than 1990, thereby meeting the interim target in the Climate Change (Scotland) Act 2009;
- implementing all of the proposals identified in the Report would then allow all of the annual targets to be met, and there would also be some flexibility in the event of any proposals being impossible to implement or less effective than expected.

The analysis also shows that:

- **Substantial progress** is being made toward achievement of annual targets and the interim target of 42% by 2020;
- A **critical success factor** in ensuring we can achieve the targets is a more ambitious trajectory for the EU ETS cap;
- With or without a change in the EU ETS, proposals will need to be successfully developed into policies in the years to come;
- **Not all the proposals in this Report will be necessary**, and others may be suggested and introduced over time;
- There remains **uncertainty** over the underlying data and the contribution of particular proposals and policies to delivery of the targets. It is not possible, or indeed desirable, to set a firm programme for the next 10 years, and expect that the programme will not evolve. It will be added to and some elements developed. The scope for innovation is significant. The implementation of this Report on Proposals and Policies will therefore require close **monitoring and evaluation of progress**.

Milestones

2.6 The Climate Change (Scotland) Act sets clear targets for reductions in emissions. This Report, wherever possible, seeks to outline milestones of progress and examples of existing activity. Examples of milestones and activities in how we will “green-up” our supply of energy and improve the efficiency of how we use energy, moderate energy demand and save carbon are as follows;

- 80% of Scottish electricity demand to come from renewable sources by 2020;
- 11% of Scotland’s heat to come from renewable sources by 2020;
- A 12% reduction in total final energy consumption by 2020;
- Carbon Capture and Storage to be fitted to new or existing Scottish coal power stations and be economically and technical proven by 2020;
- Every home to have loft and cavity wall insulation, where this is cost-effective and technically feasible, plus simple measures such as draught-proofing and pipe lagging;
- Every home heated with gas central heating to have a highly efficient boiler with appropriate controls;
- At least 100,000 homes to have adopted some form of individual or community renewable heat technology for space and/or water heating;
- A mature market for low carbon vehicles, resulting in average efficiencies for new cars of less than 95 gm/kmCO₂e;

- An electric vehicle charging infrastructure in place in Scottish cities;
- Personalised travel planning advice provided to all households;
- Effective travel plans in all workplaces with more than 30 employees;
- At least 10% of all journeys made by bicycle;
- Targets for the number of farm businesses that have adopted Farming for a Better Climate measures;
- Targets for the number of farm businesses undertaking nutrient management plans;
- Incorporation of peatland restoration data into the net Scottish emissions account, subject to UNFCCC agreement on an international methodology;
- 100 million trees planted by 2015;
- Requirements for certain priority wastes to be sorted at source and collected separately or, as appropriate, treated after collection;
- Phased introduction of bans on materials that may be landfilled: food waste and dry recyclables from 2015; and all biodegradable waste by 2017.
- Both business and public sector to contribute fairly towards reducing Scottish energy consumption by 12% by 2020, the target in the Energy Efficiency Action Plan.
- Individual public bodies will have all set and be monitoring their own ambitious annual energy efficiency targets;
- All businesses will have access to consistent energy and resource efficiency advice.

Presentation of proposals and policies

2.7 Meeting the annual targets will require a range of actions by all sectors of society – central government, local government and the public sector, businesses, individuals and communities. Some of these actions will be strategic in their nature, such as energy, agriculture or planning policy; others will be targeted and discrete, such as a policy to increase the number of homes with insulation. In many cases the action needed will be groundbreaking and the exact result is not known.

2.8 Because of the complexity of the range of actions needed to meet Scotland's statutory emissions reduction targets, and the uncertainties as to their impact, the following approach has been taken in this Report in order that the proposals and policies are presented as clearly and consistently as possible:

- A broad approach has been taken when identifying policies. For example, individual district heating projects are not identified – instead, the potential for renewable heat across the whole of Scotland has been considered.
- Policies have been grouped so that those that result in the same outcomes are considered together. For example, a single figure has been given for the impact of UK and Scottish policies aimed at increasing the number of homes with insulation.

- A distinction has been made between policies for which the resulting emissions reductions can be estimated in a direct way, and measures which will be necessary to achieve the level of reductions envisaged but whose impact is not so direct. The latter are described as ‘supporting and enabling’ measures. Emissions reductions have not been attributed to supporting and enabling measures.
- Emissions reductions in Scotland will be achieved through a mix of EU, UK and Scottish policies. Where savings come from UK policies their impact in Scotland has been estimated by using figures from the Department of Energy and Climate Change, making sensible assumptions about what Scotland’s share of the savings will be.

2.9 The figures presented in this Report represent the best current estimates of the impacts of the proposals and policies. However, the uncertainty around each figure is appreciable and therefore the analysis presented should be considered provisional, with estimates subject to change as policies are developed and implemented over time and the evidence base improves.

2.10 A summary diagram of the proposals and policies in this Report in relation to the interim target of 42% by 2020 is shown in Annex A. The diagram indicates, in a very simplified way, the key points of interaction with a number of related statutory and non-statutory plans and strategies.

The traded sector and electricity generation

2.11 Emissions from electricity generation and heavy industry are covered by the EU Emissions Trading System (EU ETS) and are known as the “traded sector”. The EU ETS operates through the trade of greenhouse gas emissions allowances throughout the EU, where one allowance represents one tonne of carbon dioxide equivalent (CO₂e). A fixed (“capped”) number of allowances is allocated or auctioned to participants, who can then trade them with other participants so that their allowances match their emissions year by year. In this way, the EU ETS incentivises the reduction of greenhouse gas emissions where this costs less than buying allowances, and therefore where it is most cost-effective to do so.

2.12 For the traded sector, the Net Scottish Emissions Account (NSEA) will count Scotland’s share of the EU-wide emissions cap rather than the actual emissions from Scottish participants. This approach is in line with international practice and reflects the fact that the reduction of the emissions cap in the EU ETS is fixed, and is not directly affected by the policies of individual member states.

2.13 This approach has the additional benefit of smoothing the reported emissions from the traded sector, which vary as a result of factors such as the weather, or fuel prices affecting the balance of fuels used for thermal generation. Reducing the volatility is particularly important with an annual targets framework such as that required in the Climate Change (Scotland) Act, where the margin for error is much less than with the UK’s five-year carbon budget approach.

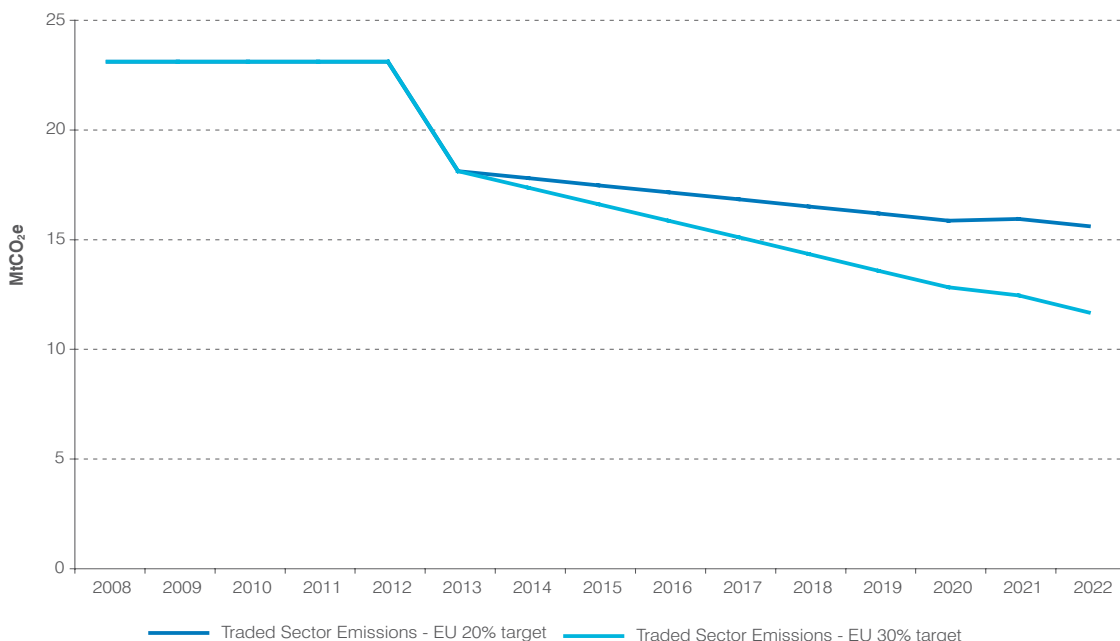
2.14 For this reason, electricity generation policies will not affect Scotland’s emissions as measured against the targets and are not included in the tables at Annex B. The traded sector is covered in more detail in the Technical Appendix.

2.15 The total number of allowances available under the EU ETS each year is set in advance, and reduces over time. Since Scotland counts a set share of these allowances in the NSEA, the rate at which the emissions cap is reduced dictates the rate at which Scotland’s emissions can be reduced. Currently, the EU ETS allowance cap is set at a level that will achieve economy-wide emission reductions of 20% by 2020 relative to 1990. The EU has committed to strengthening its target to 30% by 2020 if there is a suitable global climate deal. If Scotland is to achieve a 42% reduction in overall emissions by 2020 it is important that the EU target is strengthened to 30% in order to drive greater emissions savings from the traded sector.

2.16 Scottish Ministers were represented for the first time in the UK delegation at the United Nations climate change conference in Cancun in December 2010. The UK Government has recognised the importance of working with the Scottish Government to make the economic case for a low carbon economy, including cutting EU emissions by 30%. Scotland has the opportunity to deal directly with other national governments on climate change, and can help shift international opinion towards the inevitability of a low carbon economy. Scotland has also been an active member of The Climate Group’s States and Regions Alliance for many years, and is also a full member of The Climate Group. Sub-national Governments are responsible for implementing up to 80% of policies on climate change, and Scotland can make the bridge to the work of sub-national governments across the globe.

2.17 Figure 2 shows the estimated trajectory of the Scottish traded sector emissions under each of these scenarios.

Figure 2: Estimated Scottish traded sector emissions under EU 20% and 30% targets



Estimating emissions reductions

“Business as usual” emissions projections

2.18 To quantify the effect of policies to reduce emissions it is necessary to consider what would happen to emissions in the absence of such policies under reasonable assumptions about economic growth, fuel prices, growth in the population and number of households etc. The emissions reduction (“abatement”) resulting from a policy can then be subtracted from the “business as usual” emissions to calculate what emissions are likely to be with the policy in place.

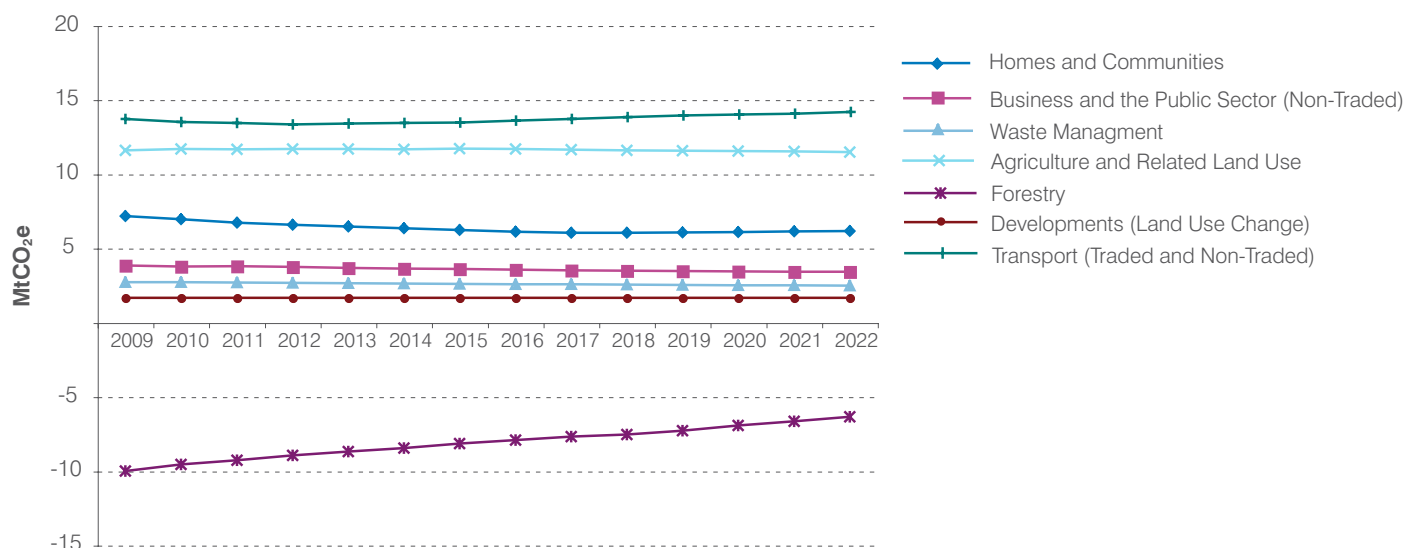
2.19 The Scottish Government has compiled reference projections for 2009 to 2022 for the non-traded sector which estimate what would happen in a “business as usual” scenario. These projections include effects of all policies up to and including the UK and Scottish Climate Change Programmes 2006. These are shown

in Figure 3, and the abatement presented for policies throughout this Report are the savings against these projections.

2.20 In the absence of policies beyond 2006 emissions in most sectors would be roughly flat out to 2022. Residential emissions would fall slightly as a result of energy efficiency measures installed under the supplier obligation, and transport emissions would rise slightly, after a fall from 2009-2011 resulting from the recession.

2.21 More notably, in the “business as usual” scenario, sequestration by forestry would decline by around 4 MtCO₂e between 2009 and 2022. This is a legacy of historical woodland creation rates, which declined in the 1990s after high levels of planting in the 1970s and 1980s.

Figure 3: “Business as usual” projections of emissions for the non-traded sector, by sector, 2009 to 2022



Advice from the Committee on Climate Change

2.22 The UK Climate Change Act 2008 established the Committee on Climate Change (CCC) to provide independent expert advice to government about all aspects of climate change, including the steps that must be taken to reduce the UK's emissions. Under the UK Act, the CCC must provide advice to the Scottish Ministers should they request it to do so. The Climate Change (Scotland) Act places statutory duties on the Scottish Ministers to request advice from the CCC in certain circumstances, including when they are preparing to set annual emissions reduction targets.

2.23 Annual targets were set in October 2010 which were informed by advice published by the CCC in February 2010²⁷, and further advice from the CCC which took into account new information about the effects of the recession. The annual targets were also informed by the work of a cross-party Short Life Working Group. The papers considered by the Working Group, including the additional advice from the CCC, are available on the Scottish Government's website²⁸.

2.24 The CCC provided additional advice to the Scottish Ministers in January 2011 on a "fair and safe emissions budget", which is defined in section 4(6) of the Scottish Act as the aggregate amount of net Scottish emissions for the period 2010-2050 recommended by the CCC as being consistent with Scotland contributing appropriately to stabilisation of greenhouse gas emissions in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The CCC advised that a fair and safe aggregate amount of net Scottish emissions for the period 2010-2050 would be

1,250 MtCO₂e. Considering the other Scottish targets in this context, the CCC concluded that the 2020 target to reduce greenhouse gas emissions by 42% relative to 1990 levels is consistent with a EU's 30% emissions target, which in turn is appropriate as a contribution to required global emissions reductions in 2020²⁹.

2.25 The set of proposals and policies outlined in this Report, and the assumptions that have been made about emissions projections and abatement potential draws, in part, on the CCC's advice to the Scottish Ministers.

Abatement from and costs of proposals and policies

2.26 A full year-by-year breakdown of the estimated impact of policies and proposals is shown in Annex B at the end of this Report, which gives some background on assumptions, uncertainties and the sources of data. These tables include climate change policies introduced since 2006 at the EU, UK and Scottish level, which will contribute to emissions reductions relative to the reference projections. Within the sectoral chapters tables show which policies have been included and give estimates of the abatement these policies will achieve in 2020. Although the annual targets have been set until 2022, the year 2020 has been chosen here since it is the interim target year and all previous publications including the Delivery Plan have used this year as the reference.

2.27 Proposals are listed separately in the tables at the end of this Report and in the sectoral chapters. Chapters 3 to 9 contain more detail about the status of proposals, the options for implementation and the action the Scottish Government is taking to develop the proposals into policies.

²⁷ Committee on Climate Change, Scotland's Path to a low-carbon economy: <http://www.theccc.org.uk/reports/scottish-report>

²⁸ Papers considered by the Short-Life Working Group on annual targets <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/climatechangeact/papers>

²⁹ Committee on Climate Change advice to the Scottish Ministers on a 'Fair and Safe Emissions Budget': <http://downloads.theccc.org.uk/s3.amazonaws.com/Letter%20Lord%20Turner%20to%20Roseanna%20Cunningham%20-%2020310111.pdf>

2.28 The costs presented in the tables throughout this Report are the total financial costs of implementing proposals. It has not been possible to show whether costs would be met by the Scottish Government, the broader public sector, businesses or individuals, as this would depend on exactly how a proposal was to be implemented. Where possible, an estimate of the cost-effectiveness of each proposal has also been shown. This represents the net financial cost or benefit of the proposal over its lifetime. A negative number denotes a net financial benefit.

2.29 The Technical Appendix that accompanies this Report describes how the figures presented here have been derived, the uncertainties involved in estimating the impact of policies to reduce emissions and the wider economic considerations relevant to this work.

The economic impact of proposals and policies

2.30 In its advice to the Scottish Ministers, in common with its equivalent advice to the UK Government, the CCC stated that the cost to the economy of meeting the 2020 target to reduce Scotland's emissions by 42% is likely to be less than 1% of GDP in 2020, which the CCC advises should be accepted given the global costs and consequences of not acting, which are estimated to be 5-20% of GDP. This is supported by a recent OECD report which highlights that ambitious policy action to address climate change makes economic sense and that delaying action could be costly in both economic and environmental terms³⁰.

2.31 There will be challenges in securing the economic benefits. Scotland (and the UK) is

currently emerging from recession. Recovery is expected to be modest in the short-term as the economy takes time to fully adjust to the effects of the recent global financial crisis. The recession has reduced the capital available for current investment purposes and will put significant pressures on public spending in the next few years.

2.32 Despite this, there are also significant opportunities associated with the transition to a low carbon economy. These are set out in more detail in the Scottish Government's Low Carbon Economic Strategy³¹ which highlights, amongst other things, the potential for low carbon activity to grow to 10% of the Scottish economy by 2015, and for renewable energy to provide 80% of our electricity.

2.33 More generally, Scotland's enviable natural resources, research expertise, and industrial base provide firm foundations to capitalise on the growth of renewable energy, carbon capture and storage and improvements in energy efficiency. Renewable energy, supported by wide-ranging activities in other parts of the low carbon goods and services sector will increasingly represent one of Scotland's most powerful areas of comparative advantage as we transit to a low-carbon world.

2.34 Scotland also has globally-competitive firms in the energy and power generation sectors and research excellence in areas such as fuel cells, battery technology and software engineering. The collaborative pooling in energy and climate change research, development and demonstration and early deployment through the Energy Technology Partnership³², the Scottish Centre for Carbon Storage³³ and Scottish Alliance

31 A Low Carbon Economic Strategy for Scotland
<http://www.scotland.gov.uk/lowcarboneyconomicstrategy>

32 Energy Technology Partnership in Scotland: <http://www.etp-scotland.ac.uk/>

33 Scottish Centre for Carbon Storage: <http://www.geos.ed.ac.uk/sccc>

30 OECD, The Economics of Climate Change Mitigation: Policies and Options for Global Action Beyond 2012: http://www.oecd.org/document/56/0,3343,en_2649_34361_43705336_1_1_1_37465,00.html

for Geoscience, Environment and Society³⁴ will help to underpin the performance of our businesses.

Examples of benefits

2.35 Together with the Low Carbon Economic Strategy, this Report on Proposals and Policies sets out many of the potential benefits, both direct and indirect, of moving to a low-carbon economy. These include:

- The potential for low carbon employment in Scotland to increase from around 70,000 to around 130,000 by 2020, specifically:
- 26,000 jobs in renewable energy, including wind, wave and tidal, biomass, geothermal, hydro and photovoltaic energy generation and the services that support them, including renewables consultancy.
- 26,000 jobs in low carbon technologies, including alternative fuels, carbon capture and storage, building technologies, energy management and carbon finance.
- 8,000 jobs in environmental management, including energy, carbon and broader environmental consultancy, air pollution control, environmental monitoring, marine pollution control, waste management, recovery and recycling; as well as the service industries that support environmental management.
- Long-term savings from energy efficiency. Decarbonising the energy supply is important, but there are also economic benefits that can be achieved by reducing consumption through improving energy and resource efficiency. Conserve and Save, the Scottish Government's Energy Efficiency Action Plan³⁵

details the Scottish Ministers' target to reduce total final energy consumption in Scotland over the period to 2020 by 12%. Depending on the measures implemented to achieve this target, the reduction in energy consumption anticipated in the domestic sector (in the form of reduced gas consumption) could result in annual fuel savings worth £325 million.

- Benefits from resource efficiency. Consuming less and better extends beyond energy use. For example, the savings from achieving greater efficiencies in the agriculture sector in Scotland are estimated as potentially being up to £470 million over the period 2010-2022.

Competitiveness impacts

2.36 There is some potential for competitiveness impacts and possible leakage of production as a result of climate change mitigation policy for sectors which are both energy-intensive and tradable or potentially tradable, and subject to a carbon price. However, the CCC's December 2008 report to the UK Government³⁶ suggested that this would be relatively limited. Around 0.7% of Scottish GDP and less than 0.5% of employment is in industries that could potentially see cost increases of greater than 5%. Some sectors, such as aluminium and cement production, have been assessed to be exposed to risk of carbon leakage outside of Europe and are eligible under the EU ETS to receive free carbon allowances to mitigate this risk.

Small and medium-sized enterprises

2.37 Small and medium-sized enterprises (SMEs) accounted for 99% of all firms and around 53% of employment in Scotland as at March 2009. The transition to a low carbon economy

³⁴ Scottish Alliance for Geoscience, Environment and Society: <http://www.sages.ac.uk/>

³⁵ Conserve and Save: Energy Efficiency Action Plan: <http://www.scotland.gov.uk/Publications/2010/10/07142301/0>

³⁶ Committee on Climate Change, Building a Low Carbon Economy: <http://www.theccc.org.uk/reports/building-a-low-carbon-economy>

will therefore present significant opportunities but also short-term challenges for the sector.

2.38 While all small firms will be impacted through increased energy bills, there are opportunities for them to offset this by making savings in energy and resource efficiency. They could also potentially benefit from installing micro-renewables, enabling access to Feed in Tariffs or the Renewable Heat Incentive.

The domestic effort target

2.39 Section 8 of the Climate Change (Scotland) Act places a duty on the Scottish Ministers to ensure that reductions in net Scottish emissions of greenhouse gases account for at least 80% of the reduction in the net Scottish emissions account in any target year.

2.40 The domestic effort target limits the quantity of “carbon units” (i.e. tradable emissions allowances) that the Scottish Ministers may use to reduce the NSEA in any target year. The exception is carbon units surrendered by participants in the EU ETS (which are accounted for in line with international practice, as described above).

2.41 The Climate Change (Limit on Carbon Units) (Scotland) Order 2010³⁷ specifies that the net amount of carbon units that may be credited to the Net Scottish Emissions Account for the period 2010-2012 is zero. The Scottish Ministers must make orders in respect of the periods 2013-2017 and 2018-2022 by 31 December 2011 and 2016 respectively.

2.42 The Scottish Ministers have no proposals or policies to purchase carbon units to offset Scottish greenhouse gas emissions during the period 2010-2022. The focus of the Scottish Government is on measures that seek to reduce Scotland’s emissions at source and for the long-term. It is the intention and expectation, therefore, that the measures put in place to reduce Scotland’s emissions in the period covered by this Report will be consistent with meeting the domestic effort target in each target year.

³⁷ The Climate Change (Limit on Carbon Units) (Scotland) Order 2010, SSI 2010 No. 217: <http://www.legislation.gov.uk/ssi/2010/217/contents/made>

Figure 4: Annual emissions targets and projected Scottish emissions from 2010 to 2022 under “business as usual”, and after inclusion of policies and proposals

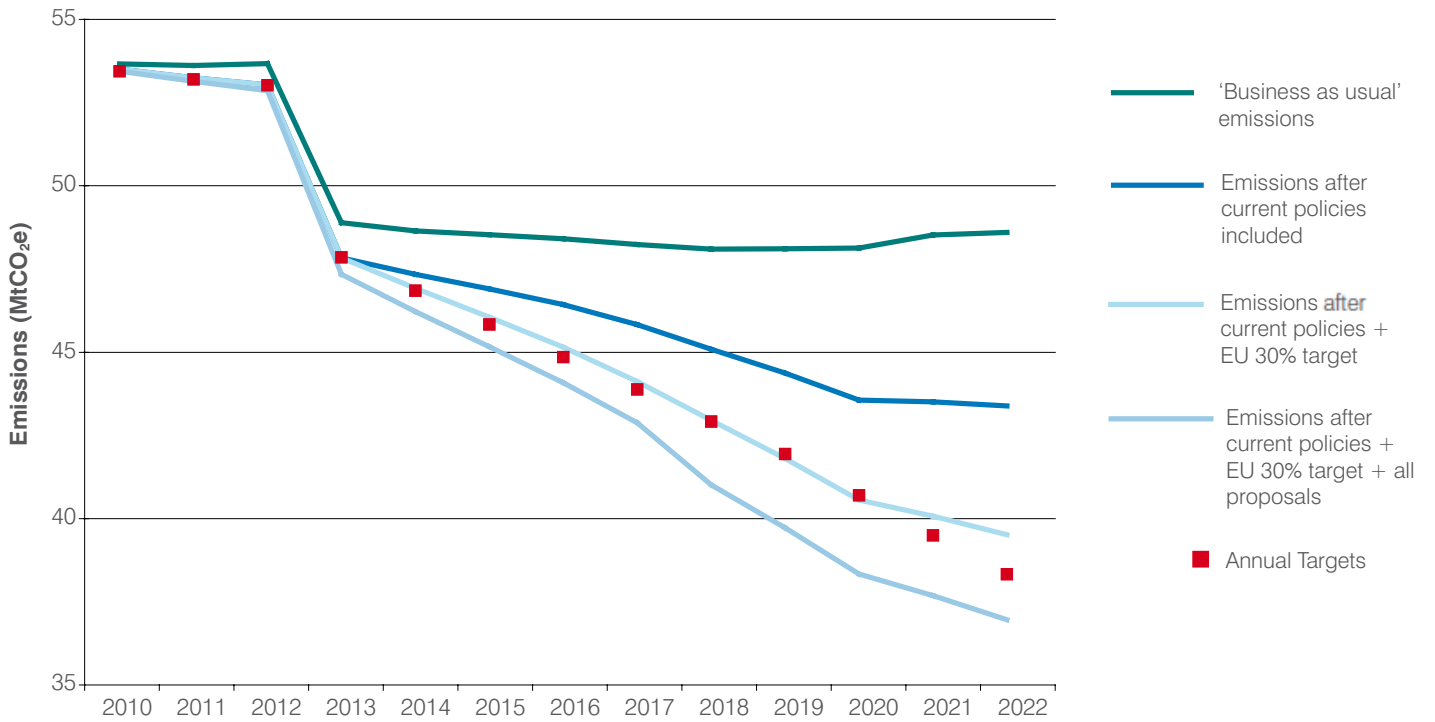
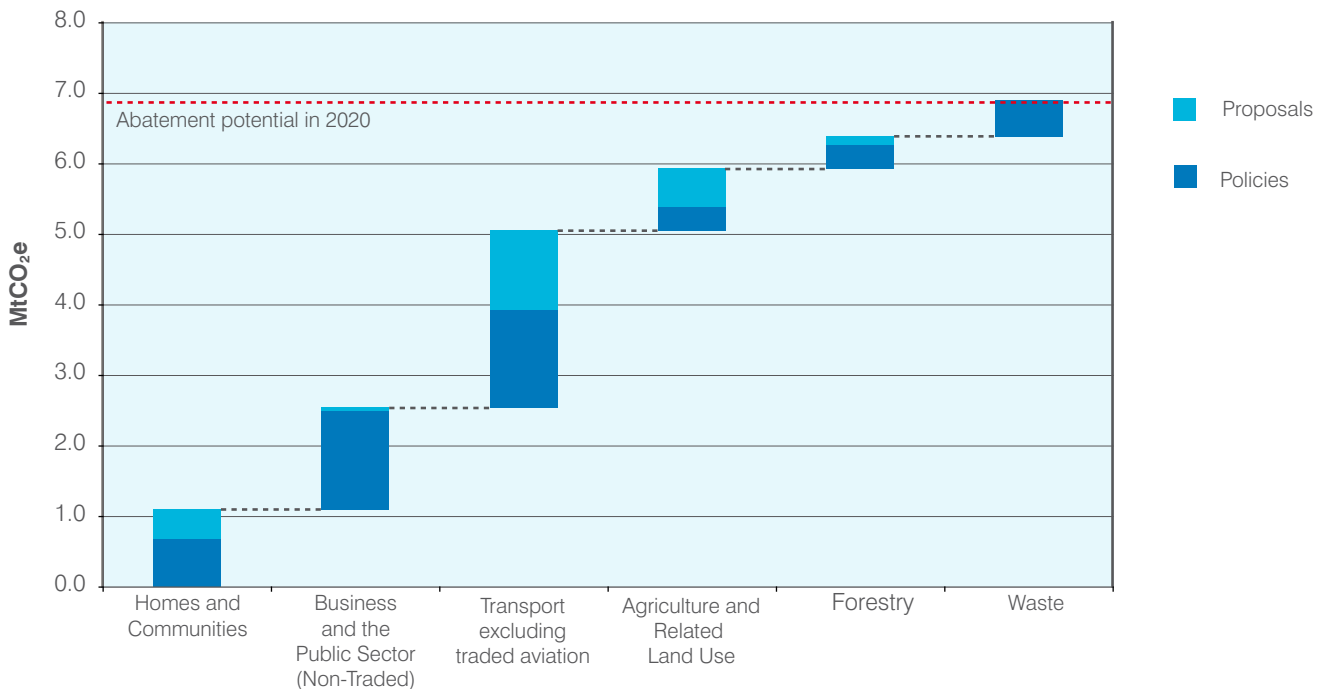
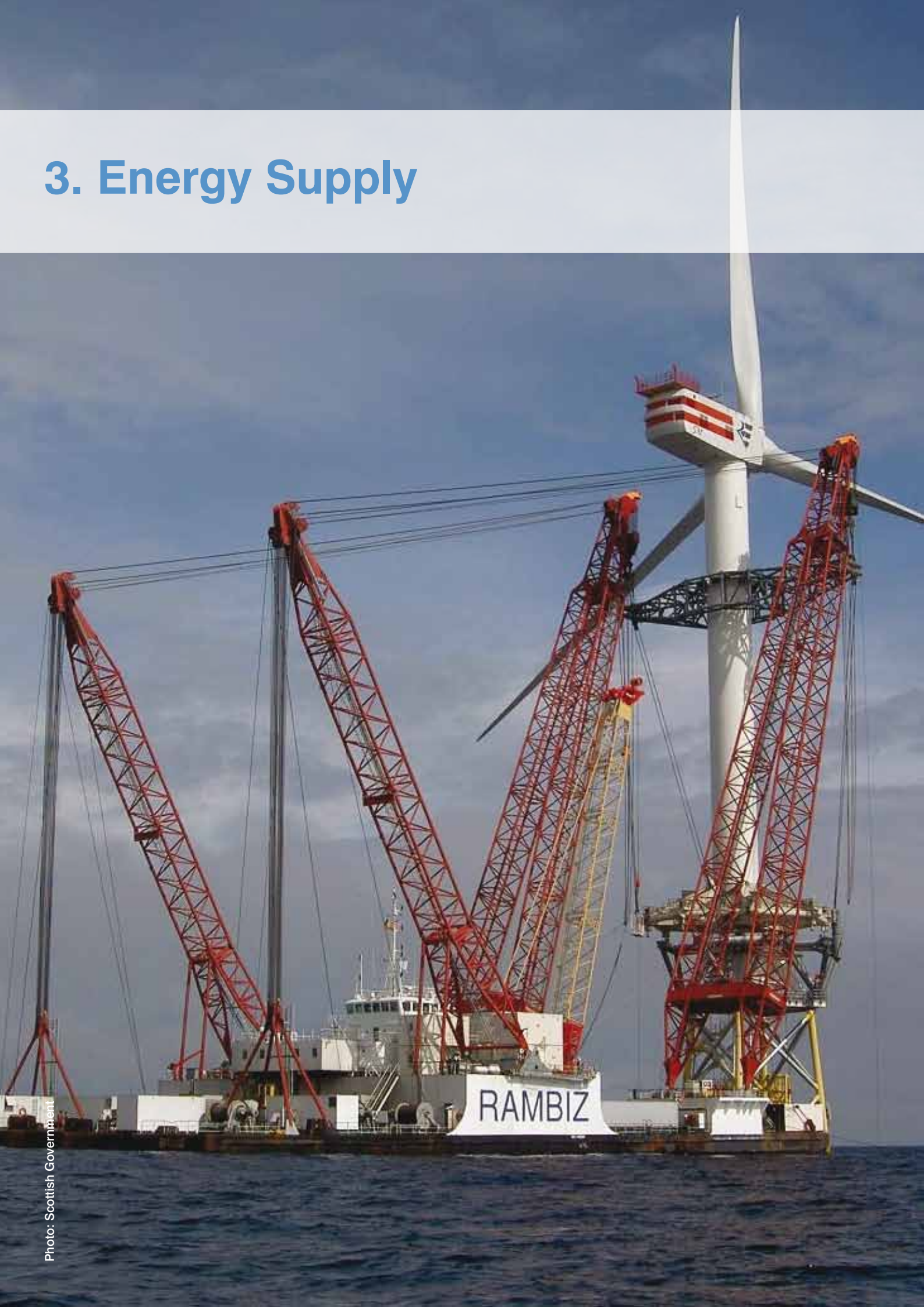


Figure 5: Abatement potential in the non-traded sector in 2020 from policies and proposals, by sector



3. Energy Supply



3. Energy Supply

3.1 To provide secure and low carbon energy supply for the long term, Scotland needs to reduce the demand for energy and decarbonise supply. Dramatic progress has already been made in harnessing Scotland's vast potential for renewable electricity generation, with generation from onshore wind increasing fifteen-fold since 2000. The next ten years will lay the foundations for exploiting the 25% of European offshore wind and wave potential held by Scotland, as well as the 10% of European potential for tidal power. Scotland is also in pole position to develop the UK's first commercial-scale carbon capture and storage (CCS) project at Longannet, and to capitalise on its position as the EU's largest potential offshore CO₂ store.

3.2 The Scottish Government has a clear commitment to decarbonise energy supplies, with the full decarbonisation of electricity supply by 2030 and significant decarbonisation of heat supply by 2030, consistent with the recommendations of the Committee on Climate Change (CCC)³⁸. The Scottish Government's Draft **Electricity Generation Policy Statement (EGPS)**³⁹ supplements and supports this Report by providing evidence on the recent important developments in renewable electricity generation, thermal electricity generation, energy efficiency, and transmission and interconnection. It also outlines the role that the Scottish Government intends each of these areas to contribute, as part of the move to a decarbonised and secure electricity supply. This chapter summarises the proposals and policies to achieve these objectives and covers:

- Electricity generation: Renewable electricity is at the forefront of the effort to decarbonise

energy supply. The recent uplift of the renewable electricity target to 80% of Scottish consumption by 2020 highlights the potential contribution from this energy source.

- Renewable Heat: The major policy interventions for the development of renewable heat are also covered in this chapter. However, the effect of renewable heat will be seen mostly in the residential, industrial and business sectors, so the estimated abatement from renewable heat is presented in Chapter 4: Homes and Communities, and Chapter 5: Business and the Public Sector.
- Other supporting and enabling measures: Energy efficiency measures are central to achieving the objectives of this Report, across the residential, industrial and business sectors, and in transport. They are covered in Chapters 4, 5 and 6. The National Planning Framework 2 and the Scottish Government's devolved consenting powers under the Electricity Act 1989 also play a key role, as can district heating.

3.3 Greater detail on all of these proposals and policies can be found in the EGPS.

³⁸ Building a low carbon economy – the UK's contribution to tackling climate change:

<http://www.theccc.org.uk/reports/building-a-low-carbon-economy>

³⁹ Draft Electricity Generation Policy Statement:

<http://www.scotland.gov.uk/egps>

Emissions trends

3.4 Although the Net Scottish Emissions Account (NSEA) will track the trajectory of EU Emissions Trading System (EU ETS) emissions rather than Scottish territorial emissions from power generation, the decarbonisation of the electricity sector is a vital first step to decarbonising other parts of the Scottish economy such as transport, which will become increasingly reliant on electricity.

- Emissions from the energy supply sector (power stations, refineries, oil and gas production, and coal mining) were 19.4 MtCO₂e in 2008, or 35% of Scottish emissions. Overall, there has been a slight downward trend in emissions since the 1990s.
- The majority of emissions from the energy supply sector are covered by the EU ETS. This sector and the other emissions-intensive industries in the ETS are referred to as the “traded sector”. Scottish emissions from sources in the traded sector were 23.8 MtCO₂e in 2008 and 22.0 MtCO₂e in 2009⁴⁰.
- Emissions from the traded sector as recorded in the NSEA were 23.0 MtCO₂e in both 2008 and 2009, showing the smoothing effect that this form of accounting has on emissions.

3.5 In this report electricity generation policies are considered as enabling policies, which, although not affecting the NSEA, are vital for the achievement of Scotland’s long term goals.

Milestones

3.6 The Scottish Government has ambitious targets for 2020 for both electricity and heat generation:

- for 80% of Scottish electricity demand to come from renewable sources; and
- for 11% of Scotland’s heat to come from renewable sources.

3.7 These are complemented by additional targets:

- for 12% reduction in total final energy consumption by 2020; and
- for emissions reduction from thermal electricity generating stations through CCS: CCS should be demonstrated on a Scottish coal power station by 2020; it should then be economically and technically proven by 2020 and progressively fitted to all coal and gas thermal plants thereafter by 2030.

EU and UK policies

Electricity generation

3.8 Energy supply policies are mostly reserved, and overall emissions are strongly influenced by a few large EU and UK schemes. In electricity generation these include:

- **UK investment in enhancements to the electricity grid**⁴¹ both onshore and offshore, to enable more renewables to be connected; and EU proposals for the development of offshore grids in the North and Irish Seas to enhance interconnection and interpenetration of electricity markets;

40 The 2009 figures have been produced by internal analysis based on the UK Greenhouse Gas Emissions Trading Scheme Registry which holds data on verified emissions and allowances surrendered for 2005-2009: <http://emissionsregistry.environment-agency.gov.uk/Default.aspx?Module=/PublicReports>

41 UK Department for Energy and Climate Change, Future Electricity Network: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/network/network.aspx

- **EU and UK funding for CCS demonstration projects**⁴² to sequester emissions from conventional generation. The UK Government Comprehensive Spending Review (CSR) in 2010 identified that £1 billion of funding is still available for CCS demonstration. Scotland is taking a lead in the development of CCS technology. Following the withdrawal of Kingsnorth from the UK competition, Scotland's Longannet coal fired station is now the clear frontrunner for UK funding, and could also benefit from co-financing under the EU's New Entrant Reserve competition. Gas fired power stations such as Peterhead are also eligible for co-finance under the New Entrant Reserve, and the Scottish Government welcomes the UK Government's announcement that they will be allowed to compete for funds under the UK's domestic CCS demonstration programme (projects 2-4);
- **reform to the regulatory system in the UK and Scotland**⁴³ to enable electricity networks to meet increasing demand and encompass smaller scale, intermittent renewable generation sources;
- **the UK Government's Electricity Market Reform exercise** to assess the role that a carbon price, emissions performance standards, Renewables Obligation, CCS Levy, feed-in tariffs, capacity payments and other interventions can play in the delivery of a secure, low carbon, affordable electricity system in the long term. This was announced in the Annual Energy Statement in June 2010⁴⁴,

with a White Paper to be published in Spring 2011 and legislation likely thereafter. Given the importance of this reform in delivering a decarbonised Scottish electricity supply, Scottish Ministers will have a key interest in ensuring this reform delivers a desired set of outcomes for Scotland, and reflects devolved competence.

3.9 Securing full Scottish powers over the way energy markets and energy generation, transmission and supply are regulated would help develop connections to the UK and Europe for the export of energy and ensure security of Scotland's future energy supply. It would allow Scottish-specific solutions to issues such as transmission access and charging, and reinforcing Scotland's grid network (where existing regulatory frameworks work against Scottish sector interests).

3.10 As part of the CSR 2010, the UK Government outlined a proposal involving Scottish Minister's agreeing to continuing the existing arrangement of subtracting from the Scottish Departmental Expenditure Limit (DEL) any funds drawn down from existing and future fossil fuel levy (FFL) surpluses for renewables expenditure. This would be in return for UK Government ring-fencing for Scotland an extra £250m of UK DEL funding within the Green Investment Bank (GIB). The UK proposal falls well short of the Scottish Government's long-argued case to have the FFL funds made immediately available in full in addition to Scotland's DEL to introduce the urgent and much needed support to accelerate key renewables industry developments in Scotland – particularly in relation to infrastructure for offshore wind manufacture and deployment. Scottish Ministers have expressed concerns relating to the lack of information available on the GIB – particularly in relation to the timeframe for development and scale of the proposed fund, the nature of

42 UK Department for Energy and Climate Change, Carbon Capture and Storage pages:

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/ccs/ccs.aspx

43 UK Department for Energy and Climate Change, Regulation of GB Energy Markets:

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/markets/regulation/regulation.aspx

44 UK Department for Energy and Climate Change, Annual Energy Statement news release: http://www.decc.gov.uk/en/content/cms/news/pn10_85/pn10_85.aspx

the funding (grants, loans or equity etc.) and governance/oversight issues, including the role of Scottish Ministers. These views are shared by our key stakeholders in this area.

3.11 The CSR report suggests that the GIB will not come on stream until 2013-14, which seems very late. The proposed arrangement would effectively result in Scotland continuing to miss out on the FFL surplus as it simply replaces money already being spent on renewables within existing DEL. In effect, there would be no net gain for Scotland. Scotland's renewable energy potential and resource would have seen it well placed to benefit significantly from the GIB proposal which was first announced in the 2010 Budget – simply ring-fencing £250m in return for FFL would seem to offer no material benefits for Scotland.

Renewable heat

3.12 The UK **Renewable Heat Incentive** (RHI)⁴⁵ will pay installers of renewable heat equipment for each unit of heat they generate. The UK Government confirmed in the 2010 CSR that the scheme will begin in June 2011, although this timescale is likely to slip, and committed £860 million of funding over that spending review period. However the conclusions from the CSR also indicated that the RHI would have to find efficiency savings of around 20% from the previous administration's proposals. Further details on implementation are still to be announced.

Other supporting and enabling measures

3.13 UK Government policy is also supported by National Policy Statements for energy, which set out the planning framework for energy in

England and Wales, and on reserved matters. They also set out the UK Government's policies for areas such as fossil fuels, gas and oil, and networks.

3.14 The EU is developing new legislative proposals for energy infrastructure development across the EU, which will look at large-scale energy interconnections and the regulation needed to support these.

3.15 The EU Renewables Directive and CCS Directive set out clear legal requirements for the development of renewable electricity and the safe geological storage of CO₂.

The EU Emissions Trading System

3.16 The EU ETS⁴⁶ covers almost all thermal power generation and heavy industry. Scottish Ministers are lobbying hard for the EU to increase its 2020 emissions target from a 20% to a 30% reduction against the 1990 baseline, which would require bigger reductions from the traded sector through the EU ETS.

3.17 With the current EU target of 20%, Scottish traded sector emissions are set to decrease to 15.8 MtCO₂ in 2020. If the EU adopts a 30% target, emissions could decrease to 12.7 MtCO₂, the exact amount depending on EU decisions about the balance of the reductions between the traded and non-traded sectors. Scottish Ministers have consistently argued that an EU move to 30% is required if Scotland is to meet its interim target of 42%.

3.18 Whatever the level of the EU target and the EU ETS cap, the price of allowances alone is not likely to be high enough to drive decarbonisation of the power sector by 2030. As the CCC has pointed out⁴⁷, traded sector emissions could be

⁴⁵ UK Department of Energy and Climate Change, Renewable Heat Incentive: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/policy/renewable_heat/incentive/incentive.aspx

⁴⁶ European Commission Climate Action, EU Emissions Trading System: http://ec.europa.eu/environment/climat/emission/index_en.htm

⁴⁷ Committee on Climate Change, 2nd Progress Report, Box 2.2: <http://www.theccc.org.uk/reports/2nd-progress-report>

reduced in line with the cap by investing solely in gas-fired generation, which would lead to a system dominated by these plants. Additional policies incentivising renewable and low-carbon thermal generation are important for avoiding “lock-in” to high-carbon generation. For example, the Scottish Government has a clear commitment to the decarbonisation of gas power stations alongside coal by 2030, and has argued for CCS to be demonstrated on a gas power station by 2020.

Scottish policies

3.19 Within the EU and UK incentive regimes, Scotland plays an important role in ensuring delivery. The Scottish Government’s position on the role of renewable electricity and fossil fuel generation in Scotland’s future energy mix is set out in full in its Draft Electricity Generation Policy Statement, which supplements and supports this Report.

Electricity generation

3.20 Scottish policies for electricity generation include:

- the **Renewables Obligation (Scotland)** – an obligation on electricity suppliers to source an increasing proportion of electricity from renewable sources⁴⁸, which parallels the UK Renewables Obligation;
- the **Renewables Action Plan**⁴⁹, which sets out the Scottish Government’s ambitions and action on renewable electricity and which is updated every six months;

- **funding schemes, innovation and research centres** to drive the development and deployment of renewable generation, including the Saltire Prize, the Scottish European Green Energy Centre (SEGEC)⁵⁰, the European Marine Energy Centre (EMEC)⁵¹, and the Wave and Tidal Energy Research, Development and Deployment Scheme (WATERS)⁵²; and the revised approach to low carbon innovation set out in the Scottish Government’s Low Carbon Economic Strategy⁵³;
- **planning consents under the Electricity Act 1989, for both thermal and renewable electricity generation**, and a clear commitment to no new nuclear power stations in Scotland;
- **policies to progressively demonstrate and deploy CCS**: guidance requires new gas plant to be carbon-capture ready⁵⁴ and CCS to be fitted to 300 MWe of any new coal plant from day one;
- **initiatives to enhance grid interconnections between Scotland and the EU**: membership of the North Sea Grid Co-ordinators’ Group, which is focusing on the European priority of developing the North Sea Grid Infrastructure; and working with the Irish and Northern Irish Governments to promote grid interconnections for renewable energy in the Irish Sea and Atlantic.

48 In 2008-09 the proportion of electricity required from renewable sources was 9.1% in England, Wales and Scotland, and 3.0% in Northern Ireland. For the 2009/10 period this has changed to an obligation based on a ‘per megawatt hour’ measure of electricity that the suppliers provide to customers during a specified period. In 2009/10, this number was 0.097 ROCs per megawatt hour.

49 Renewables Action Plan and updates are available from: <http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/19185/17612/>

50 Scottish European Green Energy Centre: <http://www.segec.org.uk/>

51 European Marine Energy Centre:

<http://www.emec.org.uk/>

52 Wave and Tidal Energy Fund webpage, Scottish Enterprise website: <http://www.scottish-enterprise.com/your-sector/energy/energy-support/energy-funding/energy-grants/Wave-and-Tidal-Energy-Fund.aspx>

53 A Low Carbon Economic Strategy for Scotland:

<http://www.scotland.gov.uk/lowcarboneyconomicstrategy>

54 Thermal Energy – Guidance for Developers:

<http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/Thermal-Guidance>

Renewable heat

3.21 The Scottish Government will seek to maximise the replacement of traditional heating with low carbon and renewable heat in the next ten years, to meet its target of 11% of heat demand from renewables by 2020. The RHI will be the main financial mechanism for encouraging the installation of renewable heat in Scotland and the Scottish Government is working with DECC to ensure that the design of the scheme takes account of specific Scottish interests when it is introduced in 2011. The Government also has a role to play in supporting the construction of combined heat and power (CHP) plants and heat networks, and is working with DECC to ensure that the RHI will include an uplift to encourage the take-up of district heating. The Government's policies for renewable heat are set out in the Renewable Heat Action Plan⁵⁵.

3.22 Heat generation from biomass will have an important role in delivering the 11% renewable heat target. The Scottish Government's policy is to promote the use of biomass plants for heat only or for combined heat and power, with new plants relatively small in scale. This is in order to optimise local supply, serve localised heat markets and maximise efficient use of a limited fuel source.

3.23 Wood fuel use for energy production has more than tripled in the last five years. The Scottish Government recently announced that it would review the blend of support available for biomass to establish a more appropriate balance between the support available, policy priorities and competing needs for the resource. Full details are given in the supporting Draft Electricity Generation Policy Statement.

Supporting and enabling measures

Importance for energy supply of reducing overall energy demand

3.24 Scotland's ability to supply sufficient renewable electricity and heat to meet its targets in a cost-effective way depends critically on reducing demand. High demand requires more generating capacity to be built. If this is done through renewables - for example, wind - it means that in addition to building turbines in the most suitable sites, some will have to be built in less suitable sites - for example, less windy areas. A turbine built in a less windy area will generate less electricity, and so the ratio of the cost of building the turbine to the value of the electricity it generates will be higher, pushing up the cost per unit. Alternatively, more turbines might be built offshore where it is more expensive to do so. Again, this would increase the cost of the electricity generated. Electricity demand is likely to rise in the long term as greater use is made for transport and heat - therefore energy efficiency measures to minimise this rise in demand will be crucial if electricity is to remain affordable.

3.25 Many of the proposals and policies described in this Report are aimed at reducing energy demand. The Energy Efficiency Action Plan established a target to reduce total final energy demand in Scotland by 12% by 2020, covering all fuels and sectors. The actions set out in the Homes and Communities, Business and Public Sector, and Transport chapters of this Report are key to achieving the target.

Infrastructure for offshore renewables

3.26 Infrastructure that is fit for purpose is key to enabling Scotland to fully harness its impressive offshore renewables resource (offshore wind, wave and tidal). To ensure this

⁵⁵ Renewable Heat Action Plan:
<http://www.scotland.gov.uk/Publications/2009/11/04154534/0>

opportunity is not missed, the Scottish National Renewables Infrastructure Fund (N-RIF) was launched in November 2010. N-RIF, with a budget of at least £70 million over the next four years, will support port infrastructure projects that relate to major manufacturing and test and demonstration facilities for the Scottish offshore wind sector. The existence of this fund places Scotland in a strong competitive position for attracting inward investors, meeting our renewable energy targets and achieving our aspirations of being a leader in the development of offshore renewables.

Planning framework

3.27 As the Low Carbon Economic Strategy makes clear, Government has a key role in enabling development of CCS, expansion of renewables, and renewable heat and district heating through providing a supportive planning process. The Second National Planning Framework (NPF2) sets out a spatial strategy for Scotland's development to 2030. Core parts of the strategy include realisation of the potential of Scotland's renewable energy resources, and the facilitation of baseload power and heat generation from clean, low carbon sources.

Consenting thermal electricity generation with CCS

3.28 Planning policy also affects the development of CCS through the requirements laid out in the section 36 guidance for consenting new thermal power stations under the Electricity Act 1989⁵⁶. In November 2009, the Scottish Government announced its intention to require CCS to be fitted to all new coal fired power stations as follows:

- From 9 November 2009, any application for a new coal plant in Scotland will need to

demonstrate CCS on a minimum of 300 MW (net) of capacity from their first day of operation;

- Further new builds from 2020 would be expected to have full CCS from their first day of operation;
- With regard to retro-fitting of existing coal plants, a 'rolling review' of the technical and economic viability of CCS will take place with the aim of taking a final view on retro-fitting by 2018, with the likelihood of having existing plants retro-fitted by no later than 2025;
- If CCS is not seen as technically or financially viable at some stage in the future then alternatives will be considered based around the EU ETS, including the possibility of an Emissions Performance Standard;
- This policy relates to coal stations only. The Scottish Government's position on gas, oil and thermal stations is that for stations over 300 MWe, applicants will have to demonstrate that any new applications demonstrate carbon capture readiness.

3.29 The CCS Roadmap⁵⁷, published in March 2010, highlights that Scotland has considerable natural advantages in CO₂ storage, alongside our world-leading research and development expertise. Our ambition is for Scotland to lead the UK and EU in the development of CCS, and to maximise our comparative economic advantage through demonstrating this technology. CCS should be economically and technically proven by 2020 and progressively fitted to all coal and gas thermal plants by 2030 to ensure full decarbonisation of the electricity supply.

56 Guidance on thermal power stations in Scotland – March 2010: <http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/Thermal-Guidance/Thermal-2010>

57 Carbon Capture and Storage Roadmap – March 2010: <http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/Thermal-Guidance/CCS-roadmap>

Consenting renewable electricity generation and transmission

3.30 The s.36 guidance also sets out the policy for the location and consenting of renewable generation. It also sets out the Scottish Government's role and responsibility for consenting improvements to the electricity grid. Individual planning authorities have control over the expansion of renewables through their role in consenting new wind farms consistent with their spatial frameworks. The Scottish Government has commissioned an on-line resource⁵⁸ to support planning authorities in producing planning guidance for wind farms.

District heating

3.31 District heating refers to systems that distribute heat generated in a centralized location for residential and commercial heating requirements such as space heating and water heating. District heating plants can use a wide range of heat sources or fuels and provide higher efficiencies and better pollution control than localised boilers. The Energy Efficiency Action Plan outlines how the Scottish Government will seek opportunities to promote district heating by:

- appointing a dedicated officer to take forward district heating policy and co-ordinate activity across Scottish Government;
- supporting a number of local heat mapping and feasibility projects over 2011-12;
- investigating options for training or workshops for planning authority officers; and
- pursuing options to finance district heating projects.

3.32 As part of this work, the Government is currently considering introducing a loan fund in financial year 2011-12 to support district heating. Plans are at an early stage, but the fund is likely to be open to a wider range of organisations, including local authorities developing district heating schemes. Further details will be announced in due course.

3.33 The Scottish Government is currently undertaking an assessment of the technical and economic implications of utilising waste heat from large scale power stations and CHP plants.

Other energy supply opportunities

3.34 Many of the opportunities to develop alternative sources of energy come from other areas. For example, policies to encourage woodland creation are necessary for the creation of a mature Scottish biomass market that is able to supply Scotland's renewable heat demand. Similarly, the use of Energy from Waste and biogas produced by anaerobic digestion needs to be rolled out in a planned way in order to contribute in the most effective way to Scotland's renewable energy and emissions targets.

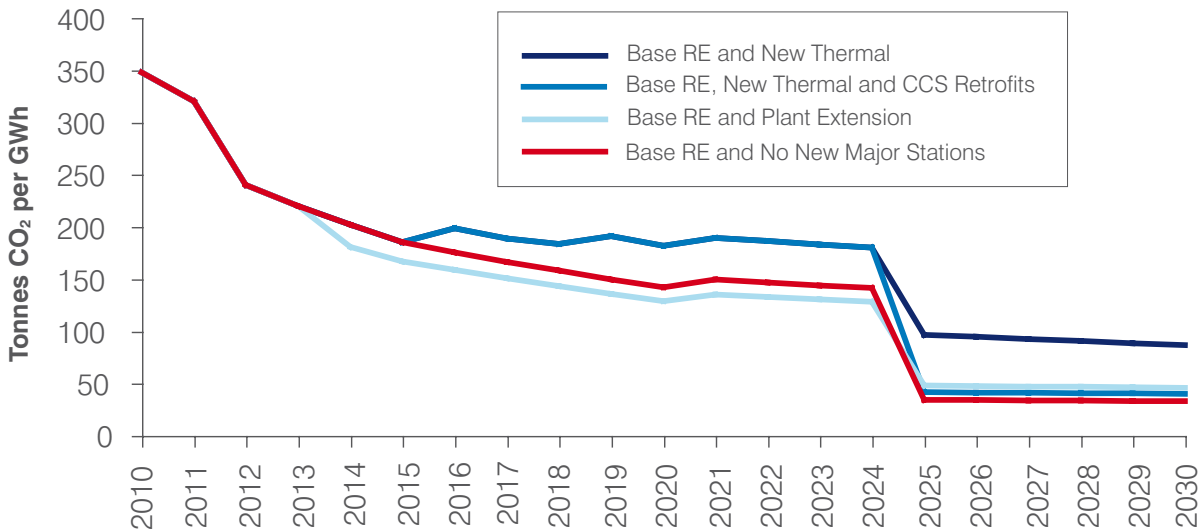
Overall abatement from policies and proposals for Energy Supply

3.35 Table 1 shows that tightening the EU ETS cap as a result of the EU move to a 30% target could result in an additional abatement of 3.0 MtCO₂e.

3.36 Table 2 lists the supporting and enabling measures in the Energy Supply sector.

3.37 Figure 6 is taken from the Draft Electricity Generation Policy Statement and shows the modelled emissions intensity of electricity supply in a number of indicative future scenarios.

Figure 6: Modelled CO₂ intensity of Scottish electricity generation under indicative scenarios, 2010 to 2030.



“Base RE” refers to renewable electricity and is consistent with the 80% target.

Costs and benefits

3.38 In its first report the CCC included in its “extended” ambition policies that cost appreciably more per tonne of carbon dioxide abated than the forecast carbon price in 2020. However the report also identified that these policies are important stepping stones on the path to 2050.

3.39 Likewise most of the energy supply proposals and policies presented in this chapter are likely to cost more than the EU ETS carbon price. However the policies aim to incentivise the construction of low-carbon infrastructure to enable the transformational outcomes. In the traded sector, the EU ETS allowance price will not be sufficient incentive to achieve the necessary uptake of renewables and CCS, and in the non-traded sector, renewable heat will not pay back the additional capital costs of installation, and so requires a financial incentive to be created.

Electricity

3.40 UK and Scottish policies such as the Renewables Obligation (Scotland), Feed-In Tariffs, and CCS levy have been designed to overcome some of these obstacles. However, these schemes reward investors over time, rather than removing the need for investment in the first place.

3.41 In its submission to the Independent Budget Review in 2010, the Scottish Government estimated the cost to the Government of its energy supply policies, including district heating, to be around £900 million in the years 2011-2022. This cost presents a significant barrier, and the Low Carbon Economic Strategy sets out the Government’s work on securing funding and investment given the current tight financial circumstances. On 28 and 29 September 2010 Edinburgh hosted a successful Low Carbon Investment Conference which provided a major forum for discussing potential innovative funding

solutions to secure the future of Scotland's renewables and CCS industry.

Heat

3.42 Estimates of the cost of renewable heat across all sectors range from around £70 million to £160 million per year. Under the RHI, up-front costs for the installation of renewable heat generation will be met by property owners, with the incentive guaranteeing them a reasonable return on investment. Details of the RHI are still to be finalised, however the CSR outlined that over the course of the spending review period (up to 2014-15) £860 million support has been allocated to the delivery of the RHI across the UK. The exact details of the scheme are not yet confirmed.

Other energy supply opportunities

3.43 The cost of energy supply opportunities to consumers and UK and Scottish Government will be significantly influenced by the outcomes of the UK Government electricity market reform exercise. It is essential that while providing a framework to incentivise low carbon generation and minimise costs to consumers, levers to incentivise the deployment of renewable electricity are not constrained.

3.44 The Low Carbon Economic Strategy describes in detail the competitive advantage that Scotland can secure by seizing the opportunity to become a world-leader in renewables and CCS. Along with economic benefits, Scotland also stands to benefit from greater security of supply, lower energy costs than if no action was taken, and the creation of new jobs in low carbon sectors.

The need for greater powers

3.45 Greater responsibilities for energy market regulation to support renewables, CCS development and licensing, OFGEM, and energy efficiency within a wider GB and EU market would secure affordable energy supplies, and develop the contribution of energy to Scotland's economy.

3.46 Responsibility for the way energy markets and energy generation, transmission and supply are regulated would help deliver a low carbon energy sector in Scotland, develop connections to the UK and Europe for the export of energy and ensure security of Scotland's future energy supply. It would allow Scottish specific solutions to issues such as transmission access, charging and reinforcing Scotland's grid network (where existing regulatory frameworks work against Scottish sector interests) and encouraging energy efficiency. Scottish powers over energy regulation and markets would give more flexibility in consenting renewable projects, including ensuring communities around Scotland benefit from energy projects that locate near them. It would help promote trade in electricity from Scotland to the rest of the UK and Europe and enable Scotland to draw in investment in renewable energy development.

3.47 CCS is a technology in which Scotland has significant advantages including academic expertise, offshore storage capacity, and the skills and infrastructure of our existing oil and gas and power engineering sectors. Giving greater powers to Scotland, such as ensuring that funding raised from any UK Government levy on generation to fund CCS projects or long term price support mechanism to support CCS is allocated directly to Scotland, would assist the development of CCS projects and ensure that Scotland is a leader in the development of this emerging

sector. CCS is currently regulated by a number of bodies including Scottish Ministers, the UK Government, and the Crown Estate. Devolving all offshore licensing, including oil and gas licensing,

to Scotland would create a seamless regulatory framework for low-carbon-based energy activity in the Scottish offshore area.

Table 1: Policies for reducing emissions from Energy Supply

Policy package and description	EU, UK or Scottish policy?	Expected abatement (ktCO ₂ e) in 2020
<p>EU target of 30% by 2020 Scotland is lobbying the EU to adopt a 30% target for emissions reduction by 2020, and to adjust the EU Emissions Trading System cap accordingly, and for the UK to move to a 42% target for 2020.</p>	UK / Scottish	3,047

Table 2: Supporting and enabling proposals and policies for reducing emissions from Energy Supply

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>Energy Efficiency and Demand Reduction The Scottish Government has a target to reduce total final energy demand by 12% by 2020.</p> <p>Almost all of the energy efficiency policies in the non-traded sector will also reduce electricity demand, and therefore act to support the decarbonisation of electricity generation.</p>	UK / Scottish	Policy	The Energy Efficiency Action Plan: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan
<p>Renewable Electricity</p> <p>Feed-in Tariffs Subsidy for small scale generation (up to 5MW) of electricity (by householders or small businesses) to guarantee return of investment. Funded by energy suppliers who pay people for the amount of electricity they generate.</p> <p>Renewables Obligation (Scotland) Electricity suppliers must purchase and submit Renewables Obligation Certificates (ROCs), issued by renewable generators, proportional to the energy they supply, or make an equivalent payment to Ofgem.</p> <p>Renewables Action Plan Describes all of Scotland's policies for encouraging and supporting renewable generation. Updated every six months.</p>	UK Scottish Scottish	Policy Policy Policy	<p>DECC website: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/feedin_tariff/feedin_tariff.aspx</p> <p>Scottish Government website: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/RenewablesObligation</p> <p>Scottish Government renewables policy webpage: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/sources/19185/17612</p>

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>Carbon Capture and Storage</p> <p>EU and UK funding for CCS demonstration projects Scotland has bid for funding of CCS projects by the EU and UK. The demonstration project at Longannet is now the clear frontrunner in the first UK competition.</p> <p>Thermal Guidance Scottish Government guidance on the criteria it will apply in consenting new thermal power stations. Any new coal plant will be required to operate CCS on at least 300 MW of its capacity, increasing to 100% by 2025.</p>	<p>UK</p> <p>UK</p>	<p>Proposal</p> <p>Policy</p>	<p>Scottish Government Electricity Generation Policy Statement: http://www.scotland.gov.uk/egps</p> <p>Scottish Government website: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/Thermal-Guidance/Thermal-2010</p>
<p>Electricity Grid Enhancements Working with the UK and other European countries to ensure electricity grid is ready for a future with many more renewables. Electricity Grid reinforcements are designated as a National Development in the National Planning Framework.</p>	<p>UK</p>	<p>Policy</p>	<p>Scottish Government National Planning Framework webpage: http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/npf/</p>
<p>Supporting Clean Baseload Generation through SEGEC The Scottish European Green Energy Centre (SEGEC) was officially opened on 17 August 2009 to support Scottish organisations in the green energy sector to gain maximum benefit from engagement with Europe.</p>	<p>UK</p>	<p>Policy</p>	<p>SEGEC website: http://www.segec.org.uk/</p>

4. Homes and Communities



4. Homes and Communities

4.1 Since emissions from domestic electricity use are part of the traded sector, emissions from the residential sector as measured in the Net Scottish Emissions Account result almost exclusively from combustion of fuel for heating and cooking. Even without electricity, the residential sector contributed 14% of total emissions in 2008. The main way of reducing these direct emissions from homes is through preventing heat loss, increasing the efficiency of heating systems, using energy intelligently, and by substituting renewable fuel sources for fossil fuels such as gas and coal.

4.2 The Energy Efficiency Action Plan⁵⁹ describes the Government's action to improve the energy efficiency of the residential sector and encourage energy efficient behaviour. This chapter summarises UK and Scottish measures and their impact on Scottish emissions. Households are set to benefit financially from many of these measures, which ultimately pay back their costs through reducing energy bills.

Trends in domestic emissions and energy use

- Direct (non-electricity) residential emissions in 2008 were 7.6 MtCO₂e, higher than in 2006 and 2007 but still 0.2 MtCO₂e lower than in 1990. Emissions in this sector are volatile as they depend heavily on weather conditions, but there has been a general downwards trend since 2000.

- An ambitious implementation of all the proposals in this chapter, including renewable heat, could result in emissions of 5.0 MtCO₂e.

Milestones in 2020

4.3 A range of energy efficiency measures, including low carbon equipment and solid wall insulation, will need to be installed in many of Scotland's homes by 2020. Milestones include:

- every home to have loft and cavity wall insulation, where this is cost-effective and technically feasible, plus simple measures such as draught-proofing and pipe lagging;
- every home heated with gas central heating to have a highly efficient boiler with appropriate controls; and
- at least 100,000 homes to have adopted some form of individual or community renewable heat technology for space and/or water heating.

The Energy Efficiency Action Plan

4.4 Emissions attributable to housing derive almost entirely from the use of energy for heating, lighting, cooking and electrical appliances. In October 2010 Scottish Ministers published the Energy Efficiency Action Plan, which includes details of their policies for reducing energy use and emissions from homes. This section summarises briefly the broad policies at UK and Scottish level.

⁵⁹ Conserve and Save: The Energy Efficiency Action Plan for Scotland: <http://www.scotland.gov.uk/Publications/2010/10/07142301/0>

UK policies

4.5 There is already a wide range of policies and programmes at UK, Scottish and local level that provide support, incentives, finance and funding to improve energy efficiency in existing housing.

4.6 Funding for domestic energy efficiency improvements is dominated by the **supplier obligation**, which requires gas and electricity suppliers to achieve emissions reduction through installing energy saving measures in people's homes, with a focus on low income/'priority group' households. The supplier obligation is a reserved policy and its most recent incarnation is the **Carbon Emissions Reduction Target (CERT)**, which will continue in its current form until the end of 2012. More recently, the smaller scale **Community Energy Saving Package (CESP)** pilot programme has begun. Under this scheme suppliers provide a range of energy efficiency measures to properties in low income neighbourhoods as part of area-based, whole house approaches. This scheme will also run until 2012.

4.7 The supplier obligation has tended to under-deliver in terms of measures provided in Scotland's homes. This is because of a range of factors such as the characteristics of Scotland's housing stock and its rurality leading to higher costs required to reach some households. The Scottish Government is working with energy companies as part of the CERT Strategy Group to maximise the level of investment in Scotland and is also monitoring the investment closely to ensure that Scotland receives its fair share. The area-based insulation and energy efficiency programmes described in paragraphs 4.11 and 4.12 are designed to interact with CERT to maximise investment levels. Similarly, the Scottish Government is working with the UK Government on the development of the Energy Company

Obligation, which will replace CERT in 2012, to ensure that Scottish-specific circumstances are considered in its design.

4.8 The previous UK Government committed to installing "**smart**" meters for gas and electricity in every home by 2020. This type of meter is able to display real-time information about energy use and costs, thereby encouraging better household energy management. The UK Government and Ofgem published a Smart Metering Implementation Programme Prospectus⁶⁰ on 27 July 2010 which sets out proposals and asks for views on a range of issues including rollout. It is expected the first UK installation will take place in 2012 and that energy suppliers will be responsible for installing meters.

4.9 As well as reducing emissions through reducing the energy used by households, the remaining emissions can be reduced still further by using heat produced from renewable or low carbon sources such as woodfuel or heat pumps. The **Renewable Heat Incentive (RHI)** is due to be introduced during 2011 and is described in Chapter 3: Energy Supply.

Scottish policies

Existing housing

4.10 The Scottish Government promotes up-take of energy efficiency measures through support for the regional Energy Saving Scotland Advice Centres, which also assist in the delivery of a range of Scottish Government Home Energy Schemes.

4.11 Area-based insulation and energy efficiency programmes are one approach to helping to maximise take-up of measures and achieve economies of scale by delivery in

⁶⁰ Smart Metering implementation programme: prospectus document: http://www.decc.gov.uk/en/content/cms/consultations/smart_mtr_imp/smart_mtr_imp.aspx

targeted areas. The Scottish Government is supporting area-based schemes offering free or low cost insulation measures to 500,000 households to help them save money, tackle fuel poverty and combat climate change. This includes a new universal-access area-based scheme that is supporting 27 projects delivered by local councils across Scotland.

4.12 As well as reducing emissions, energy efficiency measures can also mitigate fuel poverty. The Government's Energy Assistance Package (EAP) focuses on energy efficiency improvements for the fuel poor to reduce the amount they need to spend on fuel. The EAP can provide energy efficiency advice, basic insulation measures that are wholly or partially funded by energy suppliers, as well as more expensive measures such as replacement boilers and central heating systems, and advanced measures such as solid wall insulation and air source heat pumps for hard-to-treat homes. Taken together, in 2009-10, the Scottish Government's Home Energy Schemes provided 11,502 heating systems and 26,110 insulation measures.

4.13 Through its Energy Saving Scotland Advice Centres the Scottish Government funded a boiler scrappage scheme in 2010-11 to incentivise the early replacement of the least efficient (G-rated) boilers, and the Energy Saving Scotland Home Loan Pilot, giving interest-free loans for energy efficiency works.

New housing

4.14 More than half a million new dwellings could be constructed between now and 2050, making up 20% of all homes in 2050. These homes need to be as energy efficient and low carbon as practicable.

4.15 New energy standards for new homes came into force in October 2010. These revisions deliver a 30% reduction in CO₂ emissions

from new dwellings when compared to 2007 standards, and around 70% compared to the standards that existed in 1990. Revisions include:

- a 10-20% improvement in the minimum energy performance of the building fabric;
- improved efficiencies for space heating and hot water;
- an expanded role for Low Carbon Equipment (such as heat pumps and solar hot water) to contribute towards the delivery of CO₂ savings;
- a reduction in the level of uncontrolled air infiltration coupled with the introduction of random air-tightness testing; and
- a greater percentage of low energy lighting.

4.16 The Scottish Government recognises the need to provide more effective means of demonstrating that compliance with regulations is being achieved. In support of this the 2010 building regulations introduce both noise testing and air-tightness testing for new buildings. A consultation on improving compliance with building regulations was carried out in 2009⁶¹ and work to progress this agenda is ongoing, including further consideration of tools such as post-completion testing and certification schemes.

4.17 As shown in Table 3, current UK and Scottish policies are expected to result in a total of 0.7 MtCO₂e of abatement in 2020.

61 Report on the Consultation on Improving Compliance with Building Regulations
<http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/publications/pubconsult/conscomprep>

UK proposals

The Green Deal

4.18 The UK Government has committed to supporting home energy efficiency improvements by developing a Green Deal. Under this market-driven scheme households will receive energy efficiency measures from participating providers and will pay back the costs over time through the savings they make on their energy bills. The scheme will be linked to the household meter rather than the householder so that the person who benefits from the savings will pay for the measure. It could bring an unprecedented amount of private investment to Scotland for energy efficiency measures. The Green Deal will be underpinned by the new Energy Company Obligation post-2012 to replace the current CERT scheme, and is expected to focus on fuel poverty and hard-to-treat houses.

4.19 The Scottish Government is working closely with the UK Government on the UK Energy Bill. The Bill encompasses legislation that will allow the Green Deal to be rolled out throughout the UK and allow long term repayment to be made through a charge on a home's energy meter. It will also include proposals for the Energy Company Obligation. The Scottish Government is working with the UK Government on the Bill to reach an agreement on proposals which would allow the Green Deal to be delivered in Scotland in a manner that reflects Scottish circumstances and maximise the benefits available to Scottish households, meeting the aims of the Energy Efficiency Action Plan.

Scottish proposals

Housing policy paper – Homes Fit for the 21st Century

4.20 The Scottish Government published the housing policy paper, Homes Fit for the 21st Century⁶², in February 2011. Against a challenging background of sustained and substantial cuts to public spending, the paper sets out a radical agenda and vision for housing over the next decade. Recognising the contribution of improved design and energy efficiency of housing to our emissions reduction and energy efficiency targets, it commits to the promotion of energy efficiency across all tenures, working with partners to boost the green industries in Scotland, and ensuring that UK-wide and Scottish Government funding schemes are effectively targeted. The paper announces that a Strategy for Sustainable Housing in Scotland will be developed in 2012. This will bring together our policies – on climate change, energy efficiency, fuel poverty and planning and the built environment – that contribute to the development of sustainable housing and communities.

Fuel poverty and insulation programmes

4.21 National and area-based schemes, or other approaches, will be required to maximise the take-up of basic insulation measures and tackle fuel poverty, drawing in funding from UK Government schemes and other sources. Scottish Government energy efficiency programmes such as the Home Insulation Scheme (HIS) and EAP are designed to interact strongly with UK policies such as CERT to seek to ensure that Scotland receives its fair share of investment, and recent data indicates that progress is being made on this front. Given

⁶² Homes Fit for the 21st Century: <http://www.scotland.gov.uk/Topics/Built-Environment/Housing/reform>

pressure on public finances, this will continue to be a priority and the Scottish Government will seek to maximise funding from UK, European and other funding sources.

4.22 The Scottish Government will use its influence to seek to ensure that reserved policies such as Green Deal and the Energy Company Obligation are set up from the start in a way that will deliver for Scotland in both the domestic and non-domestic sectors. We will support such UK policies with our own programmes where required, and we are making a good start by continuing the successful EAP and Universal Home Insulation Scheme (UHIS) programmes[†]. UHIS will offer help to 200,000 households in 2011-12, and EAP will help an estimated 70,000 fuel poor households. We will look to maximise the impact of all our programmes in this area to ensure that they join up as effectively as possible, building on the success of the Home Energy Scotland hotline.

4.23 Consumers could save an estimated £2.6 billion on their energy bills between 2011 and 2022 as a result of energy efficiency measures in existing homes, compared to the “business as usual” scenario. At current fuel prices, Scottish households would save on average £192 per year if all proposals were implemented. Many of these measures are long-lived, meaning that savings would continue to accrue after 2022.

4.24 We will need to consider the implications of the major reforms to energy efficiency policies post-2012 that the UK Government is developing to ensure that our programmes to alleviate fuel poverty and promote home insulation continue to maximise the uptake of all potential sources of funding. Our analysis assumes that the Energy Company Obligation will be put in place beyond the current Spending Review period and this may require further adjustments to our programmes in future.

New-build domestic energy standards for 2013

4.25 Domestic building standards will be reviewed again for 2013, with the intention of improving them further, looking at the Sullivan report recommendation for a 60% reduction in emissions compared to 2007. Improvements of this magnitude are likely to require significant changes to building practices. The review will examine the most efficient and effective way of reducing emissions and energy use, through passive techniques and improved building fabric, and also through more efficient services, use of renewables and low carbon technology. The Scottish Government is currently undertaking research into the cost of implementing the Sullivan Report⁶³ recommendation for 2013 as well as the manner in which future building standards targets should be set, to better recognise and encourage inherently energy efficient design. This work also forms a platform for subsequent review programmed for 2016 (the Sullivan Report recommending net zero carbon buildings by 2016-17, if practical).

4.26 These techniques were well demonstrated by homes at Scotland’s Housing Expo⁶⁴ held in Inverness in August 2010 which considered masterplanning, lifestyle, passive energy techniques and new building technology jointly to demonstrate a way forward on low carbon building design. These homes were designed to tight cost limits, some with predicted annual heating costs of less than £100, including one type with costs as low as £47. The recent design competition for the Whitecross Scottish Sustainable Communities Initiative project⁶⁵

63 A Low Carbon Building Standards Strategy for Scotland (The Sullivan Report):

<http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/publications/sullivan>

64 Scotland’s Housing Expo:

<http://www.scotlandshousingexpo.com/>

65 Information on the SSCI Sustainable Design Ideas Competition, Whitecross, Linlithgow, is available from:

<http://www.scotland.gov.uk/Topics/Built-Environment/AandP/Projects/SSCI>

[†] The printed version of this report refers to HIS rather than UHIS because an announcement was made before publication but after the report went to print.

is another demonstration of this integrated approach. The focus of the competition was on realisable, sustainable designs. The Scottish Government is reviewing the achievements of the Expo and the Whitecross competition to establish what it can do in partnership with others to provide further practical support to the development of low-carbon building design and construction skills.

Overall abatement from policies and proposals for Homes and Communities

- As shown in Table 3 and Table 4, an ambitious implementation of all the proposals set out above could result in an abatement in 2020 of 0.4 MtCO₂e, giving a total abatement of 1.1 MtCO₂e from all proposals and policies in the residential sector compared to the baseline.s
- Residential emissions would be 5.0 MtCO₂e in 2020, 36% lower than in 1990.

Supporting and enabling measures

Behaviour change

4.27 A step change in the material energy efficiency of homes will not in itself reduce emissions from housing to a level consistent with emissions targets. Significant reductions also require a change in the way householders use energy. Advanced heating controls must be used intelligently to ensure that well-insulated rooms are not heated when unoccupied and that the rooms being used do not become overheated to the point where the occupiers open the window to let the heat out.

4.28 The Energy Efficiency Action Plan sets out in general terms the Scottish Government's approach to encouraging low carbon behaviour. Scottish Ministers published their Public

Engagement Strategy in December 2010 which describes the main actions that individuals can take to make a significant reduction in their energy use and emissions.

4.29 The Scottish Government currently funds the Energy Saving Scotland Advice Centre (ESSAC) network as its principal channel for providing advice and information to individuals and small businesses on energy efficiency, water efficiency, microgeneration and renewables. ESSACs are also responsible for delivery of SG programmes including HIS and EAP, the boiler scrappage scheme, home loans and renewables grants. It is expected that they will also be used to deliver independent advice on the Green Deal when it becomes operational in 2012.

4.30 Beyond simple changes to habits, a change in the attitudes and expectations of individuals could also provide a social motivation for improving property. The Energy Efficiency Action Plan sets out that, "we want to reach a position where potential tenants and purchasers demand an energy efficient home as a matter of course".

4.31 Much work is also going into raising awareness of the financial benefits of installing energy efficiency measures. This supports the Government's principle that those who are able to pay should invest or borrow to undertake improvements, as in most cases they will benefit financially over the long term.

Local Housing Strategies

4.32 Guidance is being prepared jointly by the Scottish Government and COSLA to provide advice to local authorities on how to address climate change in their Local Housing Strategies. This will help them meet the duties they have as public bodies under the Climate Change (Scotland) Act 2009; set out the financial and

other resources available to assist them; and identify sources of technical information and advice. Local Housing Strategies are the key strategic planning document for housing and related issues and as such have an important role to play in setting out how emissions and energy consumption from housing will be reduced and establishing climate change as a mainstream issue for housing.

Rented housing

4.33 The Scottish Government has been working with private landlords to encourage them to take up the wide range of incentive schemes for energy efficiency measures. Alongside schemes directed specifically at improving energy efficiency, such as the Landlord's Energy Saving Allowance, which allows private landlords to claim a tax allowance of up to £1,500 per property for fitting energy efficiency measures, there are also schemes which incorporate energy efficiency as an ancillary consideration.

4.34 In the social rented sector, all landlords have to meet the Scottish Housing Quality Standard (SHQS) by 2015. One of the five elements of the SHQS is that houses are energy efficient, though landlords will need to go beyond those requirements if the 2020 target is to be met. The Scottish Government will work with stakeholders to develop a new regulated standard beyond 2015 so as to achieve further reductions in emissions. The new standard and supporting guidance will be issued in 2012 to enable landlords to plan effectively for implementation by 2020 and the financial sustainability of social landlords will be a key consideration. The Scottish Government will publish guidance shortly to help landlords target their implementation of SHQS investment activity effectively. This guidance, developed after consultations with landlords and the Scottish Housing Regulator, will provide opportunities

for landlords to save up to £1 billion from their budgeted costs. In addition, the new regulated standard beyond SHQS will be developed with regard to available funding from Scottish Government, UK and energy company sources as well as, potentially, drawing on European funding sources such as JESSICA⁶⁶.

Traditional and hard to treat buildings

4.35 Many of the Government's current programmes focus on delivering high take-up of the most cost-effective energy efficiency measures, such as loft and cavity wall insulation. There is recognition, however, that many Scottish homes present additional challenges for installing energy efficiency measures, particularly those of historic and traditional construction or in rural areas off the gas grid. For example, households in the areas targeted by our area-based insulation schemes can access interest-free loans for more expensive energy efficiency measures, which may assist owners of these hard-to-treat properties. Going forward, the Scottish Government will seek to ensure that UK Government policies, such as the Energy Company Obligation, are designed in a way that recognises the distinct nature of our housing stock.

4.36 As announced in the Energy Efficiency Action Plan, Historic Scotland is undertaking pilot projects to improve energy efficiency in a range of historic and traditionally built houses and tenements with intention of providing technical guidance about how properties could be improved.

Building standards for existing buildings

4.37 The 2010 energy standards apply when owners elect to carry out new work on their

⁶⁶ The JESSICA (Joint European Support for Sustainable Investment in City Areas) fund brings together Scottish Government resources with funding from the European Commission's European Regional Development Fund to support regeneration and economic development in Scotland's most deprived urban areas.

existing property. These standards are applicable irrespective of tenure and ensure that the existing stock becomes more energy efficient when such work occurs.

4.38 Improved energy efficiency requirements have applied since October 2010 to extensions, conservatories, conversions and alterations, as well as replacement boilers, windows, and doors. There is an option for owners extending their property either to upgrade the energy performance of the building fabric of their existing home or to further improve the fabric of the extension. How these standards apply to existing homes will be reviewed for 2013.

Energy Performance of Buildings Directive

4.39 Assessment of the energy performance of housing also takes place through the production of Energy Performance Certificates (EPC), which are required for any new dwelling and upon sale or rental of existing dwellings. The EPC includes advice on low cost measures that could improve the energy efficiency of the building, which the owner can choose to implement. When a building is sold, the EPC must be accompanied by an energy report which provides further information and advice.

Regulation

4.40 Since 1 April 2009, the tolerable standard (which all houses must meet) has included a requirement for satisfactory thermal insulation. This means that all houses which are capable of having loft insulation must have it. Where this is not the case, local authorities have powers to require owners to take action to bring properties up to the tolerable standard.

4.41 The Climate Change (Scotland) Act requires Ministers to introduce regulations that will require the assessment of the energy performance of houses and, where necessary,

recommend improvements that must be made to properties. The Government is exploring options for regulation and Scottish Ministers will publish a report by the end of March 2011 setting out their approach. The Scottish Government will support and encourage people to take up energy efficiency measures, with incentives where possible and appropriate. However, regulatory measures may be necessary to require action where advice and support have been unsuccessful.

Community and small-scale renewables

4.42 Small-scale renewables and micro-generation have a part to play in reducing reliance on electricity generation from fossil fuels. Through its Energy Saving Scotland Home Renewables Scheme, the Scottish Government has supported over 3,800 grants to householders to install microgeneration technologies. At the UK level, the framework for funding such installations began a new phase in April 2010 with the introduction of Feed-in Tariffs (FIT) by the UK Government, whereby owners of micro-generation equipment receive payments for the energy they generate. This is considered (under state aid rules) to remove the need for grant support for the installation of microgeneration. The Scottish Government will seek to maximise FIT investment in Scotland which could stimulate up to 75,000 new installations by 2020. The Scottish Government is currently considering options with the Energy Saving Trust (EST) for funding domestic renewables in 2011-12. This will include reviewing the Home Renewables scheme and considering options for future support in this area.

4.43 In recent years the Scottish Government has made various schemes available to communities for the installation of small-scale renewable energy generation, such as the **Communities and Renewable Energy Scheme (CARES)**, delivered by Community Energy

Scotland. As a result of CARES, over 600 groups are benefiting from £13.5 million of funding for technical assistance and for the capital costs of projects. The Government remains committed to driving local ownership of energy and in doing so, securing wider community benefits. Building on the success of CARES, in September the Scottish Government published a feasibility study to look into early stage financing for renewables projects, carried out by the Scottish Agricultural College in conjunction with Community Energy Scotland⁶⁷. The study considered the initial business case for a loan fund for communities and landowners to cover pre-planning costs. Following consideration of the report's findings, from April 2011 a new Community and Renewable Energy Loan Fund will be established to provide loans for the high risk pre-planning stage of developing a renewables project.

4.44 The Scottish Government is working with the Scottish Federation of Housing Associations to scope out the potential for a programme of retrofitting renewables on their members' housing stock. The Government is also investigating the most efficient way of supporting this activity including attracting appropriate loan funding.

4.45 In compliance with section 70 of the Climate Change (Scotland) Act 2009, the Scottish Government introduced secondary legislation to extend permitted development rights for micro-generation technology for domestic buildings⁶⁸, which came into force in March 2010. The Scottish Government has consulted on extending this legislation further⁶⁹ and published an analysis

of consultation responses⁷⁰, and is currently also addressing microgeneration in non-domestic properties following the conclusion of a further consultation⁷¹.

4.46 In addition, under section 72 of the Climate Change (Scotland) Act 2009 local development plans must require all new buildings to operate low and zero carbon generating technologies. Scottish Planning Policy recommends that development plan policies for development involving low and zero carbon generating technologies should accord with the standards, guidance and methodologies provided in building regulations.

Sustainable places

4.47 A low carbon housing strategy must go beyond considering buildings as individual units and look at them in their wider setting. For example, a zero-carbon house in a remote setting where occupants must use a car for their daily needs will probably not result in an overall reduction in emissions. Limited improvements to the efficiency of tenement buildings may be more beneficial than isolated low carbon houses if they are situated in dense urban areas where people are more likely to walk or cycle around their neighbourhood. Scottish Planning Policy seeks patterns of development which reduce travel demand and energy consumption, and are easier to access by public transport and active travel. In addition, Chapter 6 describes a proposal for developing "community hubs" for remote working in small rural settlements to reduce the need for people to travel to towns and cities.

67 Community and Landowner Renewable Energy Loan Study
<http://www.scotland.gov.uk/Publications/2010/10/01105500/0>

68 The Town and Country Planning (General Permitted Development) (Domestic Microgeneration) (Scotland) Amendment Order 2010, SSI 2010 No. 27:

http://www.oqps.gov.uk/legislation/ssi/ssi2010/ssi_20100027_en_1

69 Extending Permitted Development Rights For Domestic Micro-Wind Turbines and Air-Source Heat Pumps:

<http://www.scotland.gov.uk/Publications/2010/02/05083644/0>

70 Extending Permitted Development Rights for Domestic Wind Turbines and Air Source Heat Pumps: Analysis of Consultation Responses:

<http://www.scotland.gov.uk/Publications/2010/08/31160229/0>

71 Permitted Development Rights for Microgeneration Equipment on Non-Domestic Properties – Consultation:

<http://www.scotland.gov.uk/Publications/2010/07/15092031/0>

4.48 Section 72 of the Climate Change (Scotland) Act amended planning legislation to require planning authorities to include policies in their local development plans to “ensure that all new buildings avoid a specified and rising proportion of the projected greenhouse gas emissions from their use”. By 1 April 2011 Scottish Ministers are to lay before Parliament the first annual report on the operation of the requirements of section 72, which should include an assessment of whether they have contributed effectively to the reduction of greenhouse gas emissions from developments.

4.49 The supporting and enabling measures described above are summarised in Table 5.

Climate Challenge Fund

4.50 The £27.4 million Climate Challenge Fund (2008-11) was established to empower communities across Scotland to come forward with their own solutions to make a significant reduction in carbon emissions. This challenge to date has been taken up by 261 communities who led projects involving a range of actions, from using less energy, walking and cycling more, to local sustainable food. The CCF scheme evaluation is scheduled for publication in June 2011 and along with detailed feedback from communities and others, including project final reports, many positive ideas should be available for sharing to enhance the future performance of communities looking to reduce their carbon emissions.

Costs and benefits

4.51 The up-front cost of implementing housing energy efficiency measures post-CERT at the scale envisaged is estimated to be around £2.9 billion to 2022⁷². Most of these costs will be

met by consumers, either through the supplier obligation, Green Deal or self-financed measures, with targeted action from Scottish Government to support uptake.

4.52 There are significant benefits alongside these costs. Consumers would save an estimated £2.6 billion on their energy bills between 2011 and 2022 as a result of energy efficiency measures in existing homes, compared to the “business as usual” scenario. At current fuel prices, Scottish households would save on average £192 per year if all proposals were implemented. Many of these measures are long-lived, meaning that savings would continue to accrue after 2022. The CCC estimated that insulation and other energy efficiency measures could lift around 150,000 households out of fuel poverty, even after increases in electricity and gas prices, improving the health and wellbeing of many people.

4.53 The cost of rolling out smart metering to households will be met by consumers through their energy bills. The Impact Assessment⁷³ for this programme showed that the financial benefits of better energy management far outweigh the costs in all scenarios.

4.54 The 2010 energy standards for new homes will cost an estimated £1.4 billion between 2011 and 2022, with the price being met by the buyers. New building standards in 2013 are likely to increase this cost further. However, the costs to householders of heating new homes will be far less than for homes built under previous standards.

4.55 Although not covered in detail here, efficient use of electricity will reduce the amount of renewable generation needed to meet Scotland’s 80% target. In broad terms, this means there will

⁷² The cost of the measures undertaken under the “business as usual” scenario plus current policies is estimated to be £6.2 billion.

⁷³ An impact assessment of a GB-wide smart / advanced meters roll out for the domestic sector:

http://www.decc.gov.uk/en/content/cms/consultations/smart_metering/smart_metering.aspx

less need to build wind turbines in less windy areas where less of a return is made on the investment, or further out at sea where it is more expensive to build them. In the long run this will help keep electricity costs down, another key benefit of energy efficiency.

The need for greater powers

4.56 The main responsibilities in energy policy and regulation of energy suppliers are reserved to Westminster. The transfer of greater regulatory powers to Scotland would ensure that energy policy and regulations were better aligned to deliver the annual emissions targets.

4.57 Regarding energy efficiency, the Scottish Government has called upon the UK Government to:

- legislate to ensure that Scotland receives its fair share of investment in energy efficiency measures through the supplier obligation;

- give powers to the Scottish Government to enable it to direct and co-ordinate this activity through a body of its choice which has a clear understanding of Scotland's needs;
- recognise the variation in Scotland's climate and housing types that has caused the supplier obligation to under-deliver in Scotland, and ensure that proposals for the Green Deal reflect Scottish circumstances and maximise the benefits available to Scottish households; and
- as part of that, provide a greater level of incentive under the supplier obligation for loft insulation top-ups.

4.58 These changes would help to guarantee that new energy efficiency investment includes Scotland's rural and island communities and to ensure the accurate, disaggregated and regular reporting of energy efficiency-related activity in Scotland.

Table 3: Policies for reducing emissions from Homes and Communities

Policy package and description	EU, UK or Scottish policy?	Expected abatement (ktCO ₂ e) in 2020	Further information available from
<p>Smart Metering and Better Billing</p> <p>'Smart' meters are to be installed in every home by 2020 to encourage better household energy management.</p>	UK	75	<p>Department of Energy and Climate Change website: http://www.decc.gov.uk/en/content/cms/what_we_do/consumers/smart_meters/</p>
<p>Domestic Energy Efficiency</p> <p>The Carbon Emissions Reduction Target (CERT) obligates gas and electricity suppliers to achieve emission savings by installing energy saving measures in people's homes, with a focus on low income/'priority group' households.</p> <p>The Community Energy Saving Programme (CESP) Energy is a UK pilot programme under which suppliers provide a range of energy efficiency measures to domestic consumers in low income areas.</p> <p>The Energy Assistance Package (EAP) is a four stage package of advice and upgrades for the least energy efficient/most fuel poor homes, supported by Scottish Government investment and accessing funding from CERT.</p> <p>The Home Insulation Scheme (HIS) is a Scottish area-based scheme promoting and installing insulation and other energy saving measures, supported by Scottish Government and CERT funding. The Universal Home Insulation Scheme has similar aims is delivered by local councils and provides measures free of charge to households.</p>	<p>UK</p> <p>UK</p> <p>Scottish</p> <p>Scottish</p>	160	<p>Energy Saving Trust website: http://www.energysavingtrust.org.uk/Easy-ways-to-stop-wasting-energy/Energy-saving-grants-and-offers/Carbon-cuts-get-serious-with-CERT</p> <p>Department of Energy and Climate Change website: http://www.decc.gov.uk/en/content/cms/what_we_do/consumers/saving_energy/cesp/cesp.aspx</p> <p>Scottish Government website: http://www.scotland.gov.uk/Topics/Built-Environment/Housing/access/FP/eap</p> <p>Scottish Government website: http://www.scotland.gov.uk/Topics/Built-Environment/Housing/quality/his</p>

Policy package and description	EU, UK or Scottish policy?	Expected abatement (ktCO ₂ e) in 2020	Further information available from
<p>New Domestic Buildings</p> <p>New-build domestic energy standards for 2007 and for 2010</p> <p>Homes built to 2007 standards have emissions 18-25% lower than those built to 2002 standards. Homes built to 2010 standards will have emissions 30% lower than those built to 2007 standards.</p>	Scottish	132	<p>Scottish Government website: http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards</p>
<p>Renewable Heat Incentive</p> <p>New UK policy offering payments to those who install and obtain heat from renewable sources.</p>	UK	318	<p>Department of Energy and Climate Change website: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/policy/renewable_heat/incentive/incentive.aspx</p>
<p>TOTAL ABATEMENT FROM HOMES AND COMMUNITIES POLICIES</p>		685	

Table 4: Proposals for reducing emissions from Homes and Communities

	Maximum abatement potential (ktCO₂e) in 2020	Total financial cost (2011-22, £m, cash terms)	Cost-effectiveness (£/tCO₂e abated)	Earliest start date	Options for implementation
Fuel poverty and insulation programmes National and area-based schemes or other approaches to maximise take-up of insulation measures and tackle fuel poverty, drawing-in funding from UK Government and other sources. Will take into account arrangements for post-2012 supplier obligations and Green Deal. Assumes continuing Energy Company Obligation in place beyond current Spending Review period.	321	2,832	Not available	2011-12	Scottish Government approaches will seek to maximise funding from all sources, and will consider the implications of major changes to policy introduced by the UK Government including revised Energy Company Obligation and the Green Deal.
New-build domestic energy standards for 2013 Domestic building standards will be reviewed again for 2013, with the intention of improving them further to achieve a 60% reduction in emissions compared to 2007.	92	Not yet quantified	Not available	2013	Policy would be implemented through the existing system of building regulations. Likely to result in increased development cost for new homes.
TOTAL ABATEMENT POTENTIAL FROM HOMES AND COMMUNITIES PROPOSALS	413				

Table 5: Supporting and enabling measures for reducing emissions from Homes and Communities

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>Regulation of energy efficiency in existing housing The Climate Change (Scotland) Act introduced wide ranging enabling powers to introduce requirements to assess the energy performance of houses and to require action to be taken based on these assessments. Such regulation may be required to underpin emissions savings from proposals for fuel poverty and insulation programmes.</p>	Scottish	Proposal	<p>Energy Efficiency Action Plan sets out Scottish Government's development of options for regulation: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan</p>
<p>Domestic Energy Efficiency</p> <p>Energy Saving Scotland Advice Centre (ESSAC) network Scottish Government currently funds the ESSAC network to provide advice and information to individuals and small businesses on energy efficiency, water efficiency, microgeneration and renewables, and they are also responsible for deliver programmes including HIS and EAP.</p> <p>Local Housing Strategies Scottish Government will produce joint guidance with COSLA on local authority coverage of climate change in Local Housing Strategies.</p> <p>Landlords' Energy Saving Allowance (LESA) Allows landlords to claim a tax allowance of up to £1,500 per property for energy efficiency measures fitted.</p> <p>Energy Performance of Buildings Directive New dwellings and existing dwellings on sale or rental must produce an Energy Performance Certificate (EPC) which assesses their energy performance. EPCs allow comparison of performance between dwellings and offer advice on cost-effective energy efficiency measures.</p> <p>Tolerable Standard Local authorities have power to make owners in houses below tolerable standards to repair and maintain their properties; requires loft insulation (where possible).</p>	<p>Scottish</p> <p>Scottish</p> <p>UK</p> <p>EU/UK</p> <p>Scottish</p>	<p>Policy</p> <p>Policy</p> <p>Policy</p> <p>Policy</p> <p>Policy</p>	<p>Energy Saving Trust website: http://www.energysavingtrust.org.uk/scotland/Scotland-Welcome-page/Help-and-advice/Energy-Saving-Scotland-advice-centres</p> <p>Energy Efficiency Action Plan, section C2: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan</p> <p>Her Majesty's Revenue and Customs website: http://www.hmrc.gov.uk/manuals/pimmanual/pim2072.htm</p> <p>Scottish Government website: http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/profinfo/epcintro</p> <p>Implementing the Housing (Scotland) Act 2006, Parts 1 and 2: http://www.scotland.gov.uk/Publications/2009/03/25154751/0</p>

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>Domestic Energy Efficiency</p> <p>Reducing emissions from social housing Work planned with social landlords and other stakeholders to consider how best to make emissions reductions from social housing, including, to develop an energy efficiency standard beyond the Scottish Housing Quality Standard.</p> <p>Loans to landlords Private landlords can access Energy Saving Scotland Small Business loans to install energy efficiency measures.</p> <p>Historic Scotland Climate Change Communications Pilot projects to improve energy efficiency in a selection of historic buildings with intention of providing technical guidance about how properties could be improved.</p>	<p>Scottish</p> <p>Scottish</p> <p>Scottish</p>	<p>Proposal</p> <p>Policy</p> <p>Policy</p>	<p>Scottish Government website: http://www.scotland.gov.uk/Topics/Built-Environment/Housing/16342/shqs</p> <p>Energy Saving Trust Scotland website: http://www.energysavingtrust.org.uk/scotland/Scotland-Welcome-page/Business-and-Public-Sector-in-Scotland/Grants-loans-awards/Small-business-loans</p> <p>Energy Efficiency Action Plan, section C2: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan</p>
<p>Climate Challenge Fund Fund empowering communities to come up with their own projects for reducing emissions.</p>	<p>Scottish</p>	<p>Policy</p>	<p>Scottish Government website: http://www.scotland.gov.uk/Topics/Environment/climatechange/ClimateChallengeFund</p>

5. Business and the Public Sector



5. Business and the Public Sector

5.1 This chapter covers emissions from non-traded industry, business and the public sector. In this sector emissions mostly result from combustion of fuel for heat, including industrial heat; however, they also include some non-CO₂ gases that result from sources including industrial and commercial refrigeration.

5.2 Despite good progress in many businesses, there are still many opportunities for businesses and public bodies to improve the efficiency with which they use energy and other natural resources. These improvements make financial sense as many measures pay back their up-front costs quickly through savings in fuel costs.

5.3 UK-wide legislation such as CRC Energy Efficiency Scheme and Energy Performance Certificates help to establish as standard practice the type of measurement and monitoring needed to bring decisions on energy-efficiency improvements to board-room level. The Scottish Government, through the Climate Change (Scotland) Act, has enabling powers that could broaden the legislative framework to a wider range of organisations. This can be supported by advice and information to help organisations make the right decisions.

5.4 The Energy Efficiency Action Plan sets out the actions the Government will take to drive a step-change in energy efficiency across this sector, and this chapter summarises the impact these actions will have on Scotland's emissions.

Trends in business, industry and public sector emissions and energy consumption

- Direct (non-electricity) emissions from business, industry and the public sector in 2008 were 8.7 MtCO₂e, 5.0 MtCO₂e lower than in 1990. This includes some emissions that are covered by the EU ETS, which did not exist in 1990.

Milestones in 2020

5.5 Both the business and public sector will contribute fairly towards reducing Scottish energy consumption by 12% by 2020, the target in the Energy Efficiency Action Plan. Specifically, in 2020:

- The public sector will have reduced its energy consumption by at least 12%;
- Individual public bodies will have all set and be monitoring their own ambitious annual energy efficiency targets;
- All businesses will have access to consistent energy and resource efficiency advice.

Energy Efficiency Action Plan

5.6 The Energy Efficiency Action Plan describes how the Scottish Government will support businesses to maximise their competitiveness through the improved energy efficiency of non-domestic buildings and business processes. The detail has not been reproduced here – this chapter summarises briefly the broad policies at UK and Scottish level.

UK policies

5.7 A suite of policies exist at the UK level for reducing emissions and energy use in non-domestic buildings. These are shown schematically in Figure 7 and described in more detail in the UK Low Carbon Transition Plan, published in June 2009⁷⁴. Policies that overlap have been “packaged” together to allow their impact to be quantified unambiguously.

Smart Metering and Better Billing

5.8 The UK Government has announced its intention to accelerate the roll-out of “smart” meters to small and medium-sized businesses as well as homes⁷⁵, allowing real-time information on energy use to be gathered, thereby encouraging better energy management. Businesses will benefit from this policy as better energy management will reduce the amount they spend on energy.

Energy Performance of Buildings Directive

5.9 All large public buildings are currently required to have their energy performance assessed and publicly display their rating. Assessments are accompanied by advice on measures that could improve energy performance, which building owners can choose whether to implement.

Climate Change Levy

5.10 The Climate Change Levy⁷⁶ is a tax on energy use in industry, commerce and the public sector, used to support energy efficiency/renewables and offset by reductions in employers’ National Insurance contributions.

Climate Change Agreements

5.11 These are voluntary agreements that exempt energy-intensive industries from most of the Climate Change Levy if they meet targets for energy efficiency/reducing emissions.

Carbon Trust and Energy Saving Trust Programmes

5.12 These two Government-funded organisations run a range of programmes to encourage businesses and the public sector to reduce energy consumption (including loans to SMEs).

The Green Deal

5.13 The Green Deal initiative is being developed for proposed introduction in 2012 and will support fabric improvements in both domestic and non-domestic buildings. These will be paid for through savings in energy consumption. The Scottish Government will work with the UK government to ensure that the Green Deal financing initiative maximises opportunities for Scottish businesses.

74 UK Government Low Carbon Transition Plan: http://www.decc.gov.uk/Media/viewfile.ashx?FilePath=White%20Papers%5CUK%20Low%20Carbon%20Transition%20Plan%20WP09%5C1_20090724153238_e_@@_lowcarbontransitionplan.pdf&filetype=4

75 UK Department for Energy and Climate Change, Smart electricity and gas meters: http://www.decc.gov.uk/en/content/cms/what_we_do/consumers/smart_meters/

76 UK Department for Energy and Climate Change, The Climate Change Levy: http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/ccas/cc_levy/c_levy.aspx

Joint UK and Scottish policy

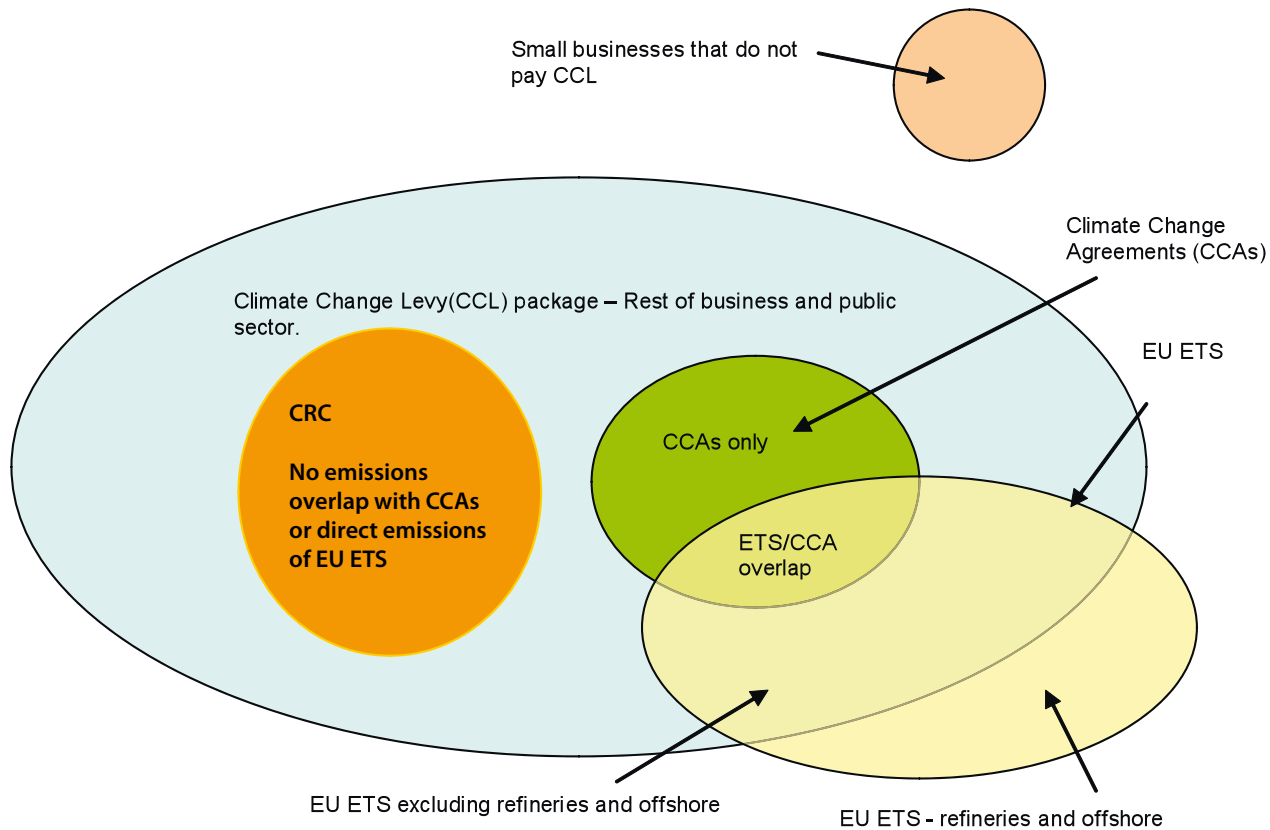
CRC Energy Efficiency Scheme

5.14 The CRC Energy Efficiency Scheme is a mandatory cap and trade scheme for emissions from large non-energy-intensive businesses and the public sector such as hospitals, hotels, offices and schools – generally those not covered by Climate Change Agreements. It is designed to incentivise the installation of cost-effective energy efficiency measures by those organisations. The scheme is run jointly by the UK Government and the devolved administrations, and all central government departments are required to participate, whether or not their energy use is above the qualifying threshold.

5.15 The UK Government announced in the 2010 Comprehensive Spending Review that CRC revenue will not be recycled back to participants, in a change to previous policy. This means that £1 billion per year from the sale of allowances will go to support UK public finances by 2014-15.

5.16 The Scottish Government is discussing with the UK Government the implications of this announcement for Scotland. A further announcement will be made when those discussions have concluded.

Figure 7: Schematic diagram showing interactions between UK policies for businesses and the public sector



Renewable Heat Incentive

5.17 In addition to the large emissions reductions the business and public sector can make through improving energy efficiency, significant reductions in emissions are possible through the use of renewable heat sources. The Renewable Heat Incentive⁷⁷ will offer payments to those installing equipment to generate renewable heat that are designed to provide a competitive return on the investment. Scottish organisations are therefore set to benefit financially from installing equipment to generate renewable heat. The UK Government will soon confirm details of the scheme.

Scottish policies

5.18 The Scottish Government is responsible for setting building standards for new non-domestic buildings. New energy standards applied from 1 October 2010⁷⁸. The new standards deliver a 30% reduction in CO₂ emissions from new non-domestic buildings when compared to 2007 standards and around 70% compared to the standards that existed in 1990. Revisions include:

- improvements in the performance of building fabric and the energy efficiency of fixed building services generally;
- improved cooling system efficiencies and controls; and
- increased provision for energy metering and sub-metering including the direct metering of Low Carbon Equipment.

5.19 As shown in Table 6, current UK and Scottish policies are expected to result in a total of 1.4 MtCO₂e of abatement in 2020.

Scottish proposals

New-build non-domestic energy standards for 2013

5.20 New non-domestic building standards will be reviewed again in 2013, with the intention of improving them further, looking at the Sullivan report recommendation for up to a 75% reduction in emissions compared to 2007, and a further review of energy standards will be undertaken for 2016.

5.21 Improvements of this magnitude are likely to require significant changes to building practices and a more flexible approach to how carbon and energy targets are set. The Scottish Government is currently undertaking research into the costs and benefits of the Sullivan Report recommendations.

Heat networks and district heating

5.22 Although most of the cost-effective potential in this sector comes through energy efficiency measures, renewable heat and the efficient use of waste heat will be important in securing additional emissions reductions. These are both covered in the Energy Supply chapter.

Other proposals

5.23 It is extremely difficult to separate out the impacts of the large and overlapping policy levers held by the UK from those of Scottish policies that encourage and influence businesses and the public sector to improve their energy efficiency and reduce emissions. Because of this, when calculating the emissions abatement necessary to meet Scotland's emissions reduction targets we have not counted the effects of the policies

⁷⁷ UK Department of Energy and Climate Change, Renewable Heat Incentive:

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/policy/renewable_heat/incentive/incentive.aspx

⁷⁸ More information about Building Standards in Scotland is available at:

<http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards>

and proposals described in the Energy Efficiency Action Plan, which sets the policy framework for this sector. The action proposed for business and the public sector is instead included under the “Supporting and enabling measures” section below.

5.24 Since it is not clear how much additional potential exists for abatement from this sector, the estimates given in Annex B can be regarded as conservative.

Overall abatement from policies and proposals for Business and the Public Sector

5.25 Table 6 and Table 7 show that an ambitious implementation of all the policies and proposals for this chapter could result in an abatement in 2020 of 1.5 MtCO₂e.

5.26 Because the EU ETS began in 2005 it is not possible to compare projected emissions from the non-traded parts of this sector in 2020 with emissions in 1990. However, the combined emissions from the traded sector and non-traded business, industry and the public sector could be 51% lower in 2020 than in 1990.

Supporting and enabling measures

5.27 The Energy Efficiency Action Plan describes in some detail the action that the Government and its partners are taking to improve the energy efficiency of and reduce emissions from business and the public sector.

Energy efficiency for business

5.28 The Energy Efficiency Action Plan describes plans to promote energy efficiency advice to businesses in Scotland through the establishment of a single Energy and Resource

Efficiency Service. The service would include the Carbon Trust, the Energy Saving Trust, the enterprise agencies, SEPA and other relevant bodies, focusing on the benefits to business of combining energy efficiency with efficient use of other resources such as water and raw materials.

5.29 To drive energy efficient practice in the industrial sector the Scottish Government has supported the Carbon Trust’s Industrial Energy Efficiency Accelerator (IEAA), aimed at improving the efficiency of processes that are specific to certain sectors. The Government has also encouraged innovative energy efficiency practices by developing an award specifically for energy efficiency as part of the Vision in Business for the Environment of Scotland (VIBES) awards.

The public sector

5.30 Leadership in the public sector is crucial to the integrity of the Government’s ambitions for a low carbon economy. The public sector, including the Scottish Government itself, must become a leader in the adoption of low carbon, energy efficient technology and practice. For example, the Government is committed to reducing emissions from energy use in its buildings by 12.6% by March 2011 and by 30% by 2020 compared to 1999-2000. Government employees flew half a million miles less in 2008-09 than the previous year, and are encouraged to use video-conferencing as an alternative to travel wherever possible.

5.31 Section 44 of the Climate Change (Scotland) Act places duties on Scottish public bodies in relation to climate change. A public body must, in exercising its functions, act:

- in the way best calculated to contribute to the delivery of the Act’s emission reduction targets;
- in the way best calculated to help deliver

any statutory programme for adapting to the impacts of climate change; and

- in a way that it considers most sustainable.

5.32 These duties came in to force on 1 January 2011. The Act also requires that the Scottish Ministers publish guidance for public bodies on fulfilling these duties, and consult on this guidance before doing so. A public consultation on a draft of guidance ran from 20 September to 26 November 2010⁷⁹. Responses received informed preparation of the guidance, which was published on 4 February 2011. More information about the public bodies climate change duties is available, along with the guidance, on the Scottish Government's website⁸⁰.

5.33 Being able to accurately measure and monitor the energy consumption and emissions from their estate is a vital first step for many organisations in reducing both. The Energy Efficiency Action Plan commits to ensuring that public bodies commit to undertake the Carbon Trust's Carbon Management Programme if they have not already done so. The Scottish Government will continue to implement its own Carbon Management Plan, which targets projects with the potential to deliver 20% emissions reduction by 2014 compared to the 2007-08 baseline. The Government is also committed to publishing details of its weekly energy consumption by spring 2011.

5.34 To ensure that the efficiency of the public sector estate continues to improve as the estate itself changes, the Government is working with the Carbon Trust to produce guidance on the procurement of energy efficient, low carbon buildings. As part of this, work will be

done to ensure that all public bodies report on the indicative total energy consumption and emissions for any building which they procure.

5.35 In addition, the Energy Efficiency Action Plan sets out the Government's intention to maximise financial support for public sector energy efficiency projects. Subject to future spending reviews and Parliamentary approval, the Government will seek to establish a new public sector energy efficiency fund, of sufficient scale to encourage ambitious projects.

Sustainable procurement

5.36 As well as direct emissions from their buildings and activities, public bodies can also affect emissions through their procurement decisions. The Scottish Government published the Scottish Sustainable Procurement Action Plan⁸¹ in October 2009. The Action Plan provides generic guidance for public bodies in Scotland on sustainable procurement. Sustainable procurement is defined in the Plan as "a process whereby organisations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis and generates benefits not only to the organisation, but also to society, the economy and the environment".

5.37 The Action Plan was issued across the Scottish public sector and recommends that full and appropriate consideration should be given to the environmental impact of public sector procurement. It makes clear that the greatest benefits are to be gained by considering sustainability at the outset of the procurement process - when requirements are being identified, specified and advertised. It provides advice on how to specify requirements in a way that will maximise social, economic and environmental benefits.

79 Public Bodies Climate Change Duties: Putting Them Into Practice - - Guidance Required by Part 4 of the Climate Change (Scotland) Act 2009: <http://www.scotland.gov.uk/Publications/2011/02/04093254/0>

80 Scottish Government Public Bodies Duties webpage: <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/climatechangeact/publicsector>

81 The Scottish Sustainable Procurement Action Plan is available from: <http://www.scotland.gov.uk/Topics/Government/Procurement/policy/corporate-responsibility>

5.38 Building in sustainable outcomes to procurement activity at the beginning of the process ensures that all tenderers are bidding to a set minimum standard. Provided that the specifications are defined in such a way that effective competition can be secured (not, for example, defined so that only one or two suppliers can comply), this helps to ensure that tender evaluations and contract awards meet the obligations of equal treatment and transparency that European legislation requires as part of public sector procurement.

5.39 The Action Plan includes a series of specifications (the “Buy Sustainable – Quick Wins”, now known as the “Government Buying Standards”) for commonly-bought goods. The specifications set minimum and enhanced levels of sustainability factors such as energy efficiency and emissions, can be easily adopted into public sector contract requirements and are designed with the need for effective competition in mind.

5.40 The Action Plan recommends the development of organisation-specific delivery plans, and the Scottish Government’s own Delivery Plan can be accessed on the Government’s website⁸².

The Scottish planning system

5.41 Scotland’s national planning policy is currently set out through the following documents:

- National Planning Framework
- Scottish Planning Policy
- Designing Places
- Designing Streets - A Policy Statement for Scotland
- Planning Circulars

5.42 More information about the planning system in Scotland, including these documents, is available on the Scottish Government’s website⁸³.

5.43 The National Planning Framework (NPF) sets out a strategy for long-term spatial development and was developed with the objectives of contributing to sustainable development and facilitating the transition to a low carbon economy. The NPF must be taken into account when development plans are prepared. Scottish Planning Policy (SPP) sets out how climate change should be addressed in the planning of new developments. Paragraph 42 of the SPP states that:

“the need to mitigate the causes of climate change and the need to adapt to its short and long term impacts should be taken into account in all decisions throughout the planning system.”

5.44 In addition, the Scottish Government’s Land Use Strategy will provide a broad context for planning authorities on Government policies relevant to all land use. We therefore expect planning authorities to have regard to the Strategy in preparing their development plans.

5.45 The Scottish Government works with planning authorities to ensure that climate change is given due weight in plan-making and decisions on planning applications. In addition, SEPA has produced a publicly-available list of the guidance and resources that are available to assist local authorities in taking climate change considerations into account in their decision making⁸⁴.

⁸³ Scottish Government planning webpages:

<http://scotland.gov.uk/Topics/built-environment/planning>

⁸⁴ SEPA, Planning and Climate Change: Key Agency and Scottish Government Resources and Guidance:

<http://www.sepa.org.uk/ldoc.ashx?docid=aa2b334c-8981-414f-b5e0-816f5a6bc579&version=-1>

⁸² Scottish Government’s Sustainable Procurement Delivery Plan: <http://www.scotland.gov.uk/Topics/Government/Procurement/policy/corporate-responsibility/procurementdelplan>

Strategic Environmental Assessment

5.46 The Environmental Assessment (Scotland) Act 2005⁸⁵ sets out the statutory requirements for the preparation and publication of Strategic Environmental Assessments (SEA) by public bodies. The purpose of SEA is to ensure that the likely significant environmental effects of Scottish plans, programmes and strategies are assessed and taken into account during their preparation.

5.47 Schedule 3 to the 2005 Act lists the environmental issues that should be considered as part of the SEA process, this includes “climatic factors”. The Scottish Government, in conjunction with SEPA, one of the statutory SEA Consultation Authorities, has developed guidance for practitioners to help stimulate best practice by encouraging consideration of climate change as part of the assessment of climatic factors⁸⁶.

5.48 Scottish public bodies can use SEA as a means to help ensure that potential impacts from plans, programmes and strategies that they are preparing are consistent with their climate change duties under section 44 of the Climate Change (Scotland) Act.

5.49 The measures detailed in this Report on Proposals and Policies have undergone Strategic Environmental Assessment as appropriate. More details about how SEA has been applied to this Report are provided in Chapter 9.

Scottish Water

5.50 Treating and transporting drinking water and waste water uses energy and resource. The Climate Change (Scotland) Act therefore placed a duty on Scottish Ministers to give Scottish Water directions requiring it to promote

water conservation and water-use efficiency. Accordingly Ministers have directed Scottish Water to prepare a plan by 2011-12 detailing how it intends to promote water conservation and water-use efficiency. Scottish Water is also required to plan and prepare for a trial of domestic metering in Scotland as well as to take steps to mitigate its carbon emissions by seeking opportunities to reduce energy demand, investing in energy efficiency and increasing, where it is cost effective to do so, its renewable generation capacity. These obligations are in addition to the ongoing work requiring Scottish Water to reduce leakage from their network to the economic long run level of leakage by 2014. Together this basket of measures will help Scottish Water to address its energy use and emissions.

Regulation

5.51 Regulation is an important tool for consolidating and releasing the potential from softer, advice-based measures by requiring certain improvements to be made. For example, primary legislation already exists (section 63 of the Climate Change (Scotland) Act) that requires Scottish Ministers to make regulations for the Assessment of Energy and Carbon Performance (ACEP) of non-domestic buildings. These assessments would give recommendations for improving the building’s energy efficiency/ emissions performance. The regulations for ACEP could be tightened to require building owners to take steps to improve the energy performance of buildings and reduce emissions.

⁸⁵ Environmental Assessment (Scotland) Act 2005:

<http://www.legislation.gov.uk/asp/2005/15>

⁸⁶ Scottish Government webpage providing guidance on Strategic Environmental Assessment: <http://www.scotland.gov.uk/Topics/Environment/SustainableDevelopment/14587/Guidance>

5.52 The Scottish Government has set up a working group, which includes representatives from the property and building industries, with the intention of developing and introducing regulations.

5.53 The supporting and enabling measures described above are summarised in Table 8.

Costs and benefits

5.54 The cost of roll-out of smart metering across businesses and the public sector is estimated to be just over £34 million from 2011 to 2022. This cost will be met by businesses and other organisations through their energy bills. Smart metering will also bring considerable cost savings in the long term by enabling and encouraging better energy management. The 2010 energy standards for new non-domestic buildings will cost around £700 million between 2011 and 2022, with the price being met by the buyers. New building standards in 2013 are likely to increase this cost further. However, both sets of energy standards will make a positive contribution to reducing energy bills.

5.55 It has not been possible to cost all of the policies in this sector, particularly current UK policies and joint UK/Scottish policies. In part this is because of changes to the policies announced in the 2010 UK Comprehensive Spending Review, including a decision by the UK Government to keep the revenues from the CRC rather than recycling them back to participants, and lack of detail on the Green Deal. However, previous analysis by the UK Government, which is due to be updated, estimated that the net present value benefit in terms of savings on energy bills as a result of measures installed in the first 15 years of the CRC would be around £1.8 - £2.1 billion⁸⁷.

5.56 All of these policies should have the wider impact of increasing the competitiveness of Scottish businesses by making the efficient use of energy and other resource use a board-room issue, saving the money previously wasted by inefficient practices, and increasing productivity.

⁸⁷ The £1.8 billion figure uses a 10% private discount rate and the £2.1 billion figure uses a £3.5 billion social discount rate. Figures are from the Final Impact Assessment on the Order to implement the CRC Energy Efficiency Scheme, available from: <http://www.decc.gov.uk/en/content/cms/consultations/crc/crc.aspx>

Table 6: Policies for reducing emissions from Business and the Public Sector

Policy package and description	EU, UK or Scottish policy?	Expected abatement (ktCO ₂ e) in 2020	Further information available from
<p>Smart Metering and Better Billing Roll-out of “smart” meters to small and medium-size businesses to encourage better energy management.</p>	UK	57	Department of Energy and Climate Change website: http://www.decc.gov.uk/en/content/cms/what_we_do/consumers/smart_meters/
<p>Energy Intensive Business</p> <p>Energy Performance of Buildings Directive Large public buildings must display their energy performance. Also requires giving of advice on cost-effective energy efficiency measures and inspections of air conditioning systems.</p> <p>Climate Change Levy Tax on energy use in industry, commerce and the public sector, used to support energy efficiency/renewables.</p> <p>Climate Change Agreements Exempts energy-intensive industries from most of the Climate Change Levy if they meet targets for energy efficiency/reducing emissions.</p> <p>Carbon Trust and Energy Saving Trust Programmes Programmes to encourage businesses and the public sector to reduce energy consumption (including loans to SMEs).</p>	EU/ Scottish	162	<p>Scottish Government website: http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/profinfo/epcintro</p> <p>Department of Energy and Climate Change website: http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/ccas/cc_levy/cc_levy.aspx</p> <p>Department of Energy and Climate Change website: http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/ccas.aspx</p> <p>Carbon Trust website: http://www.carbontrust.co.uk/Pages/Default.aspx Energy Saving Trust Scotland website: http://www.energysavingtrust.org.uk/scotland/Scotland-Welcome-page/Business-and-Public-Sector-in-Scotland</p>
<p>CRC Energy Efficiency Scheme Cap and trade scheme for emissions from large non-energy-intensive businesses and the public sector</p>	UK/ Scottish	150	Department of Energy and Climate Change website: http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/crc/crc.aspx
<p>New-build non-domestic energy standards for 2007 and for 2010 Non-domestic buildings built to 2007 standards have emissions 23-28% lower than those built to 2002 standards. Non-domestic buildings built to 2010 standards will have emissions 30% lower than those built to 2007 standards.</p>	Scottish	45	Scottish Government Website: http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards

Policy package and description	EU, UK or Scottish policy?	Expected abatement (ktCO ₂ e) in 2020	Further information available from
<p>Renewable Heat</p> <p>Renewable Heat Incentive New UK policy offering payments to those who install and obtain heat from renewable sources</p> <p>Scottish Biomass Heat Scheme Grants for installation of biomass heating systems in small and medium-sized enterprises (SMEs) – now in final year, as superseded by RHI</p>	<p>UK</p> <p>Scottish</p>	988	<p>Department of Energy and Climate Change website: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/policy/renewable_heat/incentive/incentive.aspx</p> <p>Scottish Government website: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/19185/20805/BioSupport/BioSupportHome</p>
TOTAL ABATEMENT FROM BUSINESS AND PUBLIC SECTOR POLICIES		1,402	

Table 7: Proposals for reducing emissions from Business and the Public Sector

	Maximum abatement potential (ktCO ₂ e) in 2020	Total financial cost (2011-22, cash terms)	Cost-effectiveness (£/tCO ₂ e abated)	Earliest start date	Options for implementation
<p>New-build non-domestic energy standards for 2013 Non-domestic building standards will be reviewed again for 2013, with the intention of improving them further to achieve a 75% reduction in emissions compared to 2007.</p>	45	Not yet quantified	Not yet evaluated	2013	Policy would be implemented through the existing system of building regulations. Likely to result in increased development cost for new buildings.

Table 8: Supporting and enabling measures for reducing emissions from Business and the Public Sector

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>EU Procurement Legislation</p> <p>EU Energy Service Directive 2006/32/EC, Article 5 Member states must facilitate the factoring of emissions into procurement decisions – Scotland included guidance in the Sustainable Procurement Action Plan (Scotland).</p> <p>EU Energy Service Directive 2006/32/EC, Article 6 Member states must prevent energy companies from hindering energy efficiency measures – UK has voluntary agreement.</p>	EU	Policy	
<p>Non-Domestic Buildings: assessment of energy performance and emissions</p> <p>Assessment of energy and carbon performance (ACEP) Regulations to implement section 63 of the Climate Change (Scotland) Act for the assessment of the energy performance of existing non-domestic buildings and emissions from such buildings.</p> <p>Mandatory improvement to non-domestic buildings. Option to widen scope of above regulations to mandate the implementation of ACEP recommendations.</p> <p>Widen coverage of ACEP with mandatory improvements. Option to widen scope of above regulations for mandatory improvements (assuming the policy above has been implemented).</p>	Scottish	Proposal	<p>First consulted on in 2008. Paper available from Scottish Government website: http://www.scotland.gov.uk/Publications/2008/08/15155233/0</p> <p>Implementation is subject to further consultation in 2011, which will be published on the Scottish Government's website: http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards</p>

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>Energy Efficiency for Business As part of the Energy Efficiency Action Plan, develop a single resource and energy efficiency service for Scottish businesses that will focus on SMEs.</p>	Scottish	Policy	Energy Efficiency Action Plan: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan
<p>Public Sector Energy Efficiency Fund Fund providing support for public sector energy efficiency projects.</p>	Scottish	Proposal	Energy Efficiency Action Plan: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan
<p>Scottish Government's Carbon Management Plan Plan detailing how the Government will meet its aim of reducing emissions from its estate by 20% by 2014 compared to 2007/08.</p>	Scottish	Policy	Scottish Government website: http://www.scotland.gov.uk/Publications/2009/05/26125414/0

6. Transport



6. Transport

6.1 Transport emissions, including international aviation and shipping, make up just over a quarter of Scotland's total emissions, and more than two thirds of these emissions come from road transport. The next decade holds enormous potential to make significant progress into reducing road transport emissions through electric and other low carbon vehicles, and widening the choice in low carbon modes of travel available to individuals.

6.2 Significant cuts to Scotland's capital budget as a result of the UK Comprehensive Spending Review 2010 mean that new, innovative financing models will be needed to deliver such large-scale changes in infrastructure and behaviour. Scotland will also need to maximise the funding it draws from UK schemes to research and develop low carbon vehicle infrastructure and fuels. The proposals in this chapter include descriptions of potential options for implementation, while the Low Carbon Economic Strategy⁸⁸ explores the potential funding mechanisms and the benefits to the Scottish economy of investment in low carbon travel.

Trends in transport emissions

- Transport emissions, including international aviation and shipping, were 14.5 MtCO₂e in 2008, 1.1 MtCO₂e higher than in 1990. Transport is the only sector in which emissions have grown since 1990, although emissions in 2008 were slightly lower than in 2007.
- Within this sector, road transport emissions rose from 9.3 MtCO₂e to 10.0 MtCO₂e, and emissions from aviation more than doubled from 0.8 MtCO₂e to 1.7 MtCO₂e.
- In contrast to the UK, Scotland's emissions targets include emissions from international aviation and shipping, meaning that the

Scottish 42% target for 2020 is more stretching than a UK target of the same level.

Milestones

6.3 Milestones for transport in 2020 are:

- a mature market for low carbon cars, resulting in average efficiencies for new cars of less than 95 gCO₂/km;
- an electric vehicle charging infrastructure in place in Scottish cities;
- personalised travel planning advice provided to all households;
- effective travel plans in all workplaces with more than 30 employees; and
- at least 10% of all journeys made by bicycle.

EU policies

6.4 Although some transport policy is devolved, EU and UK Government policies have a significant impact on emissions reductions in Scotland.

6.5 In particular, the European Commission is in the process of setting **mandatory targets for the emissions-intensity of new cars and vans**, which apply to all vehicle manufacturers.

- Regulations have already been passed to reduce new car fleet average emissions to 130 gCO₂/km by 2015, with a long-term target of 95 gCO₂/km by 2020⁸⁹.
- The European Council and Parliament have agreed a deal on regulations to reduce emissions from new vans, under which fleet average emissions must reduce to 175 gCO₂/km by 2017, with a long-term target of 147 gCO₂/km by 2020⁹⁰.

⁸⁹ Regulation EC/443/2009 setting emissions performance standards for new cars:

http://ec.europa.eu/environment/air/transport/co2/co2_home.htm

⁹⁰ Draft EC regulations setting emissions performance standards for new vans:

http://ec.europa.eu/environment/air/transport/co2/co2_cars_regulation.htm

6.6 Complementing these regulations, the EC's Clean Vehicles Directive⁹¹ requires public sector bodies to include environmental costs as award criteria for procuring vehicles. This regulation is currently being transposed into Scots law, and was consulted on in July to September 2010⁹².

6.7 In addition to setting regulations requiring increases in vehicle efficiencies, under the Renewable Transport Fuel Obligation⁹³ the EC requires a set (increasing) proportion of transport fuel to come from renewable sources – mostly biofuels. The regulation was amended in 2009 to slow targets in order to address concerns about the sustainability of biofuels production raised in the Gallagher review⁹⁴.

6.8 Together these measures reduce emissions by 1.4 MtCO₂e compared to the baseline projection by 2020.

6.9 As well as setting regulations for land transport, the EU is responsible for the strongest policy lever for control of aviation emissions – the EU Emissions Trading System (EU ETS). Excluding military aviation and some other specific types of flights, emissions from flights to, from and within the EU will be covered by the EU ETS from 2012 onwards. In 2012 emissions will be capped at 97% of average annual emissions from 2004 to 2006, and from 2013 to 2020 they will be capped at 95%. If air operators exceed these limits they will have to buy allowances from other participants (e.g. power stations), whose emissions are also capped, meaning that overall emissions will not rise.

91 EC Clean Vehicles Directive, 2009/33/EC:

http://ec.europa.eu/transport/urban/vehicles/directive/directive_en.htm

92 Consultation on Directive 2009/33/EC of the European Parliament on the promotion of clean and energy-efficient road transport vehicles:

<http://www.scotland.gov.uk/Publications/2010/07/05090032/0>

93 EC Renewable Transport Fuel Obligation:

<http://www.renewablefuelsagency.gov.uk/aboutthertfo>

94 The Gallagher Review of the Indirect Effects of Biofuels Production:

<http://www.renewablefuelsagency.gov.uk/reportsandpublications/reviewoftheindirecteffectsofbiofuels>

Scottish policies

6.10 Current devolved action focuses on encouraging people to switch to more sustainable forms of transport; making fuel efficient driver training and advice available to drivers; preparing for the longer term shift to low carbon vehicles (LCVs); improving rail transport; using planning policy to make development more accessible; and encouraging increased levels of cycling and walking:

- **Eco-driving advice and information** from the Energy Saving Trust helps car drivers to significantly reduce fuel consumption.
- Transport Scotland committed £4.3 million to support the procurement of low carbon vehicles and their supportive infrastructure in 2010-11. The **Low Carbon Vehicle Procurement Support Scheme** is providing grant funding to Community Planning Partnerships to assist the uptake of a range of low carbon vehicle technologies in the public sector fleet. This funding subsidises the difference in cost between a low carbon vehicle and its petrol or diesel equivalent, and can also be used for the purchase and installation of associated infrastructure.
- Central Scotland is one of five projects in the **UK-wide Plugged-in Places Programme**, which provides match-funding for up to half the cost of installing publicly available electric vehicle charging points. This project, led by Transport Scotland, aims to create a network of 375 charging points across key commuter areas such as Edinburgh, Glasgow, Fife, Lanarkshire and Falkirk.
- The **Scottish Green Bus Fund** for 2010-11 provided £4.4 million funding to bus operators for up to 100% of the price difference between a low carbon vehicle and its diesel equivalent. This will add about 50 low carbon buses to the

Scottish bus fleet. In addition, payment rates for LCVs within the Bus Service Operators Grant scheme incentivise their purchase.

- Following Scottish Government funding to establish a network of training providers, **fuel efficient driving training for drivers of HGVs and freight vans** is now available on a commercial basis with no Government involvement. In addition, free impartial information for the freight industry on saving fuel, developing skills, equipment and systems, operational efficiency and performance management is available under the **Freight Best Practice programme**.
- An **Intelligent Transport System (ITS) Action Plan** is in place to improve the efficiency of the road network. Since 2007, over £28 million has been invested on such systems. Work is underway to identify the optimum deployment of these measures on the most congested parts of the Scottish network.
- The Scottish Government's **Ferries Review**, currently underway, is considering the environmental impact of Scottish ferry services. Recent actions for domestic ferries have focused on improving fuel consumption through drag reducing paint and the provision of new more efficient propellers. Caledonian Maritime Assets Ltd. is working with counterparts in Ireland and Northern Ireland on a project, part EU funded, to develop the next generation of "small ferries" which, by utilising diesel-hybrid technology, could be 30% more fuel efficient than current small ferries.
- Advice to organisations on **travel planning** to reduce the incidence of single occupancy car journeys and encourage increased levels of active travel and public transport use is delivered by the Energy Saving Trust and through www.chooseanotherway.com. Travel planning for schools is provided by Sustrans, while Cycling Scotland currently delivers the Cycle Friendly Employer Award.
- The Scottish Government, COSLA and participating Local Authorities and Regional Transport Partnerships have committed £15 million to the **Smarter Choices, Smarter Places** programme. Sustainable travel projects in seven communities across Scotland are currently piloting initiatives to increase active travel and public transport use. The current programme will run until March 2011, after which it will be fully evaluated.
- The **Cycling Action Plan for Scotland**, published in June 2010, sets the framework for a tenfold increase in the proportion of road journeys made by bicycle. The Scottish Government has made available a total of £17.3 million in 2010-11 to promote increased cycling.
- By allowing members to access cars for various periods of time, car clubs break the link between car use and car ownership. **Funding of £200,000 was provided to CarPlus** in 2010-11 to support communities and local authorities to encourage early stage car clubs.
- The Scottish Government operates four freight grant schemes, each with the aim of **encouraging the transfer of freight from road to rail or water**, where the road option is cheaper.
- Work has started on the **Edinburgh to Glasgow Rail Improvements** programme, to electrify and improve the capacity, frequency and journey times of rail services between the two cities. Phase 1 improvements to Highland Main line services operating between Perth and Inverness will be introduced in December 2011. Transport Scotland is working closely with Network Rail to develop improvements between Aberdeen and Inverness. These major improvements have been Government policy

for some time, and as such the emissions reductions resulting from them are included in the “business as usual” emissions projection.

- **Scottish Planning Policy** influences the location, density and form of development to make access by public transport and active travel easier and reduce travel demand.

6.11 As demonstrated, the Scottish Government is currently investing in policies to reduce emissions from transport, both in existing networks and transport modes and in developing new and alternative transport options. However, in some areas a step-change is needed in devolved policy action.

Scottish proposals

6.12 The Scottish Government’s proposals for significant further reduction of transport emissions are based largely on the findings of commissioned research on potential devolved policy options⁹⁵, published in 2009 - hereafter referred to as “the Atkins study”. Some of the measures in this study were also identified by the Committee on Climate Change as Scottish levers for unlocking emissions reductions. The measures have been packaged into three key groups:

- **Driving more efficiently:** extension of eco-driving training/promotion for car drivers; more strictly enforcing 70 mph speed limits on trunk roads; further support for low carbon vehicle infrastructure and procurement; more efficient freight and van transport; Intelligent Transport Systems on trunk roads; and maritime transport efficiency improvements.
- **Widening travel choices:** more intense delivery of travel planning for schools, households and businesses; improved cycling and walking infrastructure; encouraging the

formation of more car clubs; encouraging improved, more efficient local buses and taxis; and further mode shift of freight from road to rail or water where appropriate.

- **Reducing the need to travel:** the creation of mixed use “community hubs” in smaller settlements to reduce the distances people need to travel for work and other purposes.

6.13 Most of these measures would bring financial benefits greater than their costs, largely in fuel savings for individual drivers. On top of the financial benefits, most would also bring additional benefits such as improved health as a result of active travel, improved air quality, less congestion and noise pollution, fewer traffic accidents and enhanced biodiversity.

6.14 Implementation of a number of proposals (including low carbon vehicle infrastructure and procurement, Intelligent Transport Systems, more efficient local buses and more efficient, hybrid ferries) is likely to commence in 2011-12. To ensure consistency with the published draft of this Report, they remain listed as “proposals” in tables A1 and A2 in Annex B. Chapter 2 sets out a pragmatic approach to the differentiation between proposals and policies.

Driving more efficiently

Eco-driving for car drivers

6.15 The Atkins study identified a national initiative encouraging more energy efficient driving of cars as a cost-effective way of making significant emissions reductions. The CCC also identified eco-driving as a potential option. The Scottish Government is considering extending the availability of eco-driving training, including within the public sector, following further evaluation of existing provision.

95 Mitigating Transport’s Climate Change Impact in Scotland: Assessment of Policy Options:
<http://www.scotland.gov.uk/Publications/2009/08/26141950/0>

6.16 Eco-driving training teaches driving techniques that lead to average fuel savings of 5-10%. The proposal in the Atkins study was to extend the small-scale awareness raising campaign and free training currently provided by the Energy Saving Trust to a level where 80% of the driving population would undertake free face-to-face training sessions in the period up to 2027, with updates every five years. As well as reducing greenhouse gas emissions, eco-driving would result in a range of other benefits including reduced motoring costs and pollution, and improved road safety.

6.17 Large scale partnership working with local authorities, motoring organisations and commercial partners would be required to deliver training on this scale. As with all voluntary approaches, creative solutions would be required to maximise uptake of training.

6.18 Integration within the driving test could be the starting point of a new regulatory regime. It is currently considered within the test but driving in a contrary way does not at present result in failure. Driving licensing policy is reserved to the UK Government.

Speed limit enforcement

6.19 The most efficient driving speed for cars varies according to a number of factors but, in general, above 50 mph efficiency tends to decrease. Both the CCC and the Atkins study suggested that stricter enforcement of the existing 70 mph speed limit for cars on dual carriageways and motorways would be a relatively cost-effective way to achieve more fuel-efficient driving and reduce emissions. Cost savings to motorists would be significant. The policy would exclude HGVs, which have lower speed limits.

6.20 Enforcement at 70mph could be carried out using cameras to record average speed along certain intervals of road. However,

significant issues in relation to the practicality of enforcement and their implications for costs remain to be resolved.

Low carbon vehicles and infrastructure

6.21 Although the move to lower carbon vehicles will be largely driven by EU legislation, the Scottish Government will build on the lessons already learned to further support the pace of uptake of low carbon vehicles and provision of associated infrastructure in Scotland. This will be achieved by:

- promoting the use of Scottish sustainable biofuels for Scottish business to reduce emissions from heavy / specialist public sector vehicles through the Biofuels Business Programme. For example, this approach has recently led to the creation of bio-ethanol from whisky residues, which is currently awaiting patent approval;
- extending support for the existing public sector procurement programme for LCVs. Through the procurement and efficient driving of LCVs public sector transport emissions can be reduced significantly. The procurement programme is planned to continue past 2010-11 and will also support the introduction of driver management instrumentation to improve public sector driver behaviour;
- development of essential infrastructure in Scotland to create a network of about 400 electric charging points across the central belt of Scotland for use by drivers of electric and plug-in hybrid vehicles. Further work with local authorities will be undertaken to join up other parts of Scotland;

- promoting UK grants of up to £5,000 to private motorists purchasing low carbon cars and vans; and
- supporting further research, development and trials of hydrogen technology to power road vehicles, utilising existing infrastructure and relationships with industry and academia to identify performance gaps and deliver solutions.

6.22 The Scottish Government will publish a Low Carbon Vehicle Action Plan later in 2011.

Freight efficiencies

6.23 The Government proposes a number of measures aimed at improving freight efficiency through technological, purchasing and operational changes in the fleets of freight vans and HGVs. Fuel efficient driving training is currently commercially available for drivers of HGVs and freight van drivers. EU legislation⁹⁶ requires HGV drivers to undergo a minimum of five days training within a five year period to retain their Certificates of Professional Competence. Fuel efficient driving training is an accredited course which can count towards meeting that requirement. Further options are:

- to encourage and/or incentivise collaborative initiatives with a target of reducing empty running and partial-load running; and
- to increase road freight vehicle capacity to reduce overall number of journeys.

6.24 Except where a mandatory approach is suggested, it is envisaged that these measures would rely on voluntary uptake by the freight industry. They would therefore need to be supported by targeted communication, whereby freight operators would be offered a service and could use those aspects of it that were of interest to them.

Van efficiencies

6.25 Emissions from the van fleet could be reduced by improving the efficiency of van usage, through technological, purchasing and operational changes. The Scottish Government will:

- Encourage van users to make use of advisory programmes offering free advice and information on fuel saving techniques - such as the Van Best Practice programme; and
- Encourage van drivers to participate in eco-driver training programmes.

Intelligent Transport Systems

6.26 Intelligent Transport Systems (ITS) is the collective term for the technology based 'tools' available to make the most efficient use of the trunk road network by monitoring conditions, controlling traffic where necessary and informing motorists of conditions. ITS tools could include variable speed limits, variable message signs, ramp metering and average speed enforcement as appropriate, and targeted use of the hard shoulder as an additional 'managed lane' for priority vehicles.

⁹⁶ Directive 2003/59/EC of the European Parliament and of the Council of 15 July 2003 on the initial qualification and periodic training of drivers of certain road vehicles for the carriage of goods or passengers

6.27 As outlined in Project 9 of the Strategic Transport Projects Review (STPR)⁹⁷, the use of ITS to actively manage the most congested parts of Scotland's trunk road network will improve safety, journey time reliability and in some cases result in journey time savings. Smoother traffic flows can also result in a reduction in emissions per vehicle and reduced fuel consumption.

6.28 The Managed Motorway concept in England (M42, M6) is widely used and has been shown to reduce congestion and reliably improve journey time. The Scottish Government is committed to delivering enhanced ITS, principally Managed Motorways, on the trunk road and motorway network in Central Scotland, as prioritised in the STPR.

Maritime transport

6.29 The Scottish Government is working with operators and the port sector, particularly those receiving public support, to build on their current activities relating to the environmental impact of maritime transport. This includes emissions reduction from improved vessel design, hybrid diesel-electric engines and use of other alternative fuels, and improved fleet management. Improvements to the efficiency of the subsidised fleet as a whole are dependent upon the pace of vessel replacement. The Government is considering the scope for more efficient powering of vessels in port through connection to shore-side power sources and the use of port sites for renewable power generation. The Government also supports efforts for an international agreement on carbon emissions from shipping.

Wider transport choices

Travel planning

6.30 Travel planning delivers targeted information direct to travellers to help them make sustainable travel choices, through schools, workplaces or to households. It does this by raising awareness of cycling, walking or public transport, car sharing alternatives, and flexible and home working options, and discussing how to overcome actual or perceived barriers to their use. A major increase in the provision of travel planning advice to organisations (workplaces, schools) and amongst households over the next ten years could have a significant impact on Scottish emissions. Department for Transport results from pilots in England published in February 2010⁹⁸ showed a reduction in car journeys per person of 9%. The Scottish Government's ambition is to achieve:

- personalised travel planning advice to all households in Scotland (each contacted once) by 2022, bringing reductions in non-work or -school escort trips; and
- all workplaces with more than 30 employees to have an effective travel plan by 2022, bringing reductions in commuter trips by single occupant car.

6.31 The full extent of the benefits that travel planning could offer can only be achieved if implemented alongside measures that improve infrastructure for cycling and walking, improve public transport service frequency and information provision, provide support and training for new cyclists, and 'lock in' reductions in motor traffic on local roads through speed controls or demand management measures.

⁹⁷ Strategic Transport Projects Review: <http://www.transportscotland.gov.uk/strategy-and-research/strategic-transport-projects-review>

⁹⁸ UK Department for Transport: The Effects of Smarter Choice Programmes in the Sustainable Travel Towns: Summary Report: <http://www.dft.gov.uk/pgr/sustainable/smarterchoices/smarterchoiceprogrammes/>

Transport Scotland will use the lessons learned from the Smarter Choices Smarter Places demonstration programme to work with COSLA, Regional Transport Partnerships and local authorities to consider how best to deliver travel planning after 2010-11.

Cycling and walking infrastructure

6.32 The Cycling Action Plan for Scotland sets the framework for a tenfold increase in the proportion of journeys made by bicycle. This proposal is to increase the proportion of journeys made by active travel to 20% by 2020 through the provision of infrastructure of a level and quality of that found in e.g. Sweden, Germany and Belgium. Achieving this vision will require a major reallocation of road space to cycles, and will require constructive engagement with drivers. Improved facilities are likely to be welcomed by current and potential cyclists as well as those who benefit from quieter and safer streets with less congestion.

6.33 The primary delivery agencies for this policy would be local authorities and active travel stakeholders who currently receive funding through Cycling, Walking and Safer Streets grant and the Sustainable and Active Travel budget administered by the Sustainable Transport Team at Transport Scotland.

6.34 This proposal also includes measures to encourage more people to walk shorter journeys more often by creating places for people through the implementation of Designing Streets. Options include improvements to the quality of the walking environment and associated infrastructure; the creation of more 'Home Zone' style communities and areas of shared space offering safer and more communal use of residential streetscapes; more 20 mph zones in conurbations of over 25,000 population; and intensification of the Safe Routes to Schools programme. Transport

Scotland would continue to enable behavioural change and improve information about the active travel environment, drawing on lessons learned in the Smarter Choices, Smarter Places Programme. This would support improved health, social inclusion, road safety and the economies of our local communities.

Car clubs

6.35 Car clubs offer simple and cost-effective access to a hired car for personal or business use, replacing the need to own a vehicle. The cars are available locally, maintained by the club, vehicles are replaced regularly, and car club users can book in advance and use any vehicle within the same scheme. Car clubs could be used to accelerate the introduction of electric vehicles if these were purchased preferentially by the clubs, and if charging points were installed at car club parking spaces.

6.36 Car clubs are potentially viable in towns with a population greater than 25,000, although start-up funding may be necessary to take them to a point of viability. It is envisaged that in larger urban areas schemes would be provided by the private sector, with subsidy required in smaller towns.

6.37 Provision would vary from place to place, and would depend on local authorities for provision of parking spaces. Involvement with community groups and co-operatives may be required to establish up rural car clubs. A range of options are under consideration to ensure best value for tax payers and to put car clubs on a financially sustainable footing over the long term without ongoing reliance on public finance.

Buses and taxis

6.38 The Scottish Government has been looking at options for improving public transport services further in order to encourage modal shift from car to bus, as well as reducing emissions from the current services. Options include:

- providing funding for pilot schemes for different technologies in various geographical locations. This would require reallocation of existing Bus Services Operators Grant to give incentives to operators to run low carbon buses;
- encouraging the uptake of LCVs through the continuation of the LCV incentive within the Bus Service Operators Grant scheme;
- working with the bus operators through the Confederation of Public Transport and the Greener Journeys programme to reduce the number of car journeys taken by the public and to encourage increased bus patronage;
- encouraging travel by public transport through innovative travel exchange points, information provision, and integrated travel; and
- developing an emissions strategy to improve further the fuel efficiency of the taxi/private hire cars in Scotland.

Freight modal shift

6.39 The Scottish Government will investigate options for encouraging further the transportation of freight by less emissions-intensive modes, such as rail or water. These may include:

- financial incentives to encourage modal shift, such as a mode shift grant for companies to transfer freight from road to rail or water;
- development of load consolidation centres aimed at reducing the number of lorry movements required at a local level, ensuring optimum use of fleet;

- use of the planning system to allocate sites for business with heavy freight needs at locations that enable modal choice;
- direct investment by public sector in development of multi-modal hubs at key locations identified through STPR.

6.40 As most of these measures depend on the cooperation of other bodies in both the public and commercial sectors, more work will be undertaken to assess the feasibility of these options.

Reducing the need for travel

Community hubs

6.41 In addition to travel planning advice to employing organisations on the benefits of flexible and home working in reducing the need to travel, the Scottish Government will undertake further analysis of options for introduction of shared facilities in settlements of population less than 10,000 (of which Scotland has over 100). Equipped for remote working, with ICT and remote office facilities (including video-conferencing suites), such facilities could remove a key reason for travel and reduce travel costs. Additionally, these “community hubs” could offer an additional range of benefits such as health, education, shopping delivery, post office and other financial services, and storage for ecommerce deliveries.

6.42 The most likely delivery bodies for community hubs are local authorities or local economic development organisations, acting through project management consultancies if appropriate.

Overall abatement from Transport policies and proposals

6.43 A very ambitious implementation of all the proposals set out above could result in an abatement in 2020 of 1.1 MtCO₂e, giving a total abatement of 2.5 MtCO₂e (including estimated abatement from EU policies) from all policies and proposals in the Transport sector.

Transport emissions would be 11.6 MtCO₂e in 2020, 13% lower than in 1990.

Other measures

6.44 The Scottish Government is pressing the UK Government for legislative powers to allow the Scottish Government to determine the level of the national speed limit in Scotland. The Atkins study and the CCC highlighted the role of speed limits in achieving more fuel-efficient driving and in reducing emissions.

Delivery of Transport policies

6.45 Detailed abatement potential is presented line-by-line in Table 10, but in practice there is interdependence between measures and savings. The most significant example is travel planning, the effectiveness of which is dependent on improved public transport, cycling and walking infrastructure, and demand management measures.

6.46 None of the measures have been rolled out at this level of intensity previously and, given this lack of precedence, there remains significant uncertainty over both the exact costs, abatement potential, and mode of delivery.

6.47 In addition, the proposals described above will depend on other public and private sector bodies for their delivery, especially local authorities. The Scottish Government will work with COSLA, local authorities and other local

partners to ensure measures are delivered consistently, Scotland-wide.

Supporting and enabling measures

High speed rail

6.48 Through fast journey times, the rail network provides a reliable and attractive alternative to other modes of transport as well as the potential for reduced emissions. Successive reports show that the economic and environmental case for high speed rail in the UK is stronger when Scotland is considered as an integral part of the system. A three hour journey time between Scotland and London would create modal shift from air, potentially capturing 67% of the overall travel market between Scotland and London (Scottish Strategic Business Case, Transport Scotland). Transport Scotland will continue to work with High Speed 2, the company responsible for planning of high speed rail, as it develops strategic route options for high speed rail to Scotland. Scottish Ministers are lobbying for Scotland to be included in the first wave of implementation of this project.

6.49 Transport Scotland has developed a tool quantifying the changes in emissions associated with certain rail projects to help the decision-making process.

Supportive planning process

6.50 The location and design of new development has a strong influence on the way people travel. The Scottish Government's National Planning Framework⁹⁹ describes the strategy for long-term spatial development to support the transition to a low carbon economy, including the promotion of higher densities and

99 National Planning Framework for Scotland 2:
<http://www.scotland.gov.uk/Publications/2009/07/02105627/0>

mixed use development close to public transport nodes in urban areas.

6.51 Scottish Planning Policy¹⁰⁰ specifies that opportunities for personal travel should be prioritised in the following order - walking, cycling, public transport, car and other motorised vehicles. Buildings and facilities should be accessible on foot and by cycle. Improvements to active transport networks, such as paths and cycle routes, should make these more attractive and safer for pedestrians and cyclists, including people with mobility difficulties, and thereby support more sustainable travel choices.

6.52 The availability of parking can have an important influence in reducing reliance on the car. Planning authorities should apply best practice parking standards to on-site parking at new developments to encourage modal shift. Parking management policies should be supported by measures to promote the availability of high quality public transport services. Authorities should also consider promoting Park and Ride schemes on commuter routes. Appropriate car and cycle parking should be provided at rail stations to encourage onward travel by rail. The Scottish Government is working closely with planning authorities to ensure that their statutory duty to contribute to the reduction of emissions is fully reflected in development plan policies.

Costs and benefits

6.53 The total implementation and operating costs for the three main transport packages (driving more efficiently, wider transport choices and reducing the need to travel) would be £3.9 billion from 2011-2022.

6.54 A significant proportion of the up-front funding required to implement these policies is

likely to fall to the public sector. However, most of these measures, such as eco-driving and speed management, would bring financial benefits greater than their costs, largely in fuel savings for individual drivers. It may be possible to design policies in a way that aligns the costs and benefits more closely, so that the beneficiaries of fuel savings meet at least some of the costs of the policy – for example, eco-driving training and car clubs could be provided commercially at a cost far less than the money they would save their customers.

6.55 On top of the financial benefits, most of these measures, especially those that encourage alternatives to car use, would bring additional benefits. These would include improved health as a result of active travel, improved air quality, less congestion and noise pollution, fewer traffic accidents and enhanced biodiversity. While modal shift would cause some journey times to increase, the introduction of community hubs could reduce time spent travelling for many people. The Scottish Government will develop analysis of these non-financial impacts as policies and proposals are developed further.

6.56 As noted, the majority of these measures have not been rolled out at this level of intensity previously. Consequently, there remains significant uncertainty over both the exact costs and abatement potential.

6.57 The significant intensity and scope of the measures, which would involve scaling-up small pilot projects to a national scale, requires new business models and a pool of skilled labour that currently may not be available, for example in delivering eco-driving training to drivers in private households. The Low Carbon Economy Strategy sets out some of the challenges in the transport sector as well as the opportunities and the actions needed to exploit them.

¹⁰⁰ Scottish Planning Policy:
<http://www.scotland.gov.uk/Publications/2010/02/03132605/0>

Need for greater powers

6.58 The majority of transport functions are already devolved to the Scottish Parliament. However, as noted in our Climate Change Delivery Plan, there are some areas where legislative powers and fiscal autonomy could contribute to meeting Scotland's statutory climate change targets. These include:

- Legislative powers to allow the Scottish Government to allow the Scottish Government to determine the level of the national speed limit in Scotland; and
- Fiscal autonomy to tailor fuel and vehicle excise duties to better take account of Scottish circumstances which could contribute to emissions reductions; and
- Further legislative powers, in particular increased fiscal powers, that would enable the faster delivery of high speed rail in Scotland.

Table 9: Policies for reducing emissions from Transport

Policy package and description	EU, UK or Scottish policy?	Expected abatement (ktCO ₂ e) in 2020	Further information available from
<p>EU Mandatory Vehicle Emissions Targets EU regulations on CO₂ from new cars - EC/443/2009 Obligation on manufacturers to reduce new car fleet average emissions to 95 gCO₂/km by 2020.</p>	EU	746	European Commission website: http://ec.europa.eu/clima/policies/transport/vehicles/cars_en.htm
<p>EU regulations on CO₂ from new vans Obligation on manufacturers to reduce new van fleet average emissions to 135 gCO₂/km by 2020.</p>	EU		European Commission website: http://ec.europa.eu/clima/policies/transport/vehicles/vans_en.htm
<p>EU cleaner vehicles directive – 2009/33/EC Requirement for public sector bodies to include environmental costs as award criteria for procuring vehicles – to be transposed into Scots law.</p>	EU		European Commission website: http://ec.europa.eu/transport/urban/vehicles/directive/directive_en.htm
<p>Biofuels Renewable Transport Fuel Obligation Regulation requiring set proportion of fuel to come from renewable sources.</p>	EU	640	Renewable Fuels Agency website: http://www.renewablefuelsagency.gov.uk/aboutthertfo
TOTAL ABATEMENT FROM TRANSPORT POLICIES		1,386	

Table 10: Proposals for reducing emissions from Transport

	Maximum abatement potential (ktCO₂e) in 2020	Total financial cost (2011 – 22, £m, cash terms)	Cost-effectiveness (£/tCO₂e abated)	Earliest start date	Options for implementation
Driving more efficiently					
<p>Eco-driving Eco-driving delivers driving techniques leading to average fuel savings of 5-10%. Current activity has been limited to a small-scale awareness raising campaign including free training. This proposal is to encourage market demand for eco-driving training from car drivers and its delivery.</p>	80	42	-84	2012	Large scale partnership working with local authorities, motoring organisations and commercial partners would be required to deliver training on this scale.
<p>Speed limits Stricter enforcement of the existing 70 mph limit on only dual carriageways and motorways. The policy would exclude HGVs which are currently speed limited at 60mph on motorways, 50mph on unrestricted dual carriageways and 40mph on single carriageway roads.</p>	23	48	-119	2013	Significant issues in relation to the practicality of enforcement, resource implications for the police and court service, and associated deliverability of the benefits. The cost-effectiveness figure opposite excludes fuel savings to motorists, which are expected to be significant.
<p>Low carbon vehicles and infrastructure Transport Scotland has committed £4.3m to support the procurement of low carbon vehicles and their supportive infrastructure in 2010-11 and £4.4m to the Scottish Green Bus Fund in 2010-11. This proposal involves additional measures to increase early uptake of low carbon vehicles in both the public and private sectors, and supporting infrastructure provision.</p>	70	168	48	2011	

	Maximum abatement potential (ktCO ₂ e) in 2020	Total financial cost (2011 – 22, £m, cash terms)	Cost-effectiveness (£/tCO ₂ e abated)	Earliest start date	Options for implementation
Freight efficiencies Measures aimed at improving freight efficiency through technological, purchasing and operational changes in the fleets of freight vans and HGVs.	109	55	-89	2011	
Van efficiencies Policies aimed at reducing emissions by improving the efficiency of van usage, through technological, purchasing and operational changes.	19	9	-89	2011	
Intelligent Transport Systems An Intelligent Transport System (ITS) Action Plan is in place and, since 2007, over £28m has been invested. The proposal is to use ITS to reduce the volume or increase the efficiency of traffic flows on the trunk road network.	10	249	1,211	2011	Variable speed limits, variable message signs, ramp metering and average speed enforcement as appropriate and targeted use of the hard shoulder as an additional 'managed lane' for priority vehicles.
Maritime In our domestic ferry services, recent short-term actions have focused on improving fuel consumption through drag reducing paint and the provision of new more efficient propellers. We will work with domestic ferry operators to build on the environmental impact of maritime transport to achieve emissions reductions of up to 20%.	50	24	-76	2011	

	Maximum abatement potential (ktCO ₂ e) in 2020	Total financial cost (2011 – 22, £m, cash terms)	Cost-effectiveness (£/tCO ₂ e abated)	Earliest start date	Options for implementation
Widening transport choices					
Travel planning Building on the lessons learned from existing travel planning activity, provision of a major increase in existing policy of advice and information on sustainable transport options as alternative to single-occupancy car journeys, tailored to individual circumstances.	225	127	-91	2012	The proposal envisages personalised travel planning advice to all households in Scotland by 2022; workplace travel plans to reduce the number of commute trips by single-occupant car; and schools travel plans to reduce car use for escort trips.
Cycling and walking infrastructure The Cycling Action Plan for Scotland published in June 2010 sets the framework for a tenfold increase in the proportion of journeys made by bicycle. This proposal also includes options to encourage people to walk shorter journeys more often. The proposal seeks to increase the proportion of journeys by active travel to 20%.	94	1,320	345	2012	Delivery of the policy is largely dependent on local authorities and partnerships to appropriately reallocate road space.
Car clubs Funding has been made available to 2010-11 to encourage the formation of car clubs across Scotland. This proposal is to create car clubs in towns with populations less than 25,000 to reduce the need for car ownership.	44	73	3	2012	Dependent on local authorities for provision of parking spaces and potentially community groups/co-ops for running rural car clubs.

	Maximum abatement potential (ktCO ₂ e) in 2020	Total financial cost (2011 – 22, £m, cash terms)	Cost-effectiveness (£/tCO ₂ e abated)	Earliest start date	Options for implementation
<p>Bus and taxis</p> <p>Extension of the Green Bus Fund to encourage operators and local authorities to invest in new low carbon vehicle technology. Work with the bus operators through CPT and the Greener Journeys programme to encourage increased bus patronage. Funding for local authorities to encourage travel by public transport through innovative travel exchange points, information provision, and integrated travel.</p> <p>An emissions strategy designed to further improve the quality of the taxi/private hire cars in Scotland.</p>	201	1,614	305	2011	Delivery of the policy is dependent on cooperation and match funding from other bodies.
<p>Freight modal shift</p> <p>Further incentives to encourage modal shift of freight to rail or water where appropriate.</p>	102	180	70	2011	Dependent on cooperation of other bodies.
<p>Reducing the need for travel</p>					
<p>Community hubs</p> <p>In addition to travel planning advice, this proposal aims to further reduce the need to travel through the provision of shared remote working facilities in settlements with populations less than 10,000.</p>	66	10	-107	2012	Lack of an obvious agency to implement the measure.
TOTAL ABATEMENT FROM TRANSPORT PROPOSALS	1,093	3,918			

Table 11: Supporting and enabling measures for reducing emissions from Transport

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>Rail Transport Scotland Carbon Management System Tool quantifying emissions associated with various rail projects, to aid decision-making process</p>	Scottish	Policy	Transport Scotland website: http://www.transportscotland.gov.uk/about-us/corporate-reports/j10967-00.htm
<p>Planning</p> <p>National Planning Framework 2 Strategy for long-term spatial development, supporting the transition to a low carbon economy.</p> <p>Scottish Planning Policy Scottish Planning Policy aims to influence the location, density and form of new development to make access by public transport and active travel easier and reduce travel demand.</p> <p>Designing Places Policy statement setting out the Scottish Government's expectations of the planning system to deliver high standards of design in development for rural and urban areas, with a focus on sustainability.</p> <p>Designing Streets Policy statement for street design changing the emphasis of guidance on street design towards place-making and away from a system focused upon the dominance of motor vehicles.</p> <p>Practical examples are being promoted through the Scottish Sustainable Communities Initiative, which consists of 11 exemplars of better quality development, and the Polnoon masterplan, which aims to apply the advice in Designing Places and other advice notes.</p>	<p>Scottish</p> <p>Scottish</p> <p>Scottish</p> <p>Scottish</p>	<p>Policy</p> <p>Policy</p> <p>Policy</p> <p>Policy</p>	<p>Scottish Government website: http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/npf/</p> <p>Scottish Government website: http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/newSPP</p> <p>as above</p> <p>as above</p>

7. Rural Land Use



7. Rural Land Use

7.1 In this chapter, the term “rural land use” is used to cover agriculture and related land use, and forestry. The causes of greenhouse gas emissions from the rural land use sector are different from those which occur in the other sectors in this report. Rather than being the result of combustion, emissions from rural land use come primarily from biological processes, albeit in many instances these processes are the result of some kind of human activity. In addition, rural land use activities like forestry and specific cropland management can also absorb CO₂ from the atmosphere.

7.2 A significant proportion of the emissions from agriculture and related land use come from nitrogen fertiliser use and livestock’s digestive systems. Nitrogen is an essential element for plant growth. Fertilisers may either be manufactured or come from organic, principally farm based, livestock manure and slurry.

7.3 Changes in the way land is used, such as converting grassland to cropland, can lead to the breakdown of organic matter in soils, releasing carbon to the atmosphere as CO₂. By contrast, the conversion of arable land to grassland can lead to the absorption of CO₂ through soil processes, increasing the soil’s carbon store. Scotland’s woodland is a net carbon sink as trees absorb CO₂ during the process of photosynthesis. However, as forests age, this effect diminishes and their contribution to reducing Scotland’s overall emissions decreases.

7.4 Opportunities exist across the rural land use sector to reduce greenhouse gas emissions. Farmers and other land managers can take simple steps to improve the efficiency and diversity of their businesses, benefitting their bottom line as well as cutting emissions. There are opportunities to manage soils to protect the existing carbon stores and lock away even more. By sustainably creating and managing woodland, the amount of CO₂

absorbed can be increased and the wood can be used to replace more carbon-intense materials for fuel and construction.

7.5 Rural land use activities are interrelated and interdependent. For example, a great deal of land in Scotland is used both for extensive grazing and sporting purposes. Much of Scotland’s land has significant value such as for biodiversity and access to the outdoors and these benefits may depend, in part, on agricultural and woodland management. Rural land also provides significant potential for the development of renewable energy by land based enterprises and rural communities.

7.6 Compared to other sectors of the economy there is much greater uncertainty in estimating emissions from rural land use and predicting the effects of changing practices. Fertiliser nitrogen losses, for example, depend on a complex set of conditions, including the application techniques, soil type, soil moisture and the weather during and after application. The Scottish Government is working with UK and international partners to improve our understanding of emissions from Rural Land Use, so that future policies are informed by the best evidence and farmers are properly credited for improvements in farming practices.

7.7 Despite the scientific uncertainty there are some emissions abatement measures that are known to deliver significant emissions reductions, while delivering savings to business, and biodiversity, air and water quality benefits.

Trends

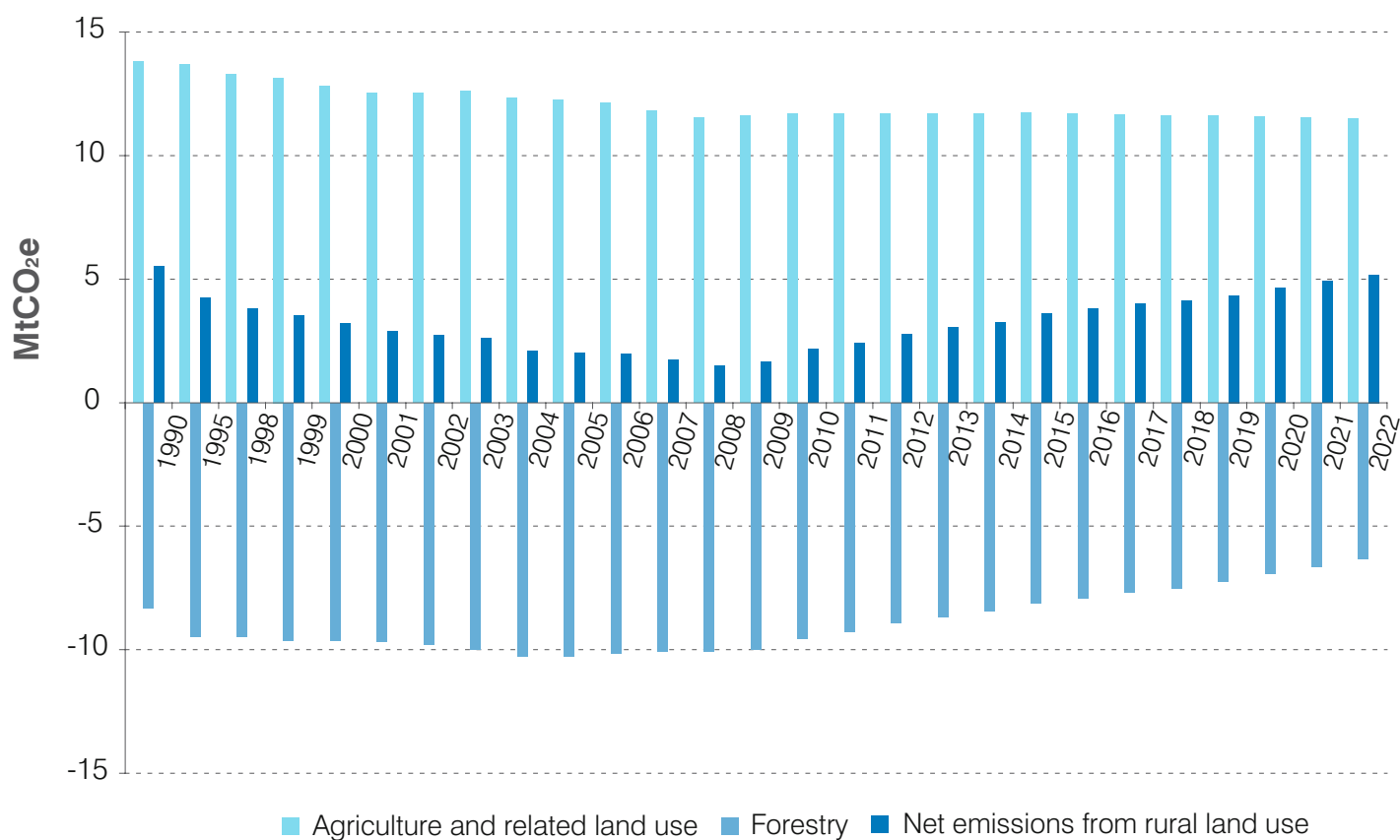
- In 2008, emissions from agriculture and related land use were 11.5 MtCO₂e, a decrease of 2.3 MtCO₂e from 1990. Woodland sequestered more greenhouse gases than it emitted, a total of 10.1 MtCO₂e, 1.8 MtCO₂e more than in 1990.

- Although carbon sequestration from woodland has increased since 1990, it is important to note that this peaked around 2004. This is because levels of woodland creation in Scotland declined in the 1990s and now many Scottish forests have reached maturity. Older trees sequester CO₂ at a slower rate than younger trees.
- The Greenhouse Gas Emissions Inventory also estimates emissions from land converted to settlements since 1950. These were

1.7 MtCO₂e in 2008, 0.1 MtCO₂e lower than in 1990. These have not been included as part of the rural land use sector, as the emissions are mostly retrospective.

7.8 Figure 8 sets out the historical greenhouse gas emissions from these activities from 1990 to 2008 together with “business as usual” projections to 2022 of emissions if no additional measures were put in place to reduce them.

Figure 8: Emissions and sequestration from rural land use in Scotland, 1990 to 2008, and “business as usual” projection to 2022



Milestones

- The conclusion and publication in 2011 of current research projects by the Scottish Government and the Committee on Climate Change on behaviour change in agriculture and the development of indicators to measure progress in reducing agricultural emissions. This will inform the development of Scottish Government climate change milestones for agriculture. Depending on the research outcomes, these are likely to focus on the number of farm businesses that have adopted Farming for a Better Climate measures and the number of farm businesses undertaking nutrient management plans.
- Subject to adoption by the UN Framework Convention on Climate Change of wetland management as an optional reporting item in the international greenhouse gas inventory process, the Scottish Government will incorporate consideration of peatland restoration into the methodology for calculating the net Scottish emissions account.
- Plant 100 million trees by 2015.

Land Use Strategy

7.9 In line with Section 57 of the Climate Change (Scotland) Act 2009, Scottish Ministers will lay a land use strategy before the Scottish Parliament in March 2011. The Scottish Government's consultation on a Draft Strategy concluded in December 2010. More information is available on the Government's website¹⁰¹.

7.10 The Land Use Strategy will be the Scottish Government's high-level and long-term agenda for sustainable land use and has been developed in line with this Report. Enabling land-based businesses to succeed in a low-carbon economy is central to this agenda. The Strategy will consider all land and all land uses across the country, and outline the delivery mechanisms for its implementation. By setting clear objectives and applicable principles for land managers and policy-makers alike, the Strategy will help Scotland get more from its land, including the contribution that can be made towards meeting our greenhouse gas emissions reduction targets.

Agriculture and related land use

7.11 A key challenge in this sector is to contribute towards climate change targets while ensuring that Scottish agriculture remains productive and competitive. The Scottish Government's approach is to begin by seeking the maximum uptake of voluntary actions which both reduce avoidable emissions (those that arise from inefficient use of fertilisers and other resources rather than from the fermentation of feeds in the guts of animals) and improve farm performance.

Scottish policies

Farming for a Better Climate

7.12 Farming for a Better Climate (FFBC) is a targeted communication strategy designed to encourage farmers to adopt efficiency measures that reduce emissions, and help them adapt to climate change while at the same time having an overall positive impact on business performance.

¹⁰¹ Scottish Government, Land Use Strategy: <http://www.scotland.gov.uk/Topics/Environment/Countryside/Landusestrategy>

7.13 The strategy targets five key areas for action:

- Using energy and fuels efficiently.
- Developing renewable energy.
- Locking carbon into the soil and vegetation.
- Optimising the application of fertiliser and manures.
- Optimising livestock management and storage of waste.

7.14 Farming for a Better Climate has been developed jointly by the Scottish Government and Scottish Agricultural College (SAC) and is funded by the Scottish Government. SAC hosts a dedicated website¹⁰² which provides farmers with advice on cost-effective measures that can be taken in each of these areas. The website was launched in September 2009 and features case studies and downloadable practical guides.

7.15 Four farms have been selected to be Farming for a Better Climate “Focus Farms”, demonstrating how to tackle avoidable greenhouse gas emissions whilst balancing sustainable food production and maintaining a competitive farming industry. The Focus Farms represent three agricultural sectors - dairy, upland livestock and arable. The fourth is a diversified farm business and can be used for education and public demonstration.

7.16 The Focus Farm programme will run until 2013 to establish best practice and monitoring and reporting procedures. Open days and demonstrations will take place on the farms, the aim being to show direct evidence of how effectively the principles can cut emissions while also improving the efficiency and therefore profitability of farm businesses¹⁰³.

7.17 Many of the measures encouraged by Farming for a Better Climate potentially qualify for grant funding through the Scotland Rural Development Programme (SRDP)¹⁰⁴. The SRDP is a programme of up to £1.5 billion of economic, environmental and social measures designed to develop rural Scotland. It commenced in 2007 and will operate until 2013.

7.18 Eligible activities include: provision of manure/slurry storage and treatment; installation of renewable energy capacity and management of lowland raised bogs.

Farming for a Better Climate example - locking carbon into the soil and vegetation.

7.19 On a global scale, soils contain about twice as much carbon as the atmosphere and about three times as much as vegetation¹⁰⁵. Small changes in the global soil carbon store could therefore have a significant effect on atmospheric CO₂ concentrations.

7.20 Well managed soils can accumulate more carbon over time but poorly managed soils, such as those subject to overgrazing, drainage, inappropriate ploughing and burning can lead to substantial emissions. This is principally caused by the carbon in exposed and disturbed soil decomposing to form CO₂. Weather can also be a factor, in particular the warmer and drier summers associated with climate change.

¹⁰² Farming for a Better Climate website:

www.farmingforabetterclimate.org

¹⁰³ More information about the Focus Farms is available on the SAC website at the following address: <http://www.sac.ac.uk/climatechange/farmingforabetterclimate/ccfocusfarms/>

¹⁰⁴ Scotland Rural Development Programme: www.scotland.gov.uk/Topics/farmingrural/SRDP

¹⁰⁵ IPCC, 2000 - Robert T. Watson, Ian R. Noble, Bert Bolin, N. H. Ravindranath, David J. Verardo and David J. Dokken IPCC Special Report on Land Use, Land-Use Change And Forestry (Eds.) Cambridge University Press, UK: http://www.ipcc.ch/ipccreports/sres/land_use/index.htm

7.21 Scotland's soils store an estimated 3,000 million tonnes of carbon^{106,107}, which is equivalent to nearly 200 years of net Scottish greenhouse gas emissions. Managing the land to help preserve this carbon store is therefore extremely important.

7.22 One of the key targets of the Scottish Government's Farming for a Better Climate programme is to help farmers to lock carbon into the soil and vegetation. The programme offers farmers advice about measures they can take to minimise emissions from these sources such as reducing tillage where appropriate (which also cuts vehicle emissions), crop rotation, incorporating crop residues into the soil after harvest, and planting trees on highly degraded or marginal soils.

7.23 Under the Scotland Rural Development Programme there is an Uplands and Peatlands package which contains a number of Axis 2 Rural Priorities Options to benefit upland habitats and carbon storage.¹⁰⁸

Support for anaerobic digestion through the SRDP

7.24 Anaerobic Digestion (AD) is the process where micro-organisms break down biodegradable materials in the absence of oxygen in an enclosed tank to produce biogas (approximately 60% methane, 39% carbon dioxide and 1% ammonia). This biogas fuels a generator which produces electricity and heat either for use on-farm or for sale to the national grid. As well as biogas, AD produces a solid

and liquid residue called digestate which can be applied to farmland as a bio-fertiliser potentially reducing reliance on manufactured fertiliser.

7.25 Scotland's Zero Waste Plan, launched in June 2010, set out the Scottish Government's intention to introduce progressive bans on the sorts of material that can be landfilled. This is covered in more detail in Chapter 8 on waste. Food waste and other organic matter will be among the material banned from landfill. AD is potentially one of the most cost-effective methods for treating this kind of waste material, offering opportunities for the processing of municipal waste.

7.26 AD is part of the suite of measures promoted through the Farming for a Better Climate initiative. Financial support is available to land managers who meet stated criteria through the SRDP for the purchase and installation of AD plant. Electricity produced from renewable sources below 5 MW may qualify for Feed In Tariffs (FITs). These are financial subsidies which offer a payment per kWh of electricity produced. FIT eligibility requirements are determined by Ofgem, with SRDP grant funded installations required to comply with state aid rules.

EU/Scottish proposals

EU Common Agricultural Policy – mandatory climate change measures

7.27 The present European Union Common Agricultural Policy (CAP) provides a level of income security to farmers as well as a "cross-compliance" framework for sustainable management of the environment. The CAP is due for revision at EU level post 2013 and there is potential for specific climate change mitigation measures, including some of those encouraged in Farming for a Better Climate, to be made mandatory through the cross-compliance regime that links farming practices to subsidy payment.

106 Milne, R. and Brown, T.A., (1997) Carbon in the vegetation and soils in Great Britain. *Journal of Environmental Management*, 49, 413-433.

107 Bradley, R.I., Milne R., Bell J., Lilly, A., Jordan C. and Higgins, A. (2005) A soil carbon and land use database for the United Kingdom. *Soil Use and Management*, 21, 4, 363-369.

108 Scotland Rural Development Programme, List of Rural Priorities Options: <http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Options>

7.28 The Scottish Government will work hard to represent the best interests of Scottish agriculture during the CAP negotiations. Attaining a high uptake of FFBC voluntary measures without resorting to regulation remains the priority. However, a mandatory regime may be necessary if insufficient progress is achieved by the sector.

Overall abatement from agriculture and related land use policies and proposals

7.29 Table 12 and Table 13 show that the overall abatement from adopting all agriculture and related land use policies and proposals could be 0.9 MtCO₂e in 2020 (0.5 MtCO₂e from proposals). Emissions would be 10.7 MtCO₂e in 2020, 23% lower than in 1990.

Supporting and enabling measures

Improved livestock health

7.30 Improving livestock health both benefits productivity and reduces greenhouse gas emissions per unit of milk or meat produced. Healthier livestock grow faster, convert feed more efficiently and are more fertile with lower mortality. The Scottish Government is funding research on improving the breeding potential of livestock and improving livestock health by tackling endemic diseases.

7.31 In September 2009 the European Commission recognised Scotland as officially free of Bovine Tuberculosis¹⁰⁹. The next priority is the eradication of Bovine Viral Diarrhoea. A programme to eradicate this disease from

Scotland's cattle herds was introduced in September 2010, with £400,000 support from the Scottish Government¹¹⁰.

7.32 The Climate Change Delivery Plan for Scotland, published in June 2009, identified research on the carbon footprint of Scottish livestock products as a priority. The Scottish Dairy Carbon Footprint Project¹¹¹ is now underway, with results expected in early 2011. The research project will contribute to meeting a key challenge for rural land use identified in the Delivery Plan: achieving greenhouse gas emissions reduction targets while working within the global context of increasing demand for food. It is envisaged that this project will serve as an exemplar for future work on other supply chains in Scotland.

Peatland restoration

7.33 Scotland's soils, and especially its peatlands, can play a key role in retaining and sequestering carbon. Scottish peatlands contain 1,600 million tonnes of carbon out of the 3,000 million tonnes held in all Scottish soils.

7.34 In support of informed discussions with stakeholders, in December 2010 the Scottish Government published a discussion paper on carbon-rich soils, setting out the activities that we currently support and areas where further work is required¹¹². The paper contains particular detail about the current state of knowledge about carbon sequestration through rewetting peatlands.

7.35 Measures such as drain blocking and the installation of other flow regulation structures

110 Bovine Viral Diarrhoea - Eradication Programme: <http://www.scotland.gov.uk/Topics/farmingrural/Agriculture/animal-welfare/Diseases/SpecificDisease/bvd/eradication>

111 The Scottish Dairy Carbon Footprint Project: <http://sites.google.com/site/dairyfootprint/>

112 Scottish Government discussion paper on the Management of Carbon-Rich Soils: <http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Pollution-1/soil/soilpolicy/carbon-rich>

109 Bovine Tuberculosis - OTF Status: <http://www.scotland.gov.uk/Topics/farmingrural/Agriculture/animal-welfare/Diseases/SpecificDisease/bTB/OTFStatus>

to re-wet peatland which has previously been drained for reasons such as improving grazing or to permit afforestation could have the potential, in the medium to long-term, to reduce and even prevent drying and the exposure to air which can otherwise lead to increased oxidation rates and enhanced emissions of CO₂.

7.36 The Scottish Government is considering the potential benefits of peatland restoration. There is potential to enhance biodiversity by improving and restoring wetland habitats. The multiple benefits from land and the opportunities provided by carbon-rich soils will be recognised in the forthcoming Land Use Strategy. However, the effects of restoration on greenhouse gas emissions are complex and uncertain both in scale and in timing. No figure for the emissions abatement potential of peatland restoration is given in this Report because there is currently insufficient data on which to base a suitable estimate. More research on peatland management is required in order to develop sufficiently robust data before any commitment to a major restoration programme can be made, not least on the grounds that such measures will need to be justified on a value for money basis.

7.37 The UN Framework Convention on Climate Change is in the process of considering an approach to adopting wetland management - namely drainage and rewetting of wetlands since 1990 - as a reported item in the greenhouse gas inventory process. This would bring the consideration of emissions and sequestration of carbon from both degraded and restored peatlands into the existing reporting structure.

7.38 The proposal is that wetland management be incorporated on a voluntary basis into the greenhouse gas inventory process. The principles were agreed at the Conference of the Parties meeting in Cancún, Mexico, in December 2010 (COP 16), but there was no agreement on the

final detail of how these will be incorporated into national emissions reporting. The next step will be for the UNFCCC to agree new accounting guidelines, hopefully in 2011, in order to allow wetland management to be incorporated into international reporting from 2013.

7.39 As stated at the conclusion of the Short-Life Working Group on Climate Change Annual Targets ¹¹³, the Scottish Government will work with stakeholders to examine how wetland management may be incorporated into emissions reporting for the net Scottish emissions account once the process is agreed internationally. It should be noted that this approach, if adopted, would apply both to activities since 1990 that generate emissions from drained areas, as well as the emissions avoided from areas restored since 1990.

7.40 In December 2010 the Scottish Government announced £200,000 of funding to support Scottish Natural Heritage's work to develop an inventory of Scotland's carbon-rich soils, and the RSPB's peatland restoration work at Forsinard to examine different approaches and benefits.

7.41 These projects will contribute to enhancing understanding of soil and emissions science. The outcomes of this work will help in the development of a programme to support conservation and restoration where it can be shown to prevent further greenhouse gas emissions or bring about carbon sequestration.

Soils policy framework and research

7.42 Other work by the Scottish Government to ensure that soil policies play an important role in Scotland's response to climate change includes:

113 Short-Life Working Group on Climate Change Annual Targets: <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/climatechangeact/papers>

- Publication in May 2009 of the Scottish Soil Framework¹¹⁴, to promote the sustainable management and protection of soils consistent with the economic, social and environmental needs of Scotland.
- Funding for a substantial research portfolio, Protecting the Nation's Soils. Estimates of the total carbon stock in Scottish soils are based on legacy data from the Soil Survey of Scotland completed in the 1980s using old analytical techniques. Protecting the Nation's Soils is due to report in the spring of 2011 on a partial re-sampling of the National Soils Inventory. This will provide up-dated estimates of the carbon stock and indications of how this carbon stock may have changed in different land uses since the 1980s.¹¹⁵
- Working with partners in the UK Government and data providers to develop the Greenhouse Gas Emissions Inventory so that it takes account of a broader range of emissions sources in sufficiently sophisticated ways to provide a more accurate picture of the emissions arising from agriculture and other forms of land use. Calculating the extent of the greenhouse gas emissions from soils is extremely difficult and not all losses of carbon from soils are currently taken into account.

7.43 In addition, SEPA will publish a State of Scotland's Soil Report in 2011. The report will collate new data from a variety of sources to highlight the importance of soil in an environmental, social and economic context. It will outline the state of Scotland's soil and will identify how and where improvements can be made to both the state of soil and our understanding of it. One of the key issues considered will be the

interactions of soil with climate change.

7.44 The Scottish River Basin Management Plans include a programme of measures to protect Scotland's water environment, complementary to Scottish Government policy on soils. In conjunction with the Diffuse Pollution Management Advisory Group, SEPA is carrying out assessments of rural land use activities that impact upon the water environment. Follow up action will include discussions with land managers on compliance with the Water Environment (Controlled Activities) (Scotland) Regulations 2005 General Binding Rules which will include information on more efficient fertiliser use. This will help to reduce over-use of fertilisers, which will reduce nitrogen losses to water and air.

Guidance on developments on high carbon soil

7.45 Advice and other practical support to land managers is essential to making best use of our natural assets. SEPA, Scottish Natural Heritage and Forestry Commission Scotland provide advice on land use changes and other activities that are likely to have a significant impact on the environment, including soil carbon. They have particular roles in advising developers and planning authorities within the Environmental Impact Assessment process.^{116, 117, 118 & 119}

7.46 In June 2008 the Scottish Government published a "carbon calculator" which provides guidance to developers on calculating the impact of wind farm developments on soil carbon

¹¹⁴ The Scottish Soil Framework:

<http://www.scotland.gov.uk/Publications/2009/05/20145602/0>

¹¹⁵ Environment – Land Use and Rural Stewardship, Protecting the Nation's Soils:

<http://www.programme3.net/soil/>

¹¹⁶ SEPA Regulatory Position Statement – Developments on Peat: <http://www.sepa.org.uk/planning/idoc.ashx?docid=c2030d4f-898f-479b-9f1c-638a3d87f036&version=-1>

¹¹⁷ SEPA Land Use Planning System Guidance Note 9, Advice on how and when to consult SEPA: <http://www.sepa.org.uk/idoc.ashx?docid=55a92a07-60eb-403c-9d73-ac80f5e61b88&version=-1>

¹¹⁸ Scottish Natural Heritage, Environmental Impact Assessment webpage: <http://www.snh.gov.uk/planning-and-development/environmental-assessment/eia/>

¹¹⁹ Forestry Commission Scotland, Environmental Impact Assessment webpage: <http://www.forestry.gov.uk/forestry/INFD-5ZGKWL>

stocks held in peats and to gauge the emissions payback time¹²⁰. A project is currently underway to update the methodology used in this guidance. It is important that the assessment should take account of the balance of emissions created as well as those avoided over the course of the life of a project.

Costs and benefits

7.47 Continuing the Farming for a Better Climate programme in its current form would cost the Scottish Government £1.8 million over the period 2011 to 2022.

7.48 The Scottish Government provides grant funding through the Scotland Rural Development Programme to help farm managers with the up-front investment costs of installing anaerobic digestion facilities to process animal wastes. It is estimated that supporting anaerobic digestion in this way would cost the Scottish Government £2.3 million between 2011 and 2022.

7.49 However, by achieving the greater efficiencies that Farming for a Better Climate encourages, farmers and other land managers could save up to an estimated £464 million between 2011 and 2022.

Woodland creation

Scottish policies

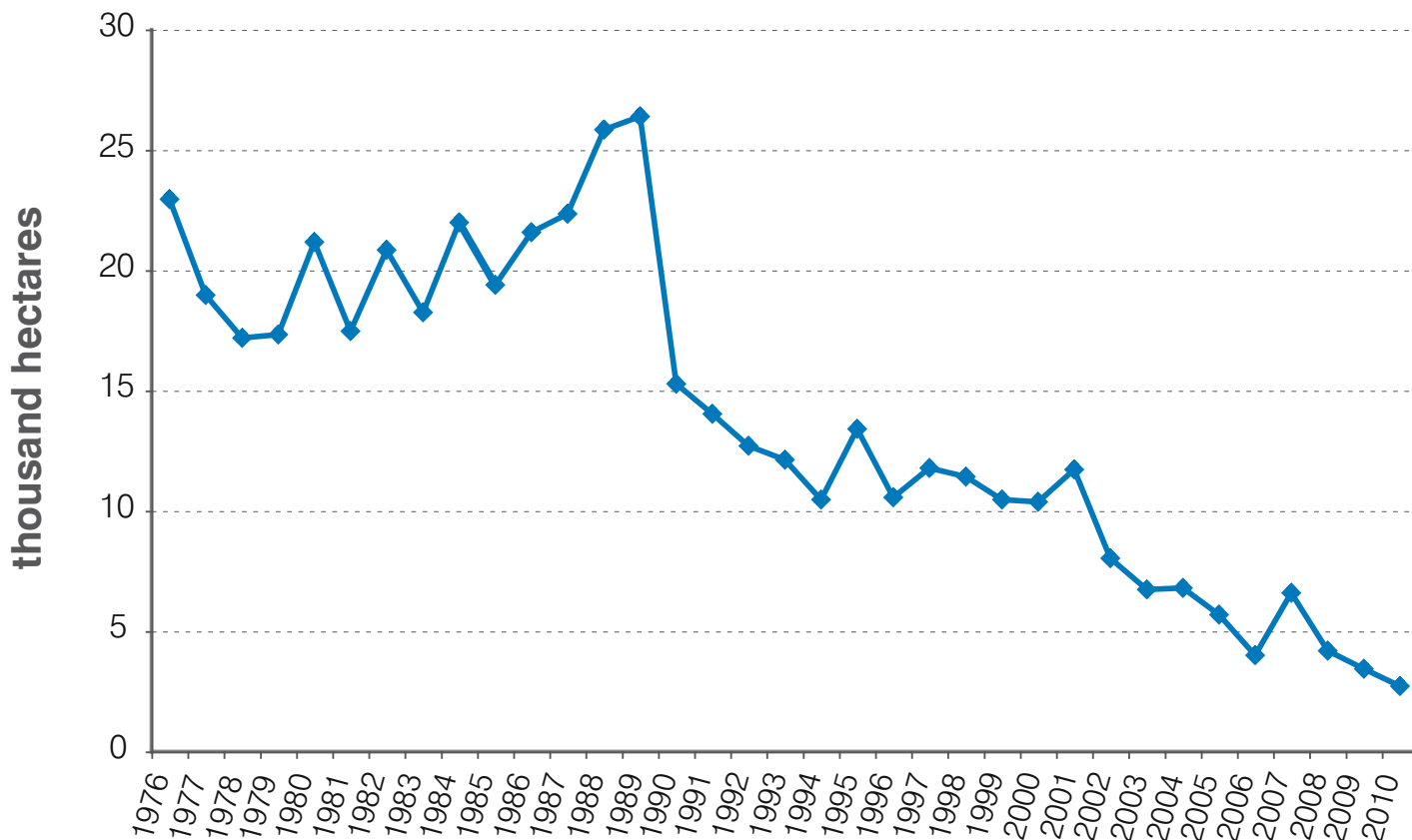
Increase woodland creation to 10,000 hectares per year

7.50 At the beginning of the 20th century woodland cover in Scotland had declined to about 5%. The formation of the Forestry Commission and subsequent introduction of a state afforestation programme in 1919 led to a steady increase in the woodland area. Initially this comprised of mainly coniferous plantations but developed to encompass a wide diversity of woodland types. Today Scotland's woodland cover is about 17% of the land area.

7.51 There was a major period of forestry expansion through the 1970s and 1980s. During the 1990s, planting averaged over 10,000 hectares per year (ha/yr) – with a greater emphasis on native woodlands than previously. More recently, planting rates have fallen – to only 2,600 ha in 2009-10 (see Figure 9). However, afforestation in 2010-11 has shown a marked increase, with an estimated 7,500 ha likely to be planted this year. This is the result of improvements in the Scotland Rural Development Programme and activity on the national forest estate.

¹²⁰ Calculating carbon savings from wind farms on Scottish peat lands: <http://www.scotland.gov.uk/Publications/2008/06/25114657/0>

Figure 9 Woodland planting rate, 1978 to 2010



7.52 The 2006 Scottish Forestry Strategy¹²¹ set a target to increase woodland cover to 25% of Scottish land area by the second half of the 21st century. This was reaffirmed in the Scottish Government’s Rationale for Woodland Expansion (2009)¹²², which set a target of planting a further 650,000 hectares of woodland. This requires woodland planting rates to increase to an average of 10,000 ha/yr.

7.53 In support of this, the Scottish Ministers have pledged to plant 100 million trees by 2015 as part of The Climate Group States and Regions Alliance’s¹²³ commitment to plant 1 billion trees to encourage governments, businesses and communities worldwide to plant a tree for each person on the planet. To achieve the 100 million target, the planting rate will need to increase towards 10,000 ha/yr, depending on planting density.

121 The Scottish Forestry Strategy: <http://www.forestry.gov.uk/forestry/inf-d-6aggzw>
 122 The Scottish Government’s Rationale for Woodland Expansion: www.forestry.gov.uk/website/forestry.nsf/byunique/inf-d-7unj3#woodexp

123 The Climate Group States and Regions alliance was formed in 2005 and members include California, Catalonia, Quebec, Manitoba, South Australia, North Rhine-Westphalia and Scotland. More information is available online at the following address: <http://www.theclimategroup.org/programs/states-and-regions>

Scottish proposals

7.54 Looking ahead, it may become appropriate to increase planting rates towards 15,000 ha/yr. Before extending the afforestation target in this way, it will be important to establish that such a goal would be practicable and cost effective. An important factor will be the availability of sufficient suitable land on which to plant trees. As discussed in paragraphs 7.58 to 7.63, new woodland must be created in appropriate places and in ways that are sensitive to other land uses such as agriculture.

7.55 In February 2010 the Scottish Ministers announced a restructuring of the grant aid available for woodland planting under the Scotland Rural Development Programme to reduce bureaucracy and allow certain types of applications to be “fast tracked”. There is evidence that this has helped to stimulate planting rates above the low levels seen in recent years. However, it is unlikely that grant aid alone will be sufficient incentive to encourage land owners to plant the quantities of additional woodland necessary to achieve an afforestation rate of 15,000 ha/yr. If higher planting rates are to be achieved and sustained it will be important that the commercial potential of woodland be developed. Forestry Commission Scotland is considering alternative approaches to increasing woodland planting rates as part of the Scottish Forest Strategy, with examples being the Woodland Carbon Code and facilitation of the development of markets for timber products, both of which are described in more detail later in this chapter.

Overall abatement from woodland creation

7.56 Table 12 and Table 13 show that the additional sequestration from increasing the

woodland creation rate to 10,000 ha/yr could be 0.31 MtCO₂e in 2020. Increasing this even further, to 15,000 ha/yr, would provide an additional 0.14 MtCO₂e in 2020. However, this abatement potential will continue to grow substantially during the following decades as these trees mature.

Supporting and enabling measures

Woodland Carbon Code

7.57 While support for woodland creation under the SRDP has been enhanced, alternative mechanisms will be required to deliver the woodland expansion target. The recent launch of the pilot phase of the Woodland Carbon Code¹²⁴ is aimed at attracting finance to contribute to the costs of woodland creation by developing well-governed forest-related carbon markets. This Code is intended to provide quality assurance standards that will underpin forest-based carbon schemes so that they are sustainable, well designed and managed and deliver the carbon benefits that they claim. The intention is that the Code will come into operation across the whole of the UK in mid 2011. Meanwhile, between October and December 2010 the UK Department for Food and Rural Affairs consulted on how businesses can use the Code protocols when measuring and reporting on net green house gas emissions¹²⁵.

Woodland planning – The Right Tree in the Right Place

7.58 While seeking to increase Scotland’s woodland area, care must be taken to ensure that new planting takes place in the most appropriate locations. The high planting rates of past decades

¹²⁴ Woodland Carbon Code:

<http://www.forestry.gov.uk/forestry/INFD-84HL57>

¹²⁵ DEFRA Discussion Document on the draft guidance on how to report greenhouse gas removals and emissions from woodland creation: <http://www.defra.gov.uk/corporate/consult/ghg-woodland/index.htm>

were, in part, achieved by planting trees on carbon rich soils, an activity which we now understand can release CO₂ into the atmosphere, contributing to global warming. Future planting must minimise this risk and be integrated with the other land uses. The revised UK Forestry Standard (UKFS) and associated Guidelines, including new guidance on forests and climate change, will be published in 2011. The UKFS will continue to provide a robust framework within which woodland creation proposals are considered.

7.59 In June 2010, Forestry Commission Scotland published *The Right Tree in the Right Place*¹²⁶, which provides guidance to planning authorities on the multiple benefits that can be derived from well-planned and well-managed woodlands and encourages them to prepare new forestry and woodland strategies to guide future woodland expansion.

Woodland and agricultural land

7.60 Forestry development in Scotland has traditionally been on poorer quality land. During the years of agricultural surpluses and relatively low land prices a prevailing view was that woodland creation should move 'down the hill' to improve the diversity of lowland landscapes and avoid further land use change in the uplands.

7.61 This situation has changed in recent years. Prices for grain and other arable crops have risen. Concerns over global food affordability and supply are being compounded by poor harvests in some major arable cropping regions, and the emergence of biofuels as a competing market for arable crops. Prices for high quality farmland in Scotland are at an historic high.

7.62 Within this context it is likely that the main focus of woodland creation will be away from

prime agricultural land and on land where the benefits offered by forests are likely to outweigh the potential for agricultural production. However, some better land will be appropriate for woodland creation, for example where it forms part of a habitat network, contributes to water and soil resource management, provides farm, community or amenity benefits or supports very high yielding energy forests close to biomass energy plants.

7.63 SRDP grants for planting woodland on agricultural land include annual payments reflecting loss of agricultural income. In addition to promoting action through SRDP, Forestry Commission Scotland is piloting a scheme whereby it will lease land from farmers for around 10 years in order to establish woodlands on farms.

Controlling woodland removal

7.64 Increasing Scotland's overall woodland area will be aided by reducing the loss of existing woodland. The Scottish Government will therefore only support the removal of woodland where it would achieve significant and clearly defined public benefits. This policy is articulated in both the National Planning Framework 2 and consolidated Scottish Planning Policy. The criteria for determining the acceptability of woodland removal and further information on the implementation is explained in the Policy on Control of Woodland Removal¹²⁷, which the Scottish Government expects planning authorities to take into account when preparing development plans and deciding planning applications.

Timber

7.65 Supporting 13,200 jobs and generating £460 million in gross value added, Scotland's timber industry makes a valuable contribution to

¹²⁶ Further information about forestry and the planning system in Scotland, including *The Right Tree in the Right Place*, is available from: <http://www.forestry.gov.uk/forestry/INFD-868FMB>

¹²⁷ Forestry Commission Scotland's Policy on Control of Woodland Removal: <http://www.forestry.gov.uk/woodlandremoval>

the country's economy¹²⁸. Currently, over 70% of the timber produced in Scotland (6.4 million cubic metres in 2009) is processed in Scotland.

7.66 The timber industry provides two cross-cutting means of reducing emissions:

- **Wood for construction** - Timber is a lower carbon alternative to construction materials such as concrete and steel. A timber frame building can store almost 11 tonnes more CO₂ than a traditional brick and block house. Forestry Commission Scotland's Timber Development Programme¹²⁹ aims to improve the quality and value of, and access to the most appropriate markets for, home-grown timber.
- **Wood for fuel** - Biomass, including woodfuel, will be an important contributor to meeting the Scottish Government's target of achieving 11% of heat usage from renewable sources by 2020. Currently over 90% of renewable heat is generated from woody biomass and demand for woodfuel for heat and power in Scotland is estimated to have reached 670,000 oven dried tonnes in 2010, an increase of 35% on 2009.

International greenhouse gas emissions accounting rules treat burning wood as largely carbon neutral, since it releases the carbon stored by trees as they grow. These rules also account for factors such as the disturbance of soils in woodland and carbon life-cycle. However, harvested woodland must be replanted in order to maintain the resource and carbon cycle.

Wood fuel is a limited resource and should be used in the most efficient way. The independent Wood Fuel Task Force reconvened recently and is reviewing supply

and demand issues with the aim of reporting to Scottish Ministers in 2011¹³⁰.

The Scottish and UK Governments are currently developing biomass sustainability criteria to require that biomass used for heat or power generation as part of government incentives such as the Renewables Obligation, comes from sustainable sources.

7.67 More information on the policies encouraging the use of renewable heat is provided in Chapter 3 on Energy Supply.

7.68 A thriving timber industry will play an important part of the contribution that the woodland and forestry sector can make to reducing greenhouse gas emissions. Demand for timber drives demand for woodland and benefits the economics of woodland creation. Managed sustainably, productive forestry also helps to balance mature woodland with younger plantings, which have the greatest potential to sequester carbon.

7.69 Developing a more efficient and competitive timber supply chain and facilitating the development of markets for forest products are key objectives within the Scottish Forest Strategy. At the local level, the Scottish Working Woods label has been developed for use by smaller sawmillers and wood users to recognise the sustainability and economic benefits of locally grown and processed timber¹³¹. More details of the actions being taken to realise the Scottish Forestry Strategy objectives are available in the 2010-2013 Implementation Plan¹³².

130 Woodfuel Task Force: <http://www.forestry.gov.uk/forestry/INFD-7APFXA>

131 Scottish Working Woods website: <http://www.scottishworkingwoods.org.uk>

132 The 2010-2013 Scottish Forestry Strategy Implementation Plan: <http://www.forestry.gov.uk/forestry/infd-6aggzw>

128 A valuation of the economic and social contribution of Forestry for People in Scotland: <http://www.forestresearch.gov.uk/fr/infid-6s8csp>

129 Forestry Commission Scotland's Timber Development Programme: <http://www.forestry.gov.uk/tdp>

Costs and benefits

7.70 The cost of achieving a new woodland planting programme of 10,000 ha/yr over the period 2011-2022 will be around £542 million, assuming an average of £5,300/ha. Much of this will come from financial support through the SRDP, currently worth up to £1.5 billion over the seven year period 2007 - 2013, but there will also be additional planting on the national forest estate.

7.71 More information about SRDP funding for woodland creation is available on the Scottish Government's website¹³³ and the Forestry Commission Scotland website¹³⁴.

7.72 These costs should be seen in the context of the employment and economic benefit attributable to the Scottish forestry sector. Forestry currently makes up about 0.5% of the total gross value added for the Scottish economy, with a proportionally more significant contribution in rural areas. As well as the 13,200 full-time-equivalent jobs sustained by the timber industry, generating £460 million each year, £206 million is spent each year on tourism and recreation associated with woodland, sustaining around 17,900 full-time-equivalent jobs. Increasing the woodland creation rate to 10,000 ha/yr could provide up to the equivalent of 6,500 person years direct employment in woodland establishment between 2011 and 2020. Increasing the rate to 15,000 ha/yr from 2015 could add an additional 3,000 person-years of employment.

7.73 Woodlands make an important contribution to Scotland's biodiversity in terms of the number of priority habitat types (seven including wood pasture) and priority species (169) it supports. Woodlands in Scotland support a higher concentration of UK priority species than all other terrestrial land uses or habitat types, and native woodlands are a key part of our natural heritage.

7.74 In addition to these economic and environmental benefits, the ability of woodlands to deliver social benefits has been increasingly recognised in the last ten years. Woods offer opportunities for physical, mental and psychological health improvement, for example through exercise and making use of woodland settings for therapeutic activities. There are also learning benefits. In 2007, 569 schools were involved in woodland-based learning activities and an estimated 63% of Scottish children made visits to Scottish woodlands.

The need for greater powers

7.75 Scottish policy on agriculture, related land use and forestry has to work within the framework of the EU Common Agricultural Policy. Although the Scottish Government works with its partners in the UK Government and other Devolved Administrations to influence the UK position in EU negotiations, the Scottish Ministers would have a better platform to represent the interests of these sectors were they able to negotiate directly in the EU.

7.76 Taxation has a fundamental influence on land use decisions. Greater flexibility to define a fiscal regime for Scotland would help align taxation regimes with Scotland's economic and environmental priorities.

¹³³ SRDP Rural Priorities, Woodland Creation: <http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Options/WoodlandCreation>

¹³⁴ Forestry Commission Scotland "Grants news": <http://www.forestry.gov.uk/forestry/INFD-7RLKLY>

Table 12: Policies for reducing emissions from Rural Land Use

Policy package and description	EU, UK or Scottish policy?	Expected abatement (ktCO ₂ e) in 2020	Further information available from
Farming for a Better Climate FFBC encourages farmers to adopt efficiency measures that also reduce emissions, particularly those having an overall positive impact on business performance.	Scottish	319	Farming for a Better Climate website: http://www.farmingforabetterclimate.org
Support for anaerobic digestion through the SRDP Grant funding through the Scotland Rural Development Programme is available for farmers to install anaerobic digestion facilities to process animal wastes.	Scottish	16	Scotland Rural Development Programme, List of Rural Priorities Options: http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Options
Increase woodland creation to 10,000 hectares per year Scottish Ministers have pledged to plant 100 million trees by 2015, increasing the current planting rate towards 10,000 ha/yr, depending on planting density. Abatement in 2020 assumes this planting rate is maintained from 2015 to 2020.	Scottish	310	The Scottish Forestry Strategy: www.forestry.gov.uk/forestry/inf-d-6aggzw The Scottish Government's Rationale for Woodland Expansion: www.forestry.gov.uk/website/forestry.nsf/byunique/inf-d-7unjy3#woodexp
TOTAL ABATEMENT FROM RURAL LAND USE POLICIES		645	

Table 13: Proposals for reducing emissions from Rural Land Use

	Maximum abatement potential (ktCO₂e) in 2020	Total financial cost (2011-22, cash terms)	Cost-effectiveness (£/tCO₂e abated)	Earliest start date	Options for implementation
<p>EU Common Agricultural Policy – mandatory climate change measures</p> <p>This would entail the addition of climate change actions to the CAP cross-compliance requirements that farm businesses would have to satisfy to qualify for the Single Payment Scheme. The effect would be to make mandatory some or all of the measures currently encouraged by Farming For a Better Climate.</p>	540	-265	-67	2018	This would result from revisions by the EU to the CAP and the earliest that this can occur is 2014, with changes on the ground not expected until 2018. Scotland has lobbying influence but no direct control.
<p>Increase woodland creation to 15,000 hectares per year</p> <p>Increasing woodland planting rates to 15,000 ha/yr would be depend on whether this can be shown to be a practicably achievable goal. A key consideration will be more privately owned land becoming available for forestry that has been the case in recent years.</p>	144 (in addition to 310 from achieving a planting rate of 10,000 ha/yr)	799	20	2011	<p>Grant funding for woodland planting will continue to have a role, but the experience of recent years is that it will not be sufficient incentive to drive planting rates of this level. There will therefore also need to be greater levels of private investment in woodland creation.</p> <p>Measures that are being implemented to stimulate woodland creation include improving the available grant funding; additional planting on the national forest estate; leasing land from farmers; and new business models such as the 'Woodland Carbon Code' to promote investment in woodland carbon projects.</p>
TOTAL FOR RURAL LAND USE PROPOSALS	684	534			

Table 14: Supporting and enabling measures for reducing emissions from Rural Land Use

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>Improved livestock health Includes measures such as an immunisation program to eradicate bovine viral diarrhoea, which would result in herds becoming more efficient and productive due to lower disease levels, reducing carbon intensity of production.</p>	Scottish	Proposal	Bovine Viral Diarrhoea - Eradication Programme: http://www.scotland.gov.uk/Topics/farmingrural/Agriculture/animal-welfare/Diseases/SpecificDisease/bvd/eradication
<p>Peatland Restoration The Scottish Government will work with stakeholders to examine how wetland management may be incorporated into emissions reporting for the net Scottish emissions account once the process is agreed internationally.</p> <p>The Scottish Government will undertake research to improve the data available regarding the effectiveness of peatland restoration. This will help to inform the development of a programme to prevent further greenhouse gas emissions or bring about carbon sequestration.</p>	Scottish	Policy	Short-Life Working Group on Climate Change Annual Targets: http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/climatechangeact/papers
<p>Soils policy framework and research</p> <ul style="list-style-type: none"> Scottish Soil Framework promotes the sustainable management and protection of soils consistent with the economic, social and environmental needs of Scotland. Funding for a substantial research portfolio, Protecting the Nation's Soils. Working with partners in the UK Government and data providers to develop the Greenhouse Gas Emissions Inventory to provide a more accurate picture of the emissions arising from agriculture and other forms of land use. Advice to land managers on compliance with the Water Environment (Controlled Activities) (Scotland) Regulations 2005 General Binding Rules, including information on more efficient fertiliser use. This will help to reduce over-use of fertilisers, which will reduce nitrogen losses to water and air. 	Scottish	Policy	<p>The Scottish Soil Framework: http://www.scotland.gov.uk/Publications/2009/05/20145602/0</p> <p>Environment – Land Use and Rural Stewardship, Protecting the Nation's Soils: http://www.programme3.net/soil/</p>

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>Guidance on developments on high carbon soil</p> <ul style="list-style-type: none"> Guidance, including for Environmental Impact Assessment, from SEPA, Scottish Natural Heritage and Forestry Commission Scotland. Scottish Government 'carbon calculator' for wind farm developments on high carbon soil. 	<p>Scottish</p> <p>Scottish</p>	<p>Policy</p> <p>Policy</p>	<p>SEPA Regulatory Position Statement – Developments on Peat: http://www.sepa.org.uk/planning/idoc.ashx?docid=c2030d4f-898f-479b-9f1c-638a3d87f036&version=-1</p> <p>SEPA Land Use Planning System Guidance Note 9, Advice on how and when to consult SEPA: www.sepa.org.uk/idoc.ashx?docid=55a92a07-60eb-403c-9d73-ac80f5e61b88&version=-1</p> <p>Scottish Natural Heritage, Environmental Impact Assessment webpage: http://www.snh.gov.uk/planning-and-development/environmental-assessment/eia/</p> <p>Forestry Commission Scotland, Environmental Impact Assessment webpage: http://www.forestry.gov.uk/forestry/INFD-5ZGKWL</p> <p>Calculating carbon savings from wind farms on Scottish peat lands: http://www.scotland.gov.uk/Publications/2008/06/25114657/0</p>

8. Waste



8. Waste

8.1 Approximately 20 million tonnes of waste is produced each year in Scotland.

8.2 The Scottish Government is committed to reducing Scotland's local and global environmental impact by moving towards a Zero Waste Scotland. This involves valuing waste as a resource; encouraging reuse, recycling and recovery; and reducing the traditional reliance on disposal of waste in landfill. This has direct benefits as it avoids organic wastes breaking down in landfill sites and producing potent greenhouse gases but it has significant indirect benefits too as re-use, recycling and recovery reduce carbon emissions from the manufacturing sector and displace use of fossil fuels.

8.3 By investing in infrastructure to reduce the proportion of waste sent to landfill, local authorities could save up to £170 million by 2020 over the cost of paying landfill tax.

Trends

- International greenhouse gas emissions accounting methodology measures direct emissions from waste management as primarily those that come from landfill sites. This is mainly methane that is produced by decaying organic matter.

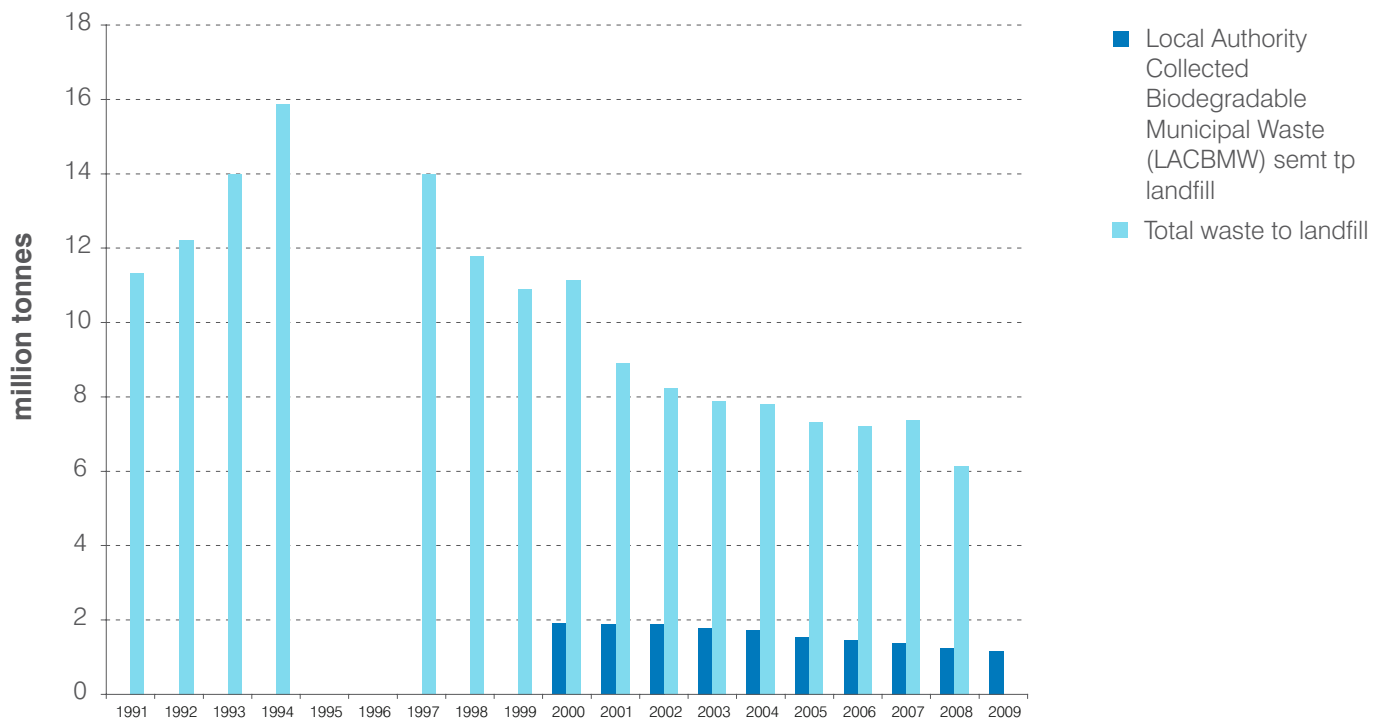
- In 1990, Scottish emissions from waste management were 5.8 MtCO₂e. In 2008, the latest year for which figures are available, these emissions had fallen to 2.8 MtCO₂e, a fall of more than 50% from 1990. The main reasons for this are that less waste is being sent to landfill and steps have been taken to reduce the impact of landfill gas in line with Landfill Directive¹³⁵ requirements. Figure 10 shows how the amount of waste sent to landfill has declined over recent years.

Milestones

- Agree and implement measures to ban disposal of organic waste from landfill and require certain priority wastes to be sorted at source and collected separately or, as appropriate, treated after collection. Following analysis of the responses to the Zero Waste (Scotland) Regulations consultation, the Scottish Government intends to introduce secondary legislation during 2011.
- Phased introduction of bans on materials that may be landfilled: food waste and dry recyclables from 2015; and all biodegradable waste by 2017.

¹³⁵ Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31999L0031:EN:NOT>

Figure 10: Local Authority Collected Biodegradable Municipal Waste sent to landfill and total waste to landfill, 1991 to 2009



EU policies

8.4 Waste policy in Scotland sits within a framework of EU legislation. The main legislation is:

- The European Union’s Revised Waste Framework Directive (2008/98/EC), which provides the EU Framework for the management of waste and lays down a number of provisions covering a variety of areas, including the definition of waste, the waste hierarchy, and re-use and recycling targets.
- The Landfill Directive (1999/31/EC), aims to prevent, or reduce as far as possible, negative effects on the environment from the landfilling of waste, by introducing stringent technical requirements for waste and landfills. The Directive also aims to reduce climate change

impact by setting targets for the reduction of the amount of biodegradable municipal waste sent to landfill. The targets are to reduce landfilling of biodegradable municipal waste to 75% of the 1995 baseline by 2010, 50% by 2013 and 35% by 2020. The Landfill Directive has been transposed in Scotland by the Landfill (Scotland) Regulations 2003.

UK policies

8.5 In support of EU policy, the UK Government has imposed a tax on waste sent to landfill. In 2010-11 the tax is £48 per tonne but this is set to rise by £8 per year until at least 2014-15, at which point the level will be £80 per tonne.

8.6 The escalating landfill tax incentivises waste producers to reduce, re-use or recycle; or recover value from waste where waste production cannot be avoided.

Scottish policies

Zero Waste Plan

8.7 In June 2010, the Scottish Government published Scotland's Zero Waste Plan¹³⁶ which sets out its vision for a zero waste society. This vision is a Scotland where waste is seen as a resource with the vast majority of waste being sorted and recycled and minimal amounts of unsorted residual wastes being treated or disposed. Unlike previous plans which focused on municipal waste managed by local authorities

(approximately 17% of Scotland's waste), the Zero Waste Plan sets out to deal with all of Scotland's waste – commercial and industrial waste as well as household waste.

8.8 Central to the Zero Waste Plan is the principle of the waste hierarchy as set out in the European Waste Framework Directive. The hierarchy identifies the prevention of waste as the highest priority, followed by reuse, recycling, recovery of other value (e.g. energy), with disposal as the least desirable option.

The Waste Hierarchy

Preferred Environmental Option



Least Environmental Option

136 Scotland's Zero Waste Plan:
<http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy>

8.9 The waste hierarchy will guide our overall approach to managing Scotland's waste. While recycling performance continues to improve, we must also continue to pursue other treatment approaches to recover greater value from the resources we use.

8.10 The Zero Waste Plan sets out 22 actions across four areas: resource streams, economic opportunity, resource management, and education and awareness. These actions are not all reproduced here although many will have direct or indirect effects on reducing emissions, particularly by encouraging more sustainable consumption and, through more and better re-use and recycling of materials, displacement of emissions that would have occurred in Scotland or elsewhere in the world to produce and transport goods.

8.11 The area of the Zero Waste Plan which has the biggest potential to impact on greenhouse gas emissions from waste is the Scottish Government's intention to require that certain priority waste materials be sorted at source and collected separately or, as appropriate, treated after collection. The intention is that the following wastes should be collected separately:

- Food waste, from households and business sectors, such as commercial kitchens, hospitality sector, food retailers and manufacturers.
- Materials such as paper/card, metals, plastics, textiles and glass from households, commerce and industry.

8.12 Sorting and collecting materials separately will ensure that the maximum environmental and economic benefits can be gained from recycling or recovery. Achieving this will require amendments to existing statutory mechanisms and the Scottish Government consulted on the best approach to doing this between December

2010 and February 2011¹³⁷. A summary of the consultation responses is available from Scotland's Zero Waste Plan web page¹³⁸.

8.13 Supporting the change to require sorting and collection of separate materials will be the phased introduction of bans on materials that may be landfilled. The Zero Waste Plan sets out the Scottish Government's intention that food waste and dry recyclables be banned from landfill from 2015 and that all biodegradable waste be banned from landfill by 2017. Views on the practicalities associated with these landfill bans were sought in the recent consultation and the Scottish Government intends to bring forward regulations in 2011.

Energy from waste

8.14 Banning food waste then all biodegradable material from landfill will cut methane and other greenhouse gas emissions but will also present the potential to use that material to generate green energy, displacing use of fossil fuels and reducing greenhouse gas impacts.

8.15 The priority of the Zero Waste Plan is to treat resources as high up the waste hierarchy as possible by preventing, reusing or recycling resources wherever feasible. However, energy from waste also has an important role to play. In terms of the waste hierarchy it is ranked above landfill and has the potential to generate enough heat for 110,000 homes and power for 170,000 homes in Scotland. For energy from waste to be truly sustainable it should only be used for resource streams which cannot practicably offer greater environmental and economic benefits through reuse or recycling.

¹³⁷ Consultation on the proposed Zero Waste (Scotland) Regulations 2011: <http://www.scotland.gov.uk/Publications/2011/02/09135833/0>

¹³⁸ Zero Waste Plan:

<http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy>

8.16 The Scottish Government plans to introduce new regulations in 2011 requiring separate collections of recyclable materials and food waste, and controlling inputs to energy from waste combustion plants. The new regulatory approach to energy from waste will ensure that waste materials which can be reused or recycled are not incinerated and will mean that unsorted waste will not be able to go directly for energy from waste without first being pre-treated. This will provide a second opportunity to remove recyclate missed at the source segregation stage and ensure that Scotland does not simply move from mass landfill to mass incineration. This new approach will apply to all resource streams, not just municipal waste.

Overall abatement from Waste policies and proposals

8.17 As shown in Table 15, measures contained in Scotland's Zero Waste Plan could result in an abatement of approximately 0.5 MtCO₂e by 2020.

Supporting and enabling measures

The Zero Waste Plan targets and data needs

8.18 The Zero Waste Plan sets targets for several aspects of waste management. These are detailed in full in Annex A of the Plan, but include:

- recycling, composting and preparing for re-use targets for waste collected from households: 40%, 50%, 60% and 70% by 2010, 2013, 2020 and 2025 respectively – diverting waste from landfill;
- recycling 70% of all waste by 2025 (including commercial and industrial waste); and
- a target to reduce the quantity of total waste sent to landfill to a maximum of 5% by 2025.

8.19 In order to monitor progress towards these targets and the implementation of other aspects of the Zero Waste Plan and to help local authorities and businesses obtain reliable information on waste materials which could be prevented, reused, recycled or recovered, the Scottish Government and SEPA need to collect more robust and accurate information about waste arisings and management than they do at present. The full scope of the information required is set out in Annex A of the Zero Waste Plan and SEPA is currently in the process updating its Waste Data Strategy to address this¹³⁹.

8.20 SEPA will focus attention, in particular, on improving the quality of commercial and industrial data. This will include making use of Regulations made under section 79 of the Climate Change (Scotland) Act 2009, establishing a mandatory requirement for businesses receiving waste data requests from SEPA to complete them. This will be exercised in line with better regulation principles.

Zero Waste Scotland - creating an effective delivery model

8.21 The need for a unified Scottish waste programme was identified in responses to the Scottish Government's consultation on the Zero Waste Plan. In January 2010 action was taken to bring together seven previously separate waste and resource related programmes under one umbrella programme called Zero Waste Scotland¹⁴⁰.

8.22 Zero Waste Scotland is funded by the Scottish Government and provides a unified delivery programme supporting the implementation of Scotland's Zero Waste Plan. Zero Waste Scotland's activities include:

¹³⁹ SEPA's Waste Data Strategy: http://www.sepa.org.uk/waste/waste_data.aspx.

¹⁴⁰ Zero Waste Scotland: <http://www.zerowastescotland.org.uk>

- provision of advice on resource efficiency to business;
- promotion of best waste and resource management practice;
- waste education and awareness; and
- waste management infrastructure capital investment support.

8.23 In addition, Zero Waste Scotland provides support for local authorities and takes the lead in promoting voluntary agreements with industry and commerce. Full details of Zero Waste Scotland's operating plan and programme of work are available on its website¹⁴¹.

Carbon metric for recycling

8.24 The Zero Waste Plan details several steps that the Scottish Government intends to take to promote high quality recycling. As well as the requirement for waste to be sorted and collected separately, the Scottish Government will introduce a carbon metric for waste to sit alongside the use of tonnage as a performance measure and target. Whilst there is no direct link with the CRC Energy Efficiency Scheme, the carbon metric will help waste holders to identify and prioritise the materials with the highest environmental benefit for recycling, leading to lower greenhouse gas emissions, better environmental outcomes generally, and a more resource efficient economy.

8.25 The new metric will recognise that the production of different primary materials produce different levels of environmental impact and will value recyclate accordingly. One tonne of aluminium collected from the waste stream in Scotland will displace the need for primary production of aluminium in another part of the world and this will avoid a greater amount of

greenhouse gases being released than, for example, recycling one tonne of paper.

8.26 The carbon metric will be applied to the local authority collected municipal waste stream first (2013 target) as this stream already reports the appropriate data. However, as data reporting from the commercial and industrial sectors improves, their performance will also be reported using the carbon metric.

8.27 Although some of the manufacturing emissions that will be displaced occur overseas, and therefore fall outside the scope of Scotland's statutory climate change targets, this approach underlines the Scottish Ministers' commitment to reducing Scotland's overall ecological footprint¹⁴².

Enabling powers in the Climate Change (Scotland) Act 2009

8.28 As well as the powers to require the provision of waste data, detailed in paragraph 8.20, the Climate Change (Scotland) Act 2009 also gives the Scottish Ministers powers to make a variety of orders and regulations in relation to waste management and climate change:

- **Waste prevention and management plans**
Section 78 of the Act enables the Scottish Ministers to place a duty on businesses and public bodies to prepare formal waste prevention and management plans.
- **Facilities for deposit of recyclable waste**
Sections 80 and 81 enable the creation of regulations to require businesses and public bodies to provide recycling facilities.
- **Procurement of recyclate**
Section 82 enables the creation of regulations

141 Zero Waste Scotland operating plan: www.zerowastescotland.org.uk/about_us/programme_governance/operating_plan.html

142 Scottish Government National Indicators, Reduce overall ecological footprint: <http://www.scotland.gov.uk/About/scotPerforms/indicators/ecologicalFootprint>

requiring a minimum percentage of recycle or re-used materials in certain public and/or private sector procurement contracts.

- **Targets for reduction of packaging**
Section 83 gives the Scottish Ministers powers to set binding targets for overall reductions in packaging.
- **Deposit and return schemes**
Sections 84 to 87 allow the Scottish Ministers to set up and manage schemes that would require retailers to include a deposit as part of the price of products, to be refunded when packaging is returned for re-use.
- **Charges for carrier bags**
Section 88 enables Ministers to make regulations about charging by sellers of goods for the supply of carrier bags.

8.29 Although the Scottish Ministers have these powers, there are no plans to use them to make secondary legislation in the short-term. The Scottish Government's preference is to seek to achieve progress by voluntary means wherever possible rather than by regulation. Good examples of this are the Courtauld Commitment by the retail sector to cut its waste, and the commitment by the construction industry to halve waste sent to landfill.

8.30 The first phase of the Courtauld Commitment was successful in reducing packaging and food waste by 1.2 million tonnes between 2005 and 2010. The value of this avoided food and packaging waste is estimated at £1.8 billion and the emissions avoided amount to around 3.3 MtCO₂e.

8.31 The Halving Waste to Landfill commitment now has over 400 signatories from across the construction supply chain in the UK, who are collectively responsible for £30 billion of spend each year. By working with firms to set resource efficiency requirements in contracts,

the commitment will divert over 1 million tonnes of waste from landfill and save more than £100 million.

Costs and benefits

8.32 In order to meet current EU and Scottish Government waste targets, more investment is required in collection, processing and treatment infrastructure but these costs will be more than offset by the saving made from not having to pay landfill taxes. Doing nothing would lead to additional costs above current spend on municipal waste managed by local authorities of £870 million between 2010 and 2020.

8.33 Investing in infrastructure to meet the 2020 60% recycling and composting target (high quality source-segregated recycling) will add approximately £700 million to the cost of local authority waste management. However, it will cost in the region of £170 million less to meet the Zero Waste targets than continuing to send unsorted waste to landfill. The Scottish Government will undertake a Business and Regulatory Impact Assessment, including cost benefit analysis, in order to inform the development of the planned legislative measures to require separate collections of recycle and food waste.

8.34 Implementing Zero Waste Plan measures will also result in additional benefits in areas such as energy and manufacturing. For example, resource efficiency in manufacturing of goods from recycled materials and displacement of fossil fuels through production of green energy from waste (heat and power) both result in emissions and financial savings.

The need for greater powers

8.35 Although the Scottish Government works with its partners in the UK Government and other Devolved Administrations to influence the UK

position in EU negotiations, the Scottish Ministers would have a better platform to influence European waste policy and delivery were they able to negotiate directly within the EU.

8.36 Taxation has a fundamental influence on waste decisions. Greater flexibility to define a fiscal regime for Scotland would help align taxation regimes with Scotland's economic and environmental priorities - for example, landfill tax and the aggregates levy are currently set

at UK level, although the UK Government has announced plans to devolve landfill tax powers to the Scottish Parliament.

8.37 Other areas where additional powers for Scotland could help to contribute to meeting climate change targets are the regulations covering excess packaging, to enable a more aggressive focus on packaging reduction, and the regulation of waste exports.

Table 15: Policies for reducing emissions from Waste

Policy package and description	EU, UK or Scottish policy?	Expected abatement (ktCO ₂ e) in 2020	Further information available from
<p>All waste policies</p> <p>Waste Framework Directive EU Framework for the management of waste and lays down a number of provisions covering a variety of areas, including the definition of waste, the waste hierarchy, and re-use and recycling targets.</p> <p>Landfill Directive Includes targets for reducing the amount of biodegradable municipal waste sent to landfill – of 75% of the 1995 baseline by 2010, 50% by 2013 and 35% by 2020.</p> <p>Landfill Tax Tax on active wastes in landfill rising on an £8 per year escalator rising to £80 per tonne by 2014-15.</p> <p>Zero Waste Plan</p> <ul style="list-style-type: none"> Sorting waste and separate collection. Sorting and collecting specific wastes appropriately to ensure that the maximum environmental and economic benefits can be gained from recovering and recycling materials. <p>Landfill Bans</p> <ul style="list-style-type: none"> Ban on specific materials being landfilled – food waste and dry recyclables from 2015, all biodegradable waste by 2017. 	<p>EU</p> <p>EU</p> <p>UK</p> <p>Scottish</p>	521	<p>Scottish Government, Waste policy in Scotland: http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1</p> <p>SEPA landfill information and guidance: http://www.sepa.org.uk/waste/waste_regulation/landfill.aspx</p> <p>HM Revenue and Customs, Landfill Tax: http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?nfpb=true&_pageLabel=pageExcise_ShowContent&id=HMCE_CL_001206&propertyType=document</p>

Table 16: Supporting and enabling measures for reducing emissions from Waste

Policy package and description	EU, UK or Scottish policy?	Policy or proposal?	Further information available from
<p>Zero Waste Plan</p> <ul style="list-style-type: none"> • Zero Waste Targets <ul style="list-style-type: none"> • Recycling, composting and preparing for re-use targets for waste collected from households: 40%, 50%, 60% and 70% by 2010, 2013, 2020 and 2025 respectively – diverting waste from landfill; and • a target to achieve an overall recycling and composting level of 70% and 5% (maximum) landfill for the total Scottish waste arisings by 2025. • Waste data collection Collection of more robust and accurate data in order to monitor implementation and progress of waste management and reduction measures. • Zero Waste Scotland - Creating an Effective Delivery Model Creation of Zero Waste Scotland as an umbrella programme to provide a one stop shop for waste support services for local authorities, businesses, the third sector and communities. • Carbon metric for Recycling The Scottish Government will introduce a carbon metric for waste to identify and prioritise the materials with the highest environmental benefit for recycling. 	<p>Scottish</p> <p>Scottish</p> <p>Scottish</p> <p>Scottish</p>	<p>Policy</p> <p>Policy</p> <p>Policy</p> <p>Policy</p>	<p>Scotland's Zero Waste Plan: http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy</p> <p>SEPA Waste Data Strategy: http://www.sepa.org.uk/waste/waste_data.aspx</p> <p>Zero Waste Scotland: http://www.zerowastescotland.org.uk/</p>
<p>Secondary Legislation under the Climate Change (Scotland) Act 2009</p> <p>The Scottish Ministers have powers to make a variety of orders and regulations in relation to waste management and climate change. However, the Scottish Ministers' preference is to seek to achieve progress by voluntary means wherever possible.</p>	<p>Scottish</p>	<p>Proposal</p>	<p>Climate Change (Scotland) Act 2009 http://www.legislation.gov.uk/asp/2009/12/contents</p>

9. Monitoring and Delivery



9. Monitoring and Delivery

Draft and final reports

9.1 This document is the final version of the Report on Proposals and Policies for meeting the annual emissions reduction targets for 2010 to 2022 that the Scottish Ministers must lay before the Scottish Parliament in accordance with the requirements in section 35 of the Climate Change (Scotland) Act 2009.

9.2 A draft version of this Report was laid before the Scottish Parliament on 17 November 2010 and underwent a 60-day period for Parliamentary consideration. This consideration was led by the Scottish Parliament's Transport, Infrastructure and Climate Change (TICC) Committee, with additional scrutiny provided by the Economy, Energy and Tourism (EET) Committee.

9.3 Before laying this final Report, Ministers had regard to all representations on the draft report, resolutions on the draft passed by the Scottish Parliament, and reports on the draft published by the Committees of the Parliament.

9.4 The TICC Committee report on the draft Report, which also incorporates the report of the EET Committee, is available on the Scottish Parliament's website¹⁴³, as is the Official Report of the Parliamentary debate on the Committee report, which took place on 12 January 2011¹⁴⁴. The Scottish Government also received direct representations on the draft Report. Where respondents gave us permission to do so, these additional representations have been published on the Scottish Government's website¹⁴⁵.

9.5 The Scottish Ministers laid a written statement before the Scottish Parliament together with this final Report, setting out the details of the representations etc. made to them in respect of the draft Report and indicating any changes that were made as a result of those representations.

Strategic Environmental Assessment of the measures in this Report on Proposals and Policies

9.6 As discussed in Chapter 5, the Environmental Assessment (Scotland) Act 2005 sets out statutory requirements for the preparation and publication of Strategic Environmental Assessments (SEA) by public bodies. The purpose of SEA is to ensure that the likely significant environmental effects of Scottish plans, programmes and strategies are assessed and taken into account during their preparation.

9.7 The Environmental Report is the key medium for outlining the outputs of the Strategic Environmental Assessment process to interested stakeholders. An Environmental Report on the proposals and policies set out in the draft of this Report was published on 17 November 2010 and was available for comment during the 60-day period for Parliamentary consideration of the draft RPP detailed above.

9.8 The Environmental Report details the results of the environmental assessment of these measures, identifying and evaluating the likely significant environmental effects of implementing them, as well as identifying the means to prevent or avoid significant adverse effects and enhance positive ones, while also considering reasonable alternatives where appropriate. As no new measures have been added between the draft and final versions of the RPP, no additional assessment was required.

¹⁴³ Scottish Parliament, Transport, Infrastructure and Climate Change Committee Report on the Draft Report on Proposals and Policies (TIC/S3/10/R9):

www.scottish.parliament.uk/s3/committees/ticc/reports-10/trr10-09.htm

¹⁴⁴ Scottish Parliament, Official Report, 12 January 2011, col. 32038:

www.scottish.parliament.uk/business/officialReports/meetingsParliament/or-11/sor0112-02.htm#Col32038

¹⁴⁵ Scottish Government, RPP Parliamentary Consideration webpage: <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/lowcarbon/rpp/parliamentconsideration>

9.9 The last output of the SEA process is the preparation and publication of an SEA Statement that sets out how the findings of the SEA have been considered, and how views expressed during the consultation period were taken into account.

9.10 More information about the SEA of the proposals and policies set out in the draft of this Report, including details of the consultation on the Environmental Report, is available on the Scottish Government's website¹⁴⁶.

Delivery of proposals and policies

9.11 The publication of this final Report on Proposals and Policies allows a shift in emphasis away from fulfilling statutory requirements to set annual targets and demonstrate how they can be met towards the practical delivery of emissions reductions. The Scottish Government has already taken steps to mainstream consideration of emissions reductions across its programme of work, and the policies and proposals in this Report will continue to be developed and delivered as part of this programme.

9.12 Chapter 2 and Annex B of this Report explain the complexity of the issues and the range of uncertainties which can influence the estimation of abatement potential and the delivery of emissions reduction for each policy or proposal in each sector. They also makes clear that this places limitations on the information that can realistically be captured in a summary document of this nature, and this Report is not intended to be a detailed delivery plan for individual policies and proposals. In line with the Scottish Government's approach to mainstreaming, the

implementation of policies and the assessment of proposals to reduce emissions will be integrated into the policy process for the relevant sector.

9.13 Each policy and each proposal will require a tailored approach to consider how best to implement the measure within the sector. That approach will vary from sector to sector, and will be influenced by the availability of relevant data, the potential range of delivery partners and the existing policy and regulatory environment into which the measure is to be introduced. The Scottish Government and delivery partners will work together as required to develop an appropriate approach.

9.14 There are, however, a number of common issues relevant across sectors as we move into an implementation phase. They are:

- The scope to deliver multiple benefits across portfolios and outcomes;
- The assumptions about the effectiveness of a voluntary approach, where relevant, and the implications of an alternative, regulatory approach;
- Best value and the cost-effectiveness of measures in the short, medium and long term;
- The scope for prioritisation within the package of proposals;
- The scope to build on or align existing policy measures to secure efficiencies of cost and of scale;
- The up-front and ongoing costs associated with policies and the identification of sources of funding to support them;
- The opportunities and risks associated with the implementation of individual policies and proposals; and
- The role of different delivery bodies and sectors.

¹⁴⁶ Strategic Environmental Assessment of the draft Report on Proposals and Policies: <http://www.scotland.gov.uk/Topics/Environment/climatechange/resource-materials/assessments/sea-draftpp>

Monitoring progress

9.15 As the programme of work arising from the policies and proposals in this Report is taken forward, the Scottish Government will keep under review the progress being made in implementing these measures, and the extent to which these policies and proposals deliver the predicted abatement potential. In the event that it becomes clear that a policy or a proposal is unlikely to deliver the expected abatement, Ministers will identify alternative or additional actions to compensate for the reduced abatement. The circumstances in which this assessment is made will vary depending on the policy or proposal in question. This process is supported by the statutory reporting provisions required by the Climate Change (Scotland) Act 2009, which are set out in more detail below.

9.16 In particular, it is Scottish Government policy to lobby the UK and the EU to match Scotland's ambition and raise their respective targets to 42% and 30% respectively for 2020. If it becomes clear that the EU will not deliver the required trajectory within the required timescale, the Scottish Government will consider whether existing policies and proposals may be accelerated or expanded, and whether additional policies and proposals may be required in the non-traded sector to deliver the relevant statutory emission reduction target. This approach applies to all policies and proposals, not just those for which lead responsibility lies at EU or UK level. The Scottish Government is well placed to monitor and influence EU discussions, and will keep the situation under review. Any changes to policies and proposals would be identified in a timescale required to comply with the relevant statutory requirements.

The Scottish Government Low Carbon Management System

9.17 To support and accelerate the mainstreaming of climate change in policy development across the Scottish Government, we are establishing internal governance systems that will ensure that progress is effectively measured and monitored. A Low Carbon Management System is being developed to further embed the responsibility to develop and monitor policies for reducing emissions across the whole of the Scottish Government. The System will:

- provide a robust framework for reporting Scottish Government actions;
- perform a key role in managing carbon effectively across the Scottish Government by increasing awareness on the activities and actions which contribute toward reducing emissions; and
- make the best use of existing frameworks, data, indicators and groups to minimise additional demands.

9.18 Senior Civil Servants leading the key sectors within the System are responsible for developing and implementing policies to reduce emissions in their sector. Each Director will be supported by a "scorecard" of policy actions and indicators against which progress will be monitored. This builds on the cross-sectoral approach taken to the development of the package of proposals and policies contained in this Report.

2020 Climate Group – performance indicators

9.19 The 2020 Climate Group is a gathering of leading figures from business, the public sector and civil society to ensure full realisation of Scotland's Climate Change Delivery Plan, and attainment of the 42% emissions reduction target. The Group was initiated by Ian Marchant, Chief Executive of Scottish and Southern Energy, with support from the Scottish Government, to ensure that all sectors of Scotland's economy and civic society contribute fully to achieving Scotland's ambitious climate change targets.

9.20 The 2020 Climate Group has developed proposals for indicators to help monitor progress in each of the Scottish Government's Low Carbon Management System sectors. The Scottish Government is working with the 2020 Group on a range of issues and has included a number of the indicator proposals within the Low Carbon Management System scorecards.

Reporting

9.21 The Low Carbon Management System complements the mechanisms already in place for monitoring progress to reduce Scottish emissions. Many of these derive from Part 3 of the Climate Change (Scotland) Act 2009 which puts in place a range of reporting requirements. Ministers must lay before Parliament:

- an updated report on proposals and policies as soon as reasonably practicable after each batch of annual targets is set. The next batch, for 2023-2027, must be set by 31 October 2011;
- an annual report stating whether the annual emissions reduction target for the most recent reporting year has been met. Scottish greenhouse gas emissions data is already published each year, generally around

18 months after the end of the reporting year. The first statutory report, in respect of the target for 2010, is due by 31 October 2012;

- in the case of a target not being met, a report saying what action will be taken in future years to compensate for the excess emissions;
- in respect of each year from 2010-2050, a report on emissions attributable to Scottish consumption of goods and services;
- in respect of each year from 2010-2050, a report on the impact on net Scottish emissions of the exercise by the Scottish Ministers of any of their functions relating to electricity generation. The Draft Electricity Generation Policy Statement is a precursor to this report;
- by 31 December 2015, a report on progress towards the interim target;
- retrospective reports on whether the 2020 and 2050 targets have been met.

9.22 Given that there will be a time lag between the end of a year and knowing whether the annual target for that year has been met, the Low Carbon Management System is a valuable tool for ensuring that the delivery of policies takes place at the pace required. Ministers will be able to refer to the scorecards to check that they are delivering the right action on the right timescales, and take additional action if necessary.

9.23 Whenever the Scottish Ministers lay a report on an annual target, a report on proposals and policies for meeting those targets, or retrospective reports on the 2020 and 2050 targets, they must also make a statement to the Scottish Parliament relating to those reports and attend, if requested to do so, any Parliamentary Committee to give evidence on the reports.

9.24 Alongside the statutory reporting requirements, the Scottish Ministers are committed to publishing an annual carbon assessment of the draft Budget, estimating the overall impact on emissions of Scottish Government spending. The second such assessment was published in November 2010.

Presenting actions and milestones to the public

9.25 This Report is not intended to be the main tool for communicating the benefits of a low carbon Scotland and the associated actions to the public, and it does not attempt to capture the vast range of action that is underway at local level to build capacity and knowledge and share best practice. The Public Engagement Strategy, published in December 2010, sets out the principles and priority activities to inform people about Scotland's climate change targets, encourage them to contribute to achievement of those targets, and identify actions people in Scotland may take to contribute to the achievement of those targets.

9.26 Supporting the work of the Public Engagement Strategy is the Climate Change Behaviours Research Programme 2010-12 (CCBRP). Led by environment researchers in government, this evolving programme features a range of projects, both in-house and commissioned, that seek to develop a clear understanding how change in key behavioural areas can be enabled and encouraged. The overall aim of the CCBRP is to inform the development and delivery of effective behaviour change interventions. More information about the CCBRP, including an update report published in February 2011, is available on the Scottish Government's website.¹⁴⁷

¹⁴⁷ Scottish Government Climate Change Behaviours Research Programme 2010-12: <http://www.scotland.gov.uk/Topics/Research/by-topic/environment/social-research/Behaviour-Change-Research>

Annex B: Tables of Abatement and Cost

Background

A.1 To assess the achievability of Scotland's annual climate change targets, the Scottish Government has undertaken analysis of the emissions reductions expected from the policies and proposals in this report compared to the "business as usual" emissions projection, detailed in table A1 below. The figures presented are subtracted from the projection and the resulting emissions profile shows that Scotland can meet its statutory climate change targets to 2022. Further detail on the methodology used to derive the projections and the emissions abatement and cost estimates is given in the Technical Appendix which accompanies this document¹⁴⁸.

Business as usual emissions projection

A.2 The business as usual emissions projection for Scotland uses evidence from several emissions projections publications and separates emissions that fall into the "traded sector" from those that fall within the "non-traded sector". Traded sector emissions are those which arise from installations that take part in the EU Emissions Trading System (EU ETS).

- The traded sector emissions projections follow the trajectory of the future emissions cap in the EU ETS and have been defined for Scotland by the Committee on Climate Change (CCC) in their advice to Scottish Ministers¹⁴⁹.

- The non-traded sector CO₂ emissions projections come from the STEPS model commissioned by CCC¹⁵⁰, which draws on the DECC energy model.
- The Land Use, Land Use Change and Forestry (LULUCF) emissions projections come from the Centre for Ecology and Hydrology¹⁵¹.
- The non-CO₂ emissions projections come from the AEA publication "Non-CO₂ Greenhouse Gas Projections for England, Scotland, Wales and Northern Ireland"¹⁵².

A.3 The projection contains underlying assumptions about variables which affect emissions including future economic growth, population growth, and oil prices out to 2022. The model runs have been updated to take account of 2008 Scottish and 2009 UK emissions data and to revise downward the estimates for medium-term economic growth. The projection can only reflect trends in emissions and cannot take account of one-off incidents such as a cold snap in the weather.

150 Assessing the Appropriate Methodology for Projecting Scottish CO₂ Emissions to 2030:
<http://downloads.theccc.org.uk/Scottish%20report/CCC%20Scottish%20CO2%20Projections%20Feb2010.pdf>

151 Inventory and projections of UK emissions by sources and removals by sinks due to land use, land use change and forestry:
http://ecosystemghg.ceh.ac.uk/docs/2009/Defra_Report_2009.pdf
NB: The mid-scenario is used.

152 Non-CO₂ Greenhouse Gas Projections for England, Scotland, Wales and Northern Ireland:
http://www.airquality.co.uk/reports/cat07/0912111421_DA_non-CO2_Projections_2007_to_2025_Report_v1r.pdf

NB: To get annual projections, these results have been linearly interpolated over the years to 2025.

148 Low Carbon Scotland: Technical Appendix:
<http://www.scotland.gov.uk/rpptechn>

149 Scotland's path to a low carbon economy:
<http://www.theccc.org.uk/reports/scottish-report>

A.4 The reference projection includes the impact on emissions of policies that were in place by 2006, as presented in the UK and Scottish Climate Change Programme 2006 documents¹⁵³,¹⁵⁴. Subsequent policy initiatives are assessed as current policies.

A.5 Many of the non-traded sector projections are relatively flat with the most significant changes being the reduction in emissions sequestered by forestry and a projected increase in emissions from the transport sector.

Abatement potential

A.6 Estimates have been made of the abatement potential of the policies and proposals in this report based on the best available evidence and data.

A.7 Where the policy has been developed at a Scottish level, a bottom-up assessment of the abatement that the policy is expected to deliver is presented, using Scottish data where possible.

A.8 In some instances, where policies are implemented at the EU or UK level and Scottish data is not readily available, a top-down assessment of the potential savings expected to arise in Scotland has been undertaken. For example, it has been necessary to apply the Scottish share of households in the UK to estimates of the abatement potential of the UK Government's smart metering policy to get an estimate of emissions savings in Scotland.

The rebound effect

A.9 The abatement analysis in Table A1 takes account of the primary rebound effect within sectors. The primary rebound effect occurs when consumers spend the money they have saved through fuel/energy savings on consuming more of that good or service and this offsets the initial reductions in energy demand. For example, installing loft insulation will lower the relative cost of heating a home to the same temperature. Consumers may then decide to spend part of this saving on heating their homes to a higher temperature, which will, to some extent, offset the reduction in emissions from installing the insulation.

A.10 There may also be an economy-wide rebound effect where a fall in the real price of energy services will lead to a fall in prices of goods and services and a rebound in overall consumption. It has not been possible to account for this wider impact in the analysis.

Costs

A.11 The CCC's advice is that the cost to the economy of meeting the 2020 interim target is likely to be less than 1% of GDP, which it advises should be accepted given the costs and consequences of not acting. In addition to the CCC's macro level assessment, Table A2 sets out the Scottish Government's estimate of the costs of implementing the individual proposals presented in Table A1, where the data is available. The costs of proposals will fall across Government, business and consumers, although the proportion falling to each will depend upon how the policies are implemented.

¹⁵³ UK Climate Change Programme 2006: http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/programme/programme.aspx

¹⁵⁴ Changing Our Ways: Scotland's Climate Change Programme: <http://www.scotland.gov.uk/Publications/2006/03/30091039/0>

A.12 Many of the measures necessary to help meet the emissions targets can be introduced at negative cost, i.e. financial savings, over the lifetime of the measure. This is particularly the case for measures that encourage investment in energy efficient products or technology such as cavity wall insulation. One potentially significant barrier to the uptake of such measures, particularly in the domestic sector, is that the costs arise first as high up-front costs which are then paid back over their lifetime as a result of future fuel savings.

Wider (social and distributional) costs and benefits

A.13 In addition to financial costs and benefits, many policies have positive impacts on health or environmental quality, other than reductions in greenhouse gas emissions. For example, policies encouraging people to walk, cycle or use public transport rather than driving in cars deliver health benefits and improvements to local air quality arising from reduced traffic congestion. There may also be hidden costs in the form of an “inconvenience factor” associated with changing daily routines, or clearing a loft for installing

insulation.

A.14 Due to a lack of data needed to put a monetary value on these variables, it has not been possible to consider all of the non-financial costs and benefits of mitigation policies. Therefore, for consistency of approach between sectors, the cost and cost-effectiveness figures given for a proposal only include variables that lead to a financial flow. This includes fuel and energy savings on the benefit side and up-front costs (e.g. capital) and on-going maintenance costs on the cost side. At the same time, in Chapters 3 to 8, important non-financial benefits or costs have been identified, and a qualitative assessment of the likely impact provided.

Table A1: Estimated abatement of policies and proposals and resulting emissions by sector, ktCO₂e, 2010 – 2022

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Traded Sector	Traded sector allocation - 20% EU target	23,025	23,025	23,025	18,035	17,708	17,390	17,071	16,752	16,422	16,101	15,779	15,851	15,522
	Policies													
	EU move to 30% target	0	0	0	0	426	862	1,299	1,737	2,167	2,606	3,047	3,488	3,929
	EMISSIONS AFTER ALL POLICIES AND PROPOSALS	23,025	23,025	23,025	18,035	17,282	16,528	15,772	15,015	14,255	13,495	12,732	12,364	11,594
Homes and Communities	Business as usual projection	6,971	6,741	6,604	6,478	6,355	6,242	6,143	6,070	6,067	6,083	6,102	6,148	6,188
	Policies													
	Smart metering	0	0	4	13	28	42	55	67	74	75	75	77	78
	Domestic building energy efficiency	0	88	190	185	179	174	170	165	163	161	160	159	158
	New-build domestic energy standards for 2010	0	4	13	27	41	55	68	84	100	116	132	148	164
	Renewable heat	0	5	16	30	50	76	106	143	184	251	318	318	339
	Total abatement from policies	0	97	223	255	298	347	399	459	521	604	685	702	739
	Proposals													
	Fuel poverty and insulation programmes	0	0	0	69	128	182	211	240	270	296	321	348	374
	New-build domestic energy standards for 2013	0	0	0	0	5	14	28	44	60	76	92	108	123
	Total abatement from proposals	0	0	0	69	132	196	239	284	330	371	413	455	497
	Total abatement from policies and proposals	0	97	223	324	430	543	638	743	851	975	1,098	1,158	1,237
	EMISSIONS AFTER ALL POLICIES AND PROPOSALS	6,971	6,644	6,381	6,154	5,925	5,699	5,505	5,328	5,216	5,107	5,004	4,990	4,952
<i>% change against 1990</i>	<i>-10%</i>	<i>-15%</i>	<i>-18%</i>	<i>-21%</i>	<i>-24%</i>	<i>-27%</i>	<i>-29%</i>	<i>-32%</i>	<i>-33%</i>	<i>-34%</i>	<i>-36%</i>	<i>-36%</i>	<i>-36%</i>	
Business and Public Sector	Business as usual projection	3,755	3,774	3,728	3,691	3,649	3,620	3,588	3,539	3,501	3,495	3,463	3,444	3,433
	Policies													
	Smart metering	0	0	4	10	20	30	40	50	56	57	57	56	56
	Energy-intensive business package	0	0	0	162	162	162	162	162	162	162	162	162	162
	CRC Energy Efficiency Scheme	2	14	24	35	46	61	77	95	112	131	150	170	192
	New non-domestic buildings energy standards for 2010	0	2	5	10	15	20	25	30	35	40	45	50	55
	Renewable heat	0	15	38	69	112	174	258	375	535	742	988	988	968
	Total abatement from policies	2	31	70	285	354	446	561	711	900	1,131	1,402	1,426	1,431
	Proposals													
	New non-domestic buildings energy standards from 2013	0	0	0	0	2	7	15	22	30	37	45	52	60
	Total abatement from proposals	0	0	0	0	2	7	15	22	30	37	45	52	60
	Total abatement from policies and proposals	2	31	70	285	357	453	576	734	930	1,168	1,446	1,479	1,491
	EMISSIONS AFTER ALL POLICIES AND PROPOSALS	3,753	3,743	3,658	3,406	3,292	3,167	3,011	2,805	2,571	2,326	2,016	1,965	1,942
<i>% change against 1990 including traded sector (20% EU target)¹⁵¹</i>	<i>-26%</i>	<i>-26%</i>	<i>-26%</i>	<i>-40%</i>	<i>-42%</i>	<i>-43%</i>	<i>-44%</i>	<i>-46%</i>	<i>-47%</i>	<i>-49%</i>	<i>-51%</i>	<i>-51%</i>	<i>-52%</i>	

151 The percentage change shown for Business and the Public Sector includes emissions from the traded sector, as it has not been possible to split emissions into "traded" and "non-traded" prior to the start of the EU Emissions Trading System in 2005.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Business as usual projection	13,559	13,493	13,395	13,456	13,497	13,522	13,653	13,765	13,890	14,001	14,064	14,119	14,237
Policies													
EU mandatory vehicle targets	27	40	60	91	140	215	272	346	444	573	746	983	983
EU biofuels target	0	0	0	61	121	176	228	295	382	495	640	640	640
Total abatement from policies	27	40	60	152	261	391	500	641	826	1,068	1,386	1,623	1,623
Proposals													
Eco-driving	0	0	0	0	38	42	52	61	69	76	80	84	87
Speed limit enforcement at 70mph	0	0	0	0	25	25	24	24	24	24	23	23	22
Freight - HGV efficiency improvements ¹⁵²	66	75	84	93	102	102	103	103	104	103	109	119	130
Freight - Van efficiency improvements	0	0	3	5	7	9	12	14	15	17	19	18	18
LCV infrastructure provision and procurement	0	0	3	10	17	23	27	31	45	58	70	82	97
Intelligent Transport Systems	0	0	4	5	7	8	10	11	11	10	10	10	10
Travel planning	0	0	0	0	53	67	113	154	178	212	225	236	242
Car clubs	0	0	0	8	14	20	25	30	35	39	44	47	51
Cycling and walking infrastructure investment	0	0	0	0	44	54	64	72	80	87	94	100	104
Buses and taxis ¹⁵²	0	27	56	83	110	136	162	187	192	197	201	208	215
Freight - HGV modal shift	0	0	12	24	36	48	59	71	82	92	102	113	123
Community Hubs	0	0	0	0	48	52	55	57	60	62	66	69	72
Maritime transport	0	5	10	15	20	25	30	35	40	45	50	55	60
Total abatement from proposals	66	107	173	244	521	612	736	851	935	1,024	1,093	1,164	1,232
Total abatement from policies and proposals	93	148	233	396	782	1,003	1,236	1,492	1,761	2,092	2,479	2,787	2,855
EMISSIONS AFTER ALL POLICIES AND PROPOSALS	13,467	13,346	13,162	13,059	12,715	12,519	12,417	12,274	12,130	11,909	11,586	11,332	11,382
<i>% change against 1990</i>	<i>1%</i>	<i>0%</i>	<i>-1%</i>	<i>-2%</i>	<i>-4%</i>	<i>-6%</i>	<i>-7%</i>	<i>-8%</i>	<i>-9%</i>	<i>-10%</i>	<i>-13%</i>	<i>-15%</i>	<i>14%</i>
Business as usual projection	11,716	11,677	11,701	11,698	11,694	11,727	11,705	11,651	11,621	11,599	11,558	11,531	11,502
Policies													
Farming for a Better Climate	39	77	116	154	193	231	270	308	312	315	319	322	326
SRDP funding for anaerobic digestion	5	6	7	8	9	10	11	13	14	15	16	17	18
Total abatement from policies	43	83	122	162	202	242	281	321	326	330	335	339	344
Proposals													
Single Farm Payment Scheme (Cross Compliance)	0	0	0	0	0	0	0	0	540	540	540	540	540
Total abatement from proposals	0	0	0	0	0	0	0	0	540	540	540	540	540
Total abatement from policies and proposals	43	83	122	162	202	242	281	321	866	870	875	880	884
EMISSIONS AFTER ALL POLICIES AND PROPOSALS	11,673	11,594	11,579	11,536	11,492	11,485	11,424	11,330	10,755	10,729	10,683	10,652	10,618
<i>% change against 1990</i>	<i>-16%</i>	<i>-16%</i>	<i>-16%</i>	<i>-17%</i>	<i>-17%</i>	<i>-17%</i>	<i>-17%</i>	<i>-18%</i>	<i>-22%</i>	<i>-22%</i>	<i>-23%</i>	<i>-23%</i>	<i>-23%</i>

152 It has not been possible to separate the effects of current schemes for improving HGV efficiencies from those of those proposals described in this report. The same is true for buses and taxis. For this reason, a conservative approach has been taken whereby all of the abatement is attributed to proposals rather than included with current policies. This is why the abatement from proposals is not zero in 2010 or 2011 for these measures

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Forestry	Business as usual projection	-9,552	-9,266	-8,929	-8,666	-8,442	-8,134	-7,895	-7,673	-7,517	-7,266	-6,911	-6,626	-6,323
	Policies													
	Increase afforestation rate to 10,000 ha/year	0	0	9	15	16	45	92	144	195	248	310	373	435
	Total abatement from policies	0	0	9	15	16	45	92	144	195	248	310	373	435
	Proposals													
	Increase afforestation rate to 15,000 ha/year	0	0	4	5	22	18	33	58	85	113	144	195	247
	Total abatement from proposals	0	0	4	5	22	18	33	58	85	113	144	195	247
	Total abatement from policies and proposals	0	0	13	20	38	63	125	202	280	361	454	568	682
	EMISSIONS AFTER ALL POLICIES AND PROPOSALS	-9,552	-9,266	-8,942	-8,686	-8,480	-8,197	-8,020	-7,875	-7,797	-7,627	-7,365	-7,194	-7,005
	Change from 1990 ¹⁵³	-1,260	-973	-649	-393	-187	96	273	418	496	666	927	1,099	1,288
Waste	Business as usual projection	2,727	2,706	2,685	2,664	2,644	2,623	2,604	2,586	2,567	2,549	2,530	2,516	2,502
	Policies													
	Zero waste policies (pre-May 2010)	86	125	164	204	193	183	175	167	158	150	142	128	114
	Zero waste policies - Zero Waste Plan	0	0	0	0	0	0	0	0	128	259	379	497	605
	Total abatement from policies and proposals	86	125	164	204	193	183	175	167	287	410	521	625	719
	EMISSIONS AFTER ALL POLICIES AND PROPOSALS	2,641	2,581	2,521	2,461	2,450	2,440	2,430	2,419	2,281	2,139	2,009	1,891	1,783
	% change from 1990	-54%	-55%	-56%	-57%	-58%	-58%	-58%	-58%	-61%	-63%	-65%	-67%	-69%
Development - Land Use Change	Business as usual projection	1,674	1,676	1,674	1,676	1,676	1,675	1,673	1,675	1,674	1,674	1,673	1,673	1,672
Whole Economy	Business as usual projection under 20% EU Agreement	53,874	53,826	53,884	49,031	48,780	48,665	48,541	48,366	48,225	48,235	48,258	48,656	48,734
	Abatement from Policies	158	376	650	1,073	1,324	1,654	2,008	2,443	3,054	3,791	4,639	5,090	5,292
	EMISSIONS AFTER POLICIES EXCLUDING EU MOVE TO 30%	53,716	53,450	53,234	47,958	47,456	47,011	46,534	45,922	45,171	44,444	43,619	43,567	43,442
	% change from 1990	-23%	-24%	-24%	-32%	-32%	-33%	-34%	-35%	-36%	-37%	-38%	-38%	-38%
	EMISSIONS AFTER POLICIES INCLUDING EU MOVE TO 30%	53,716	53,450	53,234	47,958	47,030	46,149	45,234	44,185	43,004	41,839	40,572	40,079	39,514
	% change from 1990	-23%	-24%	-24%	-32%	-33%	-34%	-36%	-37%	-39%	-40%	-42%	-43%	-44%
	Margin by which target is met (+) /missed (-)	-64	-46	-8	+18	-72	-221	-301	-239	-38	+137	+145	-584	-1,204
	Abatement from Proposals	66	107	177	318	678	833	1,023	1,215	1,920	2,086	2,234	2,407	2,576
	EMISSIONS AFTER ALL POLICIES AND PROPOSALS	53,651	53,343	53,057	47,640	46,352	45,316	44,211	42,971	41,085	39,753	38,338	37,672	36,937
	% change from 1990	-24%	-24%	-24%	-32%	-34%	-35%	-37%	-39%	-41%	-43%	-45%	-46%	-47%
	Margin by which target is met (+) /missed (-)	+1	+61	+169	+336	+606	+612	+722	+975	+1,881	+2,223	+2,379	+1,823	+1,373
Statutory Annual Targets	53,652	53,404	53,226	47,976	46,958	45,928	44,933	43,946	42,966	41,976	40,717	39,495	38,310	

153 The absolute change rather than the percentage has been shown for forestry to avoid confusion when interpreting percentages of negative numbers.

Table A2: Estimated total costs of policies and proposals (public and private), 2011-2022, and net cost-effectiveness

	Cost - effectiveness (£/tCO ₂ e) (discounted)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
£ million, undiscounted, rounded to nearest million													
Homes and Communities													
Proposals													
Fuel poverty and insulation programmes		0	0	278	344	337	304	308	308	258	258	258	258
New-build domestic energy standards for 2013		Not currently available											
Total Costs		0	0	278	344	337	304	308	308	258	258	258	258
Business and Public Sector													
Proposals													
New non-domestic buildings energy standards for 2013		Not currently available											
Transport													
Proposals													
Eco-driving	-84	0	3	3	3	2	3	5	5	5	3	4	6
Speed limit enforcement at 70mph	-119	0	0	25	3	3	3	3	3	3	3	3	3
Freight - HGV efficiency improvements	-89	4	3	2	2	7	5	4	3	3	9	6	6
Freight - Van efficiency improvements	-89	0	0	0	0	1	1	1	1	1	2	1	1
LCV infrastructure provision and procurement	48	7	5	11	11	11	11	11	20	20	20	20	21
Intelligent Transport Systems	1,211	41	44	19	19	19	20	20	13	13	13	13	13
Travel planning	-91	0	7	7	7	7	19	19	13	19	9	9	9
Car clubs	3	0	2	2	4	4	6	6	7	8	11	11	12
Cycling and walking infrastructure investment	345	0	296	207	146	81	82	83	83	84	85	86	87
Buses and taxis	305	110	130	132	134	135	137	138	138	139	139	140	141
Freight - HGV modal shift	70	15	15	15	15	15	15	15	15	15	15	15	15
Community Hubs	-107	0	2	2	2	1	1	1	1	1	1	1	1
Maritime transport	-76	2	2	2	2	2	2	2	2	2	2	2	2
Total Costs		179	508	426	347	288	303	307	305	313	312	312	317
Agriculture and Related Land Use													
Proposals													
Single Farm Payment Scheme (Cross Compliance)	-67	0	0	0	0	0	0	0	-53	-53	-53	-53	-53
Forestry													
Proposals													
Increase afforestation rate to 15,000 ha/year by 2015	20	40	44	48	61	66	70	72	75	78	80	82	83
Waste - no proposals													
TOTAL COST OF ALL PROPOSALS		219	552	753	753	691	677	687	635	596	597	599	605



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