

Scotland's low carbon future:

A sector based review of Scottish climate change policies and proposals for delivering a low carbon future in 2030

1. Introduction

The purpose of this report is to set out a macro view of a low carbon Scotland in 2030 and inform a project which aims to communicate a narrative of what Scottish Government policy commitments might mean on the ground in 2030 and raise awareness of what a low carbon future might mean for individuals. The report provides a sectoral review of the projected outcomes of Scottish emissions reduction policies, taking into account in particular the trajectories in the Second Report on Proposals and Policies (RPP2)¹. It projects the outcomes of the key changes that will occur across different sectors by 2030 in Scotland, highlighting how these differ across the rural and urban environments. The report begins with a brief overview of future climate change adaptation and mitigation plans for Scotland before providing a sectoral breakdown, covering:

- Energy;
- Transport;
- Homes and Communities;
- Business, industry and public sector;
- Waste and resource efficiency;
- Rural land use.

RPP2 outlines four scenarios for reducing emissions up to 2027. These scenarios are dependent on whether Scotland implements its policies only or both policies and proposals; while the EU plays an important role dependent on whether it sticks with its target of 20% emissions reduction by 2020, or raises it to a more ambitious 30%. The four scenarios give the following outcomes for Scottish emissions reductions:

1. **Policies only and EU at 20%** - project that Scottish emissions will have fallen by 40.1% in 2020 and 47.0% by 2027.
2. **Policies and Proposals and EU at 20%** - project that Scottish emissions will have fallen by 43.3% in 2020 and 57.8% by 2027.
3. **Policies only and EU at 30%** - project that Scottish emissions will have fallen by 43.9% in 2020 and 47.0% by 2027.
4. **Policies and Proposals and EU at 30%** - project that Scottish emissions will have fallen by 47.1% in 2020 and 57.8% by 2027.

When the Climate Change (Scotland) Bill was drafted in 2008 it was widely accepted that for Scotland to meet the 42% target by 2020 the EU needed to show the same level of ambition by raising their target to 30%. This view was backed by the Committee on Climate Change (CCC), which deemed the 42% reduction feasible under such circumstances. This report assumes that all policies and proposals are delivered and that the EU increases its target to 30%, when projecting forward the emissions reductions in the sectoral review.

¹ <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/lowcarbon/meetingthetargets>

2. Climate Change Mitigation and Adaptation Engagement

Looking ahead to 2027 and beyond, if Scotland is to achieve the low carbon future, and the policies and proposals outlined in the report are to be successful, then there will need to be a public buy in too. The Scottish Government has recognised this and released a Low Carbon Behaviours Framework that outlines what they will do to support the move to low carbon living and the key behaviours they are seeking to influence; namely in housing, transport, food and consumption.² The Framework outlines the Scottish Government's evidence-based approach to behaviour change and actions to be taken to support a low carbon transition in the lead-up to the first key climate change target in 2020. The Scottish Government has also set aside financial support for low carbon projects and initiatives such as its Climate Challenge Fund. Awards from the Fund encourage community groups to take local action on climate change through, for example, active travel measures, waste reduction and recycling, domestic energy efficiency advice, refurbishment of community-owned building to make them more energy efficient, local community food-growing and measures to increase communities' resilience to climate change. If the climate change mitigation measures outlined in this report are to be implemented successfully then continued societal adaptation will have to be achieved through engaging with people and communities and encouraging them to reduce their reliance on carbon.

3. Energy

Moving towards a low carbon future in 2030 will require significant changes in the way we produce and consume energy – principally to decarbonise the supply of electricity and heat, and reduce energy demand.

The policies outlined in this section are focussed on the Scottish Government's targets:

- The equivalent of 30% of overall energy demand met from renewable sources;
- A reduction in final energy demand across all fuels and sectors by 12% (space heating, transportation, industrial processes, etc.);
- Generating the equivalent of 100% of gross electricity consumption from renewables;
- Delivery of 11% of non-electrical heat demand from renewable sources by 2020;
- 500 MW of local and community owned renewable energy by 2020;
- Demonstration of Carbon Capture and Storage (CCS) at commercial scale by 2020, with full retrofit across conventional power stations by 2025;
- Upgrade of the transmission system to support growth in renewable capacity.

3.1 Decarbonisation of Electricity Supply

Scotland has massive green energy potential with a quarter of Europe's tidal and offshore wind potential and a tenth of its wave power. This is reflected in the Government's target to deliver the equivalent of at least 100% of gross electricity consumption from renewables by 2020. This does not mean that Scotland will be 100% reliant on renewable generation:

² Low Carbon Scotland: A Behaviours Framework:
<http://www.scotland.gov.uk/Publications/2013/03/8172>

renewables will form part of a wider, balanced electricity mix, with thermal generation continuing to play an important role.

The Government aims to reduce the carbon intensity of electricity generation in Scotland by over 80% by 2030, down from 289 gCO₂/kWh in 2011 to 50 gCO₂/kWh in 2030. This reduction will be achieved primarily through greater deployment of renewable energy technologies and a transition towards cleaner thermal generation using CCS technology.

The Electricity Generation Policy Statement (EGPS)³, published in 2013, examines the way in which Scotland generates electricity and considers the changes necessary to meet the Government's targets. The EGPS is structured around:

- Energy demand reduction
- Renewable energy sources
- Carbon Capture and Storage (CCS)
- Nuclear
- Bio-energy (heat or CHP only)
- Electricity storage
- Transmission and distribution

The scheduled closure of existing coal and gas plants, and the construction of a minimum of 2.5 GW of new or replacement efficient fossil fuel electricity generation progressively fitted with CCS, will satisfy security of supply requirements and, together with renewable energy, deliver large amounts of electricity exports.

Upgrades and reinforcements of the electricity transmission and distribution networks will help to realise Scotland's full energy potential and bolster security of supply in the period to 2030. Scotland will also play its part in developing onshore and offshore grid connections to export markets in the rest of the UK and Europe. Improvements in grid infrastructure and increased storage capacity (e.g. pumped storage) will help to facilitate lower emissions within the electricity supply sector and help to address the matching of supply with demand where variability is inherent to both, complementing interconnection and demand-side response.

3.2 Decarbonising the Heat Supply

Heat is estimated to account for over half of Scotland's total energy use, with non-electrical heat demand alone accounting for over 55% of final energy consumption. Reducing the carbon intensity of heat is central to use achieving our climate change and final energy targets. The draft Heat Generation Policy Statement "Towards Decarbonising Heat: Maximising the Opportunities for Scotland"⁴, published in March 2014, sets out the Scottish Government's approach to largely decarbonising the heat system by 2050, diversifying sources of heat, increasing heat security and reducing pressure on household energy bills, along with maximising the economic opportunities of the transition to a low carbon heat sector.

³ Draft Electricity Generation Policy Statement: <http://www.scotland.gov.uk/Topics/Business-Industry/Energy/EGPSMain>

⁴ <http://www.scotland.gov.uk/Publications/2014/03/2778>

The Heat Generation Policy Statement sets out the Scottish Government's heat hierarchy which aims to:

1. Reduce the need for heat, (demand reduction);
2. Supply heat efficiently and at least cost to consumers;
3. Use renewable and low carbon heat to deliver low carbon heat efficiently.

4. Transport

Transport emissions, including international shipping and aviation, account for just under a quarter of Scotland's total emissions, with two thirds of these coming from the road transport sector. The ambition of the Scottish Government, set out in RPP2, is for almost complete decarbonisation of the road transport sector by 2050, with the following targets set for 2020:

- A mature low carbon car market with an average efficiency for new cars of below 95g CO₂e/km (average emissions were calculated to have fallen to 128g CO₂e/km in 2013, a -29.1% change on 2000 levels)⁵.
- An electrical vehicle (EV) charging infrastructure to be in place in Scottish cities.
- Travel plans for all workplaces with over 30 employees.
- At least 10% of all journeys made by bicycle.

The decarbonisation of the transport sector has been set out across 4 packages that are set to reduce emissions by 4mt CO₂e per annum in 2027. These are:

Package 1 – Decarbonising Vehicles

The Scottish Government supports the EU directives that have guided its transport decarbonisation policy targets up to 2020, but also backs the UK Government's aim to have an emissions range of 50-70g CO₂e/km for new cars by 2030. It has also issued a range of proposals showing how this may be achieved, which focus on fleet conversion to EV in the public sector and supporting the development of EV charging infrastructure through initiatives such as the 'Low Carbon Vehicle Procurement Scheme for the Public Sector' and the Charge Place Scotland network⁶. The 'Switched On Scotland' electric vehicle roadmap also sets out a vision that by 2050 Scotland's towns, cities and communities will be freed from the damaging effects of petrol and diesel fuelled vehicles.^{7, 8} With investment in pilot projects, it is thought that a target of 50% low carbon buses is achievable by 2027, and projects, such as the 'Aberdeen Hydrogen Bus Project'⁹, will aim to seek further opportunities in this area. With respect to maritime and aviation emissions, plans are in place to make efficiency improvements through vessel investment from 2015; while the EU is the main body responsible for aviation reductions under the EU ETS.

⁵ SMMT. Average new car CO₂ emissions: www.smmt.co.uk/co2report/#

⁶ <http://www.greenerscotland.org/greener-travel/electric-vehicles/chargeplace-scotland>

⁷ Low Carbon Vehicle Procurement Programme:
www.transportscotland.gov.uk/road/sustainability/low-carbon-vehicles

⁸ Switched On Scotland – A Roadmap to Widespread Adoption of Plug-in Vehicles:
http://www.transportscotland.gov.uk/sites/default/files/documents/rrd_reports/uploaded_reports/j272736/j272736.pdf

⁹ <http://www.aberdeeninvestlivevisit.co.uk/Invest/Aberdeens-Economy/City-Projects/H2-Aberdeen/Hydrogen-Bus/Hydrogen-Bus-Project.aspx>

Package 2 – Road Network Efficiencies

In order to complement the drive for low carbon vehicles, congestion management and efficient driving schemes will be initiated. For this to be achieved Intelligent Transport Systems (ITS) and average speed cameras can be deployed, as efficiency tends to decrease above 50mph; ITS tools include variable speed limits and ramp metering.¹⁰

Package 3 – Sustainable Communities

This package aims to promote low carbon modes of travel, helping people understand their travel options such as cycling, walking and car sharing. Along with integrated bus and rail networks, the sustainable communities' package aims to deliver, in conjunction with local authorities and other delivery partners, the Cycling Action Plan for Scotland, which is focused on the shared vision that by 2020 10% of all everyday journeys will be by bike.¹¹ Beyond 2020, it is expected that work will continue to substitute cars with walking and cycling for journeys up to 5 miles. Car clubs are also expected to be further developed¹² and the roll-out of electric vehicles is already being supported through such schemes.

Package 4 – Business Engagement on Sustainable Transport

Fuel efficient driving, workplace travel planning and freight efficiencies are proposed to be rolled out to help lower carbon generated by the 10% of travel accounted for by business travel. The information package provided by the ChooseAnotherWay website, hosted by the Energy Saving Trust¹³ is an example of how business travel emissions can be lowered by providing cost effective strategies to increase travel related efficiency savings; which can be achieved through enhancing business fleet efficiency by promoting fuel-efficient driving practices. Into the future, the Scottish Government will continue to work with the haulage sector on alternatives to road haulage (freight modal shift to rail and water) and to encourage more efficient freight vehicle usage.

5. Homes and Communities

In 2012 the reported emissions from the residential sector were 7.3mtCO₂e, 14%¹⁴ of Scotland's total emissions for that year. Current measures in place to decarbonise the housing sector in Scotland are both national and UK wide and aim to improve energy efficiency, improve energy use information and facilitate the decarbonisation of household heating. Principles to achieve this have been set out in the Sustainable Housing Strategy (SHS) and the draft Heat Generation Policy Statement, which aim to:

- Largely decarbonise the Scotland's heat system by 2050, with significant progress made by 2030.
- Ensure that no-one is living in fuel poverty by 2016.

¹⁰ Transport Scotland. Intelligent Transport Systems:

www.transportscotland.gov.uk/road/technology/intelligent-transport-systems

¹¹ Transport Scotland, Cycling Action Plan for Scotland: www.transportscotland.gov.uk/news/cycling-action-plan-scotland-relaunch

¹² Car Clubs in Scotland: www.carplus.org.uk/our-work/car-clubs-in-scotland/

¹³ <http://www.chooseanotherway.com/index.php>

¹⁴ Scottish Government, *Scottish Greenhouse Gas Emissions 2012*:

<http://www.scotland.gov.uk/Publications/2014/06/5527>

- Retrofit existing housing and improve building regulations for new builds to provide energy efficient housing by 2030.
- Ensure every home has loft and cavity wall insulation, where this is cost effective and technically feasible by 2020.
- Every home heated by gas to have a highly efficient boiler with appropriate controls.
- 100,000 homes to have adopted community or individual renewable heat technologies (space or water heating) by 2030.

The following policies and proposals to decarbonise the housing sector towards 2030 have been projected to cut annual emissions to 5,106kt CO₂e by 2020, which equates to a 37% cut on the 1990's baseline of 8,146kt CO₂e.

5.1 UK Policies

The UK Government plans to install smart meters for gas and electricity in every home in the UK by 2020. This will encourage better energy management through provision of real-time information about energy use and cost reductions. The Renewable Heat Incentive (RHI) provides tariff payments to households that install and obtain heat from renewable sources, and will contribute to meeting the Scottish Government's target of 11% heat from renewables by 2020.¹⁵ Finally, the UK wide Energy Company Obligation (ECO) and Green Deal promote the take up of energy efficiency measures.¹⁶ The ECO requires energy supply companies to provide energy efficiency measures to help reduce heating costs and lower carbon emissions in homes. The Green Deal enables householders to install energy efficiency measures without facing the upfront costs by providing a loan where repayments are made from savings on energy bills.¹⁷ If these three policies are actively initiated and pursued under current timeframes then projected annual sector savings are estimated to be 307kt CO₂e in 2027.

5.2 Scottish Policies and Proposals

Since 2010 the Domestic Building Energy Standard has sought to ensure that new builds have emissions 70% lower than 1990 levels, with a 30% reduction in 2007 levels alone.¹⁸ New Domestic Buildings Energy Standards (2014) for new build properties will be introduced in 2015 and are expected to reduce emissions from new buildings by around 21% compared to 2013 levels.¹⁹

A large part will also be played by the Home Energy Efficiency Programme Scotland (HEEPS), which will refurbish and retrofit existing homes making them more energy efficient, and helping tackle fuel poverty.²⁰ HEEPS will use Scottish Government funding to leverage extra funding from energy companies through the ECO. Over the three years of this spending

¹⁵ UK Renewable Heat Incentive: <https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/renewable-heat-incentive-rhi>

¹⁶ DECC. Energy Company Obligation: www.gov.uk/government/uploads/system/uploads/attachment_data/file/48086/1732-extra-help-where-it-is-needed-a-new-energy-compan.pdf

¹⁷ DECC. Green Deal: www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx

¹⁸ Domestic Building Energy Standard: <http://www.scotland.gov.uk/Resource/0044/00449573.pdf>

¹⁹ Ministerial announcement, 25 September 2013: <http://news.scotland.gov.uk/News/Drive-for-greener-buildings-483.aspx>

²⁰ HEEPS: <http://www.scotland.gov.uk/Topics/Built-Environment/Housing/warmhomes/uhs/heelsguidance>

review period the Scottish Government will spend nearly a quarter of a billion pounds through HEEPS, including £79 million in 2014-15. The scheme is predicted to save 207kt CO₂e per year by 2027.²¹ In addition, the Warm Homes Fund (WHF) provides loan funding for renewable energy projects to support communities in fuel poverty, whilst the District Heating Loan Fund (DHLF) provides low interest finance for organisations to implement low carbon district heating projects.

The Scottish Government published the Energy Efficiency Standard for Social Housing (EESH) in March 2014. The new standard for energy efficiency will help reduce fuel poverty in, and greenhouse gas emissions from, the social housing sector. Social landlords will be expected to meet the first milestones by December 2020. In addition, a working group has been set up to develop draft regulation for consultation setting minimum energy efficiency standards in private sector housing. The Scottish Government will consult on the draft regulations in Spring 2015. The EESH and the proposed private sector regulation will work in conjunction with the Domestic Building Energy Standard, HEEPS programmes, and other schemes to improve the energy efficiency of Scotland's housing stock and help reduce greenhouse gas emissions from the sector.

A further phase of the Green Homes Cashback Scheme was announced in May 2014. The scheme provides cashback to households for up to £7300 to contribute toward the installation of energy efficiency measures in their homes recommended on a Green Deal Assessment.

In addition to this, low carbon heating has been outlined in the Draft Heat Generation Policy Statement (HGPS), which discusses diversifying heat sources, increases local control and security of supply.²² By identifying decarbonisation options, such as district heating (40,000 homes by 2020), heat recovery systems and renewable heating sources, the plan forms a large part of housing sector reductions, with predictions of 607kt CO₂e by 2027. However, the HGPS is still very much in the development stage and further explanation of how decarbonisation of the heat supply is to be achieved is needed if such reductions are to be made.

6. Business, Industry and Public Sector

This sector refers to business, industry and the public sector – sometimes referred to as the non-domestic sector. The following aims are part of low carbon developments for 2027 and beyond:

- An Energy Efficiency Action Plan that includes a Scotland wide target to reduce energy consumption by 12% by 2020²³.
- Delivery of 11% of non-electrical heat demand by renewable sources by 2020.
- By 2027:
 - Public bodies should have implemented and exceeded existing climate change mitigation, adaptation and sustainability plans, including best practice

²¹ DECC. Energy Company Obligation:

www.gov.uk/government/uploads/system/uploads/attachment_data/file/48086/1732-extra-help-where-it-is-needed-a-new-energy-compan.pdf

²² HGPS: <http://www.scotland.gov.uk/Resource/0044/00445639.pdf>

²³ Conserve and Save: Energy Efficiency Action Plan:

www.scotland.gov.uk/Publications/2010/10/07142301/0

sustainable procurement and be operating robust and effective governance and performance reporting arrangements.

- Made significant progress in transforming energy, heat and transport use in industry and business through resource efficiency measures and the successful introduction of innovative technologies such as renewables, CCS, fuel switching and the achievement of a decarbonised electricity grid.
- By 2050, direct emissions from the sector will be almost zero through reducing energy demand, the use of low carbon electricity sources, and the ambition for a largely decarbonised heat sector by 2050, with significant progress by 2030.

In order to achieve these targets a number of Scottish, UK and EU policies have been created to help the public sector and the 300,000 private enterprises in Scotland deliver on a low carbon future.

6.1 Policies

From a EU perspective the European Products Policy is an on-going energy efficiency programme aimed at setting a minimum environmental performance standard by reducing the impact of a product's life cycle on the environment.²⁴ Similarly, the EU Energy Labelling Framework requires product labelling to show energy efficiency and other sustainability considerations, such as water usage.

In the UK, the rolling out of Smart Meters to small and medium sized business will encourage better energy management. This is expected to reduce annual emissions in Scotland by 46ktCO₂e in 2027. Likewise, 2027 will also see the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme make predicted annual savings of 154kt CO₂e through incentivising investment in energy efficiency.²⁵ This will be achieved by requiring non-energy intensive organisations to report on emissions and purchase allowances from a UK provider for every tonnes of CO₂ they emit. The Green Deal has also been extended to the non-domestic sector. Additionally, the non-domestic Renewable Heat Incentive (RHI) requires the upfront cost to be met by the installation owners, who then recoup the investment through payments made from the metered heat over a 20 year period. The RHI forms a large portion of the predicted emission saving within the sector, estimated to be 914kt CO₂e per annum by 2027.²⁶

In Scotland, policies are in place through the Building Energy Standards (2010) that seek to lower emissions for non-domestic new buildings. The counterpart policy of the Domestic Building Energy Standard, it uses a range of energy efficiency measures and has predicted annual emission reductions of 101kt CO₂e in 2027. Further efficiency measures for new non-domestic buildings will be introduced in 2015.

²⁴ European Commission: <http://ec.europa.eu/enterprise/policies/sustainable-business/documents/eco-design/legislation/framework-directive/>

²⁵ Carbon Reduction Commitment Energy Efficiency Scheme: www.decc.gov.uk/en/content/cms/emissions/crc_efficiency/crc_efficiency.aspx

²⁶ Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027. The Second Report on Proposals and Policies: <http://www.scotland.gov.uk/Resource/0042/00426134.pdf>

6.2 Proposals

The remaining proposals for creating a low carbon business, industry and public sector have all been issued by the Scottish Government and present a range of abatement opportunities up to 2027. For example, the Heat Generation Policy Statement (HGPS) sets out the vision for low carbon heating in both the industry/commercial and domestic sectors, to help deliver towards the annual savings identified under RPP2 for the non-domestic sector of 1,334kt CO₂e by 2027. The largest of these is the non-domestic version of the vision for low carbon heating outlined in the HGPS. Proposing use of the same decarbonisation options as the domestic plan, the HGPS aims to make savings of 1,334kt CO₂e by 2027. There is also additional potential to reduce emissions from the public sector; with a £300m investment over 4-5 years with a 10 year payback, annual savings could rise to around 174kt CO₂e per year from 2019-20 through to 2027, subject to any related lifecycle replacement costs²⁷. Such carbon-saving actions are likely to include organisational behavioural change, continued increase of energy efficiency and renewable energy procurement.²⁸ Finally, developed under the Climate Change (Scotland) Act, non-domestic buildings will have their energy performance assessed to encourage emissions reductions. The proposal will initially cover buildings over 1000 square metres and owners and occupiers will have to meet an emissions reduction target for their building or, alternatively, report annual operational energy use.²⁹

7. Waste and resource efficiency

There is significant international momentum towards a circular economy, in which materials and products are reused, repaired, refurbished, remanufactured, reprocessed and kept in high value use for as long as possible and then disassembled and used for new products once their original service life is complete. In July 2014 the EU Commission published a package of proposals which was clearly a first step in paving the way towards an EU wide framework that supports a circular economy, with headline targets for 70% recycling of municipal waste by 2030, and an aim of improving resource efficiency by 30% by 2030. All existing regulatory mechanisms that can assist with enabling that shift are clearly being pointed in the direction of increasing ambition. Mechanisms in Scotland have been pointing in that direction for some time, including the Zero Waste Plan targets for 2025:

- 70% of household waste recycled, composted or reused.
- 70% of all waste recycled (including industrial and commercial).
- 5% limit on total waste allowed for landfill.
- reduce household and business waste by 15%.

²⁷ Based on the following assumptions: i) £300m capital investment, ii) 10 year payback period for the £300m investment, iii) 40%/60% split between electricity and fossil fuel savings, iv) Electricity unit cost of 0.0922 £/kWh (based upon DECC Fuel Price Growth Forecast, 2014), v) Electricity Carbon emission factor 0.5410 kg CO₂e/kWh (SEPA CRC Emission factors), vi) Gas carbon emission factor 0.1836 (SEPA CRC Emission factors)

²⁸ Potential Carbon Abatement from the Scottish Public Sector:
www.scotland.gov.uk/Publications/2012/12/3885

²⁹ The Scottish Government, Building Standards Consultation:
<http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/publications/pubconsult/S63SGR>

The Zero Waste Plan targets reflect that landfill gas is the greatest contributor to GHG emissions from the waste sector, but the Zero Waste Plan, together with the Safeguarding Scotland's Resources programme, takes a broader approach and aims to phase out avoidable waste from our economy, as well as deliver a decarbonised waste sector by 2025:

To support the reduction of GHG emissions, the Waste (Scotland) 2012 regulations put in place a number of measures to reduce carbon by 214kt CO₂e per annum by 2027, including:

- Businesses are required to present dry recyclables (plastics, paper, glass, etc) for collection.
- Local authorities are required to provide appropriate collection services for different types of waste – food for example.
- A ban on individually collected materials for recycling going to landfill.
- A ban on biodegradable municipal waste going to landfill by the end of 2020.³⁰

8. Rural land use

The rural land use sector will be developed to ensure that strategic and local decisions on land use include carbon concerns. The policies and proposals within the sector will aim to provide protection of carbon rich soils, reduce agricultural emissions, encourage the enhancement of carbon sinks, and the use of natural resources for energy.

At present 80% of land is used for agricultural purposes, with the 10.1Mt CO₂e emitted by agriculture representing 20% of total Scottish emissions in 2011.^{31,32}

From a sequestration stance, peatland covers 20% of Scotland, storing an estimated 1,600Mt of carbon, which can be enhanced through peatland restoration programmes for areas that have been degraded or drained. Forests too play an important role and without them there would be an 18% rise in emissions. However, the sequestration rates of Scottish woodland are falling due to a lack of new growth. These three areas of rural land use will specifically be tackled under low carbon rural land use plans, by 2027 aiming for:

- Optimal use of natural resources to produce food as well as deliver public goods, such as environmental enhancement and GHG reductions.
- Conservation of peatland as a store of carbon and restoration of peatland to ensure it is a sink of GHG's not a source.
- 100,000 hectares of new woodland by 2022 with targets for subsequent years by 2020.

In order to deliver a decarbonised future for the rural land use sector the Scottish Government has set out the following policies and proposals:

³⁰ The Waste (Scotland) Regulations 2012: www.legislation.gov.uk/ssi/2012/148/contents/made

³¹ The Scottish Government, Economic Report on Scottish Agriculture 2012, Table C2: www.scotland.gov.uk/Publications/2012/06/6894/102

³² Scottish Greenhouse Gas Emissions 2011: www.scotland.gov.uk/Publications/2013/06/1558

8.1 Agriculture

Agricultural emissions are dominated by nitrous oxide and methane due to the nature of farming practices. The transition to low emissions in agriculture is to be tackled through a programme of best practice outlined in the Farming For a Better Climate (FFBC) programme. This encourages voluntary uptake of actions in 5 key areas:

- Farm energy and fuel efficiency
- Renewable energy generation
- Locking carbon into soils and vegetation
- Optimising fertiliser and manure management
- Optimising livestock management through improved breeding and feeding practices

A particularly important part of the FFBC programme aims to tackle the amount of nitrogen fertiliser used, where a 90% uptake of efficiency measures is aimed for by 2020, saving 260kt CO₂e annually. There is also a desire to see technological developments cutting emissions in agriculture post 2020, utilising technologies, such as anaerobic digesters for energy generation, as they become more cost effective.³³

8.2 Peatlands

The Government wishes to see a growth in the restoration of peatlands, utilising the recent (voluntary) addition of wetland management to the GHG emissions, reporting under the UNFCCC. Work is currently on going in the development of an international emissions accounting methodology, but research suggests that by 2027, restoration of up to 21,000ha of peatland a year may be feasible – equating to 515kt CO₂e of abatement.

8.3 Forestry

Current forestry policy aims to deliver 10,000ha of new forest per annum by 2015 and remain at this level here after, giving an estimated additional abatement of 687kt CO₂e per year by 2027. Forestry Commission Scotland (FCS) is tasked with promoting this policy and administering grants, while also facilitating forest carbon measures, such as the Woodland Carbon Code, which aims to encourage a transparent approach to woodland carbon projects.³⁴ There are also plans to increase the amount of timber used in construction as it has the lowest embodied carbon of any other mainstream building material, with the CCC also outlining its potential use in bio-energy into the future.³⁵ However, need for transformational changes in the building sector means that the benefits of these latter forestry use changes are anticipated beyond 2022. Consequently up until 2027, the greatest contribution from changes in the forestry sector will most likely be achieved through increased carbon sequestration resulting from afforestation programmes.

³³ Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027. The Second Report on Proposals and Policies:

<http://www.scotland.gov.uk/Resource/0042/00426134.pdf>

³⁴ Forestry Commission, Woodland Carbon Code: <http://www.forestry.gov.uk/forestry/INFD-863FFL>

³⁵ Committee on Climate Change, Bioenergy Review: www.theccc.org.uk/publication/bioenergy-review

9. Conclusion

The purpose of this report is to set out a macro view of a low carbon Scotland in 2030 and inform a project which aims to communicate a narrative of what Scottish Government policy commitments might mean on the ground in 2030 and raise awareness of what a low carbon future might mean for individuals. Though broad in scope, the policies and proposals discussed in this document show that, in large part, a low carbon future will be met through efficiency improvements across all sectors of the Scottish economy, with much emphasis placed on decarbonising our energy sources. Looking ahead to 2030, a low carbon future also changes the way in which we live our lives, helping to deliver a far more resourceful society that is aware of sustainable lifestyles, the ways in which carbon savings can be made, and the financial, social, and environmental benefits of doing so.

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