CLIMATE CHANGE PLAN

Monitoring Reports

May 2022

Scottish Government
Riaghaltas na h-Alba
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Contents

Introduction

This annual monitoring report is the second to report against the updated Climate Change Plan (CCPu) as finalised in March 2021 (see last year's report here) under the statutory reporting requirements set out in the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019.

The 2019 Act is one of the most ambitious and comprehensive legislative frameworks on climate change in the world, increasing the ambition of Scotland's emissions reduction targets (from the Climate Change (Scotland) Act 2009) in response to the global climate emergency and UN Paris Agreement, committing Scotland to a 75% reduction in greenhouse gas emissions by 2030, and to reaching net zero by 2045.

The 2019 Act also placed the monitoring framework for the Climate Change Plan on to a statutory footing for the first time, with sector by sector reports on progress and the inclusion of matters relevant to a just transition. Two monitoring reports were published on the 2018 Plan prior to the commencement of the 2019 Act; in 2018 and 2019. No monitoring report was produced in 2020, as this fell during the process of updating the Plan.

Scotland's climate ambition is exemplified by the ambitious policies laid out in our landmark Climate Change Plan update, which included over 200 policies. As is highlighted in the sector reports, many of these policies and proposals have been developed since via delivery plans such as the Heat in Buildings Strategy, and the route map to achieve a 20% reduction in car kilometres by 2030.

To see what else Scotland is doing to help meet the goals of the Paris Agreement, including in terms of adaptation and international climate action, please also see the indicative Nationally Determined Contribution published in advance of COP26 in Glasgow.

The CCPu included Negative Emissions Technologies (NETs) as a sector chapter for the first time, recognising the important role that, as recently recognised by the IPCC Working Group 3 report, emissions removals will need to play in reaching net zero. The 'learning by doing' approach set out in the CCPu more widely was also identified as being particularly important in the case of this sector, given the considerable uncertainties around technological development and dependencies on UK Government action, particularly with regards to carbon capture and storage.

Policies included in the NETs chapter recognised these challenges and uncertainties and sought to acquire an evidence base to allow for further policy development. We have now undertaken an initial review of evidence.

The review indicates that NETs in Scotland can deliver at scale in due course but not at the pace assumed in the CCPu. This is due to various shifts in evidence since the time of the CCPu, including:

- the UK Government's decision to not allocate the Scottish Cluster as a Track-1 cluster for delivery in the mid-2020s, impacting on when carbon storage

underpinning NETs will be available, and industries' appetite to invest in NETs technologies. The Scottish Government are still pushing the UK Government to reverse this decision;

- the availability of home grown sustainable biomass to supply large scale power bioenergy with carbon capture and storage (BECCS); and
- no public commitment to date by a commercial operator to employ a NETs model for a single large power station in Scotland. Given lead in times for development of such a facility and proposals for carbon capture and storage (CCS) deployment for the Peterhead combined cycle gas turbine power project, it is unlikely that a new NETs power facility will be developed in the 2020s.

We are now gaining further knowledge and evidence of what scale of NETs can be delivered within Scotland and to what timescale, through undertaking a NETs feasibility study. This further evidence will be worked up over 2022 and will be considered as we develop the refreshed Energy Strategy and next full Climate Change Plan. The 2023 monitoring reports on the CCPu will also provide an opportunity to consider further the evolving evidence around the role of NETs.

Overview

This set of monitoring reports on the Climate Change Plan is complementary both to the CCPu (which in itself updates the 2018 Plan) and the most recent Official Statistics on Scotland's greenhouse gas emissions (which are for 2019), and is best read alongside these documents.

The Monitoring Framework for the Climate Change Plan for each of the sectors is structured on three levels: greenhouse gas emissions statistics provide the highest level measure of progress at an economy wide and sectoral level; a suite of policy outcome indicators measure the success of policies in achieving the changes that are needed; and a policy tracker monitoring implementation of specific policies and proposals.

Greenhouse Gas Emissions Statistics

Official Statistics on Scottish greenhouse gas emissions determine progress towards national emissions reduction targets and also provide information on total annual emissions at a sectoral level.

Statistics are published annually, typically in June, and two years in arrears. For example, the most recent figures, published in June 2021, cover emissions during 2019.

Those figures show that, on the basis used for reporting progress to Scotland's statutory economy-wide targets, emissions are now down by 51.5% (between the 1990 baseline and 2019). However, the statutory annual target for 2019 (of a 55% reduction) was missed.

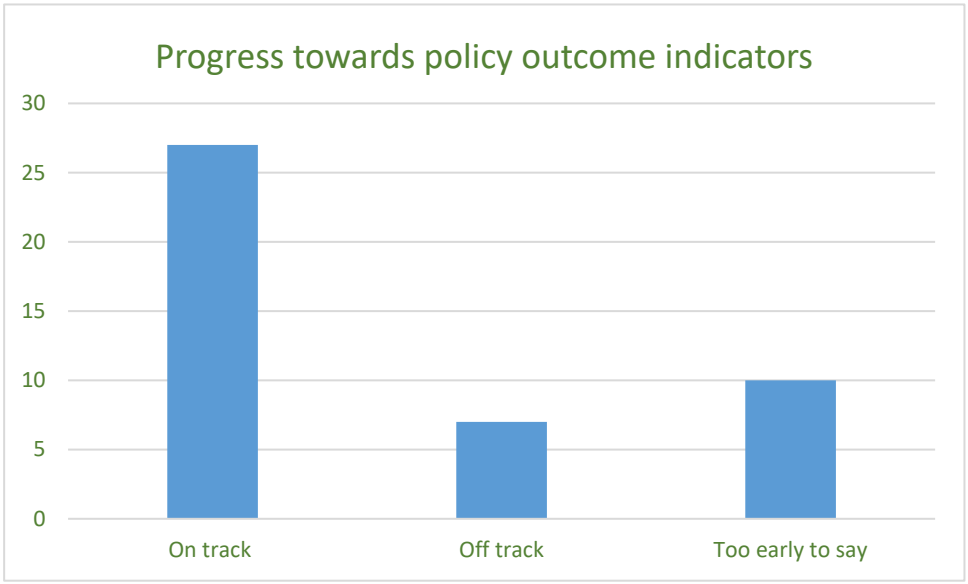
Any of Scotland's ambitious annual emissions targets not being met is clearly disappointing. However, the 2019 emissions data still entirely predates the implementation of the strengthened policy package of the CCPu. The present monitoring report, which contains more up to date information at the level of many policies and policy outcomes, shows promising early signs of progress in delivering this package across many sectors and helps identify areas where further attention may be needed. Furthermore, in October 2021 we published a catch-up report which includes additional policies (over and above those in the CCPu) aimed at ensuring that the excess emissions arising from the missed 2019 annual target are made up in the future by outperforming future targets.

Future monitoring reports, as well as sets of emissions statistics themselves, will allow us to keep the situation under regular review and make further adjustments as needed. It should be noted though that the indicators set out in this monitoring framework largely relate to policies within the control of the Scottish Government. The overall economy-wide emissions outcomes, and therefore whether statutory targets are able to be met, also depends on a range of wider actions – including action taken by the UK Government and the private sector, and the pace of development and availability of technologies required to decarbonise certain sectors.

Policy Outcome Indicators

The Plan includes key policy outcomes for each sector, defined as a measurable change on the ground resulting from a policy or combination of related policies. The Framework will measure progress towards achieving these with a set of policy outcome indicators. A policy outcome indicator is a specific, objective measure closely aligned to achieving the outcome. It will underpin monitoring of long-term progress towards the outcome, but should also be responsive to change in the near-term, so that it can be used to evaluate whether the Plan is on track. Specific milestones (or targets) are set, where appropriate, for the level of the indicator to be achieved at a given time.

In the Plan update, the set of outcome indicators from the 2018 Plan were reviewed to ensure that they reflect the updated policy commitments and to improve the quality and clarity of indicators. This led to new outcome indicators being identified, others being revised, and a few being removed where they were no longer appropriate or there were significant issues with robustness. In the last year of reporting, we have amended several indicators, and added one, meaning there are now 44 indicators in total. An explanation of where indicators have been amended is included in each sector's chapter. The following figure and table show the overview of progress against all policy outcome indicators across the sectors.



Summary graph 1

Compared to last year's report (which came shortly after the finalisation of the CCPu), many fewer indicators are classed as "too early to say" but there remain some instances where this is the case. The reasons for such assessments are laid out in sector chapters, and arise because of a lack of data availability or technology yet to be established. For example, COVID has limited the collection of several key datasets leading to several indicators being rated as "Too early to say".

Summary Table 1: Progress against policy outcome indicators

	On Track	Off Track	Too Early to Say
Chapter 1: Electricity			
Electricity grid intensity (CO_2e per kilowatt hour)	X		
Installed capacity of renewable generation (GW)	X		
Renewable capacity at planning stages (GW: 3 categories)	X		
Loss of Load Expectation (hours per year)	X		
Chapter 2: Buildings			
Number of existing domestic properties using low and zero greenhouse gas emissions heating systems			X
Services sector fossil fuel heat demand			X
Energy intensity of residential buildings (MWh per household)	X		
Emissions intensity of non-domestic buildings (tonnes of CO_2e per £ million Gross Value Added)	X		
% of homes with an EPC (EER, or equivalent) of at least C			X
% new homes built with a calculated space heating demand of not more than 20 kWh/m²/yrT	X		
% of Scottish gas demand accounted for by biomethane and hydrogen blended into the gas network			X
Percentage of households in fuel poverty			X
Chapter 3: Transport			
% reduction in car kilometres	X		
% of new car registrations that are ULEV	X		
% of new van registrations that are ULEV	X		
% of new HGV registrations that are ULEV	X		
% of new bus registrations that are ULEV	X		
% reduction in emissions from scheduled flights within Scotland			X
% of ferries that are low emissions	X		
% of single track kilometres electrified	X		
% of train kilometres powered by alternative traction			X
Chapter 4: Industry			
Industrial energy productivity (£GVAm per GWh)	X		
Industrial emissions intensity (tCO_2e per £GVAm)	X		
% of Scottish gas demand accounted for by biomethane and hydrogen blended into the gas network	X		
Chapter 5: Waste			
Total amount of landfilled waste (tonnes)		X	
Total amount of biodegradable landfilled waste (tonnes)	X		
Number of closed landfill sites with exploratory landfill gas capture/ flaring		X	
Household and non-household food waste reduced (tonnes)		X	
Total waste generated (tonnes)		X	
Chapter 6: LULUCF			

Hectares of woodland created per year	X		
Woodland ecological condition			X
Woodland Carbon Code: Projected carbon sequestration (validated credits)	X		
Annual volume (in millions of cubic metres) of Scottish produced sawn wood and panel boards used in construction		X	
Hectares of peatland restored per year		X	
Peatland Carbon Code: Projected emissions reduction (validated units)	X		
Chapter 7: Agriculture			
Increased engagement with Farm Advisory Services on environmental issues and climate change	X		
Use of Nitrogen fertilisers	X		
Spreading precision of Nitrogen fertilisers	X		
Nitrogen use efficiency for crop production			X
Time taken from birth to slaughter and increased efficiency through improved health and reduced losses	X		
Improvement in covered slurry storage	X		
Precision application of manure and slurry			X
Hectares of peatland restored per year		X	
Area of woodland on agricultural land	X		

Policy Tracker

The Plan update includes a set of specific policies and proposals for each sector to achieve the policy outcomes. The Framework will monitor progress towards implementing policies and developing proposals with a policy tracker, which will be set out for annual progress reporting, from May 2022. This will consistently record progress and next steps for policies, and where possible it will include implementation indicators for specific policies.

Chapter 1: Electricity

Part A - Overview of sector

The 2019 annual emissions envelope published in the 2018 Climate Change Plan[1] for this sector was for **2.6** $MtCO_2e$, whereas the outturn emission statistics for this year (published in June 2021) show a position of **2.0** $MtCO_2e$. On the basis of comparing these figures, the sector was **within** its envelope in 2019.

The updated Plan sets out the following three policy outcomes for this sector, the indicators for which are summarised below:

The electricity system will be powered by a high penetration of renewables, aided by a range of flexible and responsive technologies.	**On Track**	**Off Track**	**Too Early to Say**
Electricity grid intensity (CO_2e per kilowatt hour)	x		
Installed capacity of renewable generation (GW)	x		
Renewable capacity at planning stages (GW: 3 categories)	x		

Scotland's energy supply is secure and flexible, with a system robust against fluctuations and interruptions to supply.	**On Track**	**Off Track**	**Too Early to Say**
Loss of Load Expectation (hours per year)	x		

Scotland secures maximum economic benefit from the continued investment and growth in electricity generation capacity and support for the new and innovative technologies which will deliver our decarbonisation goals.

There are no indicators for this policy outcome. More information is provided in Part C.

Just transition and cross economy impacts

We wish to understand and report on the broader just transition and cross-economy impacts of our emissions-reduction activities in addition to these sector specific policy outcomes and indicators. To do this, we use data from the Office of National Statistics (ONS): Low Carbon Renewable Energy Economy (LCREE) publication. The LCREE is based on survey data of businesses which perform economic

[1] The CCPu includes updated emission envelopes for the years from 2020 onwards. Given the time period involved in the preparation of national and sectoral emissions statistics (the most up to date data available at this time is for 2019), comparisons with the updated envelopes are not yet possible. Until such a time as this can happen, the data for this aspect of these monitoring reports will be based on the envelopes published in the 2018 Plan .

activities that deliver goods and services that are likely to help generate lower emissions of greenhouse gases, for example low carbon electricity, low emission vehicles and low carbon services.

The LCREE indicator is narrowly defined and, while useful within its limited scope, does not give us the full picture of the impacts on workforce, employers and communities and progress towards a just transition.

This year we have also included ONS experimental statistics that look at green activity in the economy. These stats reflect green activities in both LCREE and non-LCREE sectors.

Over the next few years we will work to develop a meaningful set of success outcomes and indicators aimed at tracking the impacts of our policies on a just transition to net zero.

Sector commentary on progress

Scotland has made significant progress decarbonising the electricity sector, and has maintained an electricity grid intensity of below 50gCO_2e/kWh for the years 2017-2019. The overall downward trend from a carbon intensity of 320gCO_2e/kWh in 2010, is chiefly the result of the closure of two coal fired power stations in 2013 and 2016, as well as reduced reliance on gas for power generation.

There is a renewable, all energy consumption target of 50% by 2030, covering electricity, heat and transport. The Scottish Government is seeking to achieve this by expanding onshore and offshore wind, solar, bioenergy and hydro power. The recent ScotWind Offshore Wind Leasing Round saw offshore wind farms totalling 24.8GW selected, with the original aim having been 10GW. This is by far the world's largest commercial round for floating offshore wind and breaks new ground in putting large-scale floating wind technology on the map at GW scale, and will deliver around £700m in revenues to the public purse for these initial awards alone. The Scottish Government is also committed to reviewing its energy consenting processes and to continuing efforts to ensure a sustainable security of electricity supply.

Significant powers required to decarbonise electricity in Scotland remain reserved to the UK Government. In particular, the Scottish Government is calling for a reform to the Contract for Difference mechanism and to transmission charging.

Developments in monitoring arrangements since last report

No changes.

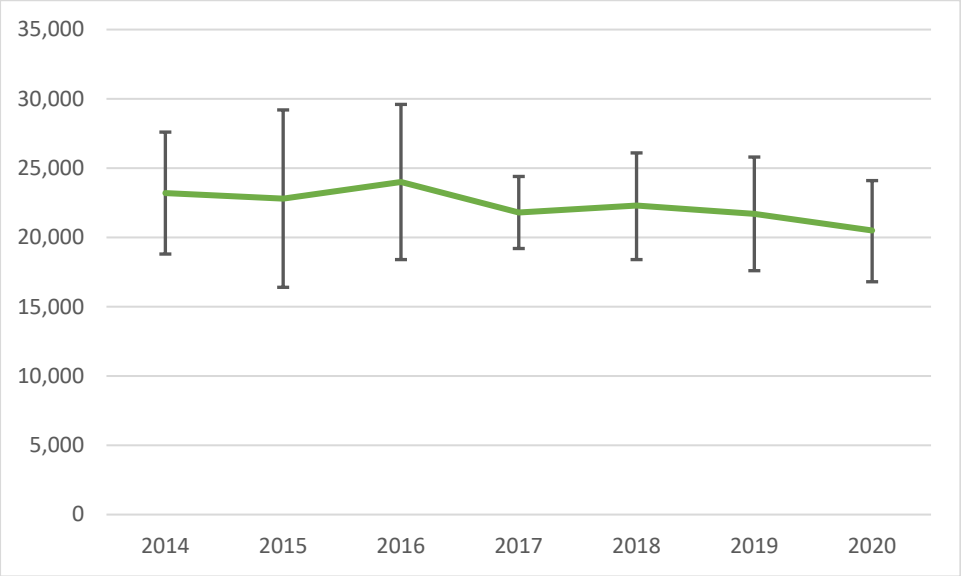
Part B – Progress to policy outcome indicators

Policy Outcome:	Indicator	On-Track Assessment (Milestone/Targets)
Cross-sectoral social and economic indicator	FTE employment in Low Carbon Renewable Energy Economy	Year-to-year change

Most Recent Data: 2020
Data Source(s): Office of National Statistics: Low Carbon Renewable Energy Economy (LCREE), Time spent of Green Tasks
Assessment: Too early to Say

- In 2020, the Scottish low carbon renewable energy (LCREE) sectors were estimated to directly provide 20,500 jobs, down from 21,700 in 2019 and from a high of 24,000 in 2016.
- The estimates of LCREE are based on a relatively small sample of businesses and hence are subject to wide confidence intervals. LCREE employment in Scotland in 2020 is similar to previous years and the difference is not statistically higher or lower than any previous year.

Employment in Low Carbon Renewable Energy Economy, FTE



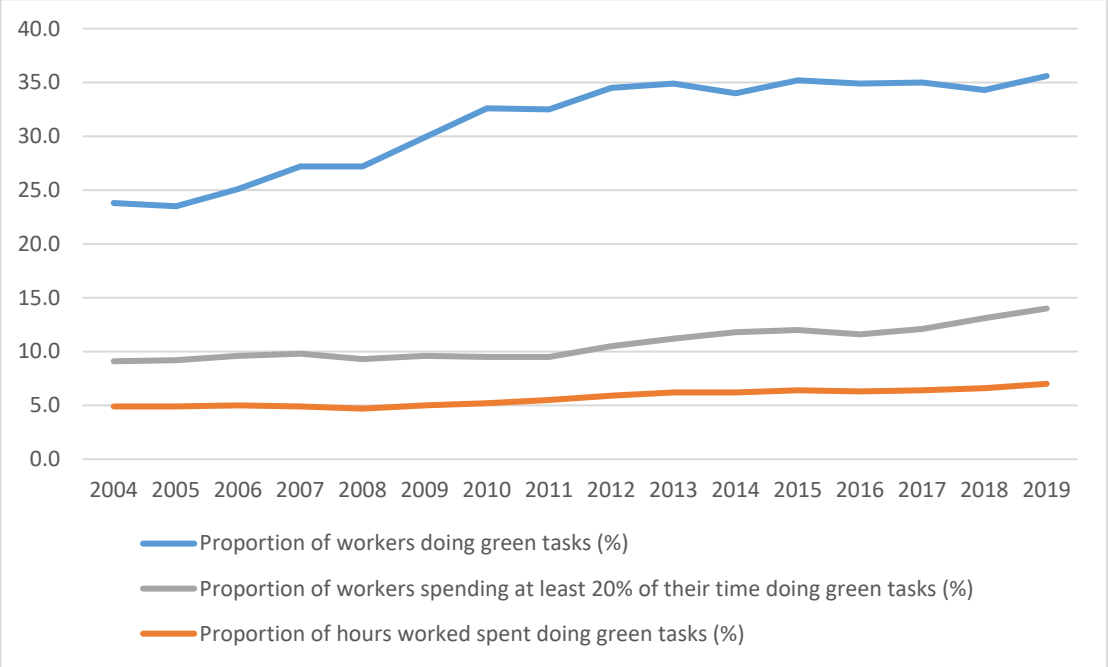
Electricity graph 1

Source: Scottish Government presentation of ONS stats

- The ONS also released experimental statistics on a wider perspective of green activity in the economy with their time spent on green tasks release. These stats reflect green activities in both LCREE and non-LCREE sectors.
- This release showed that in 2019 Scotland achieved an all-time high of hours spent on green tasks and proportion of workers doing green tasks, including workers who spend more than 20% of their time on green tasks.
- The proportion of workers doing green tasks in Scotland was 36% in 2019, up from 23.8% in 2004. Workers who have spent more than 20% of their time doing green tasks was 14%, up from 9% in 2004.

- The proportion of overall hours spend doing green tasks in Scotland was 7%, up from 4.9% in 2004.

Green Tasks Statistics, percentage



Electricity graph 2

Source: Scottish Government presentation of ONS stats

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Electricity grid intensity (CO_2e per kilowatt hour)	Maintain below 50g CO_2e per kilowatt hour

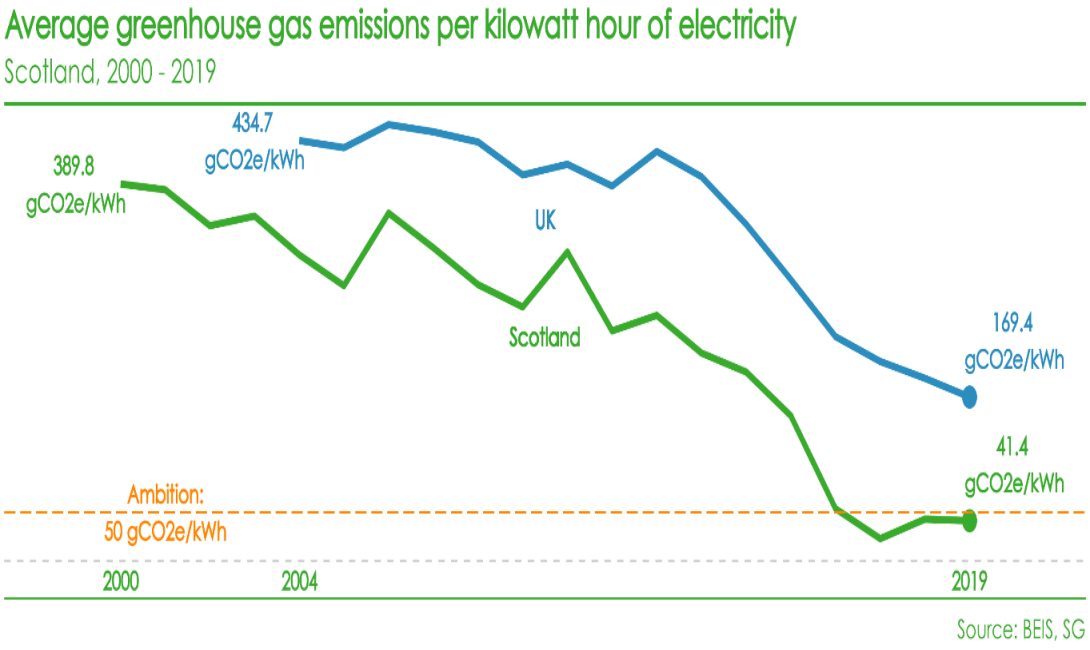
Most recent data: 2019

Data source(s): BEIS Energy Trends
Scottish Government Greenhouse Gas Emissions

Assessment: On track

Commentary:

- Scotland has maintained an electricity grid intensity of below 50gCO_2e/kWh for the years 2017-2019.
- 2019 saw Grid emissions fall slightly on 2018 levels from 43.1 to 41.4 g CO_2e/kWh.
- The overall downward trend from a carbon intensity of 320gCO_2e/kWh in 2010, is chiefly the result of the closure of Cockenzie and Longannet coal fired power stations in 2013 and 2016, as well as a reduced reliance on gas for power generation. This has significantly reduced the use of fossil fuels for electricity generation.
- With the closure of Hunterston B Nuclear power station in 2022, Scotland now has one Nuclear plant left at Torness that is due to close in 2028.
- Emissions from power generation are now concentrated in one large gas power plant in Peterhead, and a handful of smaller gas and diesel power stations across the country.
- Our expectations are that with an increased penetration of renewables, and no planned expansion of unabated fossil fuel power generation, Scottish Grid intensity will be maintained at 50gCO_2/kWh or below.



Electricity graph 3

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Installed capacity of renewable generation (GW)	Year-to-year change

Most recent data: Q3 2021

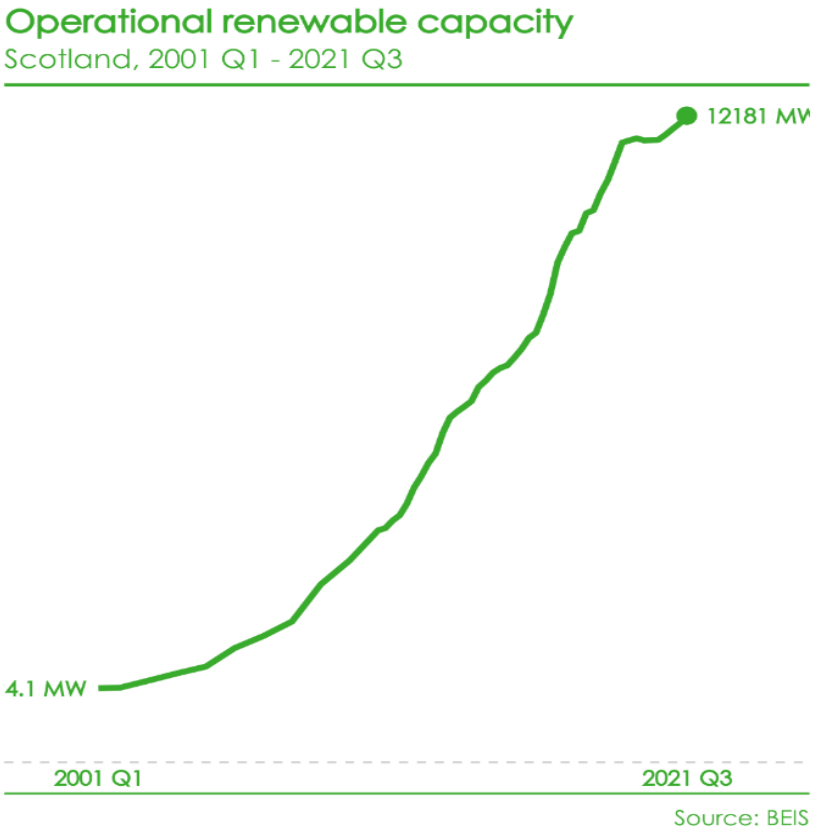
Data source(s): BEIS Energy Trends, BEIS Renewable Energy Planning Database (REPD),

Assessment: On track

Commentary:

- Scotland had 12.1 GW of installed renewable electricity generation capacity operational in 2021 Q3.
- The bulk of this capacity (8.6 GW) is from Onshore Wind followed by the next largest, large hydro at 1.3 GW.
- Offshore wind has grown from 0.18 GW in 2017 to 0.9 GW in 2021 Q3. This is expected to rise considerably in the 2020s and 2030s with the potential for 25GW of offshore wind from the first ScotWind leasing round.
- From the 2015 baseline total renewable capacity has grown by more than 60% to 2021 Q3.
- The capacity of other renewables has also risen. Solar capacity has increased 6.4% from 2020 Q3.
- The largest share of capacity is from large sites 50 MW or greater, which make up around 50% of total renewable capacity. Smaller sites less than 5 MW make up around 10% of capacity. These projects provide an important contribution to the development of smart, decentralised and local energy markets in Scotland.

Electricity graph 4



Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Renewable capacity at planning stages (GW: 3 categories)	Year-to-year change

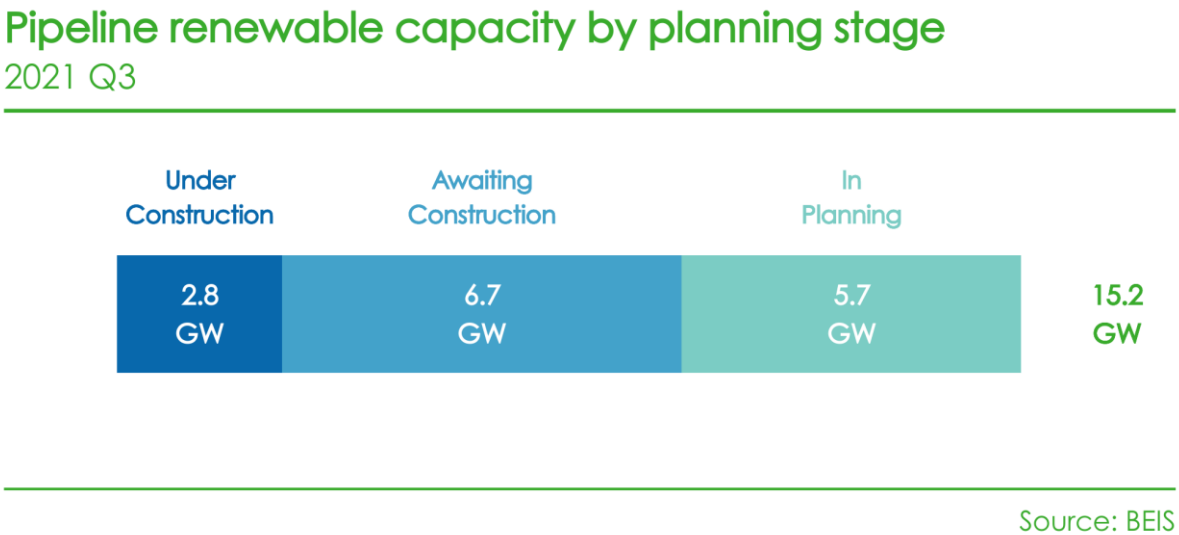
Most recent data: 2021 Q3

Data source(s): BEIS Renewable Energy Planning Database (REPD)

Assessment: On track

Commentary:

- Total Renewable capacity in the pipeline for Scotland was around 15.2 GW in 2021 Q3.
- There are 336 projects in the pipeline in Scotland. The majority of these projects are onshore wind farms which make up around 63% of projects and 68% of capacity (10.2GW).
- After wind Bioenergy and solar are the next biggest contributors to capacity with 527 MW and 357 MW respectively.
- Pipeline estimates do not include the potential 25GW of offshore wind that the ScotWind leasing round could add.
- Total renewable capacity in the pipeline for Scotland has consistently fluctuated between 10 GW and 15 GW for the past decade.
- Of the total capacity of 15.2 GW, 2.8 GW is under construction, most of which are offshore wind farms in the Moray firth. 6.7 GW are awaiting construction and 5.7 GW in planning.
- Were all capacity in the pipeline to be delivered it would more than double the level currently deployed, and could generate an estimated **36.7 TWh** of renewable electricity per year. However, there are a number of factors that may mean that projects in planning and consented do to progress to commissioning.



Electricity graph 5

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	Loss of Load Expectation (hours per year)	Maintain GB standard below 3 hours per year

Most recent data: October 2021

Data source(s): National Grid Winter Outlook

Assessment: On track

Commentary:

- Loss of Load Expectation (LOLE) is a measure of security of supply of the GB electricity system. This is measured through the number of probability projected hours of a year in which demand could exceed supply, and which would require measures be taken by National grid System Operator.
- Current projections from the National Grid Winter outlook 2021/22 indicate that LOLE in the grid system over 2021/22 is <0.3 hours/year in the base case.
- The LOLE is therefore expected to remain well below its target of 3 hours per year.
- LOLE ranges from 1.2 hours/year (High case) to <0.1 hours/year (Low case). Both sit comfortably within the 3 hours a year target.

Part C - Information on implementation of individual policies

Outcome 1: The electricity system will be powered by a high penetration of renewables, aided by a range of flexible and responsive technologies

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Support the development of a wide range of renewable technologies by addressing current and future challenges, including market and policy barriers.	CCP 2018	**Onshore Wind** SG continues to maintain its focus on tackling barriers to development - such as aircraft and seismological radar issues - working in partnership with the industry and other stakeholders. **Bioenergy** SG's aim is to see bioenergy used where it has the greatest value in reducing emissions. We are currently working to review the availability of sustainable biomass (and the most appropriate use of these finite resources) across the whole energy system in Scotland. We intend to publish a Bioenergy Action Plan in 2023, and are	N/A	Ongoing

		engaging with UK Government as they develop their Biomass Strategy this year. **Solar** Solar Power has an important role in continuing to decarbonise our heat and electricity supply, and the forthcoming Energy Strategy will (in consultation with the sector) set out a vision for its future. Solar projects are supported through a range of Scottish Government funding programmes; including Home Energy Scotland / the SME Loan Fund & the Community and Renewable Energy Scheme (CARES). **Hydro** We will work with key stakeholders to update our policy position on hydro in the forthcoming Energy Strategy Just Transition Plan later this year.		
Support improvements to electricity generation and network asset management, including	CCP 2018	Network charging and access is a reserved area of policy and regulation.	N/A	Ongoing

network charging and access arrangements that encourage the deployment and viability of renewables projects in Scotland.		The Scottish Government continues to make the case to Ofgem and BEIS for a change to the transmission charging methodology and for assurances that charging and access rights create a level playing field that both enables net zero and protects consumers. Scottish Government issued a response to Ofgem's consultation on Electricity network Charging and Access: The Cabinet Secretary for Net Zero Energy and Transport attended the GEMA board meeting in February 2022 where he raised the issue of transmission charges The Cabinet Secretary for Net Zero Energy and Transport issued a letter to the UK Secretary of State, Kwasi Kwarteng, which called out transmission charges as a key risk to meeting net zero		
Publish a revised and updated Energy Strategy, reflecting our commitment to net zero and key	March 2020	In September 2021, this was updated to include Scotland's first Just Transition Plan, following the publication of the National Just	N/A	A short context-setting document will be published in May 2022.

decisions on the pathways to take us there.		Transition Planning Framework. This will now be known as the Energy Strategy and Just Transition Plan (ESJTP). Our programme of co-design will create inclusion and enable meaningful participation. This will ensure that those most impacted by the transition to net zero are involved, which will help us identify and mitigate economic or social injustice that may be exacerbated by the transition. The timeline for the publication of the draft ESJTP has been extended to October 2022.		The draft ESJTP will be published for consultation in October 2022.
Develop and publish a Hydrogen Policy Statement by the end of 2020, followed by a Hydrogen Action Plan during 2021.	2020-2021 PfG	Hydrogen Policy Statement published November 2020. Draft Hydrogen Action Plan published November 2021. Finalised Hydrogen Action Plan will be published in 2022.	N/A	Ongoing implementation of the hydrogen action plan 2021-2025/26 to achieve ambition of 5GW hydrogen production by 2030. SG will launch the £100m hydrogen investment programme, part of the £180m Emerging Energy Technologies Fund

				(EETF). This includes the launch of a £10m Hydrogen Innovation Scheme. The hydrogen investment programme will support hydrogen pathfinder projects over the next 5 years. SG will ensure the regulatory / planning / consenting framework for renewable energy & hydrogen developments support the scale-up of hydrogen going forwards. We will also ensure our ambitions for onshore/offshore wind development in Scotland support our 5GW by 2030 hydrogen ambition. Work will continue to build on our evidence base understanding the extent of the role hydrogen is likely to play in both domestic / global

				markets.
A new renewable, all energy consumption target of 50% by 2030, covering electricity, heat and transport.	CCP 2018	In 2020 Scotland, total renewable energy met 25.4% of total nationwide consumption. (This is an increase of 1.4% since 2019; when the figure stood at 24.0%) This rise has largely been attributed to greater renewable electricity generation. Over 2,200 GWh extra renewable electricity was generated between 2019 – 2020 – much of this as a result of increased wind generation. In 2020: • The amount of electricity generated in Scotland from renewable sources was 20.7% of total energy consumption • The amount of heat generated in Scotland from renewable sources was 3.2% of total energy consumption • The amount of transport in Scotland running on renewable sources was 1.5% of total energy	Currently no milestones are set, with reporting being made as and when new data comes out.	Ongoing.

		consumption		
Introduce a new framework of support for energy technology innovation, delivering a step change in emerging technologies funding to support the innovation and commercialisation of renewable energy generation, storage and supply.	CCPu 2020	SG will support the growth of the marine renewables and offshore wind sectors with a strengthened framework of support – to be set out in the forthcoming Energy Strategy – focused on funding for the infrastructure these sectors need; such as port upgrades.	N/A	SG established the Scottish Marine Energy Industry Working Group as a forum for the sector to speak with one voice about its priorities and the steps needed to maintain Scotland's competitive advantage. The group will report to the Scottish Government in the near future on the key opportunities and barriers, and the collective actions needed in Scotland to build on the sector's achievements to date. The updated Scottish Energy Strategy (due later in 2022) will provide an opportunity to respond to the sector's recommendations, while setting out plans for further engagement and updating our strategic

				approach to marine energy.
Renewed focus on developing local energy projects and models, including through CARES, supporting the achievement of 1GW and 2GW of renewable energy being in Local Community ownership by 2020 and 2030.	CCP 2018	Local and community energy projects and models continue to be supported through the Scottish Government CARES Programme.	As of December 2020, an estimated 853MW of community and locally owned renewable energy capacity was operational in Scotland. This represents 85.3% progress towards the 2020 target, and 42.6% progress towards the 2030 target. Annual report on Community and Locally Owned Energy in Scotland, produced by EST through the CARES contract on SG's behalf (which monitors progress toward targets)	A new CARES contract began in 2021, which will have an increasing focus on decarbonisation (with development of community heat supports in place from May 2022).
We will carry out detailed research, development and analysis during 2021 to improve our understanding of the potential to deliver negative emissions from	CCPu 2020	Research has been undertaken to better understand the potential for negative emissions technologies in Scotland. See NETs chapter.	See NETs chapter	See NETs chapter.

the electricity sector.				
We will continue to review our energy consenting processes, making further improvements and efficiencies where possible, and seeking to reduce determination timescales for complex electricity generation and network infrastructure applications.	CCPu 2020	In Q1 2022, Scottish Government published guidance on applications for generating stations & overhead line applications under the Electricity Act in order to provide greater clarity on the application & determination process for developers / planning authorities / others participating in the process. Scottish Government's Energy Consents Unit has recruited new case officers to ensure a fully resourced unit, which will deliver efficiencies on determination timescales. The officers within the Energy Consents Unit received training throughout 2021 from internal / external resources in relation to key aspects of assessment and decision-making. The average time taken to determine an Electricity Act application has reduced significantly over the last few years. In 2021 the Unit determined a total of 24 applications, taking 27	SG intends to recruit further within the Energy Consents Unit throughout 2022. This will assist with continuing efficiencies to determination timeframes, & improved processes for complex applications. Scottish Government continues to work with stakeholders to identify [where possible] further improvements can be made, such as standardisation of consent conditions.	The Energy Consents Unit intend to recruit more Case Officers by Q3 of 2022, to ensure a fully resourced unit capable of addressing the increased application caseload. Scottish Government launched a consultation in Q1 2022 regarding increasing application fees for generating substations and overhead lines under the Electricity Act. This is in order to ensure cost recovery for Scottish Government in dealing with such applications. Any legislation arising from this would come into force in Q4 2022. Scottish Government is undertaking further work on standardisation of consent conditions in Q1/2 of 2022.

		months of average. The average timescale in 2021 was 17.8 months [if no public enquiry was held].		
We will deliver the actions from our Offshore Wind Policy Statement, published in October. These actions, ranging from support for supply chain, planning, innovation and skills, will support the development of between 8 and 11 GW off offshore wind capacity by 2030.	CCPu 2020	The results of the ScotWind offshore wind seabed leasing process were announced on 17 January 2022. The combined ambition of ScotWind projects is 25GW of generating capacity, which if approved, would deliver far in excess of our current planning assumption of 10GW of offshore wind. The planning and consenting processes that lie ahead means it is not possible to know now exactly what scale of development will be permitted ultimately. However, we are seeking to maximise the opportunities from ScotWind and deliver on the ambition set out in the Offshore Wind Policy Statement.	N/A	Ongoing
Accelerate our work with aviation, energy and other stakeholders to ensure	CCPu 2020	Formation of the Aviation & Renewables Collaboration Board, with distinct terms of reference /	The Group should be formed, and its deliverables /	Informal discussions with stakeholders to establish the Group

that all radars are wind turbine tolerant/neutral during the coming decade.		reporting structure / key deliverables. The aim of this group is to create a more collaborative and strategic relationship between the aviation & renewables industries; delivering mutual benefit and allowing for strategic solutions to barriers for deployment. This links in to the Bute House Agreement 8-12GW commitment and the overall Energy Strategy.	membership / timeframes announced at the point of final publication of the Onshore Wind Policy Statement. SG are in discussion with relevant groups to consider folding these objectives into existing or proposed workstreams, so this work is subject to review.	structure / where the gaps in knowledge are / what Group structure would best support delivery across both Scotland and the UK. To follow up with RUK group 'ONWARD' as their membership and workplan develops. Final publication of Onshore Wind Policy Statement is the end of 2022.
Review and publish an updated Electricity Generation Policy Statement ahead of the next Climate Change Plan.	CCPu 2020	Not progressed due to resource constraints	N/A	N/A

Outcome 2: Scotland's electricity supply is secure and flexible, with a system robust against fluctuations and interruptions to supply

Support the development of technologies which can deliver sustainable security of supply to the electricity sector in	CCPu 2020	Continued engagement with Ofgem / BEIS on the need for support for long duration energy storage. This includes Scottish	N/A	Long duration energy storage consultation outcome expected in June.

Scotland and ensure that Scottish generators and flexibility providers can access revenue streams to support investments.		Government response to the BEIS consultation. SG provided £550,000 of funding to support demonstration of wind energy providing services (including frequency response and black start) at the Dersalloch Wind Farm in Ayrshire. This is the first example in the world of a commercial wind farm demonstration black start, and it highlights opportunities to operate the electricity system in line with net zero ambitions. Cabinet Secretary opened Statkraft Greener Grid Park in Moray, which will provide balancing services to National Grid and reduce reliance on gas.		Continued engagement with ESO to take lessons learned from Dersalloch and apply under business as usual
Press the UK Government for market mechanisms and incentives which recognise locational value, both for energy and for security of supply, and which do not create undue barriers for	CCP 2018	National Grid ESO has set a target to be able to operate a net zero system by 2045. This will require new market mechanisms that support net zero technologies. Cabinet Secretary attended the GEMA board meeting, where he raised the issue of transmission	N/A	Ofgem to undertake strategic review of network charges.

investment in Scotland.		charges and the need for a completely new approach to network charging.		
Collaborate on actions to support investment in new pumped storage hydro capacity.	CCP 2018	SG responded to the BEIS call for evidence on Long Duration Energy Storage Continued engagement with industry stakeholders, BEIS and Ofgem.	N/A	BEIS response to call for evidence is expected in summer 2022.
Work with all parties to secure maximum benefits from the move towards smarter and more flexible electricity systems and networks, as set out in the UK Smart Systems and Flexibility Plan (2017).	CCP 2018	Continued engagement with Distribution Network Operators (DNOs) to support business planning and identify opportunities to test innovation. The more recent creation of the Heat and Transport Coordination Group in 2021 will provide co-ordination and senior oversight, as well as identifying, considering and addressing overlapping and strategic issues and opportunities related to the decarbonisation of heat and transport.	Engagement with DNO to support development of draft RIIO ED2 business plans which were submitted to the regulator in January 2022. Scottish Power Energy Networks have received LCITP grant funding of £1,266,000 to develop the Re-Heat project. The project will implement air source heat pumps, thermal storage and smart controllers in 150 rural or semi-rural homes in East Ayrshire, East	The Reheat project is currently in its early stages and is due to commission in August 2022.

			Dunbartonshire and the Highlands. SP Distribution plc is working alongside E.ON Energy Solutions Ltd with delivery partner Derryherk Ltd and funding partner Scottish and Southern Electricity Networks to deliver the project. The Re-heat project demonstrates how storage and smart controls can reduce the peak demands of heat pumps on energy networks. It is hoped the learnings from the projects will facilitate a quicker transition to low carbon heat by reducing the extent to which energy networks require upgrading.	
Encourage and support increased interconnection	CCP 2018	We have established a Major Energy Network Projects Group	N/A	Quarterly meetings of the MEPG

which can enhance Scottish system security while considering effects on domestic capacity and investment.		(MEPG) – which brings together Scottish Government energy policy / planning & consents unit officials / Scotland's transmission network owners / the electricity system operator / key stakeholders. The Group's key purpose is to maintain a focus on the progress of major electricity transmission projects, while widening its focus to other major energy network projects / developments as required. Roundtable meetings with all Key Remote Island Wind stakeholders for discussion on the key issues / barriers to deployment of sub-sea cables to the Islands. **Shetland** cable is underway. **Orkney** 'Needs Case' deadline is 31 December 2022. **Western Isles** 'Needs Case' – there is no deadline for Ofgem in terms of final decisions; this will depend on wider developments and changes.		

Launch a call in 2021 for evidence and views on technologies that can transform our electricity system, including energy storage, smart grid technologies, and technologies to deliver sustainable security of supply. This will help ensure that our funding and interventions support world leading activity in Scottish based companies.	CCPu 2020	Not progressed due to resource constraints.	N/A	N/A
Develop a series of whole system energy scenarios to guide infrastructure investment decisions for Scotland.	CCPu 2020	Energy Systems Catapult have produced a comprehensive set of Scotland-specific whole energy system scenarios providing options to reach the 2030 and 2045 energy system targets. These scenarios are not exclusive pathways to net zero nor are they 'preferred options'. They provide important insights to inform discussions on the trade-offs needed to meet statutory targets.	N/A	The draft report on outputs from the ESC scenarios were submitted to Scottish Government in March. Following this review, specific outputs have been shared with relevant policy teams for comment.
Ensure that sustainable security of electricity supply is included as a	CCPu 2020	Scottish Government provided £550,000 of funding to support demonstration of wind energy	National Grid ESO is working with industry to take lessons learned from	Ongoing.

priority within future Scottish Government energy innovation funding programmes.		providing services including frequency response and black start, at the Dersalloch wind farm in Ayrshire This is the first example in the world of a commercial wind farm demonstration black start and it highlights opportunities to operate the electricity system in line with net zero ambitions.	Dersalloch and implement under business as usual.	

Outcome 3: Scotland secures maximum economic benefit from the continued investment and growth in electricity generation capacity and support for the new and innovative technologies which will deliver our decarbonisation goals

Press the UK Government to further reform and maintain the CfD mechanism in a manner which better captures the economic benefits and total value added for the Scottish and UK supply chains.	CCPu 2020	The Cabinet Secretary wrote to Secretary of State Kwasi Kwartang re: changes to the Contracts for Difference (CfD) Allocation Rounds. The purpose of this was to encourage him to review the ring-fenced budget allocated for emerging tech in future rounds; as there is concern without doing so Scotland will not be able to deliver the infrastructure needed to achieve net zero on time.	BEIS confirmed that Annual auctions will take place.	CfD AR 4 will conclude between April and July 2023.

		The message ended with an entreaty to both Ofgem & BEIS to ensure there is minimal delay to changes via regulatory approval.		
Introduce new requirements for developers to include supply chain commitments when applying to the ScotWind leasing process run by Crown Estate Scotland.	CCPu 2020	We will use every lever within our devolved competence to support & grow the offshore wind supply chain here in Scotland. Each ScotWind applicant was required to include a Supply Chain Development Statement (SCDS) setting out its supply-chain goals, & committing the developers to meeting these through various stages of their projects. Failures to deliver on commitments will trigger remedies ranging from financial penalties to an inability to progress to a seabed lease. This has produced a leasing round focused on quality & deliverability of bids, and the long term prize of supply chain investment – which promises to transform the Scottish economy in coming decades.	Developers have committed to investing an average of £1bn in the Scottish supply chain for every gigawatt of capacity in their development plans.	We see these statements as the expectation of what the bid winners will deliver for Scotland. Long standing project, as it will take some time to get everything in motion.

Identify and support major infrastructure improvements to ensure that Scotland's supply chain companies and facilities can benefit from the continued growth of renewable energy.	CCPu 2020	Scottish Offshore Wind Strategic Investment Assessment was published in August 2021. The main recommendation focusses on the creation of a Scottish Floating Offshore Wind Port Cluster with targeted investment in ports and harbours upgrades and infrastructure to ensure there is capability and capacity to support the build-out of ScotWind projects and grow Scotland's domestic supply chain.	Scottish Offshore Wind Energy Council (SOWEC) has been leading sector discussion on the development of a Collaborative Framework to encourage the offshore wind sector to work together to deliver on the scale and ambition of ScotWind.	Final version of the Collaborative Framework will be circulated to all developers in April with a launch later in the month, where all signatories will be identified.

Chapter 2: Buildings

Part A - Overview of sector

The 2019 annual emissions envelope published in the 2018 Climate Change Plan[2] for this sector was for **8.9 $MtCO_2e$**, whereas the outturn emission statistics for this year (published in June 2021) show a position of **9.4 $MtCO_2e$**. On the basis of comparing these figures, the sector was **outside** its envelope in 2019.

The updated Plan sets out the following four policy outcomes for this sector, the indicators for which are summarised below:

The heat supply to our homes and non-domestic buildings is very substantially decarbonised, with high penetration rates of renewable and zero emissions heating.	**On Track**	**Off Track**	**Too Early to Say**
Number of existing domestic properties using low and zero greenhouse gas emissions heating systems			x
Services sector fossil fuel heat demand			x

Our homes and buildings are highly energy efficient, with all buildings upgraded where it is appropriate to do so, and new buildings achieving ultra-high levels of fabric efficiency	**On Track**	**Off Track**	**Too Early to Say**
Energy intensity of residential buildings (MWh per household)	x		
Emissions intensity of non-domestic buildings (tonnes of CO_2e per £ million Gross Value Added)	x		
% of homes with an EPC (EER, or equivalent) of at least C			x
% new homes built with a calculated space heating demand of not more than 20 kWh/m²/yr	x		

Our gas network supplies an increasing proportion of green gas (hydrogen and biomethane) and is made ready for a fully decarbonised gas future.	**On Track**	**Off Track**	**Too Early to Say**
% of Scottish gas demand accounted for by biomethane and hydrogen blended into the gas network			x

[2] The CCPu includes updated emission envelopes for the years from 2020 onwards. Given the time period involved in the preparation of national and sectoral emissions statistics (the most up to date data available at this time is for 2019), comparisons with the updated envelopes are not yet possible. Until such a time as this can happen, the data for this aspect of these monitoring reports will be based on the envelopes published in the 2018 Plan .

The heat transition is fair, leaving no-one behind and stimulates employment opportunities as part of the green recovery	On Track	Off Track	Too Early to Say
Percentage of households in fuel poverty			x

Just transition and cross economy impacts

We wish to understand and report on the broader just transition and cross-economy impacts of our emissions-reduction activities in addition to these sector specific policy outcomes and indicators. To do this, we use data from the Office of National Statistics (ONS): Low Carbon Renewable Energy Economy (LCREE) publication. The LCREE is based on survey data of businesses which perform economic activities that deliver goods and services that are likely to help generate lower emissions of greenhouse gases, for example low carbon electricity, low emission vehicles and low carbon services.

The LCREE indicator is narrowly defined and, while useful within its limited scope, does not give us the full picture of the impacts on workforce, employers and communities and progress towards a just transition.

This year we have also included ONS experimental statistics that look at green activity in the economy. These stats reflect green activities in both LCREE and non-LCREE sectors.

Over the next few years we will work to develop a meaningful set of success outcomes and indicators aimed at tracking the impacts of our policies on a just transition to net zero.

Sector commentary on progress

The Scottish Government published the final Heat in Buildings Strategy in October 2021. The Strategy sets out our vision for the future of heat in buildings, and the actions we are taking in the buildings sector to deliver our climate change commitments, maximise economic opportunities, and ensure a just transition, including helping address fuel poverty. The strategy makes clear the necessity of accelerating progress on retrofitting our buildings, including growing the rate of conversion from fossil fuel heating to zero emissions systems from recent levels of around 3,000 per year to around 200,000 per year later this decade.

The emissions reported above relate to the period two years prior to the publication of the Heat in Buildings Strategy, meaning the impact of our boosted ambition will not be visible in those statistics. Below (Part B) we set out specific indicators, though for several of these it is not possible to report progress due to disruption caused by COVID-19 to the collection and publication of the Scottish House Condition Survey. The most recent available data for these indicators is from 2019, which forms the baseline for these indicators. The Scottish House Condition Survey is a nationally representative survey of Scottish households, and represents a key source of information on primary heating fuel, energy performance and energy demand across the domestic building stock. Data for 2021 is due to be published in February 2023.

The three remaining indicators are rated as on-track: emissions intensity of non-domestic buildings (tCO_2e/£mGVA), % new homes built with a calculated space heating demand of not more than 20 kWh/m²/yrT, and energy intensity of residential buildings (MWh per household).

Part C shows that significant steps have been made towards progressing key commitments in the buildings sector as set out in the CCPu.

Furthermore, the Heat in Buildings Strategy commits us to publishing a Heat in Buildings Monitoring and Evaluation Framework. This will be published in due course, and will include a more detailed ratings approach for headline Heat in Buildings indicators.

Developments in monitoring arrangements since last report

Several indicators have been updated, as set out below, to better align with the objectives of the Heat in Buildings Strategy.

These changes have been made to better align with objectives as set out in the Heat in Buildings Strategy, published subsequently to the Climate Change Plan update.

Previous indicator: % heat in buildings from low greenhouse gas emissions sources
New indicator: Number of existing domestic properties using low and zero greenhouse gas emissions heating systems

Previous indicator: % of buildings using low greenhouse gas emission heating systems
New indicator: Services sector fossil fuel heat demand (GWh)

Previous indicator: Energy intensity of non-domestic buildings (GVA in the services sector per GWh)
New indicator: Emissions intensity of non-domestic buildings (tonnes of CO_2e per £ million Gross Value Added)

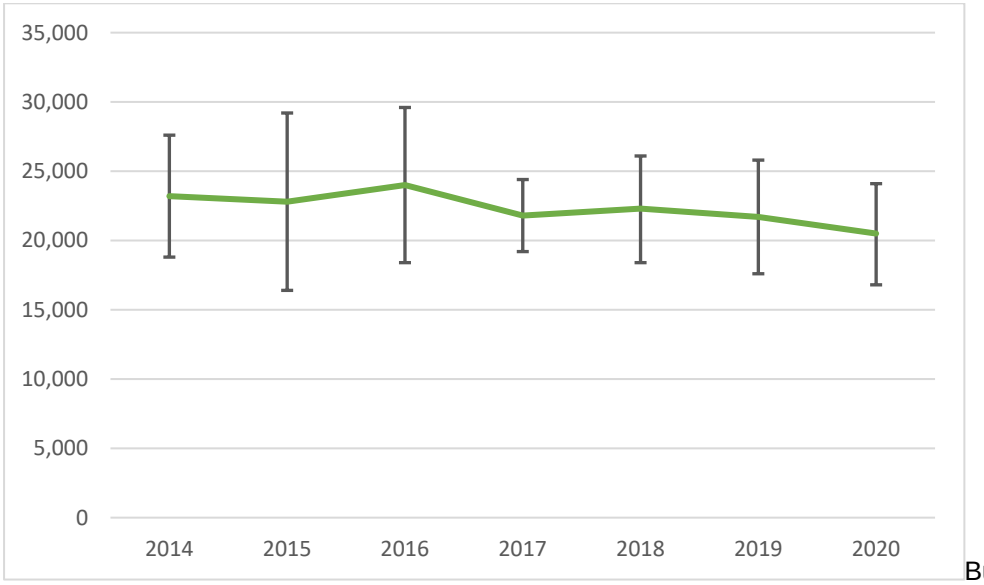
Part B - Progress to Policy Outcome Indicators

Policy Outcome:	Indicator	On-Track Assessment (Milestone/Targets)
Cross-sectoral social and economic indicator	FTE employment in Low Carbon Renewable Energy Economy	Year-to-year change

Most Recent Data: 2020
Data Source(s): Office of National Statistics: Low Carbon Renewable Energy Economy (LCREE), Time spent of Green Tasks
Assessment: Too early to Say

- In 2020, the Scottish low carbon renewable energy (LCREE) sectors were estimated to directly provide 20,500 jobs, down from 21,700 in 2019 and from a high of 24,000 in 2016.
- The estimates of LCREE are based on a relatively small sample of businesses and hence are subject to wide confidence intervals. LCREE employment in Scotland in 2020 is similar to previous years and the difference is not statistically higher or lower than any previous year.

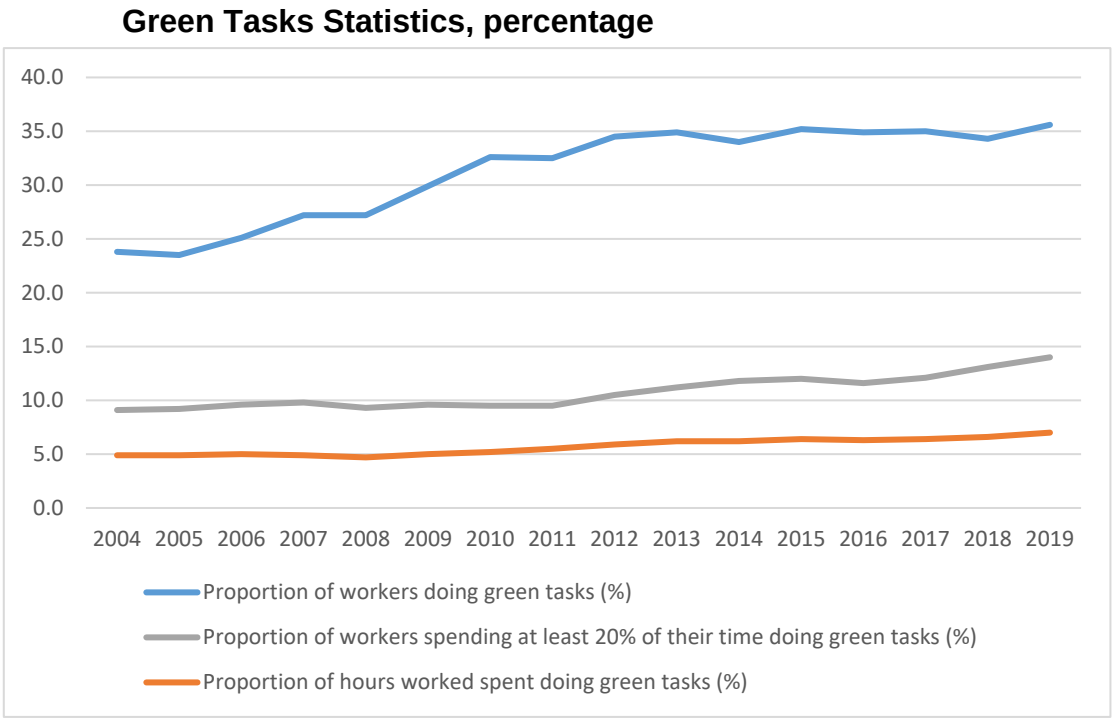
Employment in Low Carbon Renewable Energy Economy, FTE



Buildings graph 1

Source: Scottish Government presentation of ONS statistics

- The ONS also released experimental statistics on a wider perspective of green activity in the economy with their time spent on green tasks release. These stats reflect green activities in both LCREE and non-LCREE sectors.
- This release showed that in 2019 Scotland achieved an all-time high of hours spent on green tasks and proportion of workers doing green tasks, including workers who spend more than 20% of their time on green tasks.
- The proportion of workers doing green tasks in Scotland was 36% in 2019, up from 23.8% in 2004. Workers who have spent more than 20% of their time doing green tasks was 14%, up from 9% in 2004.
- The proportion of overall hours spend doing green tasks in Scotland was 7%, up from 4.9% in 2004.



Buildings graph 2

Source: Scottish Government presentation of ONS stats

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Number of existing domestic properties using low and zero greenhouse gas emissions heating systems	Progress to target [to increase to at least 1.5 million by 2030]

Most recent data: 312,000 domestic properties use low and zero greenhouse gas emissions heating systems in 2019

Data source(s): Scottish House Condition Survey - gov.scot (www.gov.scot)

Assessment: Too early to say

Commentary:

In 2019, there were 312,000 domestic properties using low or zero greenhouse gas emissions heating systems. These were properties with either electricity, biomass or communal heating as their primary heating fuel.

“Low and zero emissions heating systems” are heating systems that have zero direct greenhouse gas emissions[3] (such as individual electric heat pumps, connection to heat networks, and electric systems such as storage heaters), and those that have very low direct emissions (such as those that use hydrogen). Note that, buildings connected to existing heat networks, generally powered using natural gas, are included as they are considered future proofed and net zero ready. However, as set out in the Heat Networks Delivery Plan, operators of existing heat networks will be required to prepare and implement a Heat Network Decarbonisation Plan to reduce their emissions over time, and once our heat network legislative framework is in place, any new heat networks will need to be powered by heat from low or zero emissions sources. The list of low and zero emissions heating systems will be kept under review.

As set out in the Heat in Buildings Strategy, to stay within the Buildings’ sector emissions envelope, by 2030 the vast majority of the 170,000 off-gas homes that currently use high emissions oil, LPG, and solid fuels, as well as at least 1 million homes currently using mains gas, must convert to low and zero emissions heating. Therefore, including the 312,000 existing properties using low and zero emissions heating systems in the baseline, our overall target is that at least 1.5 million properties existing in 2020 will use low and zero emissions heat by 2030. This does not include new build properties, which are out of scope for this indicator. In future years, an adjustment will be made to Scottish House Condition Survey (SHCS) data to account for new build properties using low and zero emissions heating, to ensure we are capturing only existing properties.

[3] emissions generated within the curtilage of the building for delivering a building’s space and hot water heating and cooling requirements

The Heat in Buildings Strategy was published after the Climate Change Plan update and the corresponding monitoring framework. Therefore, this indicator has been added to improve alignment with our objectives as set out in the Heat in Buildings Strategy, and the forthcoming Heat in Buildings Monitoring and Evaluation Framework. This framework will be robust, independent, thorough and long-term, and will take account of the Climate Change Plan monitoring framework as well as monitoring and evaluation requirements for Fuel Poverty.

SHCS data is usually published with a one year lag. However, with the suspension of face-to-face interviewing in March 2020, the data collection for SHCS 2020 was not completed. The results of the 2021 SHCS are expected to be published in February 2023. Therefore, the most recent data is for 2019. This is the baseline year for this indicator, and therefore no change is observed and an assessment of progress towards the target cannot be provided.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Services sector fossil fuel heat demand	Progress to target [to reduce to 5,000 GWh by 2030]

Most recent data: Commercial sector fossil fuel heat demand was 11,170 GWh in 2020

Data source(s): Scottish Energy Statistics Hub (shinyapps.io), using input from:
BEIS: Sub-national total final energy consumption data
BEIS: Energy Consumption in the UK: end use

Assessment: Too early to say

Commentary:

In 2020, services sector fossil fuel heat demand was 11,170 GWh. This includes demand for coal, gas and petroleum products. This excludes demand for bioenergy and waste, which is considered low or zero emissions. This figure is provisional and will be finalised in September 2022, when actual consumption data is available.

The Heat in Buildings Strategy sets out our ambition to convert the equivalent of 50,000 non-domestic buildings to low and zero emissions heat by 2030, which illustrates the scale of conversion required to meet emissions reduction targets. However, given the greater diversity in size, use and construction of non-domestic buildings as compared with dwellings, there is significantly more variation in energy demand and emissions across the non-domestic building stock. Therefore, a formal indicator based on the number of buildings without accounting for these differences would not align with our overall objective of reduction emissions, and would be potentially misleading.

Therefore, a rating based on fossil fuel heat demand is more appropriate, as this more directly relates to greenhouse gas emissions. Converting the equivalent of 50,000 non-domestic buildings (existing in 2020) to zero emissions heat by 2030 would bring the total fossil fuel heat demand from the Services sector below 5,000 GWh.

A ratings approach for this indicator will be more fully developed as part of the Heat in Buildings Monitoring and Evaluation Framework. Therefore this indicator is rated too early to say.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	Energy intensity of residential buildings (MWh per household)	Progress to target [to fall by at least 30% by 2032][4]

Most recent data: Reduction of 1.3% from 2015 to 2019

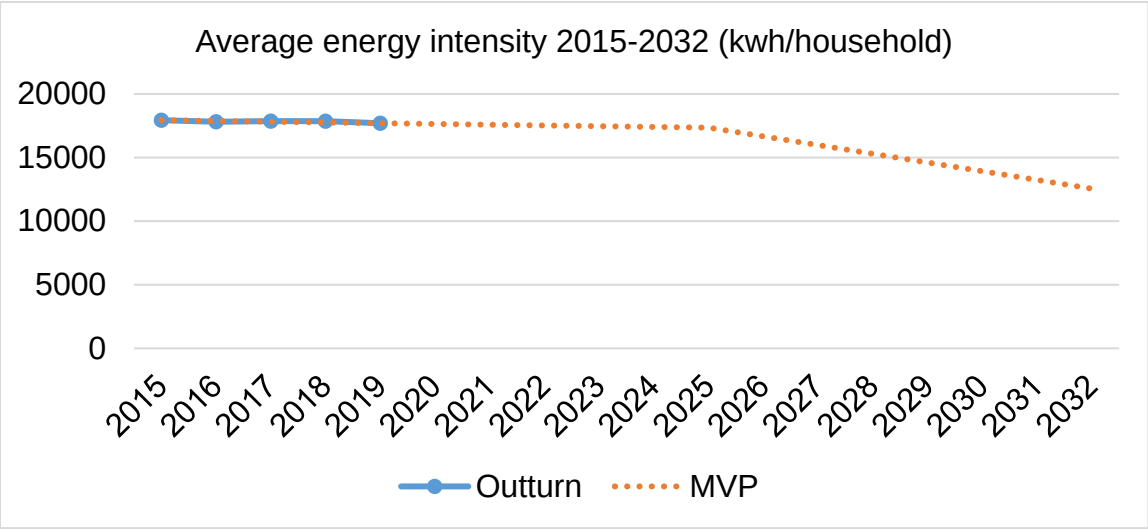
Data source(s): Scottish Energy Statistics Hub (shinyapps.io), using input from:
BEIS: Sub-national total final energy consumption data
BEIS: Energy Consumption in the UK: end use
Scottish Government: Scottish Greenhouse Gas Emissions
NRS: Estimates of Households and Dwellings in Scotland

Assessment: On track

Commentary: The Climate Change Plan target of reducing average household energy intensity by 30% from 2015 level in 2032 gives a target of 12,556 kWh/household. In 2019, the average energy intensity was 17,699 kWh/household, a reduction of 1.3% since 2015 (17,937 kWh/household). Although overall domestic energy consumption has increased slightly in those years, the number of households has also increased, leading to the overall reduction per household.

Over the same period, average emissions intensity has fallen by 1.2% to 2.49 tCO_2/household from 2.52 tCO_2/household in 2015. As with energy efficiency, the slight increase in overall residential emissions is offset by the increase in the number of households.

The minimum viable pathway (MVP) shows the minimum progress on average energy intensity that would be needed to reach the target of a 30% reduction by 2032, and shows that it is currently on track.



Buildings graph 3

[4] From the 2015 baseline

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	Emissions intensity of non-domestic buildings (tonnes of CO_2e per £ million Gross Value Added (GVA))	Progress to target [fall by 20% by 2025 and 30% by 2032, as compared to 2015]

Most recent data: 35.4tCO_2e/£mGVA in 2018

Data source(s): Scottish Energy Statistics Hub (shinyapps.io), using input from:
BEIS: Sub-national total final energy consumption data
BEIS: Sub-national residual fuel consumption data
Scottish Government: Scottish Greenhouse Gas Emissions
Scottish Government: Quarterly National Accounts Scotland - sectoral breakdown (Unpublished)

Assessment: On track

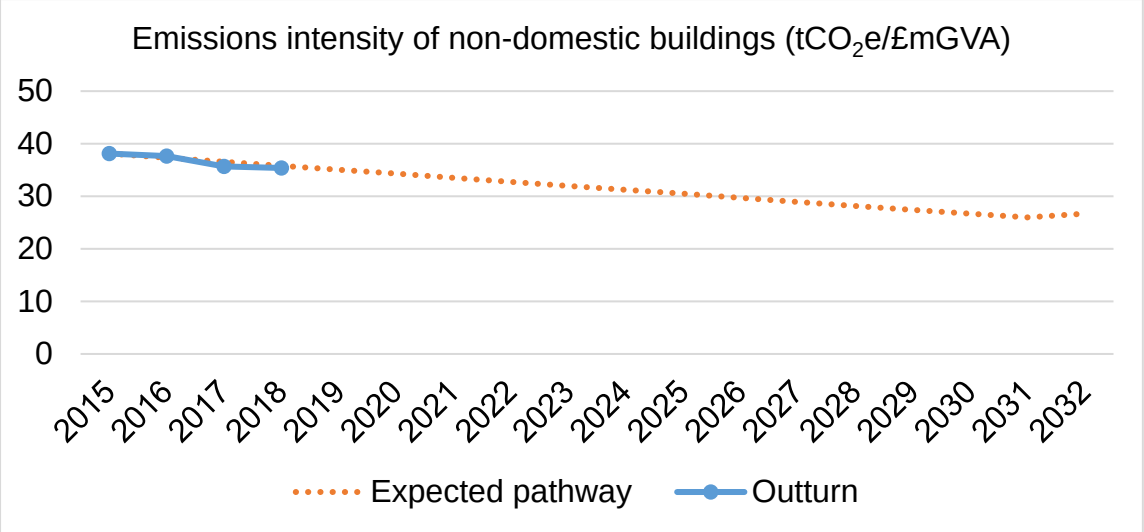
Commentary:

In 2018, emissions intensity of the services sector was 35.4tCO_2e£mGVA, a reduction of 0.3tCO_2e/£mGVA compared to 2017 and a reduction of 7.2% on 2015.

The Climate Change Plan set ambition in the services sectors to reduce emissions intensity by 10% by 2015, 20% by 2025 and 30% by 2032, from a 2015 baseline, through a combination of fuel diversification, energy efficiency improvements and heat recovery. Emissions intensity is sectoral emissions divided by GVA in the sector.

Emissions intensity has been falling in the services sector, as a result of increasing GVA and relatively flat emissions.

The expected emissions intensity of the services sector to meet the 2020, 2025 and 2032 targets is set out below. As the recorded emissions intensity of the services sector in 2018 is below the expected value, progress is currently considered to be on-track.



Buildings graph 4

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	% of homes with an EPC (EER, or equivalent) of at least C	Progress to 2033 target [all homes to have EPC C or higher where technically feasible and cost effective]

Most recent data: 45% in 2019

Data source(s): Scottish House Condition Survey - gov.scot (www.gov.scot)

Assessment: Too early to say

Commentary:

The Scottish Government has accelerated its ambition for all homes to reach a good standard of energy efficiency, equivalent at least to EPC C, where feasible and cost effective by 2033 (2028 for private rented homes). The previous target was for this standard to be reached by 2035.

In 2019, 45% of dwellings were at EPC C or above, an increase of 2pp since the previous year. It is too early to say whether this indicator is on track as more recent data is not available.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	% new homes built with a calculated space heating demand of not more than 20 kWh/m²/yr	Year-to-year change

Most recent data: Analysis of new build home completions in 2020

Data source(s): EPC data for Q1 to Q4 2020 lodged to the Scottish Energy Performance Certificate Register Home (scottishepcregister.org.uk)

Assessment: On track

Commentary:

Without applying any moderation to remove potentially erroneous values, 1,191 records reported a heat demand intensity of 20 kWh/m²/year or less. This is 7.93% of completions for 2020. This is an increase on 2019, when 6.40% of new homes were reported to have a space heat demand intensity of 20 kWh/m^2/year or less.

Adjusting the flow to account for any potentially erroneous values: Removing the 0.5% of the lodged records with the lowest space heating demand intensity and the 0.5% with the highest space heating demand intensity in effect removes all but seven of the records with a space heating demand intensity of less than 10 kWh/m^2/year, and removes all records with a space heating demand intensity of greater than 106 kWh/m^2/year. This leaves 1,116 records (7.51%) with a space heating demand intensity of 20 kWh/m^2/year or less. The adjusted figure for 2019 was 5.96%.

The on-track assessment of this indicator is based on year-to-year change, with the percentage of new homes built with a calculated space heating demand of not more than 20 kWh/m^2/year increasing between 2019 and 2020. No target/milestone is given for this indicator. The maximum level of space heating demand is based upon a number of variables including the type and mix of new build completions. Whilst the minimum standards set in guidance on building fabric in new homes will drive improvement, these standards are also reviewed only every few years and take several years to ‘bleed through’ into new build completions. We will undertake an evaluation of the likely milestone for 2023 to 2026 based upon the implementation of the changes to be applied later in 2022.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
3	% of Scottish gas demand accounted for by biomethane and hydrogen blended into the gas network	Progress to target [to increase to 20% by 2030]

Most recent data: 1.65% in 2021

Data source(s): Scottish Gas Network (SGN) (unpublished data) and BEIS (Regional and local authority gas consumption statistics)

Assessment: Too early to say

Commentary:

In 2021, 1.65% of Scottish gas demand was accounted for by biomethane gas. This is an increase of 0.12 percentage points compared to 2020, and 1.39 percentage points compared to 2015.

As set out in the Heat in Buildings Strategy, it's our ambition that by 2030 at least 20% of the volume of the gas in the GB gas grid to be alternatives to natural gas.

However, several of the key policy levers required to achieve this are not within direct Scottish Government control, and therefore we need further information from the UK Government before we can set out the expected pathway towards this target. For example, whether there is likely to be a gradual or step change in the amount of hydrogen blended in the gas grid, and at what point this will begin. Therefore, this indicator is rated as too early to say.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
4	Percentage of households in fuel poverty	Progress to 2040 target [no more than 5%] interim 2030 [no more than 15%] 2035 [no more than 10%] targets[5]

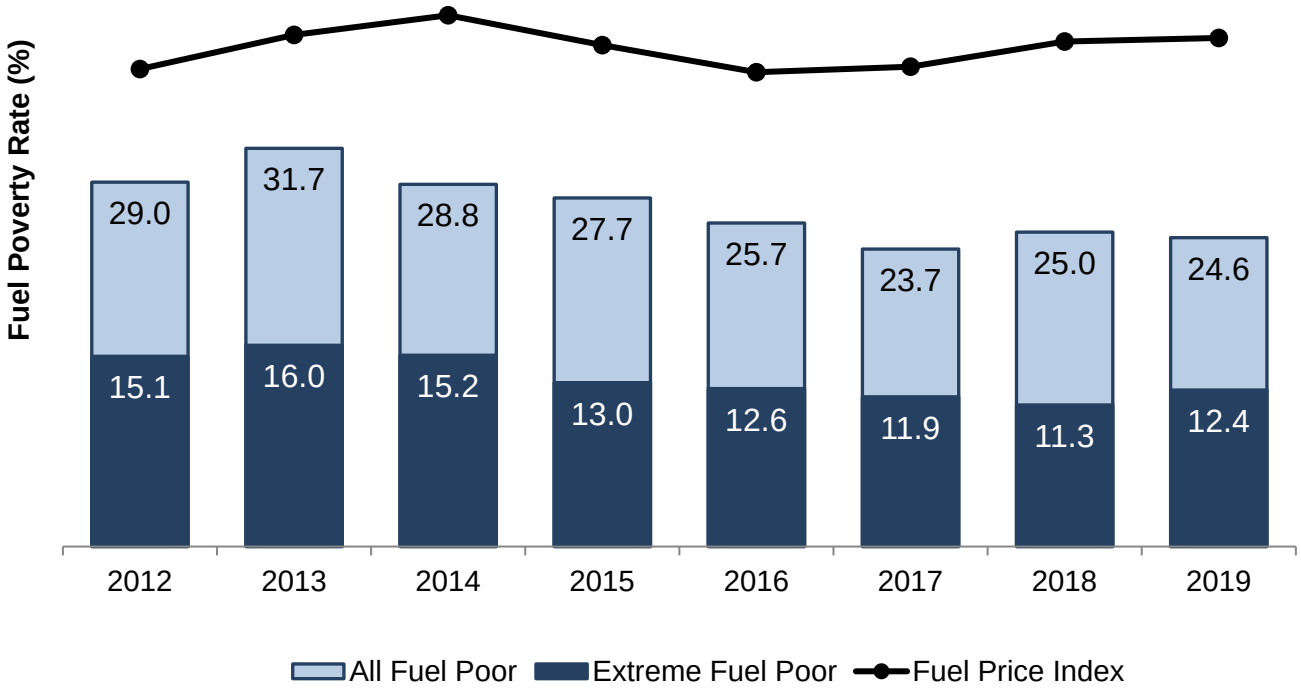
Most recent data: 24.6% of households were estimated to be living in fuel poverty in 2019.

Data source(s): Scottish House Condition Survey 2019

Assessment: Too early to say

Commentary:

Figure 1: Estimates of Fuel Poverty and Extreme Fuel Poverty, 2012 to 2019



Buildings graph 5

In 2019, an estimated 24.6% of all households (613,000 households) were in fuel poverty, similar to 2018 but lower than that recorded in the survey between 2012 and 2015. Since 2016 the rate of fuel poverty has remained between 23% and 26%.

[5] As set out in the Fuel Poverty Act with consideration of associated indicators on extreme fuel poverty and the fuel poverty gap.

Around 12.4% were living in extreme fuel poverty, similar to 2018 but a decrease from 16% in 2013. Since 2015, the rate of extreme fuel poverty has remained between 11% and 13%.

In 2019, the median fuel poverty gap (adjusted for 2015 prices) for fuel poor households was £700. This is higher than the median fuel poverty gap (adjusted for 2015 prices) in 2018 (£610) but similar to the median gap in 2012 to 2017.

The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 received Royal Assent in July 2019. The Fuel Poverty Strategy[6] required by the Act was published in December 2021 and sets out how the targets will be achieved. The Act requires that a monitoring and evaluation framework is developed to support the Fuel Poverty Strategy and that the statutory Fuel Poverty advisory panel is consulted on this. As the panel was only appointed on the same day the Fuel Poverty strategy was published, this has not yet been progressed. It is therefore too early to say whether progress towards this target is on track.

The most recent data for this indicator is from the 2019 SHCS. Following the suspension of face-to-face interviewing in March 2020, there was no further data collection for the 2020 SHCS. The 2021 SHCS was carried out by an external-only inspection, supplemented with alternative sources of data (e.g. from the Energy Performance Certificate) and the householder providing information to surveyors via telephone. This external+ approach was designed to provide as reliable as possible estimates of key statistics, including on fuel poverty, energy efficiency and external repairs, while maintaining no contact with the household. No data was collected on internal aspects such as room repairs and aspects of housing standards. The results of the 2021 SHCS are expected to be published in February 2023.

We acknowledge that the increase in energy prices since 2019 will have increased the number of households living in fuel poverty. Our analysis of the impact of the April 2022 energy price cap increase suggests that up to 831,000 households (one out of every three households) could now be living in fuel poverty. This is an increase of up to 218,000 since 2019.

[6] https://www.gov.scot/publications/tackling-fuel-poverty-scotland-strategic-approach/

Part C - Information on implementation of individual policies

Outcome 1: The heat supply to our homes and non-domestic buildings is very substantially decarbonised, with high penetration rates of renewable and zero emissions heating

Outcome 2: Our homes and buildings are highly energy efficient, with all buildings upgraded where it is appropriate to do so, and new buildings achieving ultra-high levels of fabric efficiency

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Energy Company Obligation (ECO) requires obligated energy supply companies to deliver energy efficiency measures in homes – mainly insulation-based measures and boiler replacements.	CCP 2018	ECO provides finance for energy efficiency improvements benefitting fuel poor households but offers limited funding for zero carbon heating measures. The Secretary of State (BEIS) retains an absolute veto over how these schemes are designed, operate and are financed through the energy levies in Scotland. Scottish Ministers have expressed their view that this is not an acceptable basis upon	Since 2013, approximately 13.3% of all households receiving ECO measures have been delivered in Scotland (to around 12% of all households in Scotland).	The ECO3 scheme concluded in March 2022. The scheme is replaced by ECO 4, running from April 2022 until March 2026.

		which to set regulations for a Scottish scheme.		
Energy Efficient Scotland Delivery Schemes: • Area Based Schemes and Warmer Homes Scotland. • Home Energy Scotland Advice Service and Loans. • Home Energy Scotland cashback scheme for zero emissions heating technologies and energy efficiency measures - boosted. • SME Advice Service and Loans. • SME cashback scheme for zero emissions heating technologies and energy efficiency measures - boosted.	2020-2021 PfG	Area Based Schemes now provide increased funding for whole house retrofits, zero/ low carbon heating and microgeneration. Through Warmer Homes Scotland (WHS) we have made available renewable and micro generation heat measures and new insulation measures. Grant funding has also been increased to incentivise uptake on more expensive low carbon & renewable measures. The HES Loans and Cashback Scheme provides up to £15,000 for energy efficiency improvements plus up to £17,500 for zero emissions heating and micro-renewables and up to £6,000 for battery storage. Cashback grants are available with the loans of up to £7,500 on zero emissions heating systems plus up to £6,000 for energy efficiency measures.	ABS has delivered over 100,000 energy efficiency improvements since 2013. WHS has been operating since Sept 2015 helping more than 25,000 households throughout Scotland. The Home Energy Loan Scheme has been operating since 2017 and has funded 4175 energy efficiency measures and 3958 renewable technology improvements to over 6000 Scottish households.	Scottish Ministers have expressed their intention to provide multi-year resource assumptions for ABS. Guidance for 21-22 schemes is being drafted and officials hope that this will be incorporated for ABS 10 (22-23) onwards.

Review support programmes: We will review existing Scottish Government funding schemes to ensure that they support the deployment of low and zero emissions heat. We will expand the provision of loans to the SME sector, and enhance the wider energy efficiency and heat advice service and provision of tailored start-to-end support.	2020-2021 PfG	Work on this is underway. Provision to the SME sector has been expanded The Heat in Building Strategy committed Scottish Ministers to replacing the cashback offer for homeowners and SME businesses in 2022-23 with a grant scheme to support energy efficiency and zero emissions heat improvements.		Work is underway. A new offering of Non-domestic Advice and support service was launched on 1 April 2022. Business Energy Scotland (BES) will assist SMEs in Scotland to decarbonise their premises and processes and act as a gateway to the SME Loan and Cashback scheme.
Procure a new national delivery scheme, to replace the existing Warmer Homes Scotland contract, to open in 2022.	CCPu 2020	The formal procurement process for the new National Scheme that will be the successor to Warmer Homes Scotland is underway. The Prior Information Notice (PIN) which informs the market of the upcoming tender opportunity was published on 17 December. A virtual supplier event took place on 10 February to give further information about the new scheme and procurement process to businesses with an interest in delivery of the contract.	N/A	We have committed to procuring a successor scheme to go live when the current Warmer Homes Scotland contract expires. The existing WHS contract is in the process of being extended to run until June 2023 and procurement of the successor is aligned with this timeframe to go live once the

				current contract expires. The next steps in the procurement timeline are the publication of the ITT (Invitation to Tender), evaluation of tender responses, contract award and then a mobilisation period for the winning bidder.
Energy Efficiency Standard for Social Housing: will be met by social landlords by 2020.	CCP 2018	89% of social landlords meet Energy Efficiency Standard for Social Housing (EESSH2).	The Scottish Housing Regulator reported that 87% of social rented homes were already meeting the 2020 milestone as of the end of March 2020, landlords will provide their final report on performance against EESSH1 in 2021.	Completed
New Build Heat Standard (NBHS): requiring new buildings, applying for a building warrant from 2024 onwards, to use zero direct emissions heating (ZDEH) systems.	2020-2021 PfG + CCPu	We have created an external, independently co-chaired working group to support development of Standard. We have created a non-domestic sub-group to support main	We committed to consulting on the Standard in 2020. This was achieved.	Next steps: Drafting and launch of second consultation this year. And specifically consulting on the detail of the Non-

		working group. This sub-group met again in March 2022. We have completed 3 research projects, which considered cost implications, network issues and other key challenges associated with the introduction of ZDEH. We have commissioned 2 further research projects: one to determine the emissions associated with various heating technologies, along with phase 2 of our affordable housing ZDEH evaluation. In December 2020, we launched our initial Scoping Consultation on the NBHS. The consultation closed March 2021, with the analysis of responses published in October 2021: New Build Heat Standard: scoping consultation - Scottish Government - Citizen Space		Domestic New Build Heat Standard and how it will apply to the diversity of stock. Drafting of regulations ahead of implementation in 2024.

Review of energy standards within building regulations. The review investigates the potential for further, significant improvement on 2015 standards and how building standards can support other carbon and energy policy outcomes, including our decarbonisation of heat agenda.	CCP 2018	Research to inform review of current standards, last updated in 2015, was completed in 2020. An industry working group was convened in December 2020 and is currently supporting the review process. We consulted on proposals for improved energy standard from July to November 2021.	Yes. Related indicator within CCPu – "% new homes built with a calculated space heating demand of not more than 20 kWh/m²/yrT". Initial report contribution provided in February 2021. Intent is that this percentage can be updated annually from energy performance certificate data from new home completions to illustrate the change delivered by periodic review of standards. Data to illustrate the impact of the review will accrue from energy performance certificates lodged from new homes built to the 2022 standard.	Timetable for delivery of change revised from late 2021. Amendment regulations were laid in Parliament on 22 April 2022. Revised standards and guidance to be published at the end of May 2022. New provisions apply to building warrant applications submitted from 1 October 2022. A building warrant, once granted, is valid for three years. Accordingly, the proportion of new homes completed to the 2022 standards will increase to from 2023 to 2026.
Heat in Buildings regulation: Put in place	Heat in Buildings Strategy	Commitment in the Heat in Buildings Strategy to introduce	Milestones have been set in the Heat in	Next steps: Consult on detailed proposals

regulation to increase uptake of zero emissions heating systems and improve energy efficiency standards across owner occupied and private-rented homes to come into force from 2025.		regulations to achieve this, including a clear timeframe for consulting on and laying of regulations, and backstop dates for compliance, including minimum energy efficiency standards (equivalent to EPC C) in private-rented homes by 2028 and in owner occupied homes by 2033.	Buildings Strategy regarding dates to consult and lay regulations. Backstop dates for compliance have also been discussed but not consulted on.	over the coming year.
Low Carbon Infrastructure Transition Programme (LCITP) - supports investment in decarbonisation of business and the public sector.	2020-2021 PfG	The LCITP continues to provide support investment in decarbonisation of business and the public sector. Launched in September 2020 the Green Recovery: Low Carbon Energy Project Capital Funding Invitation targeted £50 million of support for project that demonstrate innovative low carbon heat solutions for buildings.	No	The LCITP formally drew to a close in April 2022.
Expanded £1.6bn Heat in Buildings capital funding over the next parliament Building on the Low Carbon Infrastructure Transition Programme (LCITP) and existing energy efficiency and zero emissions heat support programmes.	2020-2021 PfG	As set out in the Heat in Buildings Strategy, we have boosted our ambition to invest at least £1.8 billion in heat and energy efficiency over the course of the current parliament. This includes Scotland's Heat Network fund, which was launched 21 February 2022	N/A	We will launch a pre-capital support unit as part of virtual energy agency to support development of heat networks later this year. In March 2022, we launched the £1

		making available £300 million capital over this parliament to support the development and roll out of zero emission heat networks across Scotland. It also includes at least £465m to support those least able to pay, £200m for the Social Housing Net Zero Heat Fund, and £200m Scottish Green Public Sector Estate Scheme.		million Heat in Buildings Development Funding Invitation to make grant funding available for the development of investment grade business cases for zero emissions heat projects in buildings. The Invitation is open until 31 May 2022.
Non Domestic Public Sector Energy Efficiency (NDEE) Framework: A four year framework launched in March 2016, designed to support public and third sector organisations to procure Energy Efficiency retrofit work. The Framework will continue for a further four years commencing in 2020. NDEE Support Unit accelerates the number of projects and delivery timescales of public sector energy efficiency projects using the NDEE Framework and supports	CCP 2018	In 2020, the Scottish Government launched the 2nd generation Non-Domestic Energy Efficiency (NDEE) frameworks consisting of the NDEE over £1 Million Projects framework, NDEE sub £1 Million Projects framework and NDEE Project Support Unit framework. These framework will continue to support public and third sector bodies in Scotland accelerate energy efficiency retrofit projects across their estates. The NDEE Frameworks are innovative in the way that they cover multiple and diverse energy efficiency and renewable energy solutions.		Frameworks and project support unit will operate until 2023. The central government energy efficiency grant fund will reopen to applications Q2 of 2022. This fund will provide grant support for Scottish public bodies classified as central government to improve the energy efficiency of their buildings and install low and zero carbon

our wider ambitions around energy demand reduction.		Further support is being provided to the public sector estate through the Green Public Sector Estate Decarbonisation scheme which is making available at least £200 million over this parliament to aid the decarbonisation of Scotland's public sector estates.		heat systems in building.
The Renewable Heat Incentive (RHI) - a GB-wide scheme created by the UK Government (with the agreement of the Scottish Government). UK Government is extending both the domestic and non-domestic RHI out to 2022	August 2020	1,130.7 MW of accredited capacity under the non-domestic RHI (NDRHI) between November 2011 and January 2022. 1,565 GWh of heat had been paid for between April 2014 and end December 2021 under the domestic RHI scheme in Scotland.	Scotland consistently attracted more than its pro-rata share under the NDRHI, with around 19% of non-domestic accredited installations being in Scotland.	The NDRHI closed as scheduled on 31 March 2021, though qualified extensions for both Tariff Guarantee and non-Tariff Guarantee applications were implemented prior to its closure. The Domestic Renewable Heat Incentive (DRHI) formally closed on 31 March 2022, and has been replaced by the Boiler Upgrade Scheme. The Scottish Government has opted out of the Boiler Upgrade Scheme in favour of

				boosting our existing programmes.
UK Green Gas Support Scheme - a GB-wide Green Gas Scheme is planned to come into force in 2022, stimulating biomethane injection into the gas grid.	UK Government announcement	This scheme opened in November 2021. The Scottish Government liaised closely with the UK Government on the development of the Green Gas Support Scheme (GGSS) SI and the Cab Sec provided formal consent to the laying of the SI for the scheme in September 2021. The Scottish Government has also worked closely with the UK Government and Ofgem to ensure access to data for the purpose of monitoring the impact of the scheme in Scotland can be undertaken via a DSA.		The GGSS is funded via a Green Gas Levy and we urge the UK Government to prioritise the transition of the levy from a per meter point design to a volumetric mechanism.
UK Clean Heat Grant - a GB-wide Clean Heat Grant is planned to come into force in 2022, supporting uptake of heat pumps (and limited biomass boilers) via up-front grants.	UK Government announcement	Plans for the UK Clean Heat Grant have been replaced by the Boiler Upgrade scheme, which launched in April 2022, following the closure of the DRHI.	N/A	N/A
Support for Heat Networks: the District Heating Loan Fund helps address the financial and	CCP 2018	The District Heating Loan Fund (DHLF) continues to offer low interest loans to help overcome the financial barriers to the	No	DHLF expected to continue to offer funding throughout financial year 21/22.

technical barriers to district heating projects by offering low interest loans.		delivery of low carbon infrastructure projects.		Planned launch of re-scoped DHLF in 2022.
Implement the provisions of the Heat Networks (Scotland) Bill to create a strong regulatory framework to support delivery by 2023.	2020-2021 PfG	Bill passed unanimously by Scottish Parliament on 23 February 2021. Draft Heat Network Delivery Plan written.	The Act creates two statutory deadlines: 1 April 2022: Publication of Heat Networks Delivery Plan 1 October 2023: Laying of SSI to set 2035 target for heat network supply.	We will consult on regulations in late-2021. Draft Heat Networks Delivery Plan, including section on regulations consulted on late 2021. Heat Network Delivery Plan was published on 31 March 2022. Consultation on statutory guidance and regulations to happen Spring 2022 We will deliver necessary regulations by 2023-24.
Continue to support the Heat Network Partnership - a collaboration of agencies focused on the promotion and support of district heating schemes in Scotland.	Maintained	The Heat in Buildings Strategy committed to launch a Heat Network Pre-Capital Support Unit, expanding on the previous role of the Heat Network Partnership to provide enhanced support to the public and private sector in developing a pipeline for delivery.	N/A	Review of requirements for the Heat Network Pre-Capital Support Unit will take place in summer 2022 with subsequent launch in Autumn 2022.

Net Zero Carbon Public Sector Buildings Standard will be introduced in 2021 and progressively rolled out across the public sector, as announced in the Programme for Government 2019.	2020-2021 PfG + CCPu	The Standard was finalised and approved by Scottish Ministers in November 2020. It has been rolled out across a series of pathfinder projects during 2021/22. A steering group of public sector bodies has overseen the development of detailed sectoral guidance.	The Standard and accompanying detailed sectoral guidance have been finalised. This voluntary Standard is now available to be used.	A number of public sector bodies have ambitions to use the voluntary standard. Work in 2022 is focusing on maintaining the standard, developing a governance structure to oversee its application, and discussions across Scottish Government about the funding implications.
Local Heat and Energy Efficiency Strategies (LHEES) will be in place by the end of 2023, setting out preferred heat solutions zones, guiding building owner decision making about replacement heating systems, and forming the basis for local delivery plans targeting heat and energy efficiency investment.	2020-2021 PfG + CCPu	In October 2021 COSLA agreed to develop a statutory framework for LHEES in partnership with the Scottish Government that would place a duty on local authorities to produce LHEES. A consultation on the draft LHEES Order was held in January 2022. 14 local authorities are currently being funded to develop area-wide LHEES. These projects will use the LHEES methodology, developed from the LHEES pilot programme, as well as outputs from the LHEES National Assessment, which carried out	All 32 Scottish local authorities have participated in, and completed a pilot programme for LHEES, testing different approaches and building capacity. Learning from the pilots has fed into a methodology for LHEES, which will set out a consistent approach for the production of LHEES.	We have committed to having LHEES in place across all local authorities by the end of 2023. We are working in partnership with local government to progress LHEES at pace. Following approval from the Minister, the Local Heat and Energy Efficiency Strategies (LHEES) Order (SSI) was laid in Parliament on 11 March 2022,

		the early stages of LHEES analysis centrally using national datasets.		approved by Parliament on 11 May and will come into force on 21 May 2022.
Assessment of Energy Performance and Emissions Regulations (Non-Domestic Buildings) - The Assessment of Energy Performance of Non-domestic Buildings (Scotland) Regulations 2016 require assessment of the energy performance and emissions of larger non-domestic buildings (those over 1,000 m^2). A review programmed for 2021 will investigate and consult upon amended scope of standards and more challenging improvement targets to create a viable pathway for all existing non-domestic buildings to deliver the level of energy demand and emissions reductions needed.	CCP 2018	Work to review the existing 2016 Regulations was paused in 2020 due to the Covid pandemic. The review recommenced late in 2021, however due to the hiatus and the change in context in the intervening period (i.e. the publication of the Heat in Building Strategy), the focus of the review changed. We are investigating three broad regulatory approaches: • Measures based approach – increase the ambition of the existing 2016 Regulations • Set a minimum EPC standard • Regulate based on actual energy consumption (operational ratings)	The long term milestones for delivery are set in the Heat in Building Strategy – i.e. convert 0.5m buildings to zero emissions heat by 2030, and all by 2045. The Heat in Buildings Strategy commits to introducing regulations to achieve this by 2025. A Call for Evidence on the broad regulatory approaches was published in December 2021, and closed at the end of February. Delivery milestones (i.e. rollout/ progress)	Consultation on proposals to regulate all non-domestic buildings for energy efficiency and zero emissions heat is planned for later in 2022.

			haven't been developed yet.	
Support for community low and zero emissions heat projects through CARES.	CCPu	Heat decarbonisation is a key focus of the current CARES contract, with tailored packages of support available to eligible applicants. The scheme provides free advice, and loan and grant funding, with up to £8.25m made available this financial year (2021/22) to assist community groups in developing renewable energy projects, supporting the growth of community and locally owned energy in Scotland.	Strategic policy direction will be provided to the contract delivery body through the Scottish Government Contract Manager in consultation with Heat Policy colleagues, to ensure CARES is aligned with Scottish Government heat decarbonisation objectives, with feedback on progress monitored through regular engagement and reporting commitments. The scheme has, since inception in 2010, offered advice to over 900 organisations and supported over 600 community and locally owned renewable projects throughout Scotland,	Duration of CARES contract April 2021 – March 2025. Learning obtained from projects supported.

			offering funding of over £54 million to date.	
Salix financing facility to support investment in non-domestic buildings retrofit.	CCP 2018	Salix Finance continues to deliver the Public Sector Energy Efficiency Loan Scheme on behalf of Scottish Government.	£45 million in energy efficiency projects in Scotland to date, which is forecasted to save the public sector more than £129 million over the lifetime of the projects.	Ongoing
Work with social landlords to bring forward the review of the existing Energy Efficiency Standard for Social Housing (EESSH2) with a view to strengthening and realigning the standard with net zero requirements.	CCPu 2020	The Scottish Government is committed to the EESSH2 review and we want to do that jointly with the sector. We are looking to take forward this review, as soon as possible - as we fully understand the need for the sector to have clarity around this.	EESSH2 sets a performance target for energy efficiency in social housing by 2032	Review commences 2022 for completion in 2023.
Work with our partners, including the UK Government, local authorities and utility providers to determine the best approach to heat decarbonisation for	CCPu	Work is underway to develop an area-by-area understanding of the options for buildings currently using gas. A pathways project being managed in partnership with SGN, the ENA and NGG will support a more detailed understanding of the potential for	No	Ongoing

buildings currently heated by natural gas.		green gas. The LHEES process will provide a platform for bringing together stakeholder insight, analysis and business planning on the longer-term right solutions. A high-level dialogue with the SGN, and the Heat Electrification Strategic Partnership group with the Scottish DNOs have been established for taking forward discussions around the decarbonisation of heat. We continue to call on the UK Government to accelerate reserved decisions on the role of hydrogen and the future of the gas network. We welcome their commitment to consult on enabling or requiring hydrogen-ready boilers, and will work with the UK Government on this assessment. We are also engaging closely with BEIS on the development and design of a market-based mechanism to boost heat pump deployment.		
Review the system of building assessments and reports on energy performance and heat to	CCPu	Commitment in the final Heat in Buildings Strategy to reform the EPC assessment, including consultation in summer 21 on	Milestone to consult in summer 2021. The consultation was undertaken as	We will publish the consultation response in due course in 2022.

ensure a system that is fit for purpose in meeting net zero emissions objectives for heat in buildings.		this, with focus on zero emissions and active change brought through recommended measures, and away from cost based metric.	planned, with a closing date of 8 October.	
Work with stakeholders to further understand and support the application and use of low and zero emissions heating within designated historic environment assets and hard to treat buildings.	CCPu	The final *Heat in buildings strategy - achieving net zero emissions:* contains a commitment to work with stakeholders, including Historic Environment Scotland (HES), to develop more solutions to transition Scotland's historic buildings to zero emissions heating while respecting and preserving the special characteristics of our buildings and places, and where needed continue to build our evidence base and the guidance available for the heat transition in these buildings and areas, including in our approach to regulation. The strategy also commits to working with HES to consider what specific support may be needed within regulations to take account of buildings which are designated as listed or in conservation areas, in meeting requirements for decarbonisation of their heat	N/A	We have established a Short Life Working Group which will provide recommendations for consultation on regulatory options for energy efficiency and zero emission heat in tenement buildings. This work will also consider appropriate measures for traditional and historic buildings.

		supply and reducing their demand for heat.		
Develop and introduce future regulation for non-domestic buildings and launch a consultation on these proposals.	CCPu 2020	Work to review the existing 2016 Regulations was paused in 2020 due to the Covid pandemic.	The long term milestones for delivery are set in the Heat in Building Strategy – i.e. convert 0.5m buildings to zero emissions heat by 2030, and all by 2045. The Heat in Buildings Strategy commits to introducing regulations to achieve this by 2025. Delivery milestones (i.e. rollout/progress) haven't been developed yet.	Consultation on proposals to increase ambition of existing 2016 Regulations during 2022.
Undertake work to identify the capacity and output of renewable electricity generation required in Scotland to support the projected roll-out of heat pumps.	CCPu 2020	Scottish Government undertook internal analysis and modelling of the Scottish electricity system for the duration of the Climate Change Plan during 2021.	N/A	Completed
Consider whether to extend Permitted Development Rights for	CCPu 2020	We are carrying out a multi-phase review of permitted development rights (PDR) in Scotland. COVID-	Work is in part dependent on progress with the	Heat network policy leads to advise on circumstances in

zero-emission heat networks and micro-renewable technologies.		19 has affected the timetable. Heat networks PDR are now in phase 4. Work on phase 4 PDR started in Autumn 2021.	wider legislative framework on heat networks. The Heat Networks (Scotland) Act received Royal Assent in March 2021.	which they would like to see PDR apply. Work is underway to take forward Regulations and Statutory Guidance that will see the new regulatory system for heat networks in place by the beginning of 2024.
Undertake work to better understand the impact on electricity networks of projected heat pump deployment. Work with the Distribution Network Operators through the Heat Electrification Partnership to build an evidence base to inform business planning. Work with industry and networks to understand need for heat pumps systems to be smart enabled, and identify options to integrate smart systems into our delivery programmes; and to explore how innovation	CCPu 2020	Further to the commitment in the Heat in Buildings Strategy we have established a heat electrification partnership with Scottish and Southern Electricity Networks and SP Energy Networks, Scotland's two Distribution Network Operators. We have been working with both companies over the past year to support development of their Distribution Future Energy Scenarios, an important input to their ED2 business plans. Through this forum we will engage with the DNOS on LHEES to understand how it might be used to support energy network planning and investment.	No	We have commissioned research on potential network investment costs of the heat transition for Scotland (ranges of costs and impacts on consumer).

can help to improve the consumer experience.				
Support heat networks through: Introducing a Non-Domestic Rates Relief for renewable and low carbon heat networks until 2023/24. Working to identify how new buildings in Heat Network Zones could be made ready to connect to heat networks. Including district heating within the Permitted Development Rights review. Through National Planning Framework 4, ensuring that local development plans take account of where a Heat Network Zone has been identified.	CCPu	Regulations were laid in Scottish Parliament on 24 February, ahead of taking effect on 1 April 2021. Proposal included in consultation on New Build Heat Standard published in December 2020.	Expect uptake of relief of c. £37k p.a.	Regulations will run until 31 March 2024. Anticipate that there will be a review of the relief and next steps nearer end date. New build heat standard expected to be in place by 2024.
Explore how local tax powers could be used to incentivise or encourage the retrofit of buildings, and commission further analysis to identify potential options.	CCPu 2020	The final Heat in Buildings Strategy, published in October 2021, contains a commitment to consider how our local tax powers, such as council tax and non-domestic rates, could be used to incentivise or encourage the retrofit of buildings.		We will commission further analysis in 2022 to identify potential options, to be implemented from the middle of the decade where appropriate, subject to consultation and public engagement.

Design future delivery programmes to ensure significantly accelerated retrofit of buildings, with new programmes to be in place from 2025.	CCPu 2020	We recently consulted on our draft Heat in Buildings Strategy. Responses are being analysed.		Next steps will be set out in due course.

Outcome 3: Our gas network supplies an increasing proportion of green gas (hydrogen and biomethane) and is made ready for a fully decarbonised gas future

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Hydrogen for heat demonstrator – providing £6.9m support for SGN's H100 hydrogen for domestic heat demonstrator.	2020-2021 Programme for Government	Complete – funding provided and the project is in construction phase.	N/A	N/A
Work with UK Government on product standards, with a view to making new gas boilers hydrogen-ready.	CCPu 2020	Underway, pending UK Government consultation on product standards. Scottish Ministers have written to BEIS Ministers setting out our support for the development of hydrogen-		Ongoing engagement with BEIS colleagues.

		ready boilers into the market		

Outcome 4: The heat transition is fair, leaving no-one behind and stimulates employment opportunities as part of the green recovery

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Develop a long-term public engagement strategy in 2021 and begin implementation of early actions.	CCPu 2020	The Heat in Buildings Strategy in October 2021 commits the Scottish Government to develop a Heat Decarbonisation Public Engagement Strategy, building on the objectives and guiding principles of the Climate Change Public Engagement Strategy.	Not as yet	Strategy development has commenced. Consumer research, will be undertaken Summer/Autumn 2022 to inform. A draft strategy will be produced later this year, to be consulted on through on-going stakeholder – and public – engagement. Tied to the strategy, a set of initial public engagement delivery work-streams will launch in September 2022 alongside the virtual National Public

				Energy Agency. This will include: a national campaign; and a national conversation.
Smart Meter installation: All homes and businesses will be offered a smart meter by 2020 under a UK Government initiative, providing the opportunity for a greater understanding of final energy consumption.	CCP 2018	The smart meter programme is owned and led by the UK Government who have responsibility for the policy, regulatory and commercial framework. The Scottish Government is working to deliver a Smart Meter Advice Project (SMAP) through Home Energy Scotland (HES), to enable customers to make the most of the energy use data provided by their smart meters. HES have faced delays due to transfer of smart meter data from the Data Communications Company (DCC). To avoid further delay to the service in 2021-22 HES developed a technical solution which defaults to using average tariffs when specific tariff	According to statistics provided by Smart DCC in February 2022, 47.7% of all meters in Scotland are now smart meters.	In June 2021, the UK Government confirmed the tolerance levels for the first two years of a new four-year smart metering Targets Framework, which started on 1 January 2022. This replaces the previous “All Reasonable Steps” framework which ran from 2012 and was due to end on 31 December 2020 but was extended by 1 year due to COVID-19.

		data is unavailable from DCC. The upgraded application is now available and is being monitored for data quality. HES are currently conducting a pilot with volunteer customers to trial the solution in the field		
Work with the Scottish Cities' Alliance and the seven cities on the opportunities to accelerate activity on heat and energy efficiency.	CCPu 2020	The Scottish Government have provided funding support to the SCA to deliver a Carbon Scenario Tool to support both the cities net zero ambitions and the production of LHEES. Additionally, the Low Carbon Infrastructure Transition Programme (LCITP) is supporting the development of a prospectus of heat network projects that has been produced by SCA.	N/A	The Carbon Scenario Tool project is nearly completed. Scottish Government officials are inputting to final reporting to ensure maximum benefit and relevance to LHEES.
Provide capital investment for Scottish colleges for equipment to deliver training for energy efficiency and heat.	CCPu 2020	This work is being delivered by the Energy Skills Partnership (ESP) via Energy Saving Trust and relates to 2 EV charging rigs, 5 heat pump training rigs, 3 solar thermal training rigs and an insulation	See text in previous cell which sets out what was agreed.	To date we have provided £164,700 capital investment in colleges in the north of Scotland (With further investment in the South of Scotland supported by Scottish

		training centre. 2 applications for heat pump training rigs, an application for solar thermal and 2 applications for EV charging have been received. However, Covid is creating some problems delivering this effectively due to: • Staff furloughed e.g. procurement staff who would normally do this work for curriculum teams • Access to buildings to measure and produce drawings of where equipment will fit is not possible due to Covid • ESP has experience of funds like this and in 'normal' times colleges are enthusiastic to receive this kind of funding – Covid is making this a challenge		Power Green Economy Fund) for heat pump and insulation training equipment. Three colleges in Scotland currently offer training for thermal insulation with a further two training facilities due to open Aug 2022. There are 10 colleges who are equipped to offer heat pump training, with a further 4 coming online later this year.
Respond to the recommendations of the Expert Advisory Group on a heat pump sector deal for Scotland, by Q1 2022.	CCPu 2020	The Heat Pump Sector Deal Expert Advisory Group published their recommendations in a final report in November 2021. We are now reviewing the report and will respond alongside our heat in	N/A	N/A

		buildings strategy supply chains delivery plan later this year.		
Bring forward and support demonstrator projects, such as: hybrids and high temperature heat pumps; the use of hydrogen for space and water heating; projects to understand the impact of heat transition on existing energy networks.	CCPu 2020	We are currently at the scoping stage and will provide an update at a later time.	N/A	N/A
Publish a 'Heat Network Investment prospectus' in 2021/22 - a first-cut of HN Zones across Scotland, combined with information on decarbonisation needs of existing networks.	CCPu 2020	We published a First National Assessment of Potential Heat Network Zones on 13 April 2022. Work on the decarbonisation of existing networks will be taken forward in 2022/2023.	N/A	Complete (renamed as "First National Assessment of Potential Heat Network Zones")
Establish a short life working group on finance for the heat transition.	CCPu 2020	The Heat in Buildings Strategy published in October 2021 includes a proposal to establish a Green Heat Finance Task Force in 2021 to explore potential new and value for money innovative financing mechanisms for both at-scale and individual level investment in heat	N/A	Green Heat Finance Taskforce established in 2021.

		decarbonisation.		
Establish principles to underpin our commitment to ‘no-one being left behind’ in the heat transition, ensuring our approach neither increases the fuel poverty rate nor increases the depth of existing fuel poverty. This will include the effective design and targeting of our fuel poverty and heat in buildings programmes.	CCPu 2020	The Heat in Buildings Strategy sets out the principles that will guide our delivery programmes, to assess the impacts of our programmes on fuel poverty rates, and to ensure only take forward actions where they are found to have no detrimental impact on fuel poverty rates, unless additional mitigating measures can also be put in place	The Heat in Buildings Strategy provides more detail	We have commissioned research to explore the role microgeneration and storage may play in reducing energy costs when installed alongside zero emissions heat.
Ensure Local Heat and Energy Efficiency Strategies are developed through extensive engagement with local communities.	CCPu 2020	All 32 Scottish local authorities have now piloted LHEES. Each of the three pilot phases have been evaluated, and a synthesis evaluation has been published for the whole pilot programme. As detailed above, 14 local authorities are currently being funding to develop area-wide LHEES. A monthly local authority forum was initiated in late 2022 to support local		We have committed to having LHEES in place across all local authorities by the end of 2023. The LHEES methodology contains a section on stakeholder engagement, including community engagement. This will be adapted into guidance to support the LHEES duty and, subject to it coming into force, will need to be consulted on with

		authorities with LHEES and encourage knowledge sharing.		local authorities.
Continue delivery of energy efficiency investment to support fuel poor households and conduct further modelling and analysis to better understand the potential impact of the heat transition on fuel poor households and the scale of, and options for, mitigation that may be required.	CCPu 2020	We are conducting internal analysis to understand the intersection of fuel poverty and heat decarbonisation and we continue to evolve our schemes to ensure solutions are tailored to the specific circumstance of households	N/A	Ongoing
Urge the UK Government to rebalance levy costs on energy bills to make gas and electric systems relatively more cost comparable.	CCPu 2020	We continue to press the UK Government on this. In the Heat in Buildings Strategy we set out a series of actions required by the UK Government if we are to deliver a rapid and just heat transition. Scottish Ministers have reiterated in recent correspondence with BEIS Ministers that the balance of energy costs must be addressed to incentivise zero emissions heating appropriately. In their Net Zero Strategy (October	N/A	Ongoing

		2021), the UK Government committed to look at options to shift or rebalance levies, though we continue to await the publication of the full Fairness and Affordability Call for Evidence.		

Chapter 3: Transport

Part A - Overview of sector

The 2019 annual emissions envelope published in the 2018 Climate Change Plan[7] for this sector was for **12.6 $MtCO_2e$**, whereas the outturn emission statistics for this year (published in June 2021) show a position **of 14.0 $MtCO_2e$**. On the basis of comparing these figures, the sector was **outside** its envelope in 2019.

The updated Plan sets out the following policy outcomes for this sector, the indicators for which are summarised below:

To address our overreliance on cars, we will reduce car kilometres by 20% by 2030	**On Track**	**Off Track**	**Too Early to Say**
% reduction in car kilometres	x		

We will phase out the need for new petrol and diesel cars and vans by 2030	**On Track**	**Off Track**	**Too Early to Say**
% of new car registrations that are ULEV	x		
% of new van registrations that are ULEV	x		

To reduce emissions in the freight sector, we will work with the industry to understand the most efficient methods and remove the need for new petrol and diesel heavy vehicles by 2035	**On Track**	**Off Track**	**Too Early to Say**
% of new HGV registrations that are ULEV	x		

We will work with the newly formed Bus Decarbonisation Taskforce, comprised of leaders from the bus, energy and finance sectors, to ensure that the majority of new buses purchased from 2024 are zero-emission, and to bring this date forward if possible.	**On Track**	**Off Track**	**Too Early to Say**
% of new bus registrations that are ULEV	x		

[7] The CCPu includes updated emission envelopes for the years from 2020 onwards. Given the time period involved in the preparation of national and sectoral emissions statistics (the most up to date data available at this time is for 2019), comparisons with the updated envelopes are not yet possible. Until such a time as this can happen, the data for this aspect of these monitoring reports will be based on the envelopes published in the 2018 Plan .

We will work to decarbonise scheduled flights within Scotland by 2040.	**On Track**	**Off Track**	**Too Early to Say**
% reduction in emissions from scheduled flights within Scotland			x

Proportion of ferries in Scottish Government ownership which are low emission has increased to 30% by 2032	**On Track**	**Off Track**	**Too Early to Say**
% of ferries that are low emissions	x		

By 2032 low emission solutions have been widely adopted at Scottish ports

There are no indicators for this policy outcome. More information is provided in Part C.

Scotland's passenger rail services will be decarbonised by 2035.	**On Track**	**Off Track**	**Too Early to Say**
% of single track kilometres electrified	x		
% of train kilometres powered by alternative traction			x

Just transition and cross economy impacts

We wish to understand and report on the broader just transition and cross-economy impacts of our emissions-reduction activities in addition to these sector specific policy outcomes and indicators. To do this, we use data from the Office of National Statistics (ONS): Low Carbon Renewable Energy Economy (LCREE) publication. The LCREE is based on survey data of businesses which perform economic activities that deliver goods and services that are likely to help generate lower emissions of greenhouse gases, for example low carbon electricity, low emission vehicles and low carbon services.

The LCREE indicator is narrowly defined and, while useful within its limited scope, does not give us the full picture of the impacts on workforce, employers and communities and progress towards a just transition.

This year we have also included ONS experimental statistics that look at green activity in the economy. These stats reflect green activities in both LCREE and non-LCREE sectors.

Over the next few years we will work to develop a meaningful set of success outcomes and indicators aimed at tracking the impacts of our policies on a just transition to net zero.

Sector commentary on progress

Transport remains Scotland's largest sectoral emitter, with cars accounting for 38% of all transport emissions. The comprehensive package of transport policies in the CCPu, reported on in part C below, show the delivery progress being made despite the disruption to programmes caused by the COVID-19 pandemic.

The policy outcome to reduce car kilometres by 20% by 2030 recognises the need to address our over-reliance on cars and to reverse the steady rise in single occupancy car use seen over the past decade. The challenge of this transition is significant, requiring widespread societal change and a substantial shift in travel behaviour. A draft route map, published in January this year, provides the initial framework of measures identified as required to deliver this commitment. The route map is framed around four behaviours and list the range of interventions that will support people to reduce the need to travel by using online options where appropriate; choose a more local destination; switch modes; or combine or share car trips is car remains the only feasible option.

Modal shift to active travel and public transport is one of the four sustainable travel behaviours outlined in the route map and also key to supporting a just transition to net zero. The Bus Partnership Fund launched in November 2020 and up to £25.8m has been awarded to 11 Bus Partnerships involving 28 local authorities across Scotland to deliver bus priority on local roads. At the beginning of this year, the Young Person's Free Bus Travel Scheme went live, providing free bus travel for young people under the age of 22 and potentially benefitting up to around 930,000 young people across Scotland. These initiatives, together with a record level of increased investment in active travel of at least £320 million by 2024-25 or 10% of the total transport budget, will encourage a transition away from car use to more sustainable travel.

Registrations of new Ultra-Low Emission Vehicles (ULEV) cars, vans and buses continue to show year on year progress. The ChargePlace Scotland network continues to grow and to date there are over 2200 charging points across the network. On 26 January we announced a new public electric vehicle charge point network vision as well as a new £60m fund that aims to double the size of the public charging network over the next few years.

Significant investment has also been made in decarbonising the bus fleet: The first phase of the Scottish Zero Emission Bus Challenge Fund resulted in awards offered summing to £62 million to support bus operators acquire 276 new, zero-emission buses and associated charging infrastructure. Combined with previous funding rounds, the Scottish Government has now supported a total of 548 zero emission buses, of which 344 have been, or are being, built in Scotland, supporting green jobs. At each funding round, the subsidy per bus has decreased and the scale of bids from operators has increased, demonstrating progress towards a self-sustaining market.

In July 2020, we published the Rail Services Decarbonisation Plan which focusses on decarbonising transport through modal shift for passengers and freight. In the Green Party Co-operation Agreement, we committed during this parliamentary

session, to invest over £5 billion in maintaining, improving and decarbonising Scotland's rail network. Work by Transport Scotland, Network Rail and industry partners continues to progress well to deliver the key outcomes of the Rail Decarbonisation Plan to make the traction elements of Scotland's railway carbon free by 2035.

In the context of aviation, we are working with Highlands and Islands Airports Ltd and the aviation industry to bring trials of cutting-edge zero and low emission aircraft to Scotland and are working to decarbonise scheduled flights within Scotland by 2040. A sustainable aviation test environment was created at Kirkwall Airport and a demonstration of a hybrid-electric aircraft took place in August 2021.

Developments in monitoring arrangements since last report

Policy Outcome 8:

The measurement of '% of single track kilometres electrified' has been updated to record all decarbonisation through overhead electrification, including battery electric trains operating under intermittent overhead electrification, as this is emerging as a likely option for decarbonising some routes on the network.

'% of trains powered by alternative traction' has been updated to '% of train kilometres powered by alternative traction'. This adjustment will provide a more meaningful indication of how decarbonisation relates to rail activity.

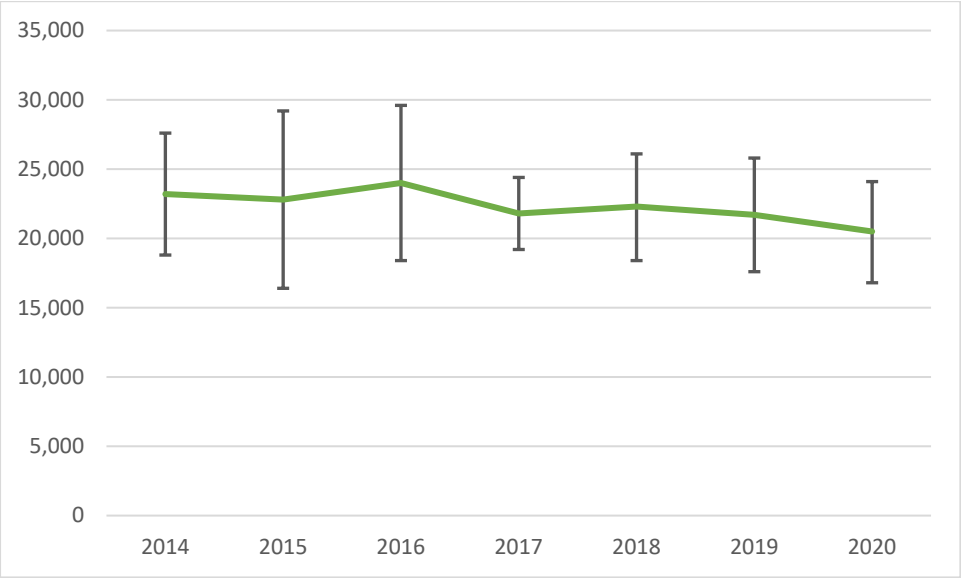
Part B - Progress to Policy Outcome Indicators

Policy Outcome:	Indicator	On-Track Assessment (Milestone/Targets)
Cross-sectoral social and economic indicator	FTE employment in Low Carbon Renewable Energy Economy	Year-to-year change

Most Recent Data: 2020
Data Source(s): Office of National Statistics: Low Carbon Renewable Energy Economy (LCREE), Time spent of Green Tasks
Assessment: Too early to Say

- In 2020, the Scottish low carbon renewable energy (LCREE) sectors were estimated to directly provide 20,500 jobs, down from 21,700 in 2019 and from a high of 24,000 in 2016.
- The estimates of LCREE are based on a relatively small sample of businesses and hence are subject to wide confidence intervals. LCREE employment in Scotland in 2020 is similar to previous years and the difference is not statistically higher or lower than any previous year.

Employment in Low Carbon Renewable Energy Economy, FTE



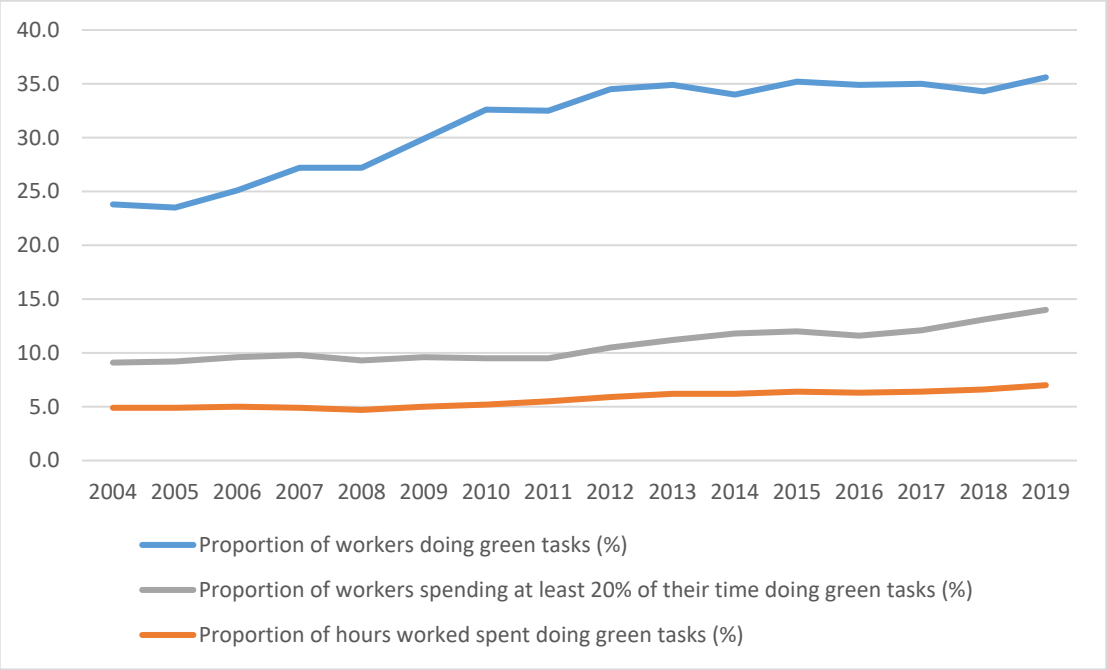
Transport graph 1

Source: Scottish Government presentation of ONS stats

- The ONS also released experimental statistics on a wider perspective of green activity in the economy with their time spent on green tasks release. These stats reflect green activities in both LCREE and non-LCREE sectors.
- This release showed that in 2019 Scotland achieved an all-time high of hours spent on green tasks and proportion of workers doing green tasks, including workers who spend more than 20% of their time on green tasks.
- The proportion of workers doing green tasks in Scotland was 36% in 2019, up from 23.8% in 2004. Workers who have spent more than 20% of their time doing green tasks was 14%, up from 9% in 2004.

- The proportion of overall hours spend doing green tasks in Scotland was 7%, up from 4.9% in 2004.

Green Tasks Statistics, percentage



Transport graph 2

Source: Scottish Government presentation of ONS stats

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	% reduction in car kilometres	Progress to target [20% reduction by 2030][8]

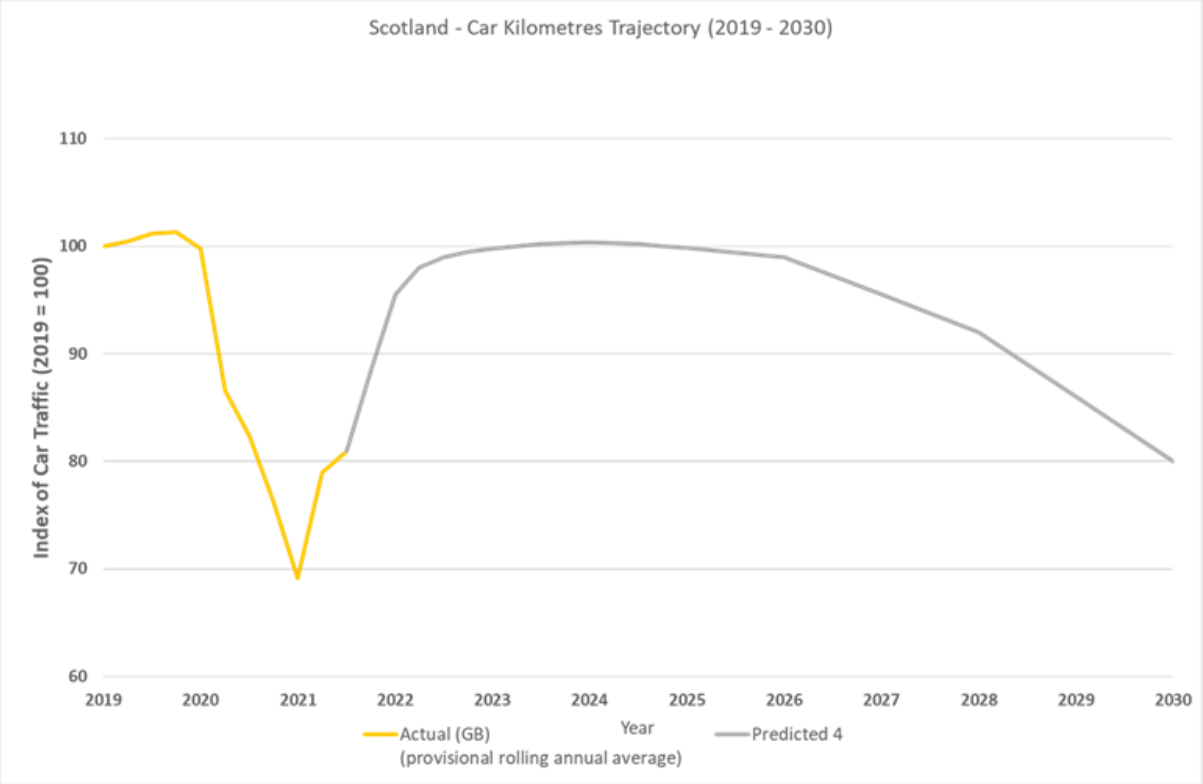
Most recent data: -26.3% 2020-21
Data source(s): Scottish Transport Statistics 2021
Assessment: On track
Commentary:

Car traffic fell significantly over the period, however this was due to pandemic-related restrictions and changes in travel behaviour. Traffic numbers are expected to increase during 2022 as COVID-19 restrictions further relax across the country and a return to work and other previously restricted activities occurs. Nonetheless, it is expected, and building on the momentum shown during the pandemic, that digital connectivity will continue to enable people to work and connect with others remotely. Given a working from home element is, however, likely to remain in place during 2022, traffic levels are expected to increase to around 95% of those seen pre-pandemic. Traffic is then expected to further increase over the next 2-3 years before interventions to deliver reductions in car traffic really start to make an impact.

Traffic levels are therefore expected to reach those recorded pre-pandemic during the short-term period. Notwithstanding this, the measures introduced in the early years of the route map, should increase people's capability, opportunity and motivation to choose one of the four sustainable travel behaviours (reduce the need to travel by using online options where appropriate; choose a more local destination; switch modes; or combine or share car trips is car remains the only feasible option) in order to reduce their car use.. Our national engagement on car use reduction will engage people in understanding the need to reduce our national level car-use; the alternative behaviours that people can choose and the interventions in place to help; and the benefits, including to health, wellbeing and community regeneration, that can result from reduced levels of cars on our roads. Our messaging and engagement, in conjunction with early interventions such as free bus travel for under-22s and Low Emission Zones (LEZ) will help set and support the foundation for achieving the longer-term goal to reduce car kilometres by 20%, by 2030.

Reduction in traffic levels is expected to occur post-2025, on the assumption that demand management measures are designed, approved and implemented in the intervening period. These will be supported by further enhancements to digital connectivity, increased emphasis on the importance of reducing unnecessary travel, and a supportive approach to flexible and local working.

[8] From 2019 baseline



Transport graph 3

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	% of new car registrations that are ULEV	Year-to-year change

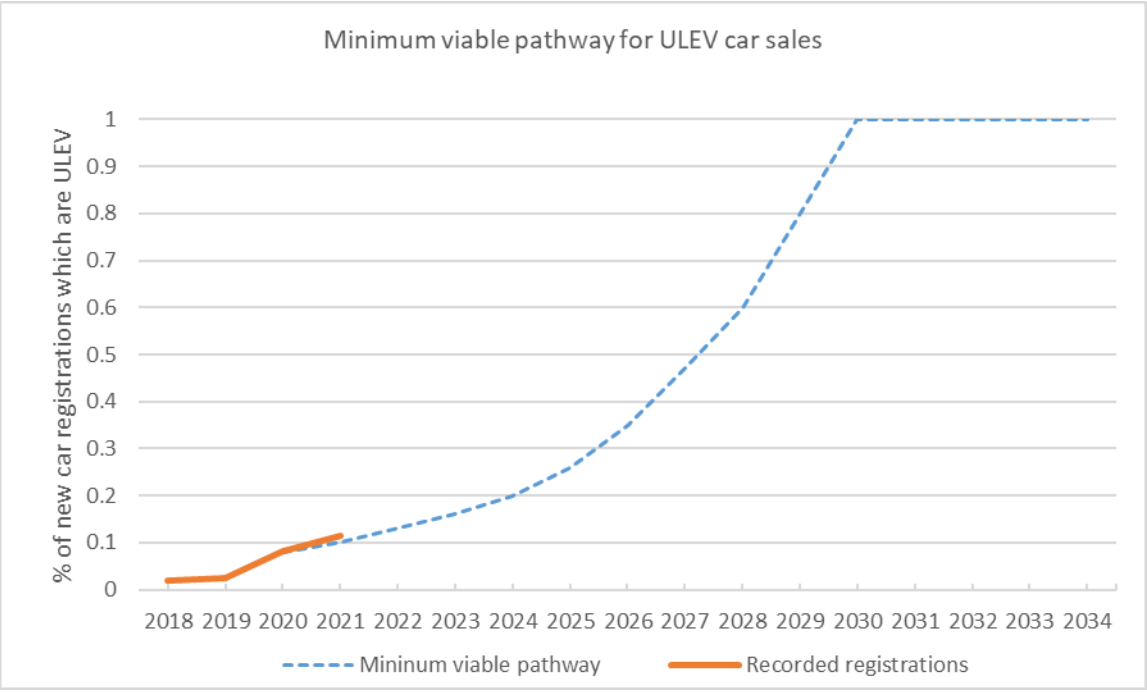
Most recent data: 11.4% (Year to Q3 2021)
Data source(s): DVLA/ Department for Transport (DfT)

Assessment: On track
Commentary:

ULEVs accounted for 11.4% of new car registrations in the 12 months to September 2021. This is an increase from 6.0% in the previous twelve-month period.

In Q3 2021 alone, ULEVs accounted for 12.5% of new car registrations. The number of new ULEV car registrations in Scotland has increased every year since records began in 2010. Over the past year, the number of ULEV cars registered for the first time in Scotland increased by 116% compared to the previous year.

The minimum viable pathway shows the minimum rate of ULEV car registrations that is considered to be required each year in order to remain on-track for achieving this policy outcome. As of Q3 2021, the rate of ULEV car registrations is greater than the minimum viable rate for 2021, therefore progress towards this policy outcome is currently considered to be on-track. This pathway may be reviewed and refined in future years.



Transport graph 4

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	% of new van registrations that are ULEV	Year-to-year change

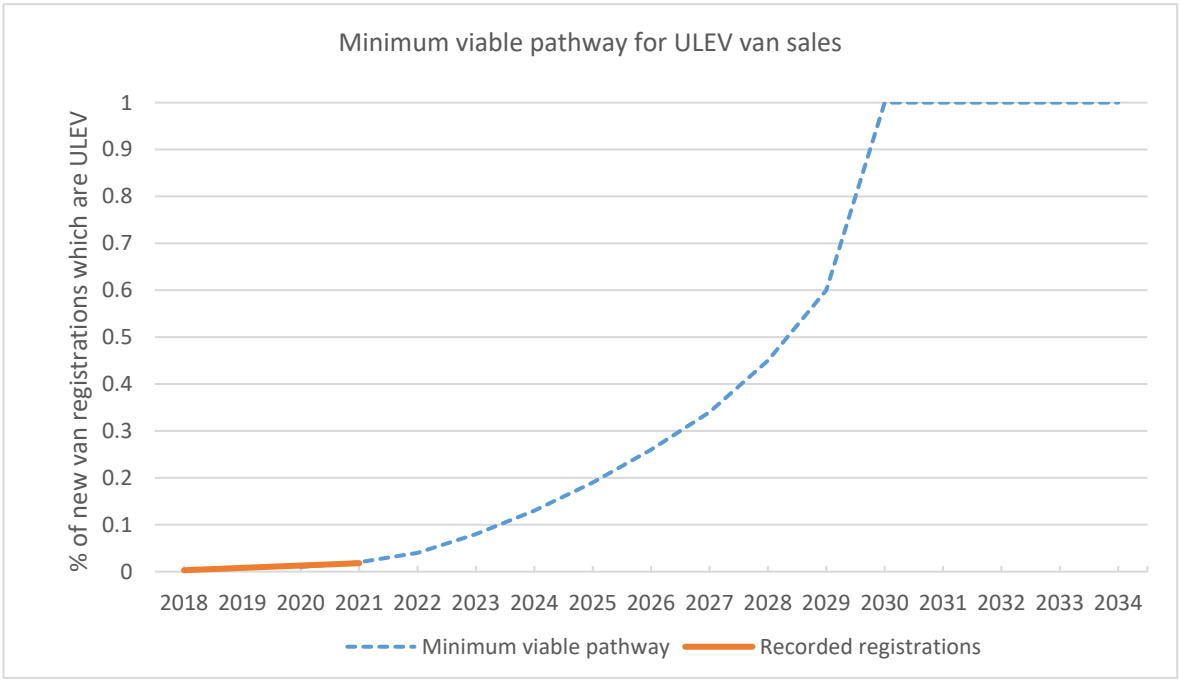
Most recent data: 1.8% (Year to Q3 2021)
Data source(s): DfT Vehicle Licensing Statistics

Assessment: On track
Commentary:

ULEVs accounted for 1.8% of new van registrations in the 12 months to September 2021. This is an increase from 1.5% in the previous twelve-month period.

In Q3 2021 alone, ULEVs accounted for 2.8% of new van registrations. The number of new ULEV van registrations in Scotland has been increasing gradually since 2010. Although ULEV vans currently represent a small proportion of all new van registrations, the number of new ULEV vans registered in Scotland has increased by 55% over the past year.

The minimum viable pathway shows the minimum rate of ULEV van registrations that is considered to be required each year in order to remain on-track for achieving this policy outcome. As of Q3 2021, the rate of ULEV van registrations is in line with the minimum viable rate for 2021, therefore progress towards this policy outcome is currently considered to be on-track. This pathway may be reviewed and refined in future year.



Transport graph 5

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
3	% of new HGV registrations that are ULEV	Year-to-year change

Most recent data: 0%
Data source(s): DVLA/DfT

Assessment: On track
Commentary:

There were a very small number of ULEV HGV registrations in the year to Q3 2021. This is to be expected given the rate at which technology has developed to date.

The market for low and zero-emission HGVs is relatively young, with a number of vehicle models in various stages of development and testing and only a few short range models currently being produced for sale in limited quantities. Advice provided to the Committee on Climate Change[9] suggests that zero-emission HGVs will not become more widely available for purchase until 2025 at the earliest. There is considerable uncertainty in the expected roll-out of zero-emission HGVs, with estimates ranging from around 10% of new sales in 2030 up to around 50% of new sales in the most ambitious scenario, depending on the mix of fuel types and levels of financial support.

Over the coming year, The Zero Emission Truck Taskforce, which has been developed with industry leaders, will meet regularly to develop a pathway and actions to zero emission heavy goods vehicles in Scotland. Given that zero emission HGVs are not expected to be widely available until 2025, progress towards this outcome is currently considered to be on-track.

[9] Analysis to provide costs, efficiencies and roll-out trajectories for zero-emission HGVs, buses and coaches (Element Energy) - Climate Change Committee (theccc.org.uk)

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
4	% of new bus registrations that are ULEV	Year-to-year change

Most recent data: 13% (Year to Q3 2021)
Data source(s): DVLA/DfT

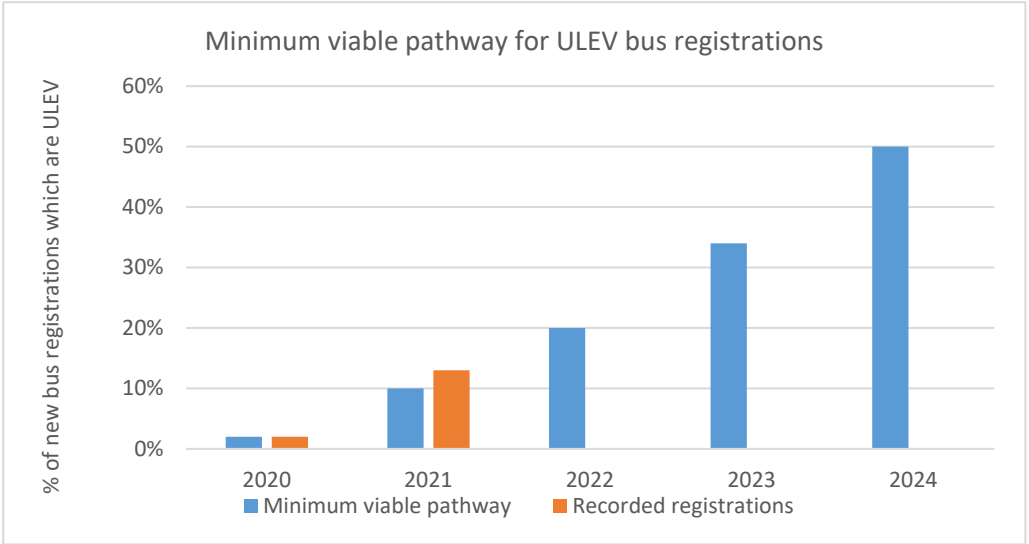
Assessment: On track
Commentary:

ULEVs accounted for 13% of new bus registrations in the 12 months to September 2021. This is an increase from 1.9% in the previous twelve-month period.

In Q3 2021 alone, ULEVs accounted for 22% of new bus registrations. The number of new ULEV buses has increased considerably in the past year, with 65% of all ULEV bus registrations to date having taken place in the 12 months to Q3 2021. As of March 2021, around 1% of all buses operating on local services were zero emission.

The first phase of the Scottish Zero Emission Bus Challenge Fund resulted in awards offered summing to £62 million to support bus operators acquire 276 new, zero-emission buses and associated charging infrastructure. Combined with previous funding rounds, the Scottish Government has now supported a total of 548 zero emission buses, of which 344 have been, or are being, built in Scotland, supporting green jobs. At each funding round, the subsidy per bus has decreased and the scale of bids from operators has increased, demonstrating progress towards a self-sustaining market.

The minimum viable pathway shows the minimum rate of ULEV bus registrations that is considered to be required each year in order to remain on-track for achieving this policy outcome. As of Q3 2021, the rate of ULEV bus registrations is above the minimum viable rate for 2021, therefore progress towards this policy outcome is currently considered to be on-track. This pathway may be reviewed and refined in future years.



Transport graph 6

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
5	% reduction in emissions from scheduled flights within Scotland	Year-to-year change

Most recent data: -45% (2019 – 2021)
Data source(s): Highland and Islands Airports Limited (HIAL)

Assessment: Too early to say
Commentary:

Emissions from scheduled flights within Scotland fell significantly over the period, however this was due to fewer flights taking place due to pandemic-related restrictions and changes in travel behaviour during 2021. The number of flights and associated emissions are expected to increase during 2022 as COVID-19 restrictions further relax across the country and a return to work and other previously restricted activities occurs.

To maintain connectivity within the Highlands and Islands of Scotland whilst reducing emissions requires either the use of new types of aircraft (such as hydrogen or fully electric), or the use of Sustainable Aviation Fuel.

While good progress has been made on the development of fully-electric, hybrid and hydrogen powered aircraft, these are not currently at a stage where they can be used on commercial passenger flights within Scotland, and it is expected to be a number of years before they reach that stage. Industry knowledge suggests that smaller, hydrogen aircraft will enter into service by 2030 at the earliest.

Similarly, the UK does not currently produce Sustainable Aviation Fuel, and while this can be sourced from other countries the cost difference means that it is not a commercially viable alternative.

Given the early stage of development for future technologies which will allow the decarbonisation of scheduled flights within Scotland, this indicator is currently assessed as ‘too early to say’.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
6	% of ferries that are low emissions	Progress to target [30% by 2032]

Most recent data: 8% of the current Scottish Government Fleet consists of low emission vessels.
Data source(s): Caledonian Maritime Assets Ltd (CMAL) & Transport Scotland

Assessment: On track
Commentary:

The long-term investment plan for vessels and ports to be completed in 2022 as part of the Island Connectivity Plan will set out how we aim to "improve resilience, reliability, capacity, and accessibility, increase standardisation, and reduce emissions".

The recently announced Small Vessel Replacement Programme, will increase the number of low emission vessels within the Scottish Government's ferry fleet. Utilising the experience and knowledge gained by CMAL and CalMac from their operation of three diesel electric hybrid vessels currently in service which were world-leading when launched. The programme will deliver vessels that utilise the latest proven battery and on shore charging technologies.

The expected share of low emissions ferries in each year is set out below. As the share of low emission vessels at the end of 2021 was in line with the expected share for 2021, progress is currently considered to be on-track.

Expected share of vessels in Scottish Government fleet that are low/zero emission: 2018 – 2032:

2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
8%	8%	8%	8%	10%	13%	15%	18%	21%	23%	26%	28%	31%	33%	33%

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
8	% of single track kilometres electrified	Progress to target [70% by 2034]

Most recent data: In July 2020 Network Rail advised that 40.7% of single track kilometres on Scotland's rail network were electrified.

Data source(s): Network Rail Scotland Route

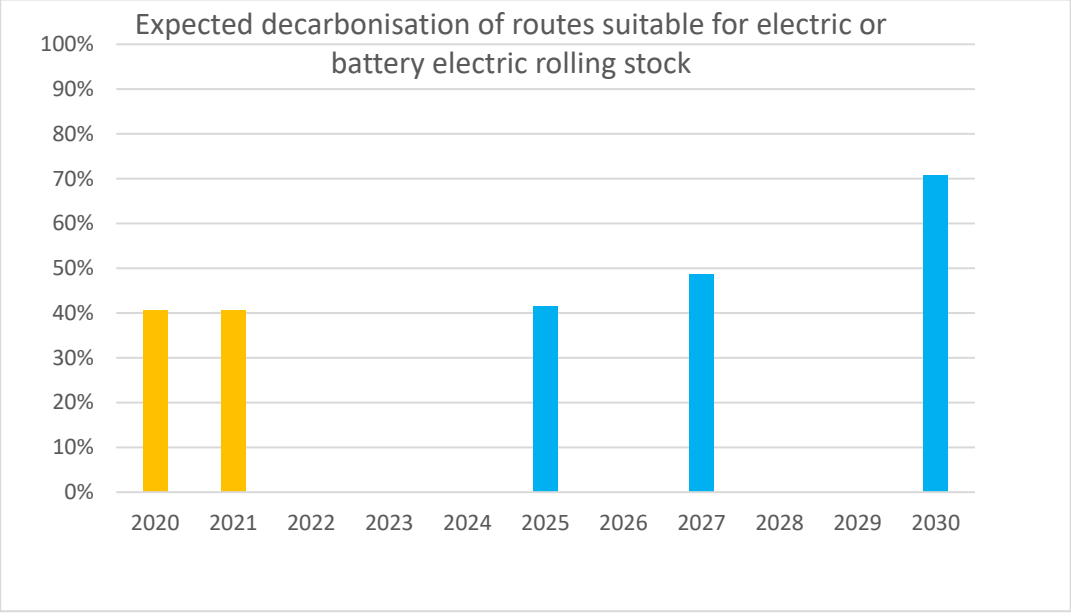
Assessment: On track

Commentary: Since using battery electric trains operating under intermittent overhead electrification is emerging as a likely option for decarbonising some routes on the network, this indicator has been altered so that it will record all decarbonisation through overhead electrification.

No electrification project has been completed since the most recent data was sought and therefore the proportion of the network able to support electric traction is unchanged since the previous monitoring report.

Year by year changes are unpredictable since whole lines effectively become electrified upon completion of long term projects and therefore the indicator will undergo discrete increases rather than following a smooth continuous increase.

A first tranche of routes is envisaged to be newly electrified by 2027. There is an aspiration to electrify a second, larger set of routes by 2030, in line with the Rail Services Decarbonisation Action Plan and rolling stock replacement schedules, taking the estimated proportion of electric or battery electric train ready track to 71%. This ambitious trajectory is reflected in the chart below, which may be reviewed and refined in future years as projects are underway.



Transport graph 7

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
8	% of train kilometres powered by alternative traction	Year to year change

Most recent data: 0%

Data source(s): n/a

Assessment: Too early to say

Commentary:
This indicator has been revised in two ways. Firstly, it excludes battery electric trains running under intermittent overhead electrification as they are now captured in the previous indicator. Secondly, it now covers train kilometres rather than number of trains to better reflect the decarbonisation impact.

It is envisaged that a small number of remote routes with low service frequency will be served by hydrogen trains or possibly battery trains relying on different charging methods. It is unlikely to be technically feasible to introduce such technologies until around 2030, largely coinciding with the expiration of most of the diesel rolling stock these technologies would replace.

The lines in question amount to around 17% of the overall track length on Scotland's rail network, but given their infrequent use, these lines only generate around 5% of Scotland's train kilometres. It is currently considered feasible to power 5% of train kilometres through alternative traction by 2030.

Part C - Information on implementation of individual policies

Policy	Date announced	Progress on implementation since time of last report / CCPu	Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.	Timeframe and expected next steps
If the health pandemic has moved to a phase to allow more certainty on future transport trends and people's behaviours – and work and lifestyle choices future forecasting – we will publish a route-map to meet the 20% reduction by 2030 in 2021.	CCPu 2020	Route map published in draft 13 January 2022, along with public consultation launch and draft impact assessments.	Complete.	Public consultation closed 6 April 2022. A finalised route map will be published by the end of 2022.

Commit to exploring options around remote working, in connection with our work on 20-minute neighbourhoods and work local programme.	2020-2021 PfG	Transport Scotland and Scottish Government have commissioned and published research through which we continue to explore options around remote options: one a socio-economic analysis of home working (published October 2021), and another on the emissions impact of home working (published August 2021).	No.	Trends on home and remote working remain uncertain in the context of the pandemic, but we will use the research to identify the scope for a more enduring shift toward local, near home and remote working.
COVID-19 has impacted on how we work. We launched a Work Local Challenge to drive innovation in work place choices and remote working to support flexible working and our net zero objectives.	2020-2021 PfG	Supported Construction Scotland Innovation Centre's NearHome Project to develop an open source digital to tool kit for retrofitting existing building to create shared local work space using Scottish wood and wood-derived materials. Working with Scottish Futures Trust on Local Work Hub research identifying current provision and the market for flexible near home work space in Scotland. Working with the Scottish Government's Digital	Publication of research by Stantec to understand the economic, social, environmental, well-being and inclusivity impacts of a lasting shift to remote working.	The latest phase of the NearHome Project completed at the end of March 2022, with the publication of a publically available open source digital design toolkit. Publication of Scottish Futures Trust Local Work Hub research at the end of March 2022. Conclusion of the current phase of the CivTech Digital Challenge innovation project.

		Directorate, to explore the Digital Challenge innovation project looking at 'How can tech help foster the development of informal networks when people are working at home or in Work Local hubs?' through the internationally recognised CivTech programme.		
We will work with the UK Government on options to review fuel duty proposals, in the context of the need to reduce demand for unsustainable travel and the potential for revenue generation.	2020-2021 PfG	Scottish Ministers have written on several occasions to UK Government ministers requesting meaningful engagement on plans for structural reform of reserved motoring taxation, which the UK Government itself acknowledged is inevitable and required in their recent Net Zero Review. To date, the UK Government has been unwilling to set out its plans or a timescale for engagement.	N/A	Timeframes on engagement are at the discretion of the UK Government, who have so far been unwilling to discuss. However, Scottish Government ministers and officials will continue to press for meaningful dialogue.
We will work with local authorities to continue to ensure that their parking and local transport strategies have proper appreciation of climate change, as well as the impact on all road users, including public transport	FCCPu 2020-although continuation of work	Early policy development work underway on updating Local Transport Strategy (LTS) guidance.	Consultation on LTS guidance – summer 2022. Policy development and early engagement with stakeholders is underway to support this milestone being achieved.	A consultation on the draft LTS guidance is expected to be held in summer 2022, with guidance published later in 2022.

operators, disabled motorists, cyclists and pedestrians.	already underway			
To support the monitoring requirement for the National Transport Strategy set out in the Transport (Scotland) Act 2019, and to further our understanding of how and why people travel, we will develop a data strategy and invest in data.	CCPu 2020	Data Maturity Assessment carried out with Transport Scotland staff. Currently analysing responses to inform resulting data strategy and action plan.	N/A	Data Strategy Working Group set up. Draft strategy for wider review in Autumn 2022.
Continue to support the Smarter Choices, Smarter Places (SCSP) programme to encourage behaviour change. Continue to support the provision of child and adult cycle training, and safety programmes including driver cycling awareness training through Bikeability.	CCP 2018	SCSP has continued to be grant-funded, and proposals for an increased fund for 2022-23 are being considered as part of the budget process. Bikeability also continues to be grant-funded via Cycling Scotland.	Quarterly reports continue to be received from delivery partners.	Applications for 2022-2023 are now open.
We will grant fund CoMoUK to increase awareness of the role and benefits of shared transport and look at the barriers to uptake of car clubs	PfG 2018	CoMo UK has continued to be grant-funded, and proposals for an increased fund for 2022-23 are being considered as part of the budget process. Challenge during COVID period as government policy was at odds with car-share/car pool schemes.	Quarterly reports continue to be received from delivery partners.	Applications for 2022-2023 are now open.

Support transformational active travel projects with a £500 million investment, over five years, for active travel infrastructure, access to bikes and behaviour change schemes. Enabling the delivery of high quality, safe walking, wheeling and cycling infrastructure alongside behaviour change, education and advocacy to encourage more people to choose active and sustainable travel. Support the use of E-bikes and adapted bikes through interest free loans, grants and trials	2020-2021 PfG	PfG of 2021 has committed that at least £320m or 10% of the total transport budget will be allocated to active travel by 2024-25. Further the Scottish budget for 2022-23 has confirmed an increase of £34.5 million for active travel, bringing total budget to a record £150 million. In preparation for this increasing budget, Transport Scotland has initiated a review of active travel delivery that will bring evidenced proposals for an alternative, holistic system for AT delivery, including recommendations on the delivery models needed. Existing programmes including e bike loans and grants continue to be supported.	AT milestones within the Cycling Action Plan has now been superseded by the active travel framework that gives indicators that grantees must meet when delivering AT initiatives. CAPS will be replaced by a new cycling framework for active travel, setting out the strategic priorities for cycling for transport and the key actions that we will take forward in partnership to achieve our aims.	The new cycling framework for Active Travel will be published in 2022 (date tbc). The review of Active Travel delivery model will report in December 2022

We have re-purposed almost £39 million of active travel funding for the Spaces for People; this is enabling local authorities to put in place the temporary measures such as pop-up cycle lanes and widening walkways that are needed to allow people to physically distance during transition out of the COVID-19 lockdown.	2020-2021 PfG	This fund closed in July 2020 to new applications. Whilst the temporary interventions can last only 18 months, many local authorities are looking to make these permanent – latest information shows at least 54% will become permanent. Due to project cancellation and de-scoping, the final total for Spaces for People was £33 million.	This programme is now closed and no further milestones are set – each local authority will assess individual projects to ensure appropriate road order is in place for each scheme after 18 months of the Temporary TRO in place.	Local authorities can now bid into the Places for Everyone programme to fund permanent AT initiatives where appropriate
Support increased access to bikes for all including the provision of public bike and e-bike share.	2019-2020	Free bikes for every child commitment – 10 pilot projects launched in August 2021; bike share and e-bike share schemes supported through grant funding (EST e-bike grant fund)	The independent mid-point evaluation has been completed and will be published in the coming weeks.	Pilots funded until August 2022, although expect a period of extension as evaluation due thereafter to inform full roll-out

Mobility as a Service and increased use of peer to peer car sharing which will help reduce the number journeys made by car. To do this we are harnessing innovation within our transport system through investing up to £2 million over three years to develop 'Mobility as a Service' (MaaS) in Scotland. .	PfG 2018	Five MaaS projects have now been awarded funding through the MaaS Investment Fund. In round one grants were awarded to HITRANS for "GO-HI", Tactran for "Enable" and Dundee City Council for "GetGo Dundee", and these pilots are now live. Round two awards were announced in 2021 to the University of St Andrews, SEStran and HITRANS.	N/A	Pilots are due to be completed by Winter 2023 followed by programme evaluation with a final report due in Winter 2024.
We will work to improve road safety, ensuring people feel safe with appropriate measures in place to enable that. We will publish Scotland's Road Safety Framework to 2030, following consultation on an ambitious and compelling long-term vision for road safety where there are zero fatalities or serious injuries on Scotland's roads by 2050.	2020-2021 PfG	Scotland's Road Safety Framework to 2030 published end February 2021 Scotland's Road Safety Framework to 2030 1st annual Delivery Plan published end of September 2021	In 2020: 141 people killed (on target to 2030) 1,533 people seriously injured (on target to 2030) 6 children (aged 16<) killed (not on target to 2030) 144 children (aged 16<) seriously injured (on target to 2030)	Scotland's Road Safety Framework to 2030 2nd annual Delivery Plan will be published this year.

We are committed to taking forward policy consultation in advance of drafting supporting regulations and guidance to enable local authorities to implement workplace parking levy schemes that suit their local circumstances.	2019-2020	The Workplace Parking Licensing (Scotland) Regulations 2022 came into force on 4 March 2022.	Guidance will be published in the first half of 2022. Guidance is being developed with the input of a technical working group.	Regulations in force: 4 March 2022 Guidance will be published: first half of 2022.
We will bring forward a step change in investment with over £500 million to improve bus priority infrastructure to tackle the impacts of congestion on bus services and raise bus usage. We will launch the Bus Partnership Fund in the coming months to support local authorities' ambitions around tackling congestion.	2020-2021 PfG	The Bus Partnership Fund launched in November 2020 and up to £25.8m has been awarded to 11 Bus Partnerships involving 28 local authorities across Scotland to deliver bus priority on local roads. Funding awarded to date is for quick wins and appraisal work to support local transport authorities towards developing business cases which will detail how the investment will achieve strategic objectives.	The outcome of appraisal work currently being undertaken by funded Partnerships will inform future milestones.	5 years – FY 20/21 - FY 25/26
We remain committed to delivering a national concessionary travel scheme for free bus travel for under 19s, and have begun the necessary preparations including planning, research, legal review and due	2020-2021 PfG & Budget 2020	The Young Persons' Free Bus Travel Scheme opened for applications on 10 January and came into operation on 31 January 2022. It could benefit up to 930,000 young people in	In the run up to the scheme's launch the overall public advice was to stay at home and avoid large groups. With restrictions now easing, we are now in a	We have committed to undertake a review of the scheme following the first full year in operation.

diligence.		addition to almost 60,000 who already receive free bus travel as part of the Older and Disabled Persons Scheme.	position to encourage all young people to apply.	
We are also carrying out a review of discounts available on public transport to those under the age of 26 – due for completion end of December 2020 (with consultation planned on young people's views on the impacts of COVID 19 and post lockdown measures on public transport usage and behaviour).	2020-2021 PfG	The Under 26s Concessionary Fares Review has been concluded and is being prepared for publication in early March 2022. To ensure the review reflects the circumstances and events which continue to shape people's lived experience of the transport system, we have sought to include engagement and consultation findings within the review. These have been gathered with the support of the Scottish Youth Parliament from discussions both before and during COVID-19.	Evidence and data from the under-22s free bus scheme can be used to inform the take up and demand for fare free public transport for young people.	The U26s Review has not suggested a specific policy outcome. The upcoming Fair Fares Review covers next steps in addressing concessionary fares schemes in Scotland, however this work is not scheduled to be delivered until 2023.
Delivery of our first Active Freeways - segregated active travel routes on main travel corridors connecting communities and major trip	CCPu 2020	The 45 draft Strategic Transport Projects Review 2 (STPR2) recommendations, including the proposal for Active Freeways were	The draft STPR2 Technical Report sets out the rationale and evidence behind the Active Freeways concept. The	A STPR2 Delivery Plan will be published in late 2022, which will set out in more detail proposals for the prioritisation, programme,

attractors.		published on the 20 January 2022 which started a 12 week consultation on the proposals and the accompanying impact assessments. Following closure of the consultation on the 15 April, any changes to the recommendations will be considered in light of the feedback received.	specific project level detail and further design development will commence in FY 2022/23 and will develop over the forthcoming years to allow implementation in FY 2025/2026.	potential funding and work with delivery partners. This will include proposals around Active Freeways.

Outcome 2: We will phase out the need for new petrol and diesel cars and vans by 2030

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
We will consider and develop new financing and delivery models for electric vehicle charging infrastructure in Scotland and working with the Scottish Future Trust to do so.	Boosted 2019-2020 PfG	July 2021 joint report published by Transport Scotland and Scottish Futures Trust setting out opportunities for growing Scotland's public electric vehicle charging network. 26 January 2022 statement in Parliament on draft vision for Scotland public charging network and announcing	£30m of new funding programme aimed to be leveraged from commercial sector and doubling public charging provision from current baseline of approximately 2,800 over next 4 years	New funding programme to be launched in Q1 2022/23.

		plans for new £60m programme to smooth commercial investment across Scotland.		
We have invested over £30m to grow and develop the ChargePlace Scotland network which is now the 4th largest in the UK. We will continue to develop the capacity of the electric vehicle charging network.	CCP 2018	Investment in the ChargePlace Scotland network has now risen to over £50m, continuing to expand the network	Number of chargepoints on the CPS network now exceeds 2200	New EV funding programme to be launched in Q1 2022/23.
Our Low Carbon Transport Loan has provided over £80m of funding to date to support the switch to low carbon vehicles. We will continue to support the demand for ultra-low emission vehicles (ULEVs) through our Low Carbon Transport Loan scheme, which is now being expanded to include used electric vehicles.	CCP 2018	We have now provided over £145m of funding to support individuals and businesses make the transition to new and used low carbon vehicles.	N/A	We are currently reviewing the loan criteria to allow a more targeted approach to the scheme and to ensure a more just transition across all communities across Scotland.
We will continue to promote the uptake of ULEVs in the taxi and private hire sector.	CCP 2018	Energy Saving Trust (EST) through annual funding from TS continue to provide support, guidance and access to appropriate financial schemes to taxi owners and operators across Scotland.	N/A	Annual workplan with EST is currently being reviewed with TS for proposed schemes for FY 22/23
Continue to promote the	CCP	EST continue to provide	N/A	Annual workplan with EST

benefits of EVs to individuals and fleet operators (exact nature of promotion to be decided annually).	2018	support and guidance to the Arnold Clark Innovation Centre through providing material and signposting to financial support available through TS/EST, the centre is also used by EST to delivery targeted training to businesses to support EV uptake.		is currently being reviewed with TS for proposed schemes for FY 22/23
We will work with public bodies to phase out the need for any new petrol and diesel light commercial vehicles by 2025.	2019-2020 PfG	Continued financial support to public bodies to support fleet decarbonisation. £10m of funding in 20/21.	Not currently available. Data collection exercise underway	We will continue to support public bodies to decarbonise their fleets through provision of funding, support and intelligence
We will support the public sector to lead the way in transitioning to EVs, putting in place procurement practices that encourage EVs. In the Programme for Government we committed to work with public bodies to phase out the need for any new petrol and diesel light commercial vehicles by 2025.	2019-2020 PfG	Currently working with a number of local authorities to consider aggregated procurement approaches to deliver value for money.	N/A	Further support and likely pathfinders to support continued innovation in procurement and funding
Create the conditions to phase out the need for all new petrol and diesel vehicles in Scotland's public sector fleet by 2030.	New [2019-2020 PfG]	Continued financial support to public bodies to support fleet decarbonisation. £10m of funding in 20/21.	N/A	We will continue to support public bodies to decarbonise their fleets through provision of funding, support and intelligence

We will continue to invest in innovation to support the development of ULEV technologies and their adoption.	CCP 2018	Continued to support innovation through a range of investments via Scottish Enterprise and directly to new facilities such as the LOCATE testing facility.	Each project has its own timeline to delivery which is being managed either monthly or quarterly.	From 22/23 a new Transport Innovation Fund will combine such investments under a single vehicle.
Take forward the initiatives in respect of connected and autonomous vehicles set out in A CAV Roadmap for Scotland.	CCP 2018	Transport Scotland continue to work with our Project CAVForth partners to progress towards the commencement of the passenger trial service.	Transport Scotland has completed all of our commitments in advance of the trial. The commencement of the trial itself has been delayed as a result of various impacts caused by the pandemic and supply chain issues.	Trial is expected to commence in 2022 and Transport Scotland will continue to identify other opportunities to take forward the initiatives set out in the CAV Roadmap.
With local authorities and others, evaluate the scope for incentivising more rapid uptake of electric and ultra-low emission cars and vans.	CCP 2018	Currently working with Scottish Cities Alliance to consider approaches to ULEV incentivisation. Continue to invest in public EV infrastructure to support switch to zero emission vehicles,	Demand for electric vehicles continues to grow – almost 20% of vehicles sales in December 2021 where electric. Number of public chargepoints now exceed 2100	Continued support for EV infrastructure and provision of funding to EST to provide independent advice on EV purchase

Outcome 3: To reduce emissions in the freight sector, we will work with the industry to understand the most efficient methods and remove the need for new petrol and diesel heavy vehicles by 2035.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against**	**Timeframe and expected next steps**

			these.	
To support businesses we will establish a Zero Emission heavy duty vehicle programme and will invest in a new zero drivetrain testing facility in 2021.	2020-2021 PfG	Heavy Duty Vehicle Programme was established and run in conjunction with Scottish Enterprise. This included mapping of the supply chain, support feasibility studies and providing support to SMEs	Progress has been measured to a set of objectives which were refined in the Autumn of 2021 after personnel changes.	From 22/23 a new programme building on the successes of the Heavy Duty Vehicle programme will continue to provide insights for further policy action
Explore the development of green finance models to help business and industry to invest in new road transport technologies.	CCPu 2020	The Bus Decarbonisation Taskforce undertook desktop research and extensive stakeholder engagement to develop a comprehensive analysis of different financing models available to bus operators. Zero Emission Bus Financing Models Presentation	No	The forthcoming Zero Emission Truck Taskforce will build on this work to support the haulage and logistics sectors to decarbonise, exploring where additional research/ development may be required – 2022-23
We will engage with industry to understand how changing technologies and innovations in logistics (including consolidation centres) can help to reduce carbon emissions, particularly in response to the increase in e-commerce.	CCPu 2020	Research published which explores approaches to reducing logistics emissions in other countries; collates existing fleet decarbonisation commitments; develops a profile of last mile delivery in	Under development	We will work with stakeholders to develop the vision for the decarbonisation of last mile delivery transport – 2022 We will work closely with

		Scotland: Last mile delivery in Scotland The Zero Emission Truck Taskforce has been developed with industry leaders and will meet regularly over the coming year to develop a pathway and actions to zero emission heavy goods vehicles.		industry develop a pathway and associated actions to decarbonise HGVs, ensuring that SME operators are engaged with the process – 2022-23
Continue to investigate the role that other alternative fuels, such as hydrogen, and biofuel can play in the transition to a decarbonised road transport sector. Consider the scope for testing approaches to alternative fuels infrastructure and supply.	CCP 2018	Joint work between TS and SE has seen: • Commissioning of research study to explore the potential role of biomethane in the transport sector, and potential supply-chain or economic benefits – reporting in March. Currently procuring support for a stakeholder workshop to identify priorities and gaps to inform TS' work programme on wider low carbon alternative fuels (AF) policy support and potential trials – aimed for end-March.	Biomethane study and AF workshop workstreams have milestones set within procurement process. Indicators and milestones for the wider AF programme will be set up as part of the programme development in 2022, informed by the initial work and other inputs.	Programme development in Q2 2022, based on workshop outputs and other evidence, for consideration by LCE SMT.
Launched the new Hydrogen Accelerator (H2A) Programme	July 2020	The range of activities H2A is involved in include:	The work programme of H2A is agreed with	Ongoing delivery of the agreed work programme

to attract technical experts to help scale up and quicken the deployment of hydrogen technologies across Scotland.		Scotland's Zero Emission Hydrogen Train project, investigating marine hydrogen applications, the Dundee Hydrogen Bus Project, input to the establishment of the LOCATE testing facility, the "Translating Hydrogen into Action" project with SE, and running regular themed events for industry and other stakeholders.	Transport Scotland and monitored through regular monthly management meetings with TS and H2A staff.	through the initial 3-year period of TS funding for H2A

Outcome 4: We will work with the newly formed Bus Decarbonisation Taskforce, comprised of leaders from the bus, energy and finance sectors, to ensure that the majority of new buses purchased from 2024 are zero-emission, and to bring this date forward if possible.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
We have introduced a revised green incentive of the Bus Service Operators Grant.	April 2019	The revised green incentive was introduced in April 2019 with a variable incentive weighted in favour of zero emission buses, payable for a maximum of five years.	Revision of the scheme was delayed due to Covid-19. As we emerge from the pandemic, the Covid-19 Support Grant and Covid-19 Support Grant- Restart	The Network Support Grant introduced from 1 April 2022 does not provide any additional green incentive for any new buses brought into service from and

		Further revision of the incentive was to commence in 2021. However, due to the Covid-19 pandemic, the Bus Service Operators Grant (BSOG) was suspended from March 2020 and emergency payments were made to bus operators through the Covid-19 Support Grant and Covid-19 Support Grant-Restart. Rates of payment were based on previously estimated BSOG payments for 2019-20 and then 2020-21 respectively, and these emergency payments remain in place until March 2022.	payments are being replaced with new recovery payments which will be reviewed throughout the 2022-23 financial year. Green Incentives paid for eligible buses brought into service prior to and throughout the pandemic will be entitled to the appropriate green incentive for a period of five years. A new grant scheme is being introduced and will replace both BSOG and the Covid-19 Support Grants	including 1 April 2020. Future green subsidies will be paid through capital costs only i.e. the upfront purchase of bus or supporting infrastructure through the Scottish Zero Emission Bus Challenge Fund (ScotZEB).
We launched a £9 million Scottish Ultra Low Emission Bus Scheme (SULEBS).	August 2020	Over 2020/21 we awarded £50.7 million through the Scottish Ultra Low Emission Bus Scheme and unlocked over £71 million of private investment, to support 272 new zero emission buses and associated infrastructure. 207 of those buses have or are currently being manufactured in Scotland, supporting green	N/A	The Scottish Ultra Low Emission Bus Scheme has been replaced by the Scottish Zero Emission Bus Challenge Fund

		jobs.		
In the context of the National Transport Strategy Delivery Plan and Transport Act, we will examine the scope for climate change policies, in relation to buses, across the public sector in high-level transport legislation strategies and policies.	CCP 2018	A public consultation on the implementation of the bus provisions of the Transport (Scotland) Act 2019 ran between July and October 2021. Responses to this will help shape the introduction of secondary legislation and any associated guidance in relation to local authority run services, Bus Service Improvement Partnerships, franchising and information relating to services. In March we published an analysis of the results.	Implementation milestones – introduction of secondary legislation and guidance under the bus services improvement provisions. We are currently in the process of developing an implementation timeline which is assisted by the responses received to our recent consultation.	Development of an implementation timeline for the provisions to be shared publicly –2022
We will work to align government financial support of £120 million over the next 5 years with private sector investment to drive forward a fully decarbonised future for Scotland's bus fleet and support the Scottish supply chain.	CCPu 2020	The awards of the first phase of the Scottish Zero Emission Bus Challenge Fund (ScotZEB), worth £62 million, were announced by the Minister for Transport on 28 February 2022. This will support bus operators to acquire 276 new, zero emission buses and supporting infrastructure. Details of the awards have been published on the Transport Scotland website.		The final meeting of the Taskforce will be held in summer 2022, to launch the Pathway to zero emission bus fleets. In order to prepare for the next phase of ScotZEB, the bids and awards of the first phase will be reviewed. Advice and feedback from the Minister will inform our approach to next steps.

		The design of the Challenge Fund was informed by discussions with the Bus Decarbonisation Taskforce. ScotZEB aims to encourage the market to agree and implement new and innovative ways to finance zero emission buses.		

Outcome 5: We will work to decarbonise scheduled flights within Scotland by 2040

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
We will aim to create the world's first zero emission aviation region in partnership with Highlands and Islands Airports Limited (HIAL). This will include taking action to decarbonise airport operations in the HIAL region.	Green New Deal 2019	Highlands and Islands Airport Ltd are leading on the sustainable aviation test environment project (see box below for more details) - the work on this project will be used to inform next steps towards creating zero-emission aviation region.	N/A	Scheduled flights within Scotland decarbonised by 2040. Date by which HIAL will decarbonise their airport operations still be agreed (current budget allocation sufficient for safety critical capital expenditure only)
We will begin trialling low or zero emission planes in 2021.	2020-2021 PfG	Creation of a sustainable aviation test environment at Kirkwall airport (Funded by UK Research and	N/A	Decision by UKRI on funding the next phase of the sustainable aviation test environment expected

		Innovation (UKRI) Future Flight Fund), hybrid-electric aircraft demonstration flight between Wick and Kirkwall took place August 2021		April 2022
The Scottish Government will continue to engage with Aviation sector to encourage sustainable growth post COVID-19.	CCPu 2020	Stakeholder workshop on transition to low and zero-emission aviation held December 2021 Public consultation on the aviation strategy closed 21 January 2021		possible publication of Aviation Strategy late 2022/ early 2023’
Explore the potential for the purchase of zero/low emission aircraft by the Scottish Government, for lease back to operators, with more detailed assessment in the forthcoming Aviation Strategy.	CCPu 2020	See above		See above
Explore options for incentivising the use of more sustainable aviation fuel as we develop our Aviation Strategy, recognising that significant levers in this area are reserved.	CCPu 2020	See above		See above

Outcome 6: Proportion of ferries in Scottish Government ownership which are low emission has increased to 30% by 2032.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If**	**Timeframe and expected next steps**

			so, most recent data for progress against these.	
Continue to examine the scope for utilising hybrid and low carbon energy sources in the public sector marine fleet as part of our vessel replacement programme.	CCP 2018	The Small Vessel replacement Programme (SVRP) that will support the achievement of this objective has now appointed Naval Architects and feasibility studies into shore side power availability are nearing completion.	The SVRP that will replace up to 7 vessels with low/zero emission vessels is currently on track.	Public engagement 2022 Design completion Dec 22 Construction Tender Feb 2023
Working with the UK Government to support proposals at the International Maritime Organisation (IMO) to significantly lower shipping carbon emissions in the global sector, including the option of introducing a global levy on marine fuel to fund research in cleaner technologies and fuels.	2020-2021 PfG	Limited progress in influencing change on a global industry. Regular engagement with the UK Government to continue to apply leverage. Joined up with UK Government progress on aspects such as a second round of UK Government's Clean Maritime competition, shore power consultation and a new office for maritime emissions.	No	Timeframe is difficult to quantify as there are limited levers to influence a global industry and progress largely dependent on technology, relative lifecycle of vessels and shipping operators' capacity to invest significant sums after unprecedented societal and economic pressures.

Outcome 7: By 2032 low emission solutions have been widely adopted at Scottish ports

Policy	**Date announced**	**Progress on implementation since time**	**Have any implementation indicators / milestones**	**Timeframe and expected next steps**

		of last report / CCPu	**been set for this policy? If so, most recent data for progress against these.**	
Working with individual ports and the British Ports Association to consider a process for encouraging shared best practice initiatives for reducing emissions across the sector.	CCPu 2020	Ports collecting data on scope 1, 2, and 3 emissions with a view to lowering them, particularly scope 1 and 2. Exploring what zero/low emission shipping fuels of the future may be necessary. E.g. Cromarty Firth's hydrogen project	No	Early stages of adoption. Continued engagement with ports and evaluation by ports to inform future decision making.
Working with the ports sector and with its statutory consultees through the Harbour Order process to ensure future port developments are environmentally underpinned.	CCPu 2020	Investing in lower emission and more efficient cargo-handling and operational technology, including investing in renewable energy generation, shoreside power where this is feasible and a realistic business case exists and electric or hybrid non-road mobile machinery.	No	Timeframe for infrastructure developments are difficult to quantify as they are subject to external factors such as technological developments, good energy grid capacity and economic constraints.

Outcome 8: Scotland's passenger rail services will be decarbonised by 2035

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for**	**Timeframe and expected next steps**

			progress against these.	
Our commitment to decarbonise (the traction element of) Scotland's railways by 2035 will be delivered through investment in electrification and complementary alternative traction systems. Transport Scotland has published the Rail Services Decarbonisation Action Plan (July 2020) which will be updated as appropriate. Work is ongoing by industry partners to develop the initial schemes.	2020-2021 PfG	We continue to progress the first 4 priority rail electrification projects announced as part of the Strategic Transport Projects Review 2 Phase 1. The electrification of the Glasgow to Barrhead route has now been authorised to completion; the Glasgow to East Kilbride line has been authorised to the Final Business Case stage and we continue to make progress on the development of the Borders and Fife Circle routes. It is anticipated intermittent electrification may be deployed on some routes that can then be served by electric / battery trains with consideration of full electrification of these routes over the longer term. Transport Scotland is engaged with the train rolling stock supply chain who continue to develop	The commitment is to make Scotland's rail passenger services carbon free by 2035 through increased electrification of the network and to deploy alternative traction battery / hydrogen trains where appropriate.	The electrification of the Glasgow to Barrhead and the Glasgow to East Kilbride route sections are expected to be complete and ready for service in December 2024 we continue to make progress on the development of the Borders and Fife Circle routes. **A detailed update on progress with delivery of the rail decarbonisation action plan will be given in 2023.**

		alternative traction battery and hydrogen technologies.		
We will establish an international rail cluster in Scotland to unlock supply chain opportunities using the interest at Longannet as a catalyst. This will be built around existing strengths in rail in Scotland and will seek to enhance the innovation and supply chain in the decarbonisation of our rolling stock and wider network.	Part of Rail Services Decarbonisation Action Plan, July 2020	Scottish Engineering has been awarded an 18 month contract to create an international rail cluster linking Scottish SMEs with train manufacturers, contractors, academics, and research centres. Initially, in the light of prevailing circumstances, this work will begin life as a digital project with a number of events bringing business and academia together online.	The following has been achieved to date: 900 individuals, 515 companies registered and 233 of them are SMEs; 14 of 8 planned events delivered; 3 of 3 proposed technical report published; 2 of the two market sector reports published and 37 of the planned 100 1-2-1 meetings with SMEs conducted (37 SMEs have reached the target of 7 hours, 55 SMEs have had more than 3.5 hours of support and 620 hours of support has been given to SMEs in total; the total number of SMEs getting 1-2-1 support is 151); organisation of rail freight conference during COP26; Innovate UK's FOAK 2021 challenge had the highest number of	Consideration is being given to a further contract from May 2022

			submissions from Scottish businesses as a result of the FOAK 2021 launch event in Feb 2021 that the rail cluster ran.	
Continue to deliver our Rail Freight Strategy.	CCP 2018	Work continues alongside rail industry partners to take forward the actions from the published rail freight strategy. This includes innovative regulatory targets for rail freight, including rail freight growth, and a dedicated Scottish Strategic Rail Freight Fund for this 5-yearly rail control period which runs from 2019 - 2024.	There are no official interim indicators but Network Rail monitors the targets on a quarterly basis and the regulatory targets are currently on schedule to be met.	No defined and specific timescales for completing the actions. Network Rail's regulatory targets have their own associated milestones and timescales. The evaluation will take place at the end of the control period. Current steps include high level strategy meetings with logistics/ freight companies and rail freight customers to improve collaboration and determine how best to maximise the opportunities and overcome the

				challenges for modal shift to rail. A detailed update will be provided following the end of the rail control period in 2024.

Chapter 4: Industry

Part A - Overview of sector

The 2019 annual emissions envelope published in the 2018 Climate Change Plan[10] for this sector was for **10.2 $MtCO_2e$**, whereas the outturn emission statistics for this year (published in June 2021) show a position of **10.8 $MtCO_2e$**. On the basis of comparing these figures, the sector was **outside** its envelope in 2019.

The updated Plan sets out the following two policy outcomes for the sector, the indicators for which are summarised below:

Scotland's industrial sector will be on a managed pathway to decarbonisation, whilst remaining highly competitive and on a sustainable growth trajectory	**On Track**	**Off Track**	**Too Early to Say**
Industrial energy productivity (£GVAm per GWh)	x		
Industrial emissions intensity (tCO_2e per £GVAm)	x		

Technologies critical to further industrial emissions reduction (such as carbon capture and storage and production and injection of hydrogen into the gas grid) are operating at commercial scale by 2030.			
% of Scottish gas demand accounted for by biomethane and hydrogen blended into the gas network	x		

Just transition and cross economy impacts

We wish to understand and report on the broader just transition and cross-economy impacts of our emissions-reduction activities in addition to these sector specific policy outcomes and indicators. To do this, we use data from the Office of National Statistics (ONS): Low Carbon Renewable Energy Economy (LCREE) publication. The LCREE is based on survey data of businesses which perform economic activities that deliver goods and services that are likely to help generate lower emissions of greenhouse gases, for example low carbon electricity, low emission vehicles and low carbon services.

The LCREE indicator is narrowly defined and, while useful within its limited scope, does not give us the full picture of the impacts on workforce, employers and communities and progress towards a just transition.

[10] The CCPu includes updated emission envelopes for the years from 2020 onwards. Given the time period involved in the preparation of national and sectoral emissions statistics (the most up to date data available at this time is for 2019), comparisons with the updated envelopes are not yet possible. Until such a time as this can happen, the data for this aspect of these monitoring reports will be based on the envelopes published in the 2018 Plan .

This year we have also included ONS experimental statistics that look at green activity in the economy. These stats reflect green activities in both LCREE and non-LCREE sectors.

Over the next few years we will work to develop a meaningful set of success outcomes and indicators aimed at tracking the impacts of our policies on a just transition to net zero.

Sector commentary on progress

There has been a considerable decline in Scotland's industrial emissions since 1990, falling by almost 50% (10.3 $MtCO_2e$) between 1990 and 2019. Research estimates that emissions from Scotland's large industrial sites could feasibly reduce by 80% or more by 2045, while maintaining output.

At present, around 30% of total Scottish GHG emissions are generated by a diverse range of industrial sub-sectors, predominantly manufacturing, as well as mining and construction. Our Climate Change Plan Update estimates that by 2032 industrial emissions need to decrease by 43% on 2018 levels to meet Scotland's Climate Change targets, whilst ensuring Scottish industry remains globally sustainable and competitive.

However, due to the balance of reserved and devolved responsibilities, to some extent progress is often dependent on UK Government and/or international policy and markets. For example, UK Government decision-making on where to focus its support to develop carbon capture and storage infrastructure, and the lack of clarity this is delivering for Scottish projects, is beginning to negatively impact on investor confidence for Scottish decarbonisation projects.

There remains a significant risk of carbon leakage: if the Scottish industrial sector were to have a less supportive policy environment for decarbonisation than their competitors in the rest of the UK, Europe and beyond, they could be faced with higher costs as a result of carbon pricing mechanisms which could push production, and therefore jobs, overseas. From 2019 estimates, there are 93,000 employees in industrial sectors in Scotland at risk of carbon leakage. The UK Emissions Trading Scheme (UK ETS) is currently the key carbon pricing tool available to us, with the Scottish Government jointly responsible for the scheme alongside the UK Government and the other devolved authorities. Continued work to ensure a level regulatory playing field is needed.

Developments in monitoring arrangements since last report

No changes to indicators.

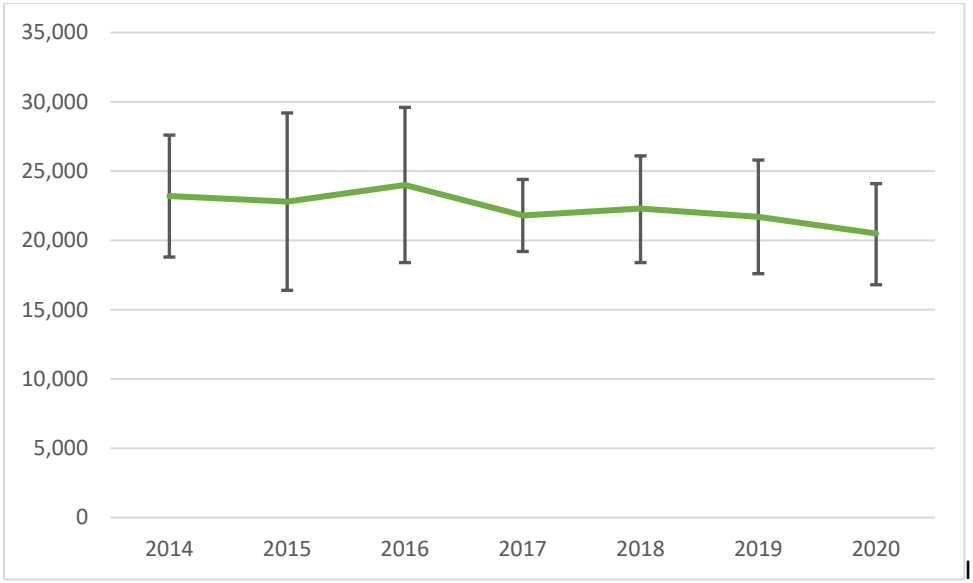
Part B - Progress to Policy Outcome Indicators

Policy Outcome:	Indicator	On-Track Assessment (Milestone/Targets)
Cross-sectoral social and economic indicator	FTE employment in Low Carbon Renewable Energy Economy	Year-to-year change

Most Recent Data: 2020
Data Source(s): Office of National Statistics: Low Carbon Renewable Energy Economy (LCREE), Time spent of Green Tasks
Assessment: Too early to Say

- In 2020, the Scottish low carbon renewable energy (LCREE) sectors were estimated to directly provide 20,500 jobs, down from 21,700 in 2019 and from a high of 24,000 in 2016.
- The estimates of LCREE are based on a relatively small sample of businesses and hence are subject to wide confidence intervals. LCREE employment in Scotland in 2020 is similar to previous years and the difference is not statistically higher or lower than any previous year.

Employment in Low Carbon Renewable Energy Economy, FTE

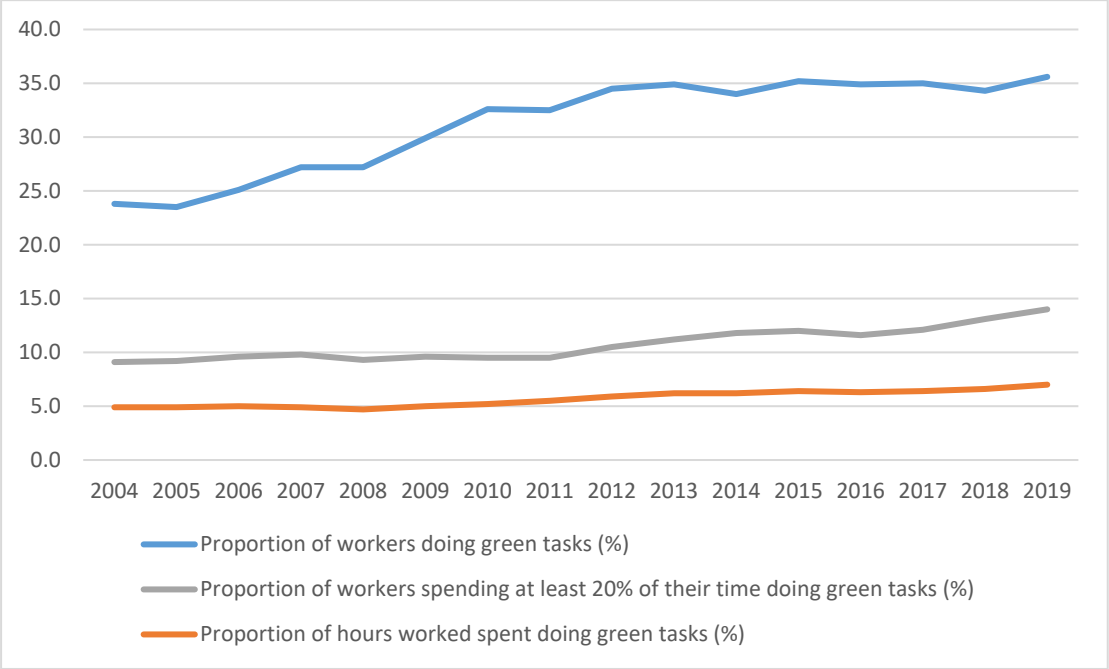


Industry graph 1
Source: Scottish Government presentation of ONS stats

- The ONS also released experimental statistics on a wider perspective of green activity in the economy with their time spent on green tasks release. These stats reflect green activities in both LCREE and non-LCREE sectors.
- This release showed that in 2019 Scotland achieved an all-time high of hours spent on green tasks and proportion of workers doing green tasks, including workers who spend more than 20% of their time on green tasks.
- The proportion of workers doing green tasks in Scotland was 36% in 2019, up from 23.8% in 2004. Workers who have spent more than 20% of their time doing green tasks was 14%, up from 9% in 2004.

- The proportion of overall hours spend doing green tasks in Scotland was 7%, up from 4.9% in 2004.

Green Tasks Statistics, percentage



Industry graph 2
Source: Scottish Government presentation of ONS stats

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Industrial energy productivity (£GVAm per GWh)	Progress to target [Increase 30% by 2032][11]

Most recent data: 2019

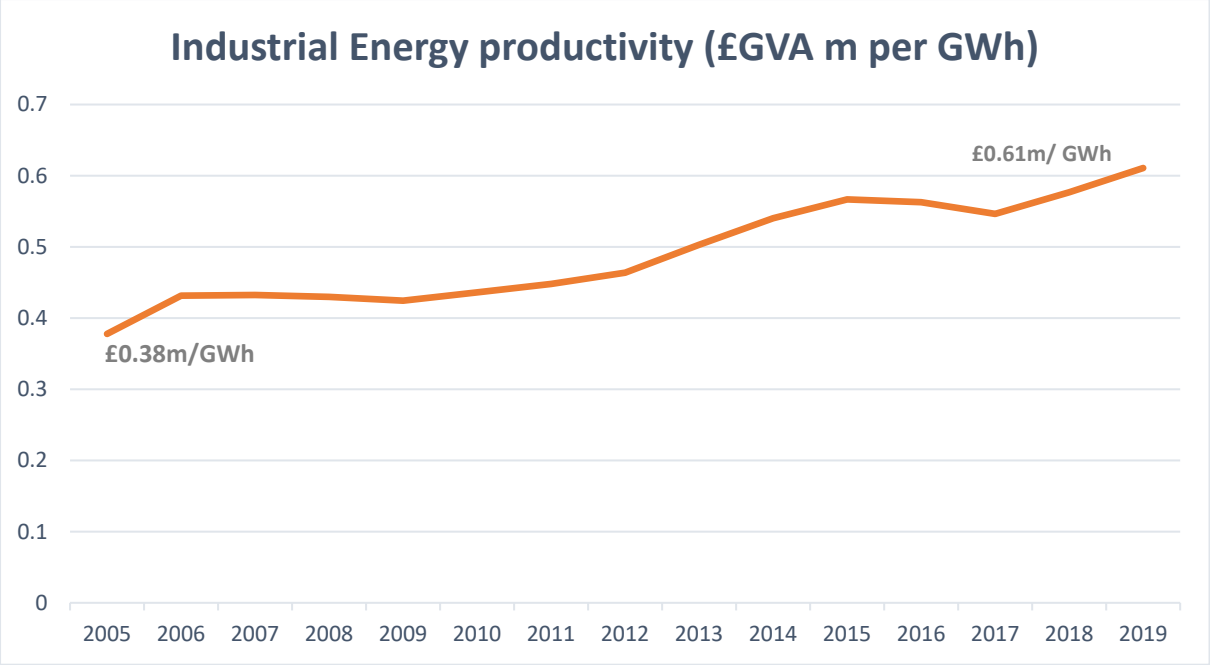
Data source(s): BEIS sub-national energy consumption statistics, BEIS Energy Consumption in the UK statistics, Scottish Government Quarterly National Accounts Sectoral breakdown – unpublished.

Assessment: On track – however, it should be noted that there is a high level of uncertainty with this assessment rating. Fundamental decisions on the Scottish Carbon Capture Utilisation and Storage (CCUS) Cluster status and UK ETS could have a material impact on the assessment of this indicator.

Commentary:

- Industrial GVA comprises the manufacturing, construction and mining sectors.
- Industrial energy productivity is 7.8% above the baseline year 2015.
- Industrial energy productivity in Scotland (the GVA obtained through each GWh of energy used in the industrial sector) grew steadily, by over 55%, from 2005-2015, followed by a 6% decline over the next two years, and an uptick of 11.8% over the two most recent years 2018-19.
- There has been a strong (7.8%) rise in productivity from the 2015 baseline to 2018.
- This compares to 2018 where the rise on the 2015 baseline was 1.8%.
- Improvements on this indicator are likely to be stepped, or lumpy, rather than gradual year-year changes, as success depends on substantial process changes at a small number of large sites. We'll continue to review the suitability of the indicators used to reflect success in the sector and refine these as needed
- Industrial GVA fell slightly (0.7%) in 2019 from 2018. Industrial energy consumption has fallen 30% from 2005-2019.
- Industrial energy consumption fell by 6.2% from 2018 to 2019. This has contributed to the upward trend in GVA per GWh.

[11] From a 2015 baseline


Industrial Energy productivity (£GVA m per GWh)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
£0.61m/ GWh
£0.38m/GWh
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Industrial emissions intensity (tCO_2e per £GVAm)	Progress to target [Reduce 30% by 2032][12]

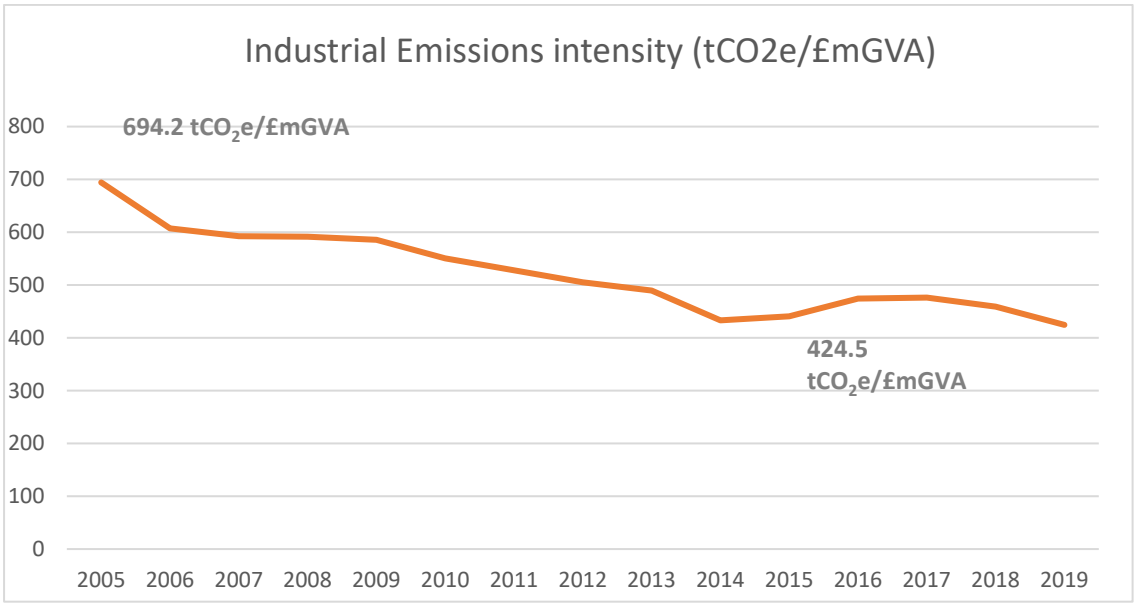
Most recent data: 2019

Data source(s): Scottish Government Greenhouse Gas Emissions publication, Scottish Government Quarterly National Accounts

Assessment: On track – however, it should be noted that there is a high level of uncertainty with this assessment rating. Fundamental decisions on the Scottish CCUS Cluster status and UK ETS could have a material impact on the assessment of this indicator.

Commentary:

- Industrial emissions intensity in Scotland (the volume of emissions produced through each £1m of GVA in the industrial sector) fell by over 36% 2005-2015, rose 8% to 2017, decreased 3.6% to 2018, and fell a further 7.5% to 2019.
- This puts the total decrease from the 2015 baseline at 3.7%.
- Improvements on this indicator are also likely to be stepped, or lumpy, rather than gradual year-year changes, as success depends on substantial process changes at a small number of large sites. We'll continue to review the suitability of the indicators used to reflect success in the sector and refine these as needed
- Total industrial emissions fell by 30.8% between 2005 and 2019, this is reassuring given 2017-2018 saw a rise in industrial emissions.
- Compared to the 2015 baseline year Industrial emissions intensity has fallen 3.7%. However, as discussed above due to the nature of decarbonisation in a number of large sites we expect changes to be stepped.



[12] From 2015 baseline

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	% of Scottish gas demand accounted for by biomethane and hydrogen blended into the gas network	Based on trend

Most recent data: 2021

Data source(s): SGN
Assessment: On track

Commentary:

- 1.7% Scottish gas demand accounted for by biomethane blended into the gas grid in 2021
- Although moderate, this growth in biomethane levels has contributed to a lower emissions intensity of the gas grid.
- There was 126 GWh of biomethane injected into the SGN in 2015 and 802 GWh in 202, a 536% increase. So despite a 2.6% increase in Scottish gas consumption from 2015 to 2021 the percentage of biomethane in the gas network increased from 0.3% to 1.7%.

Part C - Information on implementation of individual policies

Outcome 1: Scotland's Industrial sector will be on a managed pathway to decarbonisation, whilst remaining highly competitive and on a sustainable growth trajectory.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Emissions Trading Scheme (ETS): following EU Exit we will work with UK Government and other devolved administrations on maintaining carbon pricing that is at least as ambitious as the EU ETS. The Scottish Government's preference is to establish a UK ETS will have an interim cap 5% tighter than the EU ETS, and will be reviewed for consistency with Net Zero in 2021.	June 2020	The UK ETS, established jointly by Scottish Ministers with the UK Government and the other devolved administrations, became operational on 1 January 2021. It currently mirrors the EU ETS to provide a smooth transition for the new market, but with clear commitment to review it for consistency with net zero.	The policy was implemented on 1 January 2021. There are no specific indicators in the CCPU. The first data from participants will not be available until Q2 2022.	We have publically committed to consult on this within 9 months of the CCC's sixth Carbon Budget advice (so Sept 2021). And implement and changes by Jan 2023 if possible, but Jan 2024 at the latest.
Deliver an Energy	June 2020	Project delivery underway	The overall ETF	The overall ETF

Transition Fund (ETF) to provide support for a sustainable, secure and inclusive energy transition in the North-East.		for Energy Transition Zone, the Global Underwater Hub, the Net Zero Technology Transfer Partnership and Aberdeen Hydrogen Hub	timescales is to invest £75m over a five year timescale to 2024/5.	timescales is to invest £75m over a five year timescale to 2024/5.
Establish and deliver a Scottish Industrial Energy Transformation Fund (SIETF) – to support the decarbonisation of industrial manufacturing through a green economic recovery.	June 2020	8 businesses offered received grants in the first application window. Many of these projects are at procurement stages but some have progressed to installation. A second application window closed in December 2021. Due diligence is underway for around 15 deployment or study projects. .	Estimates of annual cumulative carbon savings resultant from co-investment from SIETF will be annually reviewed. However actual savings are unlikely to evidence until 2024 after significant energy efficiency or decarbonisation deployments are operational. We will monitor number and value of projects supported, and track projected emissions and energy productivity savings	A third application window will open during Q3 2022.
Making Scotland's Future: multi-faceted programme will boost manufacturing productivity, innovation, and competitiveness,	December 2020	Final version of Manufacturing Recovery Plan (MRP) published on 3 June 2021. A range of actions in the	In relation to the CivTech Challenge, six milestones have been established to manage the one year project (milestone zero to	Working towards milestone three expected for completion by the end of June 2022. Milestones four and

supporting manufacturing businesses to make the transition to net zero and realise the opportunities of a low carbon economy.		MRP delivered successfully in broader terms and others in review for next steps in the forward programme for Making Scotland's Future. Specific to the low carbon theme and the CCPu, partners established a CivTech 6.0 Challenge which has successfully entered its pre-commercialisation agreement (PCA) with one start-up company – iSumio – to develop and deliver a technological solution to helping manufacturers decarbonise. £605k funding approved via the Low Carbon Manufacturing Challenge Fund (LCMCF) to support the PCA. As with any CivTech Challenge, projects supported can be considered highly innovative and, therefore, there is no guarantee of success until the project is fully delivered.	milestone five). Each of these have a set of contractually agreed measures that require to be met prior to the approval of each payment associated with that respective milestone. To date, the project has successfully completed and passed milestones zero, one and two.	five have been set for end Sept and Dec 2022 respectively. Beta product expected for launch by end Dec 2022. The Making Scotland's Future partnership will continue to work with iSumio to maximise the opportunity for success.
Low Carbon Manufacturing Challenge Fund: to support	2020-2021 PFG	Confirmation of Fund announced in PfG 2020.	Fund recently approved by the Scottish Enterprise Board.	The LCMCF was launched as a R&D fund in May 2022.

innovation in low carbon technology, products and processes. Will be delivered as a R&D scheme with focus on implementing product circularity through design, reducing product/process waste and reducing emissions through product lifecycle		Working with Scottish Enterprise to develop and deliver the Fund.	The first tranche of capital funding in FY 21/22 has been used to support CivTech 6.0 Challenge, as a part of the Manufacturing Recovery Plan, to help manufacturers to more effectively track their emissions and to decarbonise. This complements the wider aims of the LCMCF.	SE's processes to deliver and manage the Fund are being finalised. Working to agree and establish plans to launch Fund.
The Renewable Heat Incentive (RHI) is a GB-wide scheme created by the UK Government (with the agreement of the Scottish Government).	August 2020	Closed on 31 March 2021, with the regulations for its closure laid on 25 January 2021, though qualified extension for both Tariff Guarantee and non-Tariff Guarantee applications have been implemented.	N/A	N/A
Scottish Industrial Decarbonisation Partnership (SIDP): Scottish Government - convened cross-sector energy-intensive industrial (EII) stakeholder forum with representatives from manufacturing sites.	CCPu 2020	Developing the proposal's mission, objectives, structure and governance. Then consider options in context of other initiatives, and consider breadth of membership.	Too early to set indicators or milestones	Launch by end of 2022

Initial objectives: bring together other initiatives; build a shared narrative between government/ industry on decarbonisation; and disseminate best-practice.				
Deliver a Net Zero Transition Managers Programme to embed Managers in organisations tasked with identifying, quantifying and recommending decarbonisation opportunities for the business.	CCPu 2020	Consultancy support has been procured and targeted external engagement is underway.	N/A	Design and delivery of a pilot programme in 2022.
Establish a Grangemouth Future Industry Board (GFIB) – forum to coordinate public sector initiatives on growing economic activity at the Grangemouth industrial cluster, whilst supporting its transition to our low-carbon future.	2020-2021 PfG	GFIB has been established.	N/A	The Board will meet every 2 months to discuss specific areas of interest for the board and work together to deliver on priorities (February 2021-22).
Develop policy on providing market-benefit for Scottish industries	CCPu 2020	Research commissioned to explore demand-side policy options completed by Frontier Economics and	It includes a measurement and benchmarking case study on cement. Final	N/A

that invest to decarbonise production.		published on the ClimateXChange website at the end of November 2021	report can be accessed here Improving the market benefits for lower-carbon industrial production in Scotland (climatexchange.org.uk)	
Green Jobs Fund, to help businesses create new, green jobs, working with enterprise agencies to fund businesses that provide sustainable or low carbon products and services to help them develop, grow and create jobs. Further funding will help to ensure that businesses and supply chains across Scotland can capitalise on our investment in low carbon infrastructure such as the decarbonisation of heating and green transport.	2020-2021 PfG	Year 1 funding has been allocated and projects are underway. With over 50 projects being approved for funding, creating and safeguarding more than 850 FTE jobs.	The overall Green Jobs Fund timescales is to invest £100m over a five year timescale to 2025/26.	N/A
Seizing the economic opportunity, we will work across government, enterprise agencies and the innovation system to identify strengths that can	CCPu 2020	Re MSIP: The Net Zero Industrial Cluster Exchange (NICE) network was announced at COP26 by the Cabinet Secretary and CEO of	Re MSIP: A cross- policy workshop advertised the network and enabled further links to be established across a	Re MSIP: The formal launch of the NICE network is planned for 10 June at Scotland House, Brussels.

be built on as part of the decarbonisation journey, for example on The Clyde Mission and continued support for the Michelin Scotland Innovation Parc (MSIP).		Michelin. The NICE network will bring together a range of European partners to facilitate practical knowledge sharing between private companies, public authorities and other stakeholders in supporting the drive for industrial transformation undertaking decarbonisation towards net zero.	range of policy areas including Energy and Just Transition.	
		The MSIP Skills Academy will be a showcase establishment to the emerging needs of the sustainable mobility and renewable energy industries and support the creation of green jobs and skills in Scotland	On 24 March, the Cabinet Secretary announced £2.1 million of funding for the Skills Academy at the Michelin Scotland Innovation Parc (MSIP).	Opening of the Skills Academy is scheduled for August 2022.
		Clyde Mission: Clyde Mission has undertaken extensive cross-sector engagement on areas of need and opportunity. A Strategy Group has been convened, comprising representatives from government agencies, local	Clyde Mission: Clyde Mission has committed to investing at least £25 million in heat decarbonisation along the Clyde over the current Parliamentary term. An independent study on climate	Clyde Mission: Further information on funding for heat decarbonisation activities is expected to be provided later in 2022.

		authorities and universities. Working-level Mission Groups are considering and making recommendations on potential opportunities for net zero and climate adaptation activities.	adaptation pathways for the River Clyde has commenced – it is anticipated that this will help to inform the approach taken to decision making on adaptation to the risks of future tidal flooding.	

Outcome 2: Technologies critical to further industrial emissions reduction (such as carbon capture and storage and production and injection of hydrogen into the gas grid) are operating at commercial scale by 2030

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
ACORN CCS Project: support the delivery of the CCS and Hydrogen capability at St. Fergus Gas Processing complex by 2025.	CCP 2018	In October 2021, UK Government failed to award the Scottish Cluster (led by the Acorn Project at St Fergus) Track 1 status in their CCUS cluster sequencing process. The Scottish Cluster was instead given "reserve status". In response: • SG has called on UK Government to reverse its decision and grant the Scottish Cluster Track-1 status. The UK Government has been clear that it will not re-open its Track 1	There are no specific indicators in the CCPU. However, it does note that "…Acorn CCS is anticipated to be operational by 2024 and is well placed to attract support from the UK Government's £1 billion CCUS Infrastructure Fund" (3.4.35). UK Government's failure to award the Scottish Cluster Track-1 status will delay Acorn CCS' ability to become operational.	SG will continue to engage with UK Government on how the Scottish Cluster's planning and development can best be supported. Further clarity from UK Government on the Track-2 cluster sequencing process (anticipated in early 2022) will impact timeframes and next steps.

		selection decision. • SG is continuing to engage with UK Government on how the Scottish Cluster's planning and development can best be supported. • SG has offered to provide funding of up to £80 million, from the Emerging Energy Technologies Fund, to support an accelerated timetable for the Scottish Cluster.		
Establish and deliver a Carbon Capture and Utilisation (CCU) Challenge Fund.	2020-2021 PfG	Fund launched in April 2022.	There are no specific indicators in the CCPU.	The Fund launched in April 2022 and will fund projects for 2 years.
Emerging Energy Technologies Fund – to support the development of Hydrogen, CCUS and Negative emissions technologies.	CCPu 2020	In development – First tranche due to launch in June 2022. SG has offered to provide funding of up to £80 million, from the Emerging Energy Technologies Fund, to support an accelerated timetable for the Scottish	N/A	N/A

		Cluster.		
Carbon Capture Utilisation and Storage (CCUS): work closely with the UK Government to achieve commercial, policy and regulatory frameworks required to support CCUS at scale in the UK.”	2020-2021	SG continued to engage with UK Government on the development of relevant frameworks (e.g., business models) required to support CCUS at scale in the UK. The remaining £100m of the £180m EETF has been confirmed as a hydrogen investment programme.	There are no specific indicators in the CCPU.	SG is continuing to engage with UK Government on the development of relevant frameworks, including how business models could effectively support the Scottish Cluster to continue its development. The EETF- £10m Hydrogen Innovation Scheme will launch in June 2022
Forums for CCUS and Blue (low-carbon) Hydrogen: to bring together industry, academics and membership organisations to promote and attract investment in CCUS and Blue Hydrogen.	NECCUS 2019	North East Carbon Capture, Utilisation and Storage Alliance (NECCUS) has become established as a major industry led membership forum and the Scottish Government has now delivered over £300,000 of grant funding to NECCUS between the 2019/20 and 2021/22 financial years.	SG has now delivered over £300,000 of grant funding to NECCUS between the 2019/20 and 2021/22 financial years.	SG is now exploring the potential for further grant funding to support NECCUS in the 2022/23 financial year.

Evidence for CCUS and Blue Hydrogen: building the evidence base on impact of technology, regulatory and market barriers.	PfG 2020/21	SG has commissioned and finalised a study with SE on the economic impacts of CCUS in Scotland. SG has commissioned and finalised a study through ClimateXChange on developing a CO_2 utilisation economy. SG has commissioned a study into the potential for CO_2 shipping in Scotland (ongoing). A regulatory steering group has been convened to explore regulatory barriers. A draft CCUS regulatory report prepared by external legal consultants is now being reviewed.	There are no specific indicators in the CCPU.	Further steps on regulatory barriers will be explored as part of the regulatory steering group. Work is ongoing on the study into the potential for CO_2 shipping in Scotland.
Strategic development of Scotland's hydrogen economy - This is a cross-portfolio proposal that will impact on the delivery of multiple outcomes.	Hydrogen Assessment and Policy Statement 2020, draft Hydrogen Action Plan	The finalised Hydrogen Action Plan requires cross-portfolio and its implementation cross-portfolio governance and delivery.	N/A	Governance structures to support the implementation of the Hydrogen Action Plan and delivery of the EETF will be established.

	2021			
Hydrogen Demonstration: to replicate and scale-up demonstration projects and the evidence base for hydrogen based technologies.	Hydrogen Assessment and Policy Statement 2020, draft Hydrogen Action Plan 2021	The draft Hydrogen Action Plan set out that a £10m Scottish hydrogen innovation funding element of the EETF would be launched in 2022 as the first tranche of the £100m hydrogen funding programme, to support Scottish researchers and innovators to drive innovation that will support the realisation of Scotland's 5GW by 2030 ambition. Hydrogen Demonstration forms a key part of the objectives for the scheme: Stream 1: Feasibility and Demonstration Stream 2: Test & Demonstration Facilities Stream 3: Scottish Participation in EU Funded Projects		The EETF- £10m Hydrogen Innovation Scheme will launch in June 2022

Chapter 5: Waste and the Circular Economy

Part A - Overview of sector

The 2019 annual emissions envelope published in the 2018 Climate Change Plan[13] for this sector was **1.2 $MtCO_2e$**, whereas the outturn emission statistics for this year (published in June 2021) show a position of **1.6 $MtCO_2e$.** On the basis of comparing these figures, the sector was **outside** its envelope in 2019.

The updated Plan sets out the following four policy outcomes for the sector:

Reduction in waste sent to landfill	On Track	Off Track	Too Early to Say
Total amount of landfilled waste (tonnes)		x	
Total amount of biodegradable landfilled waste (tonnes)	x		

Reduction in emissions from closed landfill sites	On Track	Off Track	Too Early to Say
Number of closed landfill sites with exploratory landfill gas capture/ flaring		x	

A reduction in food waste	On Track	Off Track	Too Early to Say
Household and non-household food waste reduced (tonnes)		x	

Reduce waste and establish a more circular economy, where goods and materials are kept in use for longer	On Track	Off Track	Too Early to Say
Total waste generated (tonnes)		x	

Just transition and cross economy impacts

We wish to understand and report on the broader just transition and cross-economy impacts of our emissions-reduction activities in addition to these sector specific

[13] The CCPu includes updated emission envelopes for the years from 2020 onwards. Given the time period involved in the preparation of national and sectoral emissions statistics (the most up to date data available at this time is for 2019), comparisons with the updated envelopes are not yet possible. Until such a time as this can happen, the data for this aspect of these monitoring reports will be based on the envelopes published in the 2018 Plan .

policy outcomes and indicators. To do this, we use data from the Office of National Statistics (ONS): Low Carbon Renewable Energy Economy (LCREE) publication. The LCREE is based on survey data of businesses which perform economic activities that deliver goods and services that are likely to help generate lower emissions of greenhouse gases, for example low carbon electricity, low emission vehicles and low carbon services.

The LCREE indicator is narrowly defined and, while useful within its limited scope, does not give us the full picture of the impacts on workforce, employers and communities and progress towards a just transition.

This year we have also included ONS experimental statistics that look at green activity in the economy. These stats reflect green activities in both LCREE and non-LCREE sectors.

Over the next few years we will work to develop a meaningful set of success outcomes and indicators aimed at tracking the impacts of our policies on a just transition to net zero.

Sector commentary on progress

While Scotland has already made significant strides in reducing emissions from waste, with more than 30% reduction in emissions between 2011-2019, our Climate Change Plan Update recognised that progress needs to be accelerated to deliver our ambitious waste reduction and recycling targets, and enable us to meet updated waste sector emissions envelopes. Emissions from the waste and resources sector are currently around 1.5 million tonnes per year (2019). We aim to reduce these emissions to 0.9 million tonnes by 2025, and 0.7 million tonnes by 2030.

To achieve this, we must accelerate action across society to reduce the demand for raw material in products and encourage reuse and repairs through responsible production and consumption; and recycle waste and energy to maximise the value of any waste that is generated.

As set out in this report, the most recent data reporting on outcome indicators was published in 2019 and 2020. However, as a result of the December 2020 cyber-attack on the Scottish Environment Protection Agency (SEPA), waste from all sources publications from 2019 and 2020 are on hold, and this means data for some of our indicators is not available at this time.

While we have made progress in delivering key policy measures set out in our Climate Change Update, based on available information it is clear that, for many of the indicators, Scotland is not on track.

For example, while the reduction in landfilled waste in recent years is encouraging, achieving the 5% to landfill target represents a significant challenge. The indicator to reduce biodegradable landfilled waste (tonnes) to zero is judged as on track, as work with partners to prepare local authorities and the wider sector for the forthcoming ban on landfilling biodegradable municipal waste (which comes into force at the end of 2025) continues at pace.

However, across all of the other targets, we still have a significant challenge ahead and it is unlikely that all of these targets will be met in full without large-scale, significant and rapid system changes. As we set out in the Climate Change Plan Update, we are developing a route map to deliver our waste reduction and recycling targets to 2025 and beyond, in a way that maximises carbon savings potential. Shortly, we will consult on our draft route map and set out proposed new and boosted measures to accelerate progress towards existing targets. Alongside the route map, we will also consult on proposals for a circular economy bill, to ensure legislation is in place to support Scotland's transition to a circular economy.

These actions will complement the existing measures we have in place to support delivery of these targets. Work continues on other policies set out in the Climate Change Plan update to meet this challenge. For example, Scotland's Deposit Return Scheme will be implemented by August 2023; and have established a £70 million fund to improve local authority recycling infrastructure, and made our first investments from the Fund this financial year. To date, over £20.3 million has been awarded to local authorities to increase the quantity and quality of recycling, marking the beginning of one of the biggest investments in recycling in Scotland in a generation.

Developments in monitoring arrangements since last report

Work continues to develop more robust reporting for some of the indicators, including landfill gas capture and food waste measurements.

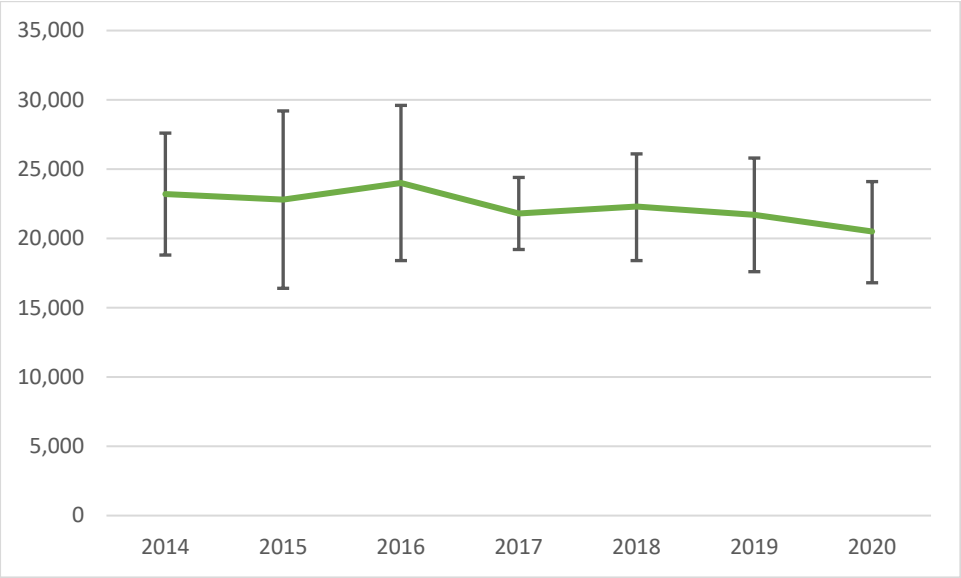
Part B - Progress to Policy Outcome Indicators

Policy Outcome:	Indicator	On-Track Assessment (Milestone/Targets)
Cross-sectoral social and economic indicator	FTE employment in Low Carbon Renewable Energy Economy	Year-to-year change

Most Recent Data: 2020
Data Source(s): Office of National Statistics: Low Carbon Renewable Energy Economy (LCREE), Time spent of Green Tasks
Assessment: Too early to Say

- In 2020, the Scottish low carbon renewable energy (LCREE) sectors were estimated to directly provide 20,500 jobs, down from 21,700 in 2019 and from a high of 24,000 in 2016.
- The estimates of LCREE are based on a relatively small sample of businesses and hence are subject to wide confidence intervals. LCREE employment in Scotland in 2020 is similar to previous years and the difference is not statistically higher or lower than any previous year.

Employment in Low Carbon Renewable Energy Economy, FTE

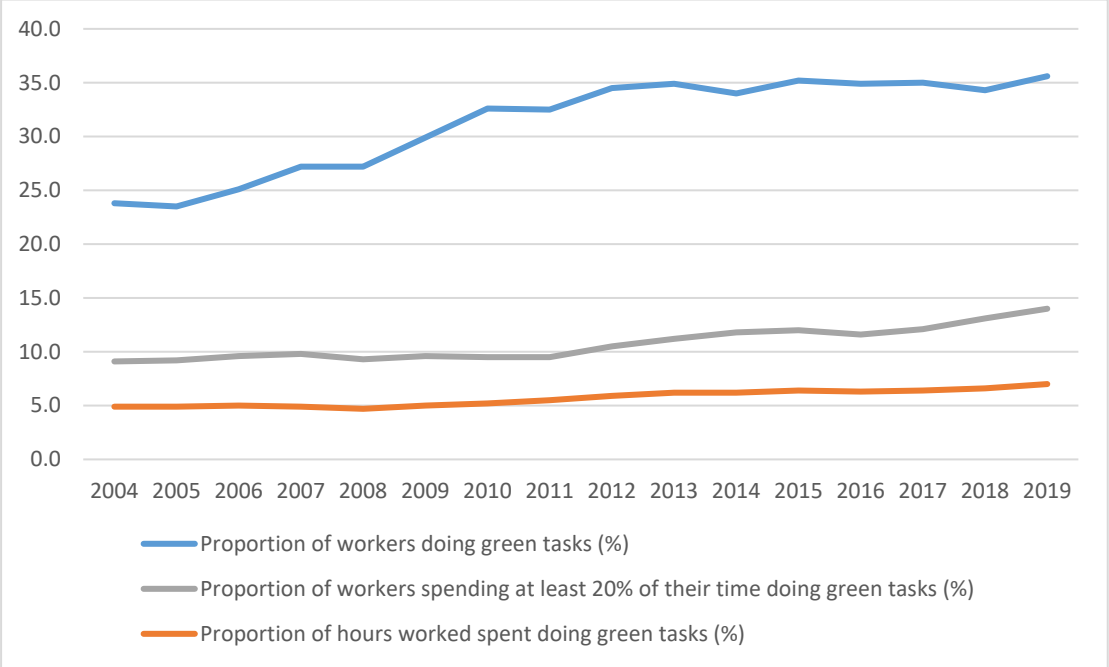


Waste graph 1

Source: Scottish Government presentation of ONS stats

- The ONS also released experimental statistics on a wider perspective of green activity in the economy with their time spent on green tasks release. These stats reflect green activities in both LCREE and non-LCREE sectors.
- This release showed that in 2019 Scotland achieved an all-time high of hours spent on green tasks and proportion of workers doing green tasks, including workers who spend more than 20% of their time on green tasks.
- The proportion of workers doing green tasks in Scotland was 36% in 2019, up from 23.8% in 2004. Workers who have spent more than 20% of their time doing green tasks was 14%, up from 9% in 2004.
- The proportion of overall hours spend doing green tasks in Scotland was 7%, up from 4.9% in 2004.

Green Tasks Statistics, percentage



Waste graph 2

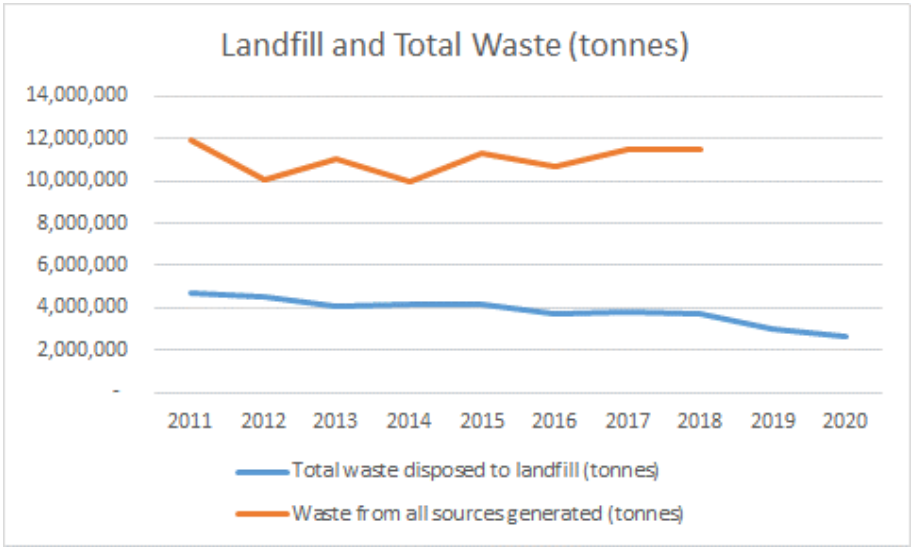
Source: Scottish Government presentation of ONS stats

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Total amount of landfilled waste (tonnes)	Progress to target [no more than 5% of all waste to landfill by 2025]

Most recent data: Landfilled waste reduced from 3.74 million tonnes in 2018 to 3.00 million tonnes in 2019 and 2.61 million tonnes in 2020. However, the percentage of total waste sent to landfill in 2019 and 2020 cannot be calculated due to the absence of total waste figures for those years.

Data source(s): SEPA official statistics
Waste landfilled in Scotland 2020, Waste from all sources 2018

Assessment: Off track



Waste graph 3

Commentary: Currently Scotland landfills less than half of what it did in 2005, with waste sent to landfill falling from around 7 million tonnes in 2005 to around 2.6 million tonnes in 2020. Although the reduction in landfilled waste in recent years is encouraging, the trajectory in terms of the percentage of total waste landfilled cannot be calculated for 2019 and 2020 because total waste figures are not available (as a result of the December 2020 cyber-attack on SEPA, waste from all sources publications from 2019 and 2020 are on hold).

Despite this delay in up-to-date data on waste from all sources, achieving the weight-based, 5% to landfill target represents a significant challenge and the pace of reduction would need to accelerate to meet the target. We are therefore assessing this as ‘Off track’, pending development of our Route Map to drive progress towards our 2025 targets and beyond, which will set out new and boosted measures to accelerate the pace of waste reduction and recycling. The Route Map will be in early 2023, taking account of the outcome of public consultation on proposed measures. This will complement the existing measures we have in place to support delivery of this target. Other factors (for example fluctuations in total waste due to changes in construction and demolition waste) will also influence whether the target is met.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Total amount of biodegradable landfilled waste (tonnes)	Year-to-year change + Progress to interim target [0 tonnes of biodegradable municipal waste landfilled by 2026]

Most recent data: 2020

Data source(s): SEPA official statistics – waste landfilled in Scotland.

Assessment: On track

Commentary: Clear progress is being made. Biodegradable municipal waste has reduced from 1.36 million tonnes in 2011 to 0.69 million tonnes in 2020. This means that Scotland has exceeded the EU based target to reduce the quantity of biodegradable municipal waste landfilled to less than 1.26 million tonnes by 2020.

The ban on landfilling biodegradable municipal waste, delayed from 2021, will come into force at the end of 2025. Work is in train to support remaining local authorities to put in place alternative solutions to comply with the ban. Although progress has been impacted by COVID-19, overall this work is on track.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	Number of closed landfill sites with exploratory landfill gas capture/ flaring	Progress to target [12 by 2025]

Most recent data: n/a

Data source(s): To be determined.
Assessment: Off track

Commentary: This was a new [boosted] policy, as outlined in the recent Climate Change Plan update, to accelerate Landfill Gas Capture, working with SEPA and key industry partners to scale up the existing landfill gas capture programme to mitigate effects of landfill and environmental impact of closed landfill sites. This is supported by additional funding from the Low Carbon Fund, with the aim to harness the energy generated from landfill gas capture and maximise circular economy opportunities. Due to other unavoidable resource implications, including COVID-19 contingency work, progress on this policy outcome was paused in 2021/22. We are reviewing plans for 2022/23 to ensure progress is made.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
3	Household and non-household food waste reduced (tonnes)	Progress to target [reduce all food waste by 33% by 2025][14]

Most recent data: An estimated 987,890 tonnes (baseline year) of food and drink in Scotland was wasted. As part of work on the Food Waste Reduction Action Plan (FWRAP), Zero Waste Scotland is currently developing updated estimates of food waste in Scotland.

Data source(s): 'How much food is wasted in Scotland?' – Zero Waste Scotland, November 2016.

Assessment: Off track

Commentary: A review of the FWRAP and progress towards the 33% target will be published in 2022. This review has been delayed by the significant impact COVID-19 has had on the whole food and drink supply chain. The review will provide updated estimates of total food waste in Scotland and further sector specific data. Scotland does not currently collect waste data at the granular level necessary to report annually or by supply chain sector.

According to our 2013 baseline data, the two largest sector sources of food waste are Household & Consumer (61%) and Food & Drink Manufacturing (25%). While the Scottish householder is a clear target for change, the relationships between the consumer, the retailer and the supply chain are complex, with each influencing the others' decisions and behaviour. The remaining 14% is food waste generated by the Hospitality & Catering, Wholesale & Retail, Education, and Healthcare sectors.

A waste compositional analysis across several local authorities is currently ongoing and will inform the updated estimate for household food waste in Scotland. Our Route Map to accelerate progress towards our 2025 waste and recycling targets will set out additional measures to tackle food waste, and further detail will be set out in updated Food Waste Reduction Action Plan to be published in 2022.

[14] Reduce all food waste arising in Scotland on a per capita basis by 33% by 2025, based on 2013 baseline;

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
4	Total waste generated (tonnes)	Progress to target [reduce total waste by 15% by 2025 against 2011 baseline][15]

Most recent data: 2018

Data source(s): Official statistics publication by SEPA- waste from all sources 2018.

Assessment: Off track

Commentary: The total amount of waste generated in 2018 was 11.45 million tonnes, the same as in 2017. This equates to a 4.2% reduction compared with 2011. Changes in waste from different sources can be marked. For example, whilst household waste decreased by 8% during this period, construction and demolition waste increased by 12%. As a result of the December 2020 cyber-attack on SEPA, waste from all sources publications from 2019 and 2020 are on hold, with limited data available to update our assessment.

We are developing a Route Map to set out additional actions that we will take to accelerate progress towards our 2025 waste prevention and recycling targets. This will be published later in 2022, taking account of the outcome of public consultation on proposed measures.

[15] By 2025 reduce total waste arising in Scotland by 15% against 2011 levels;

Part C - Information on implementation of individual policies

Outcome 1: Reduction in waste sent to landfill

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
End landfilling of biodegradable municipal waste by 2025, reduce the percentage of all waste sent to landfill to 5% by 2025 and recycle 70% of all waste by 2025 by: • Developing a new route map to reduce waste and meet our waste and recycling targets for 2025 in a way that maximises their carbon savings potential. • Developing a post-2025 route map for the waste and	2020-2021 PfG	• Our £70 Recycling Improvement Fund was launched in March 2021. So far £20.3 million has been awarded to local authority projects to improve recycling infrastructure. • Our Route Map to reduce waste, and meet our 2025 targets and beyond, has been under development, and a formal consultation will be published in May 2022. • Work is ongoing to support remaining local authorities to put in place	For Recycling Improvement Fund: Projected recycling tonnage increase 22,100 tonnes per year, and potential CO_2 emissions savings as a result of investments so far 21,400 tonnes each year - the equivalent of taking 11,400 cars off the road.	Recycling Improvement Fund is a five-year fund, further investments will be made across the lifetime of the Fund. Route Map: consultation in May. This will set out proposed next steps for a range of current and additional policy measures. Finalise Route Map following consultation. Extending forthcoming ban on landfilling

resources sector, identifying how the sector will contribute towards Scotland's journey towards net zero in the period to 2030 and beyond. • Establishing a £70m fund to improve local authority recycling collection infrastructure. • In line with EU requirements, further promoting reuse and recycling ensure separate collection of textiles by 2025; and ensuring that bio-waste (e.g. garden waste), is either separated and recycled at source, or is collected separately and is not mixed with other types of waste by 2023. In response to the Committee on Climate Change's (CCC's) latest recommendations, it is our intention to extend		alternative solutions to comply with the ban on landfilling biodegradable municipal waste.		biodegradable municipal waste: We intend to undertake the necessary impact assessments and consult on extending the ban during 2022-23. We will consult on separate collection of garden waste during 2022-23.

the forthcoming ban on biodegradable municipal waste to landfill to include biodegradable non-municipal wastes, subject to appropriate consultation and work to provide assurance around some specific waste streams.				
Work with COSLA in the coming year to evaluate the Household Recycling Charter and review its Code of Practice as a key step in developing a future model of recycling collection.	2020-2021 PfG	Following a delay due to COVID-19, work with Zero Waste Scotland and local government continues on the review of the Charter's Code of Practice.	N/A	N/A
Underpinning this we will take steps to improve waste data, continuing to work with UK Government, other devolved governments and agencies to develop electronic waste tracking, which will help deliver a step change in the quality and usefulness of waste data for decision making. This will include taking the necessary steps	Low Carbon Fund 2020	A 4-nations consultation on the *Introduction of Mandatory Digital Waste Tracking*, ran from 21 Jan to 15 April.	We are working towards a target date for go live of a central digital waste tracking service from 2023 to 2024, however, this will be dependent on the IT development and the transition needs of businesses.	Following consultation, a summary of the responses to the consultation and the government response will be published.

alongside SEPA to drive implementation of the system in Scotland.				
Electronic waste tracking fund Improved waste data system will help drive further progress to deliver on existing waste and recycling targets.	Low Carbon Fund 2020	See above	See above	See above

Outcome 2: Reduction in emissions from closed landfill sites

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Accelerate Landfill Gas Capture and Landfill Legacy Management: we will work with SEPA and key industry partners to scale up the existing landfill gas capture programme to mitigate effects of landfill and environmental impact of closed landfill sites	Low Carbon Fund 2020	This was a new [boosted] policy, as outlined in the recent Climate Change Plan update, to accelerate Landfill Gas Capture, working with SEPA and key industry partners to scale up the existing landfill gas capture programme to mitigate effects of landfill and environmental impact of	N/A	Landfill gas capture: Engagement with sector and key stakeholders in first half of 2022/23, alongside research on investment opportunities.

		closed landfill sites. Due to other unavoidable resource implications, including Covid-19 contingency work, progress on this policy outcome was paused in 2021/22. We are reviewing plans for 2022/23 to ensure progress is made.		
Landfill gas capture on closed sites: in association with SEPA and the waste industry, double the number of landfill gas capture sites that undertake investigative or development work (from 12 to 24 sites) by 2025, in order to harness energy generated from landfill gas capture and maximise other circular economy opportunities. SEPA has already identified 12 sites for potential investigative work.	Low Carbon Fund 2020	See above	See above	See above

Outcome 3: A reduction in food waste

Policy	Date announced	Progress on implementation since time of last report / CCPu	Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.	Timeframe and expected next steps
We will lead collaborative efforts to deliver Scotland's landmark Food Waste Reduction Action Plan (FWRAP). To reduce food waste by 33% from the 2013 baseline by 2025. Actions include: • Improving monitoring and infrastructure by considering a mandatory national food waste reduction target and mandatory reporting of Scotland's food surplus and waste by food businesses. Consulting on the current rural	FWRAP published 2019; 2020-2021 PfG	• Although implementation of FWRAP has been delayed due to Covid-19 pandemic, key activities undertaken across range of settings to support food waste reduction, including support for businesses. • Phase 2 of food waste marketing campaign launched Feb 2022, honouring our 2019-20 PfG commitment which was delayed due to COVID-19. The campaign highlights the importance of preventing food waste in the first place, but also encourages people to	FWRAP Review to be published in 2022 and will provide updated estimates of total food waste in Scotland and further sector specific data.	• Consultation on proposed additional actions to drive progress towards food waste reduction target (May). • Continued delivery of actions in 2019 FWRAP; publish FWRAP review in 2022 with new proposals to achieve the 33% reduction target by 2025.

exemption and food separation requirements for food waste collections, to help break down barriers to food waste reuse and recycling. • Supporting leadership, innovation, effectiveness and efficiency in Scotland's public, private and hospitality sectors by expanding pilot programmes across the education sector and public sector buildings; • Support the development and implementation of an NHS Scotland national action plan on food waste; • Develop best practice guidance for public sector procurement teams to drive new ways of working and more transparent supply chains.		recycle the food waste they can't prevent. • Scottish Government provided £200,000 of funding in 21/22 for FareShare's Surplus with Purpose scheme to support food redistribution. The programme works with farmers, growers and manufacturers to cover the additional costs involved with getting their unsold good-to-eat food onto people's plates. • £20.3m has been awarded to 13 local authorities via the Recycling Improvement Fund to increase the quantity and quality of recycling, funding a range of improvements, including the extension of food and garden waste collections.		

• A sustained approach to public engagement and communications to enable the public to make changes in their choices and behaviours around food and food waste, in partnership with Zero Waste Scotland.				

Outcome 4: Reduce waste and establish a more circular economy, where goods and materials are kept in use for longer.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
We will work with local authorities and the future DRS scheme administrator(s) to explore options that will unlock reprocessing investments, including pricing and incentive schemes, to create jobs and a ready supply of	2020-2021 PfG	Options continue to be explored	N/A	Options work expected to be completed during 2022

recycled material for new packaging.				
Measures to encourage more sustainable consumer purchasing, including plans to take further steps to consult on a charge on single use disposable beverage cups and to increase the carrier bag minimum charge from 5p to 10p in this parliamentary session.	Boosted [2020-2021 PfG]	Regulations to increase carrier bag charge passed by Parliament and came into force on 1 April 2021 Further work is underway to consult on a minimum charge on single-use disposable beverage containers.	N/A	Advisory Group to advise on the implementation of a charge during 2022-23
Banning priority single use items: We will consult on banning a number of problematic plastic items identified in the EU's Single Use Plastics Directive (with a view to introducing legislation in 2021) and outline how we will give effect to the wider requirements of the Directive before the end of 2020	2020-2021 PfG	Regulations banning the supply and manufacture of certain problematic single-use plastic products were passed in November 2021, coming into force in June 2022. In March 2022, we announced the formation of an advisory group that will shape plans for mandatory charges on coffee cups and other single-use disposable beverage containers. In April 2022, we published a call for evidence on	N/A	The Regulations come into force in June 2022, subject to the impact of the UK Internal Market Act.

		tackling consumption of single-use food containers and other commonly littered or problematic single-use items.		
Implementation of our Deposit Return Scheme (DRS) for single use drinks containers.	CCP 2018	Implementation date reviewed in light of impact of Covid-19 and EU Exit. As a result, regulations amending full implementation date to 16 August 2023 came into force February 2022.	Series of milestones announced December 2021. Progress is broadly on track.	Monitor delivery of milestones towards full implementation in August 2023.
We will also work collaboratively across the public sector developing tools and guidance and a practical approach to influence and empower buyer, supplier and key stakeholder communities to use public procurement to support a green recovery and our wider climate and circular economy ambitions through procurement, embedding climate considerations in organisational procurement strategies by 2021 and reporting	2020-2021 PfG	Publication of Policy "Taking Account of Climate and Circular Economy Considerations in Public Procurement" Ministerial call to action to Chief Officers in the Public Sector, highlighting the need for wider engagement across organisations to maximise the positive impact procurement can have on addressing the Climate Emergency. Development and launch of Climate Literacy eLearning. A unique, demand led	n/a	Continued support of the National Climate and Procurement Forum and associated work streams. Ongoing promotion and development of a suite of Sustainable Procurement Tools and associated guidance to help public sector bodies embed relevant and proportionate sustainability requirements into the procurement process

progress in annual procurement reports.		product which helps to encourage and assist public bodies to take account of climate and circular economy in their procurement activity. Refreshed guidance and development of a library of best practice case studies, covering Climate Change as well as wider sustainable procurement.		
Reforming extended producer responsibility schemes: We will continue to work with the UK Government and other devolved administrations on reforms to the packaging extended producer responsibility regime, which we expect will deliver improved funding for local authorities in the future.	2020-2021 PfG	Second consultation closed and joint government response to consultation published.	N/A	The intention is to have introduced an extended producer responsibility for packaging by 2024. The next step will be draft regulations.
We are boosting our commitment to building a circular economy, where goods and materials are	CCPu 2020	Publication of National Strategy for Economic Transformation Scotland's National Strategy for	N/A	Publication of Waste and Recycling Route Map Consultation and Circular Economy Bill

kept in use for longer. We will deliver this by embedding circular recovery principles in the wider green recovery. Through Zero Waste Scotland and Scottish Environment Protection Agency (SEPA), we will intensify our work with industry and businesses to address emissions associated with production, consumption and waste of products/resources; and to promote resource efficiency.		Economic Transformation - gov.scot (www.gov.scot)		consultation May 2022.
In the context of the latest CCC recommendations and building on progress already made by the sector, we will consider measures to ensure new energy from waste plants are more efficient, and 'future-proofed' for Carbon Capture and Storage technology.	CCPu 2020	Independent review of the role of incineration in Scotland's waste hierarchy commissioned Autumn 2022. This review is considering options to decarbonise existing Energy from waste plants.		Publication of review report and Scottish Government response
As part of our work on developing a route map to 2025, we will	CCPu 2020	As above on the development of our Route Map. This project includes	N/A	Route map consultation May 2022

undertake a specific and focused piece of work to examine the range of fiscal measures used by other countries to incentivise positive behaviours and to develop proposals to go further in this area.		examination of the range of fiscal measures used by other countries to incentivise positive behaviours.		

Chapter 6: LULUCF

Part A - Overview of sector

The 2019 annual emissions envelope published in the 2018 Climate Change Plan[2] for this sector was for **-6.1**, whereas the outturn emission statistics for this year (published in June 2021) show a position of **2.7**. On the basis of comparing these figures, the sector was **outside** its envelope in 2019. However, it should be noted that the historical GHG inventory for the period 1990-2019 was subject to technical revisions since the time of development of the 2019 Plan, which places significant limitations on comparisons.

The updated Plan sets out the following three policy outcomes for the sector, the indicators for which are summarised below:

We will introduce a stepped increase in the annual woodland creation rates from 2020-2021 to enhance the contribution that trees make to reducing emissions through sequestering carbon	**On Track**	**Off Track**	**Too Early to Say**
Hectares of woodland created per year	x		
Woodland ecological condition			x
Woodland Carbon Code: Projected carbon sequestration (validated credits)	x		

Increase the use of sustainably sourced wood fibre to reduce emissions by encouraging the construction industry to increase its use of wood products where appropriate	**On Track**	**Off Track**	**Too Early to Say**
Annual volume (in millions of cubic metres) of Scottish produced sawn wood and panel boards used in construction		x	

To enhance the contribution of peatland to carbon storage, we will support an increase in the annual rate of peatland restoration.	**On Track**	**Off Track**	**Too Early to Say**
Hectares of peatland restored per year		x	
Peatland Code: Projected emissions reduction (validated units)	x		

[2] The CCPu includes updated emission envelopes for the years from 2020 onwards. Given the time period involved in the preparation of national and sectoral emissions statistics (the most up to date data available at this time is for 2019), comparisons with the updated envelopes are not yet possible. Until such a time as this can happen, the data for this aspect of these monitoring reports will be based on the envelopes published in the 2018 Plan .

We will establish pilot Regional Land Use partnerships (RLUPs) over the course of 2021.

While this policy outcome does not have any indicators, this policy outcome is progressing. Five RLUP pilot regions have been announced and the Scottish Government is working collaboratively with them to enable their establishment and production of Regional Land Use Frameworks by end-2023. More information is provided in the body of this report.

Just transition and cross economy impacts

We wish to understand and report on the broader just transition and cross-economy impacts of our emissions-reduction activities in addition to these sector specific policy outcomes and indicators. To do this, we use data from the Office of National Statistics (ONS): Low Carbon Renewable Energy Economy (LCREE) publication. The LCREE is based on survey data of businesses which perform economic activities that deliver goods and services that are likely to help generate lower emissions of greenhouse gases, for example low carbon electricity, low emission vehicles and low carbon services.

The LCREE indicator is narrowly defined and, while useful within its limited scope, does not give us the full picture of the impacts on workforce, employers and communities and progress towards a just transition.

This year we have also included ONS experimental statistics that look at green activity in the economy. These stats reflect green activities in both LCREE and non-LCREE sectors.

Over the next few years we will work to develop a meaningful set of success outcomes and indicators aimed at tracking the impacts of our policies on a just transition to net zero.

Sector commentary on progress

Forestry:

New woodland planting has continued at pace in Scotland. In 2020-21, 10,660 hectares of new woodland were planted. This is around 89% of the 12,000 hectares target, and represents over 80% of all new woodland planting in the UK. Ongoing COVID restrictions, combined with heavy rain and snow across most of Scotland in early 2021, resulted in unavoidable delays to planting. Scottish Forestry worked closely with woodland managers, and much of the delayed planting was carried out in April and May, before the end of the planting season. Planting figures for 2012-22 are not yet available but is expected to be close to the 13,500 hectare target.

Record levels of Scottish Government funding are being channelled into supporting woodland creation schemes. Both large and small schemes are important in contributing towards climate change objectives. An additional £150 million is being pumped into creating new woodlands. Planting objectives are being increased from

13,500 hectares (27 million trees) in 2021/22 to 18,000 hectares (36 million trees) each year by 2024/25. We are also increasing private sector investment in woodland creation via the Woodland Carbon Code. Interim statistics show that 5.1M woodland carbon credits had been validated in Scotland at December 2021, with a 14% increase between April and December 2021. An updated and expanded carbon registry, the UK Land Carbon Registry, was launched in November 2020 and now also includes peatland restoration credits generated under Peatland Code.

Peatland:

In 2021-22, circa 8000 hectares of peatland were set on the road to restoration through collective work by our delivery partners. This is off-track against the relevant indicator target of 20,000 hectares per year. In 2022-23, it is forecast that around 11,000 hectares of peatland restoration will be set on the road to recovery.

Since publication of the last progress report, we have increased our focus on addressing the barriers to increased annual rates of peatland restoration. This has included establishing a new Scottish Government-led Peatland Restoration Programme which is exploring opportunities to create a more flexible and efficient delivery system; and working with partners to increase private sector investment in peatland restoration via the Peatland Code.

Work has also progressed in developing tools to enable more targeted, efficient restoration activity. A CivTech challenge launched in 2021 to explore how technology can better help us to identify peatland restoration sites that will optimise costs and benefits. We are working with Environment Systems to produce an online tool that will bring together natural capital evaluation with satellite data analytics to provide area-based peatland restoration prioritisation. RESAS are also working on analysis to support decision making and engagement. This includes a survey with the crofting community concerning peatland restoration. Work is underway to establish a pilot for peatland restoration on crofting land.

In our 2021-22 PfG, we pledged to take forward work to develop and consult on a ban on the sale of peat related gardening products as part of our wider commitment to phase out the use of peat in horticulture. We are working with the horticulture industry to understand the challenges for transition. Within the coming months, we will launch a consultation that will inform our direction and speed of travel, setting a date to ban the sale of peat related gardening products that is both realistic and ambitious.

<u>Developments in monitoring arrangements since last report</u>

N/A

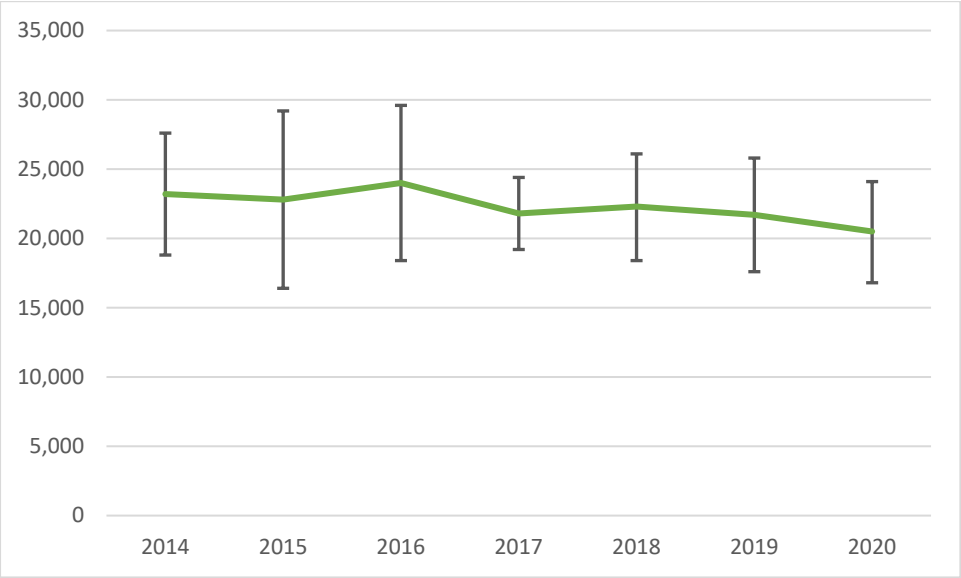
Part B- Progress to Policy Outcome Indicators

Policy Outcome:	Indicator	On-Track Assessment (Milestone/Targets)
Cross-sectoral social and economic indicator	FTE employment in Low Carbon Renewable Energy Economy	Year-to-year change

Most Recent Data: 2020
Data Source(s): Office of National Statistics: Low Carbon Renewable Energy Economy (LCREE), Time spent of Green Tasks
Assessment: Too early to Say

- In 2020, the Scottish low carbon renewable energy (LCREE) sectors were estimated to directly provide 20,500 jobs, down from 21,700 in 2019 and from a high of 24,000 in 2016.
- The estimates of LCREE are based on a relatively small sample of businesses and hence are subject to wide confidence intervals. LCREE employment in Scotland in 2020 is similar to previous years and the difference is not statistically higher or lower than any previous year.

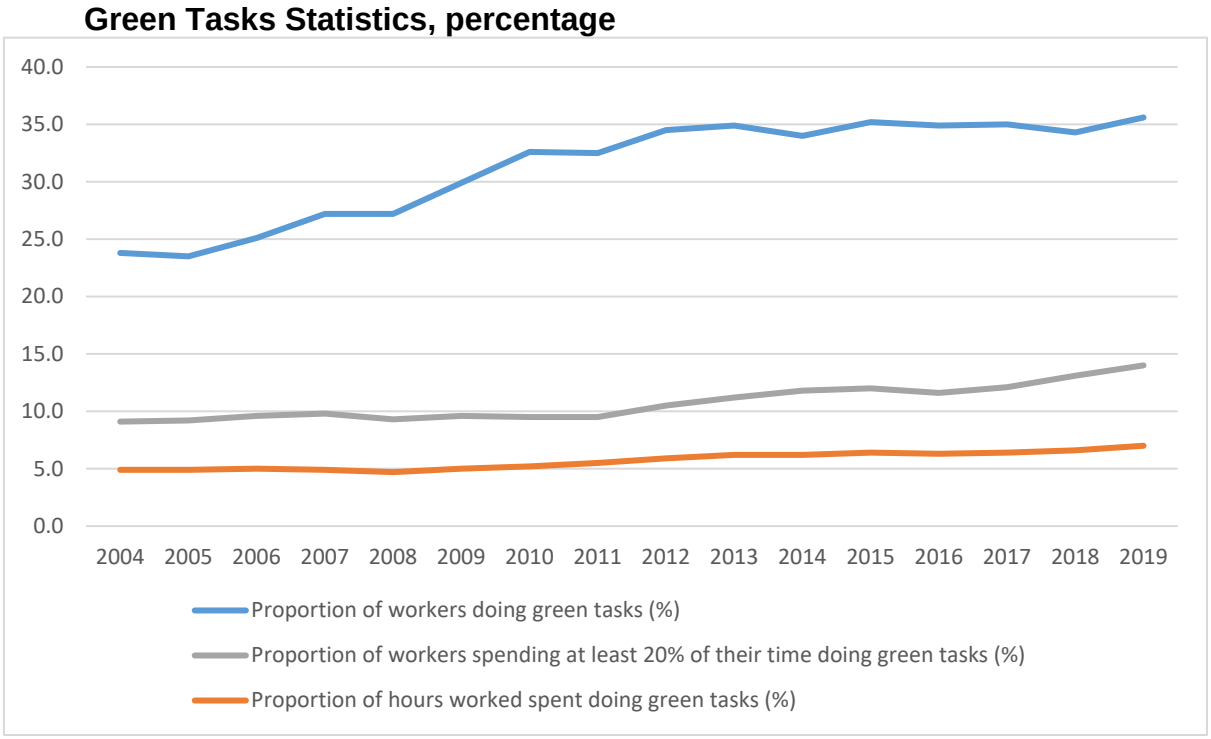
Employment in Low Carbon Renewable Energy Economy, FTE



LULUCF graph 1

Source: Scottish Government presentation of ONS stats

- The ONS also released experimental statistics on a wider perspective of green activity in the economy with their time spent on green tasks release. These stats reflect green activities in both LCREE and non-LCREE sectors.
- This release showed that in 2019 Scotland achieved an all-time high of hours spent on green tasks and proportion of workers doing green tasks, including workers who spend more than 20% of their time on green tasks.
- The proportion of workers doing green tasks in Scotland was 36% in 2019, up from 23.8% in 2004. Workers who have spent more than 20% of their time doing green tasks was 14%, up from 9% in 2004.
- The proportion of overall hours spend doing green tasks in Scotland was 7%, up from 4.9% in 2004.



LULUCF graph 2
Source: Scottish Government presentation of ONS stats

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Hectares of woodland created per year	2020/21 = 12,000 ha/yr 2021/22 = 13,500 ha/yr 2022/23 = 15,000 ha/yr 2023/24 = 16,500 ha/yr 2024/25 = 18,000 ha/yr

Most recent data: Forestry Statistics 2021
Data source(s): Forestry Statistics
Assessment: On track

Commentary:

Current levels of woodland creation applications indicate that we are on track to meet the 13,500 target. Delivery is dependent upon landowners implementing their projects as agreed. Official data on woodland creation for this period will be released in summer 2021.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Woodland ecological condition	Year-to-year change

Most recent data: Published February 2020
Data source(s): National Forest Inventory
Assessment: Too early to say

Commentary:

Published as official statistics by the National Forest Inventory (NFI), the study into Woodland Ecological Condition is the largest and most in-depth assessment of the ecological condition of any habitat in Great Britain.

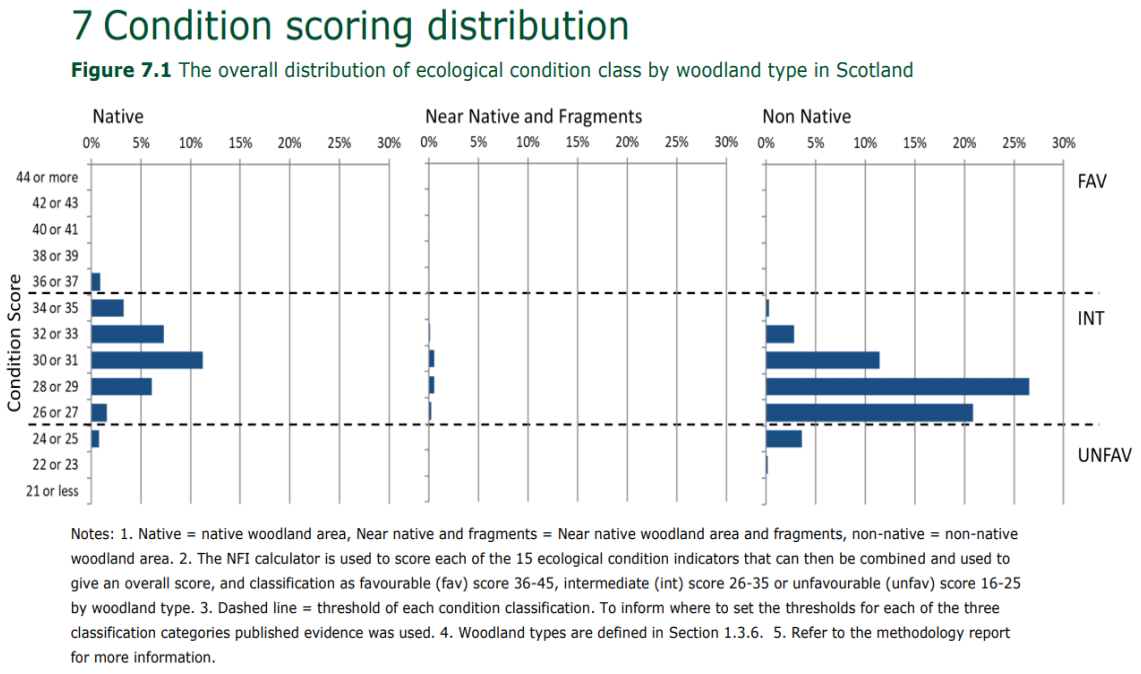
It reveals that in Scotland 442,611 hectares are now classified as native woodland and that the majority of this is North East and West Scotland.

The statistics reveal that over 430,000 ha of these native woodlands are in overall ‘favourable’ or ‘intermediate’ condition. They also show that Scotland’s non-native woodlands make an ecological contribution, with less than 6% in ‘unfavourable’ ecological condition.

Furthermore, the survey demonstrates that the active management of a forest for wood production delivers higher biodiversity as well as a renewable supply of wood to help sustain an industry that benefits climate change mitigation, jobs and the economy - at minimal cost to the public purse.

The second report covering the second 5-year survey will be due soon.

LULUCF graph 3



Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
1	Woodland Carbon Code: Projected carbon sequestration (validated credits)	Progress to target (increase 50% by 2025)[16]

Most recent data: Forestry Statistics 2021, and Woodland Carbon website for latest unofficial data
Data source(s): UK Land Carbon Registry, Forestry Statistics (Forest Research)
Assessment: On track

Commentary:

- There has been a 14% increase in the number of validated credits in Scotland under the Woodland Carbon Code between April and December 2021.
- Interim Statistics note that 5.1m carbon credits had been validated in Scotland at December 2021.
- Data for 2021-22 will be released in in the publication of Forestry Statistics in summer 2022.

[16] Carbon sequestration baseline March 2020

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	Annual volume (in millions of cubic metres) of Scottish produced sawn wood and panel boards used in construction	Progress to Targets [2020/21 = 2.6 million m3 2026/27 = 2.8 million m3 2031/32 = 3.0 million m3]

Most recent data: 2.09 million m3 estimated in construction in 2020
Data source(s): Forestry Statistics 2021
Assessment: Off track

Commentary:

- Official Statistics on timber are published annually in September. These provide the best dataset to estimate volume of Scottish timber used in construction.
- The figure reported here, of 2.09 million cubic metres of timber used in construction in 2020, is based on these statistics.
- As predicted, Covid had an impact on the estimate of the 2020 volume of Scottish timber used in construction. Despite some recovery in the construction industry and demand in the international market it is unlikely that the annual volume will increase sufficiently to meet the 2020/21 target and as such we have rated this indicator as “Off track”.
- As construction production returns to pre-Covid levels and demand for Scottish sawn wood and panel board grows we hope that the figures will move back on track to hit the longer term targets.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
3	Hectares of peatland restored per year	20,000 ha/y[17]

Most recent data: Around 8,000 hectares on the road to recovery in 2021-22
Data source(s): NatureScot
Assessment: Off track

Commentary:

In 2021-22, circa 8,000 hectares of degraded peatland were set on the road to restoration through collective work by Peatland ACTION (NatureScot), Cairngorms National Park Authority, Loch Lomond and the Trossachs National Park Authority, Scottish Water and Forestry Land Scotland. This is an increase on the previous year (5,658 hectares restored) but it remains around 12,000 hectares short of our annual target of 20,000 hectares.

Scottish Government has provided funding for peatland restoration since 2012-13, which has resulted in around 30,000 hectares of restored peatland to date. The 2018 Climate Change Plan established a restoration target of 250,000 ha by 2030, with a cumulative target within that of 50,000 hectares by the end of 2019-20. Over that period circa 15,000 hectares have been set on the road to restoration, circa 35,000 hectares short of the 50,000 hectare target.

In 2022-23, it is forecast that around 11,000 hectares of peatland will be set on the road to recovery.

Peatland restoration is a relatively new industry and there are a number of complex challenges when it comes to upscaling restoration rates. In 2021-22 there were several operational challenges which impacted on peatland restoration rates including unexpected heavy snow in early December, Covid-related staff absences and reduced staff capacity for key delivery partners. There are also significant longstanding challenges including limited availability of experienced and skilled contractors for peatland restoration in Scotland and the UK more broadly.

We are working with partners and experts to consider transformative new delivery models that will enable us to increase the rate of peatland restoration to meet targets. In October 2021 we established a new Peatland Programme Board which will provide governance and oversight to the challenge of upscaling peatland restoration rapidly in the coming years.

[17] Area of peatland restored is a proxy measure which doesn't directly represent the reduction in emissions, an emissions reduction indicator may be adopted in the future. Also, the current per annum area restoration target figure is under review and may be increased, updates will be reflected in future annual reporting.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
3	Peatland Code: Projected emissions reduction (validated units)	Year-to-year change

Most recent data:
141,595 validated units from 3 Peatland Code projects in Scotland in 2021-22. These projects, their validation date and associated units are as follows:

Project name	Date validated	Net emission reductions (tCO_2e)
Rottal Estate (Phase 1)	24/02/2021	6462
Glutt 1	21/12/2021	74956
MDMG Kinrara 21	20/12/2021	60177
Total		141,595

Data source(s): Peatland Code, IUCN UK Peatland Programme
Assessment: On track

Commentary:
The CCPu acknowledges that Government cannot fund on its own the scale of peatland restoration and management that will be needed to deliver on our emissions reduction targets. Alongside the funding we make available through grants for peatland restoration and agri-environment schemes, private investment in Scotland's natural capital will also be essential. It will also be necessary to ensure long-term sustainable management of restored peatland so that the carbon it stores remains locked up in the long term.

As well as our commitment of £250 million of funding over ten years, we are working to attract increased private investment. The Peatland Code is a recognised standard for businesses to purchase and report on carbon units for peatland restoration.

We will increasingly work to integrate public and private funding for peatland restoration and management through better coordination between the Peatland Code and government grants to landowners and land managers via our delivery partners.

The data reported above represents the total validated units from projects in Scotland in the year 2021-22. The total validated units in the year 2021-22 (141,595) represents an increase of 22.9% from the previous year's total (115,209).

Part C - Information on implementation of individual policies

Outcome 1: We will introduce a stepped increase in the annual woodland creation rates from 2020-2021 to enhance the contribution that trees make to reducing emissions through sequestering carbon.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Forestry grants: we will provide funding via a grant scheme, to support eligible land owners establish appropriate woodlands.	2020-2021 PfG	This policy was been boosted through an additional £100m of funding (announced in the PfG in 2020) to support an increase in woodland creation up to 2025. There is a currently a full pipeline of woodland creation projects.	The indicator for woodland creation is hectares planted per year. Approvals indicate that we are on track to deliver 15,500 hectares for 2021-22.	The targets for woodland creation consist of stepped increases until 2024-25 when the target will reach 18,000 hectares per year.
Woodland creation on Scotland's national forests and land: Forestry and Land Scotland will deliver an annual contribution towards the overall woodland creation target by creating new	CCP 2018	Forestry and Land Scotland (FLS) continues to create woodlands and is developing partnerships with a range of potential partners to undertake woodland creation for carbon capture	In 21/22 FLS will create around 510-590ha of woodland	FLS will continue to create woodlands each year on an ongoing basis

sustainable woodland on Scotland's national forests and land, including through partnerships with external organisations to scale carbon capture opportunities.				
Awareness-raising: We will continue to deliver a programme of farm-based events to demonstrate and support improved productivity through integration of farming and forestry enterprises.	CCP 2018	This policy has been maintained, although the COVID-19 restrictions have prevented the planned number of events taking place	No Hard indicators. But a new series of events is currently underway associated with the establishment of a monitor farm network that includes farm forestry.	Ongoing – annual series of events and developments to increase uptake of farm forestry e.g. launch of Small Woodland Load Scheme in spring 2022
Woodland standards: The Scottish Government will lead on the work with the UK and other UK Governments to maintain and develop a UK Forestry Standard that articulates the consistent UK wide approach to sustainable forestry. The Standard defines how	CCP 2018	The four administrations of the UK have begun work on the review of the current UK Forestry Standard (UKFS). The review takes place every five years and the aim is to update and publish the next version by the end of 2022.	No	Next edition of the UK Forestry Standard is due to be published by the end of 2022

woodland should be created and managed to meet sustainable forest management principles and provides a basis for monitoring.		The review will ensure the Standard is up to date and continues to safeguard and promote sustainable forestry practice in the UK, whilst reflecting the international context in which forestry operates. The UKFS is the technical standard which underpins the delivery of the forestry policies of the four UK countries.		
Woodland carbon capture: The Scottish Government will further develop and promote the Woodland Carbon Code in partnership with the forestry sector, and will work with investors, carbon buyers, landowners and market intermediaries to attract additional investment into woodland creation projects and increase the woodland carbon market by 50% by 2025.	CCPu 2020	Scottish Forestry is providing technical support to private sector investors, land managers and advisors, and intermediaries in the woodland carbon market. We are taking further measures to develop the Code to facilitate further expansion of the market.	Quantity of validated carbon units under the Woodland Carbon Code	50% increase in validated carbon units by 2025
Forestry and woodland strategies: Forestry and woodland strategies	CCP 2018	A number of current strategies are being	N/A	

continue to be prepared by planning authorities, with support from Scottish Forestry. They provide a framework for forestry expansion through identifying preferred areas where forestry can have a positive impact on the environment, landscape, economy and local people.		reviewed and updated. Work is also ongoing with Scottish Borders Council to pilot further improvements to how such strategies can be developed in future. That work will inform a refresh of the current Scottish Government Guidance, which is planned to be commenced in 21/22		Work with Scottish Borders Council will be completed by the end of 2022 Planned to commence refresh of relevant Scottish Government guidance in 22/23
Support forestry sector on plant and seed supply strategy to help meet the increased planting targets: A programme of technical innovation to develop and adapt modern horticultural practices will help improve seed preparation and handling, techniques to reduce environmental impacts, and increase nursery production. Funding to support increased production of young trees is available through the Harvesting and Processing grant.	Scottish Forestry Implementation Plan	There has been good take up of the grant scheme. We are still working with Confor and other stakeholders to obtain better data on plant production. Defra has introduced its own grant support scheme for the forest nursery sector that will also support the forest nursery sector	No	N/A

Forestry and Land Scotland will begin development of a new approach to woodland investment with a view to acquiring more land to establish further woodland on Scotland's national forests and land for the benefit of future generations and to optimise carbon sequestration. This includes partnering with private sector and other organisations to enhance scale and funding of carbon capture projects.	CCPu 2020	Acquisition Strategy has been prepared setting out FLS approach to investing in new woodland and is being applied. Disposal criteria are being reviewed to reflect FLS' strategic asset management approach and sustainability objective. SG funds from the Low Carbon Investment Fund (LCIF) have been allocated against new land purchases along with left-over New Woodland Investment Programme (NWIP) funds which FLS now holds in a Strategic Acquisition Fund for strategic land and asset purchases. A number of carbon off-setting agreements and partnerships are being explored and are at various stages of discussion. Variations in market pricing along with a strong demand for land make this a challenging area of business.	Key indicator for land acquisition is to fully invest the Scottish Government funds available. For FY 21/22 this is projected to be c 110% of the £6m funds provided, all against new land acquisition which is just over 1,000 ha gross. New land will contribute to FLS annual planting contribution, although there is a c 2 year gap between acquisition and planting due to the planning and consultation process. LCIF funds will be used for planting costs once the land acquired is ready for planting.	New Governance and business Rules have been set up and are now being implemented. Monitoring is undertaken by the Strategic Acquisition Board.

Outcome 2: Increase the use of sustainably sourced wood fibre to reduce emissions by encouraging the construction industry to increase its use of wood products where appropriate.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
In collaboration with the private forest sector and other public sector bodies the Scottish Government will implement the Timber Development Programme through an annual programme of projects that support the promotion and development of wood products for use in construction.	CCP 2018	SF have funded a number of projects this year arising from the Roots for Further Growth economic strategy produced by Scottish Forest & Timber Technologies Industry Leadership Group (SFTT ILG), including: • Research project by Edinburgh Napier University into domestic potential for Wood Fibre Insulation (£23.5k) • Economic study on the local impact of forestry and timber micro-businesses (£18k)	N/A	On-going

		• Ongoing co-funding for 3 PhDs – 2 in biorefining and 1 around tree genetics (3 * £7k = £21k)		

Outcome 3: To enhance the contribution of peatland to carbon storage, we will support an increase in the annual rate of peatland restoration

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Restoration grants: We will provide grant funding to support eligible land managers to deliver peatland restoration. Levels of funding will enable at least 20,000 hectares of peatland restoration per year. We will undertake research to inform where restoration can deliver the greatest	Budget 2020/21, reinforced in 2020-2021 PfG	Funding available for peatland restoration in 2021-22 rose to a record high of £22 million. A CivTech challenge launched in 2021 to explore how technology can better help us to identify peatland restoration sites that will optimise costs and benefits. We are working with Environment Systems to produce an online tool that	In 2021-22, progress against the annual target is off track and is forecast to remain so in 2022-23.	A Scottish Government-led Peatland Programme has been established and is working to provide strategic direction and address systemic barriers to upscaling of peatland restoration. In

emission savings per hectare.		will bring together natural capital evaluation with satellite data analytics to provide area-based peatland restoration prioritisation.		February 2022, NatureScot presented recommendations to the Programme Board and Ministers on transformative new approaches to upscale delivery. An action plan will be developed to drive forward this work.
Awareness raising: Working through partnership, we will put in place tools and information to promote peatland restoration and develop the capacity, skills and knowledge of land owners, land managers, contractors and others to deliver peatland restoration.	CCPu 2020	NatureScot, a key delivery partner in peatland restoration, are leading on work to promote peatland restoration, communicate its benefits and increase demand. Work has started on a Communications Plan which will identify key messages for different target audiences and targeted media approaches. This will include using traditional and digital media to raise awareness of how peatland restoration plays a critical	NatureScot's Communications Plan will be finalised in the next few months and will be shared with SG partners.	Communications plan and plans on expanding the peatland restoration workforce will be implemented from 2022-23 and beyond.

		role in Scotland's response to Climate Change and biodiversity emergencies, making direct contact with land managers and their agents at a local level and developing a suite of case studies to promote Peatland ACTION. Work is also underway to develop a plan for expanding the peatland restoration workforce.		
With partners, refresh our vision for Scotland's peatlands and review peatland restoration support mechanisms to overcome embedded barriers and improve how we fund and deliver this activity.	CCPu 2020	In October 2021, we established a Scottish Government-led Peatland Programme that is working to provide strategic direction and address systemic barriers to upscaling of peatland restoration. This includes assessing options for alternative and transformative delivery models and agreeing a new action plan to deliver better protection, restoration and management of peatlands in Scotland.	In 2021 the Peatland Programme Board was established, which is the first step towards an updated vision for Scotland's peatlands and improving overall efficiency in peatland restoration funding mechanisms and delivery.	The work plan for the emerging Peatland Programme includes development of a new vision for Scotland's peatlands and associated action plan.
Phase out the use of peat in horticulture by increasing uptake of	2019-2020 PfG	In our 2021-22 PfG, we pledged to take forward work to develop and consult	Outcomes of the consultation will be used to inform	In 2022, we will launch a Scottish consultation on

alternative materials, undertaking stakeholder engagement to understand transitional challenges, to improve the uptake of alternatives and develop a time-scaled plan.		on a ban on the sale of peat related gardening products, building on our wider commitment to phase out the use of peat in horticulture that was set out in the 2019-20 PfG. Discussion with industry has helped us understand transition issues and we have commissioned research that is helping us to understand attitudes of consumers and industry.	timescales and allow us to set milestones for phasing out the use of peat in horticulture.	horticultural peat, which will inform both our direction and speed of travel.
Our Position Statement on National Planning Framework 4 confirmed our current thinking that through the planning system we will not support applications for planning permission for new commercial peat extraction for horticultural purposes, we are looking at strengthening controls on development on peatland and we will help facilitate restoration through permitted development rights.	CCPu 2020	The draft fourth National Planning Framework (NPF4), which was laid in Parliament on 10 November 2021, sets out that development proposals for new commercial peat extraction, including extensions to existing sites, should not be supported unless: the extracted peat is supporting an industry of national importance to Scotland; and there is no reasonable substitute; and the area of extraction is the minimum necessary and the proposal aims to retain a	N/A	The draft NPF4 was considered by Parliament and out for public consultation until the 31 March 2022. Consultation responses are now being reviewed, with an updated NPF4 being worked on.

		residual depth of peat of no less than one metre across the whole site; and the time period for extraction is the minimum necessary; and the proposal is supported by a comprehensive site restoration plan which will return the area of extraction back to its original environmental status. The draft NPF4 also outlines support for the protection of soils, including peat and carbon rich soils which have a critical role to play in helping the country reach its net zero target by sequestering and storing carbon. Our draft soils policy also set out that; Local development plans should protect locally, regionally, nationally and internationally valued soils. The draft policy goes on to state development on peatland, carbon rich soils and priority peatland habitat should not be supported unless it is essential and in a limited range of circumstances, with		

		such proposals being subject to further assessment.		
Develop opportunities for private sector investment in peat restoration, engaging with sectors to establish investment pathways, enabling both public and private sector to invest in a range of measures to help mitigate effects of climate change	CCPu 2020	The total validated units for this year represents an increase of 22.9% on the previous year.	The indicator *Peatland Code: projected emissions reduction (validated units)* shows that there have been 141,595 tCO_2e net emissions reductions from Peatland Code projects in 2021.	We will explore further opportunities to attract private sector investment such as through the development of a Scottish Carbon Fund and a price floor mechanism.
Explore how best to restore all degraded peat in the public estate and also within formally designated nature conservation sites, including through statutory mandate.	CCPu 2020	Peatland restoration delivery partners are working to restore peat in the public estate. Scottish Water has a commitment to restore peatland, where appropriate on all Scottish Water land, as laid out in their Net Zero Route Map. Forestry Land Scotland is developing an ambitious programme to restore all the peatland on Scotland's Forest and Land by 2045 in support of the Scottish	Work is progressing to restore degraded peat in the public estate.	We will explore options to increase peatland restoration in the public estate, including through statutory mandate.

		Government's net zero emissions target. NatureScot are exploring how to scale up peatland restoration on the public estate through the 'Natural capital on public land' workgroup. This includes mapping publically owned land to help target restoration works.		
Explore the development of a Peatland Restoration Standard to ensure best practice and continuous development in the success and effectiveness of peatland restoration.	New [CCPu 2020]	NatureScot, a key delivery partner for peatland restoration, have been working with a range of delivery bodies, agents and stakeholders to develop technical and practical advice across all phases of peatland restoration. This advice will be included in a Technical Compendium that can provide the basis for the standards expected in Scotland. NatureScot are well placed to provide technical and practical advice due to their expertise and knowledge across all	NatureScot's Technical Compendium is expected to be updated by the end of September 2022.	Development of a Peatland Restoration Standard will follow publication of the Technical Compendium, with input from Scottish Government and a wide forum of stakeholders.

		phases of development projects.		

Outcome 4: We will establish pilot Regional Land Use partnerships (RLUPs) over the course of 2021.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Establishment of pilot Regional Land Use Partnerships to help ensure that we maximise the potential of Scotland's land to help achieve net zero.	CPU 2020	Five Regional Land Use Partnership pilots have been establishing themselves, and they will develop Regional Land Use Frameworks by 2023. The regions are: • Cairngorms National Park; • Highlands Council Region; • Loch Lomond and the Trossachs National Park; • North East Region (Aberdeenshire and Aberdeen City Councils);	Regional Land Use Frameworks will be produced by each of the five pilot RLUPs by end-2023. No indicators have been developed for RLUPs at this stage. The pilots will however play a facilitative role in support of the wider suite of LULUCF indicators.	The pilots will begin development of their Regional Land Use Frameworks, which will be finalised by end-2023.

		• South of Scotland (Dumfries and Galloway and Scottish Borders Councils).		
Publication of Scotland's third Land Use Strategy (LUS3) by statutory deadline of 31 March 2021	CCPu 2020	Scotland's third Land Use Strategy was published on the 24th March 2021. It resets the strategic focus on to the integrated nature of land use and introduces a new landscape-based approach to demonstrating the range of demands placed on land and the variety of benefits it can provide.	N/A	N/A

Chapter 7: Agriculture

Part A - Overview of sector

The 2019 annual emissions envelope set in the 2018 Climate Change Plan[18] for this sector was for **8.4 $MtCO_2e$**, the actual emission statistics for this year show a position of **7.5 $MtCO_2e$**[19]. As such, the sector was **within** its envelope during 2019.

The updated Plan sets out the following six policy outcomes for the sector, the indicators for which are summarised below:

A more productive, sustainable agriculture sector that significantly contributes toward delivering Scotland's climate change, and wider environmental, outcomes through an increased uptake of climate mitigation measures by farmers, crofters, land managers and other primary food producers

There are no indicators for this policy outcome. More information is provided in the body of this report.

More farmers, crofters, land managers and other primary food producers are aware of the benefits and practicalities of cost effective climate mitigation measures	**On Track**	**Off Track**	**Too Early to Say**
Increased engagement with Farm Advisory Services on environmental issues and climate change	x		

Nitrogen emissions, including from nitrogen fertiliser, will have fallen through a combination of improved understanding efficiencies and improved soil condition	**On Track**	**Off Track**	**Too Early to Say**
Use of Nitrogen fertilisers	x		
Spreading precision of Nitrogen fertilisers	x		
Nitrogen use efficiency for crop production			x

Reduced emissions from red meat and dairy through improved emissions intensity	On Track	Off Track	Too Early

[18] The CCPu includes updated emission envelopes for the years from 2020 onwards. Given the time period involved in the preparation of national and sectoral emissions statistics (the most up to date data available at this time is for 2019), comparisons with the updated envelopes are not yet possible. Until such a time as this can happen, comparisons will be made based on the 2018 Plan envelopes.
[19] If the published GHG statistics for 2019 are adjusted to include known future inventory revisions around reporting for wetlands and changes to global warming potentials of some GHGs then this figure would become an estimated 7.7 $MtCO_2e$

			to Say
Time taken from birth to slaughter and increased efficiency through improved health and reduced losses	x		

Reduced emissions from the use and storage of manure and slurry	On Track	Off Track	Too Early to Say
Improvement in covered slurry storage	x		
Precision application of manure and slurry			x

Carbon sequestration and existing carbon stores on agricultural land have helped to increase and maintain our carbon sink.	On Track	Off Track	Too Early to Say
Hectares of peatland restored per year		x	
Area of woodland on agricultural land	x		

Just transition and cross economy Impacts:

We wish to understand and report on the broader just transition and cross-economy impacts of our emissions-reduction activities in addition to these sector specific policy outcomes and indicators. To do this, we use data from the Office of National Statistics (ONS): Low Carbon Renewable Energy Economy (LCREE) publication. The LCREE is based on survey data of businesses which perform economic activities that deliver goods and services that are likely to help generate lower emissions of greenhouse gases, for example low carbon electricity, low emission vehicles and low carbon services.

The LCREE indicator is narrowly defined and, while useful within its limited scope, does not give us the full picture of the impacts on workforce, employers and communities and progress towards a just transition.

This year we have also included ONS experimental statistics that look at green activity in the economy. These stats reflect green activities in both LCREE and non-LCREE sectors.

Over the next few years we will work to develop a meaningful set of success outcomes and indicators aimed at tracking the impacts of our policies on a just transition to net zero.

Sector commentary on progress

Our vision for the future of agriculture in Scotland is a positive one, with a clear ambitious aim: to transform how we support farming and food production in Scotland to become a global leader in sustainable and regenerative agriculture.

We have committed to shifting half of all funding for farming and crofting from unconditional to conditional support by 2025, with targeted outcomes for biodiversity gain and a drive towards low carbon approaches which improve resilience, efficiency and profitability.

The National Test Programme (NTP) was announced in October 2021 and, over the next three years will deliver Scottish Government investment of up to £51 million. It is based on, and informed by, the work and recommendations of the Farmer-led Groups, particularly to ensure we begin with tackling the most urgent needs, and will create a base upon which to build a whole-farm low carbon approach. An outline of the NTP was published ahead of COP26.

The first phase NTP, 'Preparing for Sustainable Farming'(PSF), was launched in Spring and aims to help farmers and crofters to prepare their farms to meet the conditions of future agriculture policy and support and is open to all. Further information on PSF is available on the Scottish Government website, including comprehensive guidance for those seeking to get involved.

The NTP sits in the wider context of the agricultural transformation to support farmers and crofters to transition from the EU CAP regime to a future rural support mechanism which will deliver our Vision for Agriculture. We are planning to introduce enhanced conditionality for payments with targeted outcomes for environmental and biodiversity gain, and a drive towards low carbon approaches. The NTP will help farmers, crofters and land managers to understand how economically and environmentally sustainable farming will be supported and rewarded in future, and the learning provided will inform the future policy and service design.

The work on the NTP is being co-developed with industry to ensure that farmers, crofters and land managers help inform the process as we move towards the new Scottish Agriculture Bill which will be brought forward in 2023 and will provide a replacement for the Common Agricultural Policy. It will help ensure that when the new Agriculture Bill becomes law, the right tools and support are in place. From 2025, the climate and biodiversity performance of businesses will determine the level of agricultural support payments.

During this time a new Scottish Agriculture Bill will be brought forward to provide a replacement for CAP. The Agriculture Reform Implementation Oversight Board (ARIOB) has been established to develop new proposals for sustainable farming support.

Regulations came into force from 1 January 2022 to consolidate the Silage Surry and Agricultural Fuel Oil(Scotland) Regulations 2003 into The Water Environment (Controlled Activities) (Scotland) Regulations 2011. These included improved controls on the storage of slurry and digestate to reduce leakage, and a move to precision spreading methods to maximise the nutrient benefit and reduce emissions. This will provide benefits to water quality, air quality, and climate change mitigation. Support will be available to farmers in 2022 for low emission slurry spreading equipment and slurry store covers that will help farmers, crofters and agricultural contractors comply with new regulatory requirements, reducing harmful ammonia

emissions and adverse impacts on water quality from the storage and spreading of livestock slurry and digestate.

Advice and support for farmers and crofters on how to mitigate their emissions continues to be provided through the Farm Advisory Service, Farming for a Better Climate and Farming and Water Scotland.

Developments in monitoring arrangements since last report

A new indicator on the nitrogen use efficiency of crop production in Scotland has been added to this year's monitoring report. This is a new indicator which has been added following new data available through the Scottish Nitrogen Balance Sheet which was published on 15 December 2021.

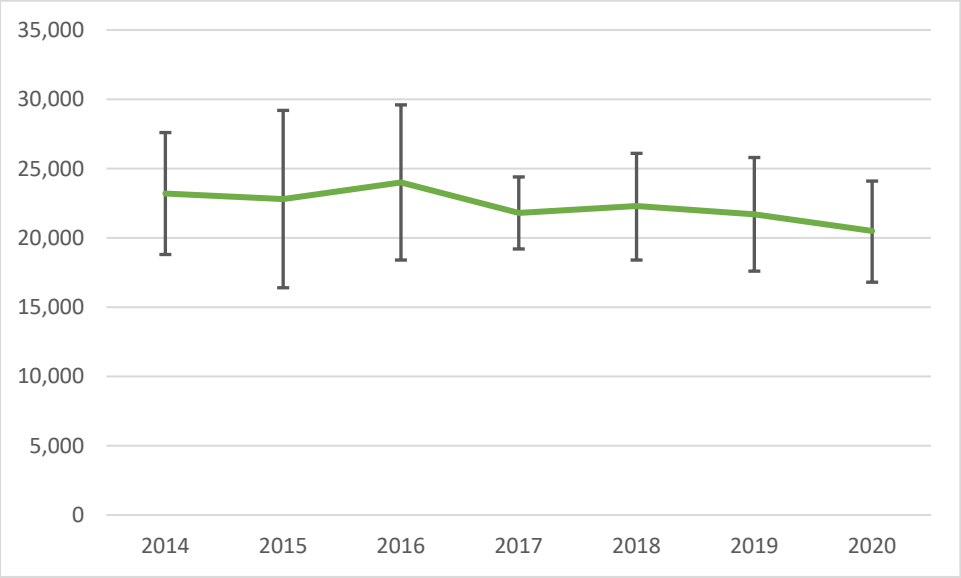
Part B - Progress to Policy Outcome Indicators

Policy Outcome:	Indicator	On-Track Assessment (Milestone/Targets)
Cross-sectoral social and economic indicator	FTE employment in Low Carbon Renewable Energy Economy	Year-to-year change

Most Recent Data: 2020
Data Source(s): Office of National Statistics: Low Carbon Renewable Energy Economy (LCREE), Time spent of Green Tasks
Assessment: Too early to Say

- In 2020, the Scottish low carbon renewable energy (LCREE) sectors were estimated to directly provide 20,500 jobs, down from 21,700 in 2019 and from a high of 24,000 in 2016.
- The estimates of LCREE are based on a relatively small sample of businesses and hence are subject to wide confidence intervals. LCREE employment in Scotland in 2020 is similar to previous years and the difference is not statistically higher or lower than any previous year.

Employment in Low Carbon Renewable Energy Economy, FTE



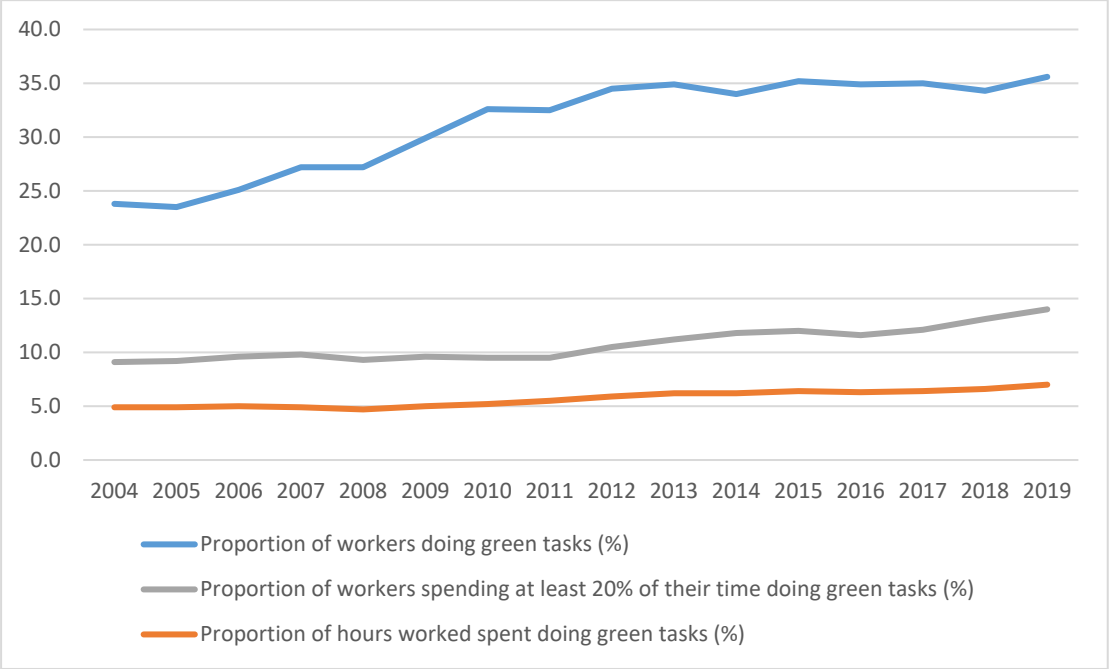
Agriculture Graph 1

Source: Scottish Government presentation of ONS stats

- The ONS also released experimental statistics on a wider perspective of green activity in the economy with their time spent on green tasks release. These stats reflect green activities in both LCREE and non-LCREE sectors.
- This release showed that in 2019 Scotland achieved an all-time high of hours spent on green tasks and proportion of workers doing green tasks, including workers who spend more than 20% of their time on green tasks.
- The proportion of workers doing green tasks in Scotland was 36% in 2019, up from 23.8% in 2004. Workers who have spent more than 20% of their time doing green tasks was 14%, up from 9% in 2004.

- The proportion of overall hours spend doing green tasks in Scotland was 7%, up from 4.9% in 2004.

Green Tasks Statistics, percentage



Agriculture graph 2
Source: Scottish Government presentation of ONS stats

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
2	Increased engagement with Farm Advisory Services on environmental issues and climate change	Based on trend

Most recent data: Farm Advisory Service (FAS) reporting / website engagement. Farming for a Better Climate end of Programme report, including data on website engagement and number of workshops. Engagement with Skillseeder on environmental / climate change issues.
Data source(s): Farm Advisory Service Annual Reports
Assessment: On track

Commentary:

Across the Farm Advisory Service and Farming for a Better Climate, engagement is broadly increasing year on year. The number of people receiving advice through FAS dropped in 2020, mainly due to Covid-19 related issues and events being replaced by online activities and there was an exceptional year in 2019 with high numbers of carbon audits being undertaken due to the requirements of the Beef Efficiency Scheme.

Farm Advisory Service

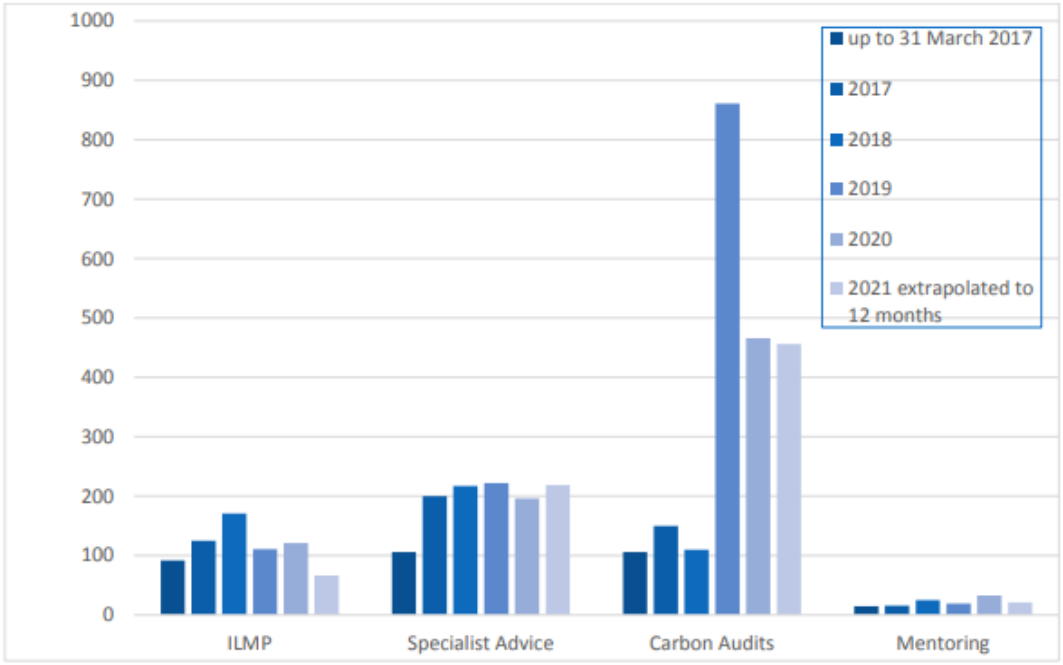
Number receiving advice through FAS

Focus Area	2017	2018	2019	2020	2021	Total
2A	2,293	1,749	3,086	1,763	3,513	**12,404**
2B	812	960	1,671	2,566	1,996	**8,005**
3B	2,088	1,999	3,634	1,645	1,368	**10,734**
4	1,960	1,936	3,047	1,224	1,817	**9,984**
5B	616	688	1,334	1,560	2,617	**6,815**
Total	**7,769**	**7,332**	**12,772**	**8,758**	**11,311**	**47,942**

Focus Areas:

2A	Improving the economic performance of all farms and facilitating farm restructuring and modernisation, notably with a view to increasing market participation and orientation as well as agricultural diversification
2B	Facilitating the entry of adequately skilled farmers into the agricultural sector and, in particular, generational renewal
3B	Supporting farm risk prevention and management
4	Restoring, preserving and enhancing ecosystems related to agriculture and forestry
5B	Increasing efficiency in energy use in agriculture and food processing

Applications to One-to-One Farm Advisory Service



Agriculture graph 3
Source: One-to-one annual report
Note: ILMP refers to Integrated Land Management Plans

In 2021, the demand for one-to-one element of FAS followed the broad trends of previous years:

- Specialist advice exceeded targets by 113%;
- Carbon audits were 64% above target (409 applications against a target of 250);
- Integrated Land Management Plans (ILMPs) only reached 25% of the target;
- Mentoring only reached 37% of the target.

Other activities through FAS had high engagement in 2021:

- 167 knowledge transfer events were held. The total attendance was 4,850 (121% of the predicted).
- Publications were downloaded more than 220,270 times, an increase on 2020.

Farming for a Better Climate

Farming for a Better Climate has generated engagement from the sector:

- Farming for a Better Climate has received over 90,000 webpage visits with nearly 300,000 page views from an international audience.
    - Page visits count the number of sessions per visitor, so the 90,000 visitors to Farming for a Better Climate have looked at over 300,000 pages, suggesting that visitors to the Farming for a Better Climate webpages find the content engaging.
    - The average time on the Farming for a Better Climate pages is over 13 minutes, again suggesting that visitors find the content engaging.

- There has been a significant increase in traffic to Farming for a Better Climate webpages from 2020 to 2021:
    - Web page visits -75.5% increase
    - Page views - 118.8% increase
    - Unique page views - 68.4% increase
    - Maximum actions per visit (visitor viewed multiple pages) - 248.9% increase
    - Average time spent on the pages - 41.8% increase
    - Total searches carried out - 151.8% increase
- Case studies were viewed 8,862 times (unique page views)
- Farming for a Better Climate have produced 36 videos which were played a total of 35,665 times and nine podcasts which have been listened to a total of 1,269 times

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
3	Use of Nitrogen fertilisers	Based on trend

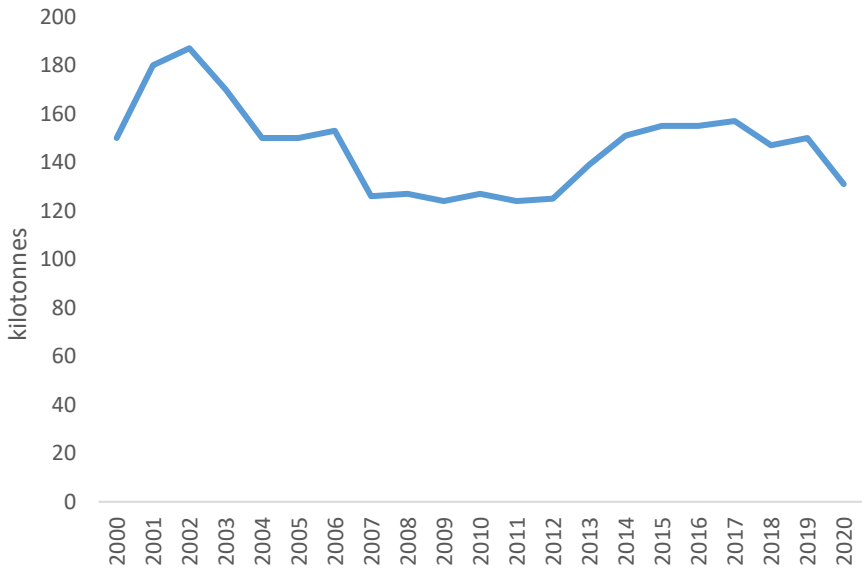
Most recent data: 2020
Data source(s): British survey of fertiliser practice 2020
Assessment: On track

Commentary:
This data shows that from 2000, the use of nitrogen fertilisers has decreased overall, with some fluctuation.

Nitrogen use decreased between 2002 and 2011 followed by and increase to 2017. Since 2017, there has been a downward trend from 157kt total nitrogen use in 2017 to 131kt total nitrogen use in 2020.

Total nitrogen use (kt), Scotland 2000 to 2020

2000	150
2001	180
2002	187
2003	170
2004	150
2005	150
2006	153
2007	126
2008	127
2009	124
2010	127
2011	124
2012	125
2013	139
2014	151
2015	155
2016	155
2017	157
2018	147
2019	150
2020	131



Agriculture graph 4

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
3	Spreading precision of Nitrogen fertilisers	Based on trend

Most recent data: 2020
Data source(s): British survey of fertiliser practice 2020
Assessment: On track

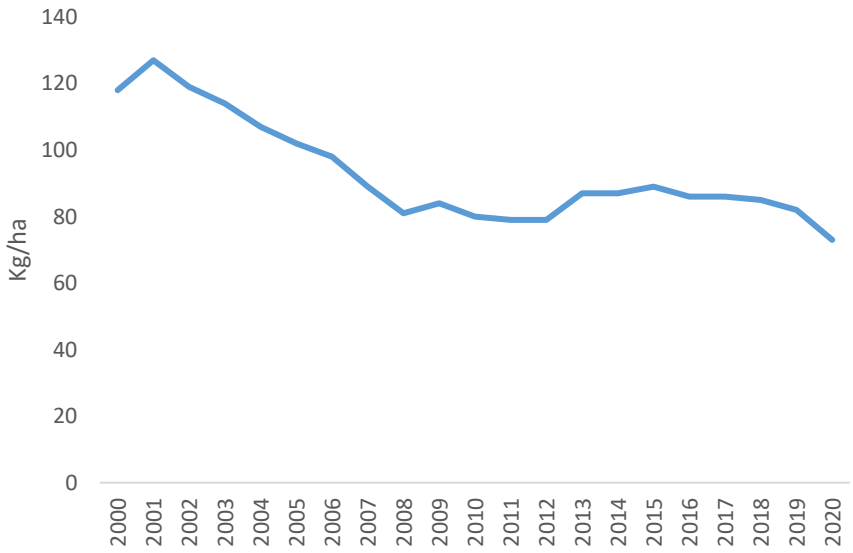
Commentary:

This data shows that from 2000, the overall application rates of nitrogen fertilisers have decreased, with some fluctuation.

The trend shows that the overall nitrogen application rates decreased from 118 kg/ha in 2000 to 73kg/ha in 2020.

Total overall nitrogen application rates (kg/ha), Scotland 2000 to 2020

2000	118
2001	127
2002	119
2003	114
2004	107
2005	102
2006	98
2007	89
2008	81
2009	84
2010	80
2011	79
2012	79
2013	87
2014	87
2015	89
2016	86
2017	86
2018	85
2019	82
2020	73



Agriculture graph 5

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
3	Nitrogen use efficiency for crop production	Based on trend

Most recent data: 2020
Data source(s): Scottish Nitrogen Balance Sheet
Assessment: Too early to say (baselining)

Crop production nutrient use efficiency (NUE) for Scotland (all data 2019, except for N deposition which is 2018)

Inputs to arable land	kt N
mineral fertiliser	62.1
slurry/manure	17.8
atmospheric N deposition	4.0
seeds (sowing/planting)	1.7
digestate (non-crop/crop waste feedstocks only)	1.7
Biological N fixation (BNF) by arable crops	1.6
sewage sludge	1.2
Compost	0.9
total N inputs	**90.2**

Useful outputs	kt N
Food crops (inc. human-edible crops that end up as livestock feed, seed materials or biomass)	56.3
Fodder crops harvested (turnips, kale etc.)	1.9
total N outputs	**58.2**

Recycling terms (not included in either inputs or outputs for the purpose of this NUE calculation):
digestate from crops, crop residues

NUE = 65%

Commentary:

This is a new indicator which has been added following new data available through the Scottish Nitrogen Balance Sheet (SNBS) which was published on 15 December 2021. Crop production underpins much of wider food production, which in turn is the main engine of overall national nitrogen use in Scotland. Nitrogen Use Efficiency (NUE) is an important summary indicator metric that can be calculated from the comprehensive dataset on nitrogen flows assembled in the SNBS.

It is important to note that NUE in arable production inherently varies depending on farm type/systems, management, environmental conditions (soils, climate), etc. While good management can reduce losses, in practice some losses are inevitable due to continuous nitrogen transformation processes in soils and leaching. As such, crop production NUE values between 50-90% can generally be considered desirable but there is no simple one size fits all “good value.”

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
4	Time taken from birth to slaughter and increased efficiency through improved health and reduced losses	Based on trend

Most recent data: 2021
Data source(s): Cattle Tracing Scheme, analysis by Scotland's Rural University College
Assessment: On track

Average age of prime animal slaughter by farm type, Scotland 2015 to 2021

Beef	Mean Age (months)	Number of Animals
2015	21.86	**150,788**
2016	21.56	**156,186**
2017	21.41	**147,741**
2018	21.36	**139,632**
2019	21.43	**145,839**
2020	21.3	**144,114**
2021	21.08	**142,870**
Dairy		
2015	22.34	**17,273**
2016	22.18	**17,415**
2017	22.13	**14,213**
2018	22.47	**12,241**
2019	22.01	**12,435**
2020	22.12	**10,693**
2021	21.99	**8,765**
Finisher		
2015	23.73	**176,831**
2016	23.32	**183,359**
2017	23.15	**182,683**
2018	23.11	**185,417**
2019	23.13	**182,444**
2020	22.82	**183,325**
2021	22.49	**182,295**
Trader		
2015	23.71	**14,837**
2016	22.75	**10,801**

2017	23.29	**11,180**
2018	22.01	**12,457**
2019	22.63	**11,681**
2020	22.4	**11,021**
2021	22.17	**8,559**
Grower		
2015	24.53	**3,390**
2016	24.78	**3,543**
2017	23.63	**4,524**
2018	23.56	**4,508**
2019	23.95	**4,103**
2020	24.04	**3,374**
2021	23.99	**2,592**

Commentary:

The average age of prime animal slaughter decreased for all farm types between 2015 and 2021.

We expect this to continue to reduce towards around 18 months. However, as most calves are spring born, we do not expect the whole industry to shift to an 18-month age of slaughter and so we expect the mean age of slaughter to remain above 18 months.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
5	Improvement in covered slurry storage	Based on trend

Most recent data: 2016
Data source(s): Farm Structure Survey 2016
Assessment: On track

Manure and slurry storage, Scotland 2013 and 2016

		2013				2016			
		All holdings with storage		…of which are covered		All holdings with storage		…of which are covered	
		Number of holdings	Percentage of all holdings	Number of holdings	As a percentage of holdings with storage	Number of holdings	Percentage of all holdings	Number of holdings	As a percentage of holdings with storage
Storage for solid dung		8,963	27.1	1253	12.7	6178	19.2	720	11.7
Storage facilities for slurry…	In a tank	3,838	3487	11.6	10.5	3007	2739	9.3	8.5
	In a lagoon		641		1.9		571		1.8
					2354	61.3			1872	62.3
Total		9882	29.8	8482	85.8		7161	22.2	6204	86.6

Note: Sum of sub-categories do not equal base figure as holdings may employ more than one form of storage

Commentary:

The data show a small overall increase in the percentage of holdings with covered slurry stores between 2013 (85.8%) and 2016 (86.6%).

We expect the percentage of slurry stores that are covered to continue to increase over time. This is likely to increase at a similar rate to that of the change between 2013 and 2016 due to the significant investment required to cover slurry stores or build new slurry stores with covers.

This data was gathered as part of the Scottish Survey of Farm Structure and Methods in 2016. The next iteration of the survey had been scheduled for 2020. This was delayed due to COVID-19 but the data collected through this survey is included

in the scope for the Scottish Government's Agricultural Statistics Transformation Programme and should be available in the coming years.

The Sustainable Agricultural Capital Grants Scheme (SACGS) 2022 will have a focus on providing support for low emission slurry spreading equipment and slurry store covers that are proven to reduce harmful ammonia emissions and reduce adverse impacts on water quality resulting from the storage and spreading of livestock slurry and digestate.

There is also funding available through the Agri-Environment Climate Scheme (AECS) for slurry stores and between 2015 and 2021, 162 contracts for slurry stores through AECS have been accepted since 2015 with a total value of £6.26 million.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
5	Precision application of manure and slurry	Based on trend

Most recent data: 2016
Data source(s): Farm Structure Survey 2016
Assessment: Too early to say (baselining)

Commentary:

Method of manure and slurry application by tonnage, Scotland 2016

	2016	
	Holdings	Tonnes
Broadcast		
Ploughed in or injected within four hours	920	385,842
Ploughed in after four hours	5,146	2,117,346
Not ploughed in or injected	4,957	9,322,483
Bandspread		
Trailing hose	550	4,178,295
Trailing shoe	294	602,161
Injection		
Shallow/ open slot	63	576,821
Deep/closed slot	11	31,043
Total applied	9,246	17,213,991

This data was gathered as part of the Scottish Survey of Farm Structure and Methods in 2016. The next iteration of the survey had been scheduled for 2020. This was delayed due to COVID-19 but the data collected through this survey is included in the scope for the Scottish Government's Agricultural Statistics Transformation Programme and should be available in the coming years.

The Sustainable Agricultural Capital Grants Scheme (SACGS) 2022 will have a focus on providing support for low emission slurry spreading equipment and slurry store covers that are proven to reduce harmful ammonia emissions and reduce adverse impacts on water quality resulting from the storage and spreading of livestock slurry and digestate.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
3	Hectares of peatland restored per year	20,000 ha/y[20]

Most recent data: Around 8,000 hectares on the road to recovery in 2021-22
Data source(s): NatureScot
Assessment: Off track

Commentary:

In 2021-22, circa 8,000 hectares of degraded peatland were set on the road to restoration through collective work by Peatland ACTION (NatureScot), Cairngorms National Park Authority, Loch Lomond and the Trossachs National Park Authority, Scottish Water and Forestry Land Scotland. This is an increase on the previous year (5,658 hectares restored) but it remains around 12,000 hectares short of our annual target of 20,000 hectares.

Scottish Government has provided funding for peatland restoration since 2012-13, which has resulted in around 30,000 hectares of restored peatland to date. The 2018 Climate Change Plan established a restoration target of 250,000 ha by 2030, with a cumulative target within that of 50,000 hectares by the end of 2019-20. Over that period circa 15,000 hectares have been set on the road to restoration, circa 35,000 hectares short of the 50,000 hectare target.

In 2022-23, it is forecast that around 11,000 hectares of peatland will be set on the road to recovery.

Peatland restoration is a relatively new industry and there are a number of complex challenges when it comes to upscaling restoration rates. In 2021-22 there were several operational challenges which impacted on peatland restoration rates including unexpected heavy snow in early December, Covid-related staff absences and reduced staff capacity for key delivery partners. There are also significant longstanding challenges including limited availability of experienced and skilled contractors for peatland restoration in Scotland and the UK more broadly.

We are working with partners and experts to consider transformative new delivery models that will enable us to increase the rate of peatland restoration to meet targets. In October 2021 we established a new Peatland Programme Board which will provide governance and oversight to the challenge of upscaling peatland restoration rapidly in the coming years.

[20] Area of peatland restored is a proxy measure which doesn't directly represent the reduction in emissions, an emissions reduction indicator may be adopted in the future. Also, the current per annum area restoration target figure is under review and may be increased, updates will be reflected in future annual reporting.

Policy Outcome	Indicator	On-Track Assessment (Milestones/ Targets)
6	Area of woodland on agricultural land	Based on trend

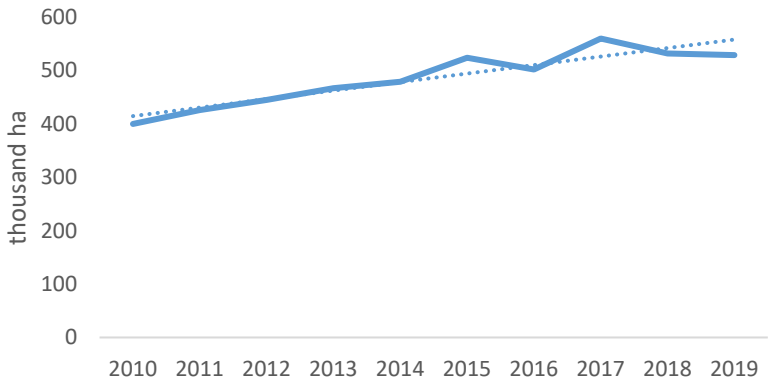
Most recent data: 2019
Data source(s): Forestry Statistics 2020
Assessment: On track

Commentary:

The area of farm woodland in Scotland has increased between 2010 and 2019. The area of farm woodland in Scotland has increased at an average rate of 15.93 thousand hectares per year over the period 2010 – 2019.

Area of farm woodland, Scotland 2010 to 2019 (thousand hectares)

2010	400
2011	426
2012	445
2013	467
2014	479
2015	524
2016	502
2017	560
2018	532
2019	529



Agriculture graph 6

Part C - Information on implementation of individual policies

Outcome 1: A more productive, sustainable agriculture sector that significantly contributes towards delivering Scotland's climate change, and wider environmental, outcomes through an increased uptake of climate mitigation measures by farmers, crofters, land managers and other primary food producers

Policy	Date announced	Progress on implementation since time of last report / CCPu	Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.	Timeframe and expected next steps
Scale up the Agricultural Transformation Programme across all the policies, including monitoring to assess the effectiveness of the pilot Sustainable Agricultural Capital Grant Scheme that will enable farmers and crofters to purchase equipment that	2019-2020 Programme for Government	The National Test Programme, announced in October 2021, will support farmers and crofters in becoming world leaders in sustainable and regenerative agriculture through a twin-track approach. This will include support for every farmer and crofter to undertake a Carbon Audit and soil testing to support nutrient management planning. This first track will also put in place livestock data and performance systems for businesses with cattle, with the aim of improving both business and emissions performance. We have committed to shifting half of all funding for farming and crofting from unconditional to conditional support by 2025, with targeted outcomes for biodiversity gain and a drive towards low carbon approaches which improve resilience, efficiency and profitability. Therefore, alongside	No new indicators	The National Test Programme will run for three years The new Agriculture Bill is to be introduced in 2023. An initial survey of successful SACGS

should assist in reducing their greenhouse gas emissions, and support practice change.		the first track which will offer support to all farmers and crofters, a programme to test the application of environmental conditionality is being developed, the aim being to work with a cross section of farmers and crofters to learn from them how conditions can be applied effectively and appropriately. The first part of the Programme will be live from Spring 2022 and funding of £51 million will be available for the Programme over three years. During this time a new Scottish Agriculture Bill will be brought forward to provide a replacement for CAP. The Agriculture Reform Implementation Oversight Board (ARIOB) has been established to develop new proposals for sustainable farming support. The Sustainable Agricultural Capital Grant Scheme (SACGS) 2022, which is part of the wider agricultural transformation intentions, will be focussed on support for low emission slurry spreading equipment and slurry store covers that will help farmers, crofters and agricultural contractors comply with new regulatory requirements reducing harmful ammonia emissions and adverse impacts on water quality resulting from the storage and spreading of livestock slurry and digestate. This follows a Scottish Government commissioned report assessing the greenhouse gas (GHG) mitigation potential of farm equipment funded through the pilot Sustainable Agriculture Capital Grant Scheme (SACGS) concluded that there was a clear technical rationale for each item included in the pilot scheme and all the items had benefits to performance, business efficiency or the wider environment.		applicants from the pilot project is intended to be undertaken in 2022. SACGS 2022 is expected to open for applications in Spring 2022 for a six week period. Following assessment of the applications successful applicants will be notified by mid-summer and will then have until the end of February 2023 to purchase the items and claim their grant.

		However it also recognised that for some items there was a lack of sufficient and robust evidence/data in relation to emissions mitigation potential.		
Develop rural support policy to enable, encourage and where appropriate, require the shift to low carbon, sustainable farming through emissions reduction, sustainable food production, improving biodiversity, planting biomass crops and appropriate land use change developed in line with just transition principles.	CCPu 2020	A new Scottish Agriculture Bill will be brought forward in 2023 to provide a replacement for the Common Agricultural Policy (CAP). The Agriculture Reform Implementation Oversight Board (ARIOB) has been established to develop new proposals for sustainable farming support and its work will also be informed by the outcomes from the "Agricultural Transition in Scotland" consultation launched in August 2021 on key themes from the reports of the Farmer-led Groups. The Agricultural Vision was published on 2nd March 2022. The National Test Programme, announced in October 2021, will support farmers and crofters in becoming world leaders in sustainable and regenerative agriculture through a twin-track approach. This will include support for every farmer and crofter to undertake a Carbon Audit and soil testing to support nutrient management planning. This first track will also put in place livestock data and performance systems for businesses with cattle, with the aim of improving both business and emissions performance. We have committed to shifting half of all funding for farming and crofting from unconditional to conditional support by 2025, with targeted outcomes for biodiversity gain and a drive towards low carbon approaches which improve resilience, efficiency and profitability. Therefore, alongside the first track which will offer support to all farmers and	No new indicators	The National Test Programme was launched in Spring 2022. A consultation will run in 2022 to inform the introduction of a Scottish Agriculture Bill in 2023.

		crofters, a programme to test the application of environmental conditionality is being developed, the aim being to work with a cross section of farmers and crofters to learn from them how conditions can be applied effectively and appropriately. The first part of the Programme will be live from Spring 2022 and funding of £51 million will be available for the Programme over three years. We are also committed to publishing a Just Transition Plan for Land and Agriculture which will ensure that nobody is left behind in our journey towards net zero.		

Develop new schemes and approaches to support low carbon, sustainable farming, including through the Programme Board for the Beef Suckler Climate Group, other farmer-led groups on arable, dairy and high value, nature farming and crofting which will report in 2021.	2020-2021 PfG & Agriscot 2020	The National Test Programme, announced in October 2021, will support farmers and crofters in becoming world leaders in sustainable and regenerative agriculture through a twin-track approach. This will include support for every farmer and crofter to undertake a Carbon Audit and soil testing to support nutrient management planning. This first track will also put in place livestock data and performance systems for businesses with cattle, with the aim of improving both business and emissions performance. We have committed to shifting half of all funding for farming and crofting from unconditional to conditional support by 2025, with targeted outcomes for biodiversity gain and a drive towards low carbon approaches which improve resilience, efficiency and profitability. Therefore, alongside the first track which will offer support to all farmers and crofters, a programme to test the application of environmental conditionality is being developed, the aim being to work with a cross section of farmers and crofters to learn from them how conditions can be applied effectively and appropriately. The first part of the Programme will be live from Spring 2022 and funding of £51 million will be available for the Programme over three years. We continue to support farmers, crofters and land managers to play their part in cutting emissions, addressing climate change as well as delivering wider biodiversity and environmental benefits. We have committed £243 million through the Agri-Environment Climate Scheme (AECS) since 2015, and	No new indicators	The National Test Programme was launched in Spring 2022. An initial survey of successful SACGS applicants from the pilot project is intended to be undertaken in 2022.

		Ministers have committed to running new rounds of the Scheme until 2024. SACGS 2022, which is part of the wider agricultural transformation intentions, will be focussed on support for low emission slurry spreading equipment and slurry store covers that will help farmers, crofters and agricultural contractors comply with new regulatory requirements reducing harmful ammonia emissions and adverse impacts on water quality resulting from the storage and spreading of livestock slurry and digestate. The Natural Capital Pilot Programme (NCAPP) is a suite of partnership pilot projects led by NatureScot to test natural capital and outcomes-based approaches to land use at a variety of scales. The pilots will inform the development of future support for land-based businesses outside of the Common Agricultural Policy. It enables testing of innovative approaches natural capital investment and how that might support business resilience, job creation, quality food production and Scotland's response to climate change and biodiversity priorities.		
Introduce Environmental Conditionality, from 2021 via implementation of the Beef Suckler Climate Report and, more widely from 2022, through the	CCPu 2020	The National Test Programme, announced in October 2021, will support farmers and crofters in becoming world leaders in sustainable and regenerative agriculture through a twin-track approach. This will include support for every farmer and crofter to undertake a Carbon Audit and soil testing to support nutrient management planning. This first track will also put in place livestock data and performance systems for businesses with cattle, with the aim of improving both business and emissions performance.	No new indicators	The National Test Programme was launched in Spring 2022. A consultation will run in 2022 to inform the

review of existing CAP Greening which will extend the requirements to all farmers and crofters to undertake environmental actions.		We have committed to shifting half of all funding for farming and crofting from unconditional to conditional support by 2025, with targeted outcomes for biodiversity gain and a drive towards low carbon approaches which improve resilience, efficiency and profitability. Therefore, alongside the first track which will offer support to all farmers and crofters, a programme to test the application of environmental conditionality is being developed, the aim being to work with a cross section of farmers and crofters to learn from them how conditions can be applied effectively and appropriately. The first part of the Programme will be live from Spring 2022 and funding of £51 million will be available for the Programme over three years.		introduction of a Scottish Agriculture Bill in 2023.
Further provision of advice for farmers and crofters who wish to retire: A new commitment to work with stakeholders to provide advice, including further extending the Land Matching Service and guidance for farmers and crofters who wish to step back from agricultural	CCPu 2020	The Scottish Land Matching Service (SLMS) has sought engagement from a range of stakeholders including the James Hutton Institute, Scottish Land Trust, the Soil Association, North East National Farmers Union Scotland, Scottish Crofting Federation, Tenant Farming Commission, FAS and the Institute for Auctioneers and Appraisers in Scotland to name a few. The SLMS team are working hard to ensure the crofting counties are being further supported and aware of the service by linking up with the Crofting Commission. SLMS advisors have also been attending FAS events to speak to farmer/crofters on issues of succession and joint ventures. The SLMS website is also being promoted by the FAS Programme.	No new indicators	In 2022, we will be evaluating and considering how we can further develop the SLMS.

businesses by providing an opportunity to consider alternative land-uses or alternative agricultural uses.				

Outcome 2: More farmers, crofters, land managers and other primary food producers are aware of the benefits and practicalities of cost effective climate mitigation measures.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
The dissemination of information and advice on climate change mitigation measures in agriculture through a range of communication	CCPu 2020	The FAS has continued to offer easy access, up to date and relevant climate change mitigation knowledge and information to all farmers and crofters through a network of advisory centres, online resources and a telephone advice facility.	For the training fund, Lantra Scotland will gather data on:	Fund launched by Lantra Scotland 25 February 2022. Fund will be revised during FY 2022-23

methods utilising technology and all media to best effect.		In 2021 the programme delivered produced 278 publications, 211 videos, 60 podcasts and 8 online tools, as well as 167 events and across the board we would conservatively estimate that more than 50% of this activity will be around climate change adaptation and mitigation support. Event attendees highlighted an improved knowledge of climate change, improved soil/nutrient management, and improved knowledge of environmental issues and opportunities. In terms of FAS one to one support since 2016 they have delivered Carbon Audits to over 1,466 individual businesses and another 343 in the pipeline. A number of specialist advice outputs covering precision farming and nitrogen use have been undertaken under this FAS programme including: 293 improved farm efficiency, 152 woodland management and conservation, 132 biodiversity habitat landscape management, 51 climate change adaptation and mitigation, 28 on organics, 206 on soil and nutrient management, Farming for a Better Climate (FFBC), a Scottish Government funded initiative, run by SAC Consulting. Since 2010, FFBC has provided a key source of information and support for Scottish farmers to encourage the uptake of climate mitigation and adaptation measures. FFBC continues to promote practical and cost effective	• number of applications; • type of training; • diversity of applications; • geographical spread of applications; Monitoring reports will be provided, initial feedback on the success of the training will be provided along with assessment 6 months after training has been completed.	

		climate change mitigation and adaptation measures to farmers and land managers, alongside real time findings from the Farming for a Better Climate Soil Regenerative Agriculture Group. Messages are promoted via a project webpage, social media accounts, a regular podcast and other press and promotional material. The farmer-led soil regenerative agriculture network continues to focus on positive actions that can be taken on Scottish farms to support, enhance and protect their soils. The group have trialed new approaches to allow them to improve production whilst delivering wider benefits such as building soil resilience, improving water retention, storing carbon and enhancing biodiversity. The Climate Mitigation and Adaptation Practical Training Fund was established in February 2022. The Scottish Government funded Lantra Scotland to enable people to access the right practical training for their needs. It will provide people, across Scotland, working or looking to working in the land based sectors and those looking to retrain and upskill with access to funded support for practical training courses, enabling them to take positive action and undertake land management activities to mitigate and adapt to climate change. Lantra Scotland are utilising the Skillseeder platform so people can		

		access eligible training courses and apply in the same place.		
An agri-tech group will be established to share, disseminate and encourage adoption of advances in agricultural science and technology as widely as possible.	CCP 2018	**Completed** The agri-tech group has now concluded with outputs shared from the group to Scottish Government. The agri-tech group was an industry led group established in 2018 following a commitment in the Climate Change plan: '"An agri-tech group will be established to share, disseminate and encourage adoption of advances in agricultural science and technology as widely as possible."	N/A	Engagement with industry on agricultural science and technology has continued through the farmer led groups, ARIOB and the National Test Programme.
Launch a new and expanded peer to peer knowledge transfer initiative based on the success of our Young Climate Change Champions work.	CCPu 2020	The Agriculture, Biodiversity and Climate Change Network was announced in December 2021. It aims to inspire farmers and crofters to take greater action by highlighting their peers' activities in one location online. Farmers will be able to share a wide range of information, including videos and photos, to detail the measures they have undertaken and the results. It will be a joint government and industry initiative made up of partner organisations who will offer their expertise on agriculture, climate and the wider environment.	No new indicators	The Agriculture, Biodiversity and Climate Change Network will launch in 2022.
Realign and enhance our established programmes and initiatives such as the Farm Advisory Service,	CCPu 2020	The Knowledge Transfer and Innovation Fund (KTIF) continued to deliver skills development and knowledge transfer in the primary agricultural sector. This was achieved through a range of	No new indicators	A further application window for KTIF opened in March 2022, it will accept project application up to a value of £150k for both

the Knowledge Transfer and Innovation Fund and Monitor Farm Programme to create a more cohesive approach to ensure advice and support is focussed on helping industry to professionalise to support sustainable farming.		different projects all of which have final report available to view on the FAS website. The most recent round of KTIF funding was for projects which focus on promoting resource efficiency and support the shift toward a low-carbon and climate resilient economy in the agriculture sector and/or aim to restore, preserve and enhance ecosystems in the sector. FAS, along with both KTIF and Monitor Farms continue to engage with industry stakeholders to ensure that the advice and support being given is more cohesive. Five years of additional funding for the Monitor Farm Programme was announced in February 2022 and the programme is in development the programme is set to start-up again soon (to a sum of £1.78m over a 5 year period). Officials are currently considering a business case for a new Monitor Farm Programme where there will be an element of Continuous Professional Development and qualifications for each participating farm. One of which includes the development of a 'marketing plan' for each monitor farm which will guide ambition and business decisions over the lifespan of the business. This was a key recommendation of the Suckler Beef Climate Group. In light of the Climate Change emergency and Biodiversity crisis, officials and QMS have been working together to ensure the programme delivers outcomes aligned to priorities. This will		innovation and knowledge transfer based projects ending in March 2023. The funding window will accept applications focusing on any of the rural priorities under KTIF including: fostering knowledge transfer and innovation in agriculture, forestry and rural areas; • enhancing the viability and competitiveness of all types of agriculture, and promoting innovative farm technologies and sustainable forest management; • promoting food chain organisation, animal welfare and risk management in agriculture; • promoting resource efficiency and supporting the shift toward a low-carbon and climate resilient economy in the agriculture, food and forestry sectors; and

		involve detailed data collection, and enhancing the knowledge, skills, and competence of the industry through collaborative industry buy-in. In particular the programme is expected to provide the information that is essential for driving Scotland's food and drink sector forward, through strengthening rural economies and meeting Scotland's climate change targets. Farming for a Better Climate (FFBC), a Scottish Government funded initiative, run by SAC Consulting. Since 2010, FFBC has provided a key source of information and support for Scottish farmers to encourage the uptake of climate mitigation and adaptation measured. FFBC continues to promote practical and cost effective climate change mitigation and adaptation measures to farmers and land managers, alongside real time findings from the Farming for a Better Climate Soil Regenerative Agriculture Group. Messages are promoted via a project webpage, social media accounts, a regular podcast and other press and promotional material. The farmer-led soil regenerative agriculture network continues to focus on positive actions that can be taken on Scottish farms to support, enhance and protect their soils. The group have trialled new approaches to allow them to improve production whilst delivering wider benefits such as building soil resilience, improving water retention, storing carbon and enhancing biodiversity.		• restoring, preserving and enhancing ecosystems related to agriculture and forestry. Scottish Government have procured another year of the Farm Advisory Service to run April 2022 to March 2023 and will be reframe to focus further on climate change and support farmers to contribute further to both mitigation and adaptation. Once the Implementation Board (ARIOB) has reported its advice/findings, officials will start work on procuring multi-year FAS contracts aligned to the Board's priorities for March 2023/24 onwards.

Carbon Audits: in 2018, we will consult on how best to ensure maximum take up of carbon audits and how to enable tenant farmers and crofters in particular to benefit.	CCP 2018	Carbon Audits were broadly consulted upon in the Stability and Simplicity consultation Stability, certainty and simplicity in rural support - gov.scot (www.gov.scot) Track 1 of the National test Programme will be open to all with support provided to every farmer and crofter to undertake a Carbon Audit to support them in understanding their farms performance	No new indicators	The National Test Programme was launched in Spring 2022.
We will explore with stakeholders, including the Scottish Tenant Farmers Association and the Tenant Farming Commissioner, how best to engage tenant farmers to increase understanding of the environmental and economic benefits of low carbon farming.	CCP 2018	A working group on “Trees in Tenancies” have produced a woodland creation financial analysis, including the woodland carbon code, based on full rotations of different forestry types. The Scottish Land Commission are taking on the work of the Tenants and Trees group from Crown Estate Scotland and will lead further co-ordination/ discussions involving stakeholders on this topic via the Tenant Farming Advisory Forum (TFAF). We are also updating the Small Farm Grant Scheme to provide more options for woodlands and tree management within this scheme.	No new indicators	Will continue development throughout 2022.
Marketing scheme: Determine the feasibility of a Low Carbon Farming marketing scheme.	CCP 2018	We are undertaking scoping work to develop a single marketing brand for all Scottish produce – Sustainably Scottish – available to all Scottish based producers, manufacturers and suppliers, big or small, that can satisfy stringent criteria on provenance and low carbon operations.	No new indicators	June 2022 – initial research complete. Phase Two (July-December 2022) - Phase One research will be used

		SAOS (Scottish Agricultural Organisation Society) have been engaged to carry out phase one research, exploring existing schemes both on a Scottish and international perspective to inform scheme design. This research commenced January 2022 and is anticipated to complete in June 2022.		to design scheme options to be tested with Scottish food and drink business to allow inform next steps.

Outcome 3: Nitrogen emissions, including from nitrogen fertiliser, will have fallen through a combination of improved understanding, efficiencies and improved soil condition

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Communicate and demonstrate the benefits of precision farming and nitrogen use efficiency in order to achieve a	CCPu 2020	Since 2016, the Farm Advisory Service (FAS) have delivered Carbon Audits to over 1,466 individual businesses and another 343 in the pipeline. Carbon audits offer information to farmers about the quantity and source of GHG	A new indicator, on Nitrogen use efficiency	The National Test Programme was launched in Spring 2022.

reduction in GHG emissions.		emissions, including those relating to nitrogen use. A number of specialist advice outputs covering precision farming and nitrogen use have been undertaken under this FAS programme including 293 on improved farm efficiency, 51 on climate change adaptation and mitigation, 28 on organics and 206 on soil and nutrient management. Farming for a Better Climate (FFBC), a Scottish Government funded initiative, run by SAC Consulting. Since 2010, FFBC has provided a key source of information and support for Scottish farmers to encourage the uptake of climate mitigation and adaptation measured. The Farming for a Better Climate Soil Regenerative Agriculture Group continue to work together to establish how best to support, enhance and protect their farm soils. Their actions cover a number of measures which support nitrogen use efficiency for example, use grass leys, cover crops and reduced tillage or no tillage to reduce loss of soil organic matter, and improving soil structure which reduces run off and loss of nitrogen. The FFBC website includes a range of additional materials that support farmers to take action in this area including a page on Soils, Fertilisers And Manures and a podcast episode on 'The benefits of reduced tillage'.	(NUE) for crop production has been included for agriculture in this monitoring report. This indicator comes from the SNBS and will be updated annually from 2023. The baseline (c. 2019) NUE value for Scottish crop production is 65%	The SNBS will now be reviewed and updated on an annual basis from 2023 onwards. After each such round of review, an updated version of the Balance Sheet dataset will be published, with an accompanying report setting out assessments of progress towards relevant on-the-ground actions to improve the use of nitrogen and identification of opportunities for further improvements in future.

		Regulations came into force from 1 January 2022 to consolidate the Silage Surry and Agricultural Fuel Oil(Scotland) Regulations 2003 into The Water Environment (Controlled Activities) (Scotland) Regulations 2011. These included improved controls on the storage of slurry and digestate to reduce leakage, and a move to precision spreading methods to maximise the nutrient benefit and reduce emissions. This will provide benefits to water quality, air quality, and climate change mitigation. Guidance and advice is provided to farmers to support their actions in this area through the Scottish Environment Protection Agency and Farming and Water Scotland, an initiative funded by Scottish Government. On 15 December 2021, the Scottish Government published the first economy and environment wide Scottish Nitrogen Balance Sheet (SNBS) dataset and an accompanying report. This establishes a baseline for nitrogen efficiency economy wide as well as setting out nitrogen efficiencies for agriculture. The Climate Change (Nitrogen Balance Sheet) (Scotland) Regulations 2022 came into force on 11 March 2022. They set out the requirement for the Scottish Government to review and update the nitrogen balance sheet annually from 2023 which include nitrogen flows for agriculture.		

		Track 1 of the National Test Programme will support farmers and crofters to complete carbon audits and soil testing to inform nutrient management planning.		
Work with the agriculture and science sectors regarding the feasibility and development of a SMART (specific, measurable, achievable, relevant and time bound) target for reducing Scotland's emissions from nitrogen fertiliser.	CCPu 2020	On 15 December 2021, the Scottish Government published the first economy and environment wide Scottish Nitrogen Balance Sheet (SNBS) dataset and an accompanying report. This establishes a baseline for nitrogen efficiency economy wide as well as setting out nitrogen efficiencies for agriculture. The Climate Change (Nitrogen Balance Sheet) (Scotland) Regulations 2022 came into force on 11 March 2022. They set out the requirement for the Scottish Government to review and update the nitrogen balance sheet annually from 2023 which include nitrogen flows for agriculture. Track 1 of the National Test Programme will support farmers and crofters to complete carbon audits and soil testing to inform nutrient management planning.	A new indicator, on Nitrogen use efficiency (NUE) for crop production has been included for agriculture in this monitoring report. This indicator comes from the SNBS and will be updated annually from 2023. The baseline (c. 2019) NUE value for Scottish crop	The SNBS will now be reviewed and updated on an annual basis from 2023 onwards. After each such round of review, an updated version of the Balance Sheet dataset will be published, with an accompanying report setting out assessments of progress towards relevant on-the-ground actions to improve the use of nitrogen and identification of opportunities for further improvements in future.

			production is 65%	
From 2018 we expect farmers to test the soil on all improved land every five or six years, and we will work with them to establish how best to achieve this.	CCPu 2020	Track 1 of the National Test Programme will offer support to all farmers and crofters to undertake soil testing to inform nutrient management planning.	No new indicators	The National Test Programme was launched in Spring 2022.
Investigate the benefits and barriers of leguminous crops in rotation.	CCP 2018	Research on the potential for leguminous crops in Scotland was published in January 2021 - The potential for leguminous crops in Scotland (https://www.climatexchange.org.uk/research/projects/the-potential-for-leguminouscrops-in-scotland) The environment, food and rural affairs Strategic Research Programme 2022-2027 has two projects which will consider legumes: • The Impact of Novel Crops and Farming Technologies on the Scottish Agricultural Landscape • Crop Improvement for Sustainable production in a Changing Environment	No new indicators	The projects will run until March 2027.
Crop varieties with improved nitrogen-use efficiency.	CCP 2018	The environment, food and rural affairs Strategic Research Programme 2022-2027 has two projects which will consider nitrogen: • Exploring Barley Diversity for resilience and sustainability	No new indicators	The projects will run until March 2027.

		• The Impact of Novel Crops and Farming Technologies on the Scottish Agricultural Landscape		

Outcome 4: Reduced emissions from red meat and dairy through improved emissions intensity

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Commission and publish a report into the establishment of emissions intensity figures for beef, lamb and milk.	CCP 2018	Completed - ClimateXChange published Emission intensity of Scottish agricultural commodities in August 2018 (https://www.climatexchang No new indicators N/A 196 e.org.uk/research/projects/e mission-intensity-of-scottishagricultural-commodities/)	N/A	N/A
Work with Quality Meat Scotland, ScotEID and livestock producers to encourage improved emissions intensity through genotyping,	CCPu 2020	As part of track one of the National Test Programme (announced October 2021 - https://www.gov.scot/publications/nfus-autumn-conference-2021-cabinet-secretary-speech/) we put in place livestock data and performance systems to support collation of	No new indicators	The National Test Programme was launched in Spring 2022. A revised Animal Health and Welfare Livestock

improving fertility, reducing animal mortality and improving on farm management practices.		data and performance information for every cattle farmer. This will provide farmers and crofters with information to inform decision-making around improving fertility and farm management practices. The Beef Efficiency Scheme (BES) was a five-year scheme to contribute to a range of improvements focusing on cattle genetics and management practice on-farm. The scheme has now concluded with a total of approximately 200,000 genotypes uploaded and processed from BES animals (calves and sires) through the mandatory genotyping in the scheme. Farmers involved in BES were required to complete carbon audits in three of the five years of the scheme. The Animal Health and Welfare Livestock Strategy is under review and the report is expected to be published in April.		Strategy is to be published in 2022.
Determine the practicality of establishing a SMART target for reduction in the intensity of emissions for beef, sheep and dairy sectors.	CCP 2018	Within track two of our National Test Programme we will work with a cohort of beef farms to understand the impact on productivity of improved data capture technology combined with specialist advice. This will be complimented with activity in track two to work with farmers in all sectors to test how farmers will respond to actions	No new indicators	The National Test Programme was launched in Spring 2022.

		aimed at delivering positive outcomes with regard to emissions reduction.		
Consult in 2018 to determine the nature of livestock health measures that the sector will adopt from 2019.	CCP 2018	The Animal Health and Welfare Livestock Strategy is under review and the report is expected to be published in April 2022.	No new indicators	A revised Animal Health and Welfare Livestock Strategy is to be published in 2022.
Determine the practicalities and feasibility of using livestock feed additives as a means of reducing emissions.	CCP 2018	A report on livestock feed additives was produced through the ClimateXChange and a summary is available at: https://www.climatexchange.org.uk/research/projects/methane-reducing-feed-additives/ There are no methane reducing feed additives approved for use. The regulatory process in for approving methane inhibitors is operated by Food Standards Scotland and the Food Standards Agency. They have received one application for a methane inhibitor product (in April 2021), and have indicated an 18-24 month approval time for their authorisation process. Options to encourage uptake, once authorisation is granted, are being considered.	No new indicators	Awaiting approval for use

Outcome 5: Reduced emissions from the use and storage of manure and slurry

Policy	Date announced	Progress on implementation since time of last report / CCPu	Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.	Timeframe and expected next steps
Engaging with farmers to explore their support requirements, establish how they can improve the use and storage of manure and slurry, including the potential for cooperatively owned and managed anaerobic digesters.	Dec 2020, before CCPu 2020	Regulations came into force from 1 January 2022 to consolidate the Silage Surry and Agricultural Fuel Oil (Scotland) Regulations 2003 into The Water Environment (Controlled Activities) (Scotland) Regulations 2011. These included improved controls on the storage of slurry and digestate to reduce leakage, and a move to precision spreading methods to maximise the nutrient benefit and reduce emissions. This will provide benefits to water quality, air quality, and climate change mitigation. Guidance and advice is provided to farmers to support their actions in this area through the Scottish Environment Protection Agency and Farming and Water Scotland, an initiative funded by Scottish Government.	No new indicators	Under the new regulations: • From 1 January 2022: SEPA must be notified before construction of any new, reconstructed, or substantially enlarged silo and newly constructed slurry stores must have capacity to store the total slurry likely to be produced in 26 weeks by

		Funding available through the Agri-Environment Climate Scheme in 2022 will provide continued support to improve water quality and help mitigate climate change by ensuring sufficient slurry storage capacity is available on a farm for the equivalent livestock units. SACGS 2022, which is part of the wider agricultural transformation intentions, will be focussed on support for low emission slurry spreading equipment and slurry store covers that will help farmers, crofters and agricultural contractors comply with new regulatory requirements reducing harmful ammonia emissions and adverse impacts on water quality resulting from the storage and spreading of livestock slurry and digestate. New or enlarged slurry storage facilities must meet the building design requirements of Schedule 2 of The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2021. Farmers can access advice on improving the use and storage of slurry and silage through FAS and FFBC.		housed pigs or 22 weeks by housed cattle • From 1 January 2023: Liquid digestate must be applied using precision equipment; slurry must not be applied using a raised splash plate or rain gun; slurry must be applied using precision equipment if applied by a contractor and/or on farms with more than 100 milking cows, 200 beef or more that 800 fattening pigs or sows. • From 1 January 2024: Silage and slurry stores built after 1991 (or that were

				substantially reconstructed or enlarged on or after 1st Sept 1991) and those with planning permission but not yet constructed must be structurally compliant and all liquid digestate stores constructed before 1st January, or where planning permission was granted prior to 1st Jan 2022, must meet requirements within the regulations • From 1 January 2026: Silage and slurry stores built before 1991 (and not substantially enlarged or

				reconstructed since 1991) must be fully compliant and slurry stores located outside an NVZ must have capacity to store the total slurry likely to be produced in 26 weeks by housed pigs or 22 weeks by housed cattle by 2026 • From 1 January 2027: all slurry application must be applied using precision equipment. Scottish ministers have committed to extending AECS up to 2024 with new rounds opening each calendar year.

				An initial survey of successful SACGS applicants from the pilot project is intended to be undertaken in 2022. SACGS 2022 is expected to open for applications in Spring 2022 for a six week period. Following assessment of the applications successful applicants will be notified by mid-summer and will then have until the end of February 2023 to purchase the items and claim their grant.
Investigate the practicalities of livestock grazing in rotation on current arable land.	CCP 2018	**Completed** The East/West Beed Grazing Collaboration Pilot run by SAOS was supported under the Knowledge Transfer and Innovation Fund to work toward establishing evidence on the financial and environmental value of moving cattle to lower cost natural resources.	No new indicators	N/A

		The operational group produced case studies showing there are environmental and carbon sequestration benefits, especially where fodder crops are grown and grazed gradually over the winter period. The findings included significant potential fuel savings, that adopting rotational grazing negates the necessity for artificial fertilisers and intensely farming the fields and that it was on the whole a low cost, low carbon system with less reliance on cereals-based diets and greater utilisation of grazing ground both in the summer and winter.		
Conduct a feasibility study for the establishment of manure/ slurry exchange.	CCP 2018	N/A – no updates since last monitoring report **Completed** – a feasibility study was published in June 2020, through the ClimateXChange Establishing a manure/slurry exchange in Scotland (https://www.climatexchang e.org.uk/research/projects/e stablishing-a-manureslurryexchange-in-scotland/)	No new indicators	N/A
Determine how to consistently minimise emissions from slurry storage.	CCP 2018	Research includes Slurry Storage on Scottish Farms – A Feasibility Study (climatexchange.org.uk) and Microsoft Word - IQ26-2019 - establishing a manure-slurry exchange in Scotland-a feasibility study - FINAL - 8 June 2020.docx (climatexchange.org.uk)	No new indicators	N/A

		Support for slurry storage is available for farmers through the Agri-Environment Climate Scheme and was part of the pilot Sustainable Agriculture Capital Grant Scheme. Since 2015, 162 contracts at a cost of £6.26 million were approved for slurry storage through AECS. SACGS 2022, which is part of the wider agricultural transformation intentions, will be focussed on support for low emission slurry spreading equipment and slurry store covers that will help farmers, crofters and agricultural contractors comply with new regulatory requirements reducing harmful ammonia emissions and adverse impacts on water quality resulting from the storage and spreading of livestock slurry and digestate.		
Review management of storage and application of organic materials such as silage, slurry and liquid digestate, including what support may be required to ensure best practice.	CCPu 2020	Completed. Regulations came into force from 1 January 2022 to consolidate the Silage Slurry and Agricultural Fuel Oil (Scotland) Regulations 2003 into The Water Environment (Controlled Activities) (Scotland) Regulations 2011. These included improved controls on the storage of slurry and digestate to reduce leakage, and a move to precision spreading methods to maximise the nutrient benefit and reduce emissions. This will provide benefits to water quality, air quality, and climate change	No new indicators	N/A

		mitigation. Guidance and advice is provided to farmers to support their actions in this area through the Scottish Environment Protection Agency and Farming and Water Scotland, an initiative funded by Scottish Government. SACGS 2022, which is part of the wider agricultural transformation intentions, will be focussed on support for low emission slurry spreading equipment and slurry store covers that will help farmers, crofters and agricultural contractors comply with new regulatory requirements reducing harmful ammonia emissions and adverse impacts on water quality resulting from the storage and spreading of livestock slurry and digestate.		

Outcome 6: Carbon sequestration and existing carbon stores on agricultural land have helped to increase and maintain our carbon sink

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**

Explore with the farming and forestry sectors how best to increase planting of trees and hedgerows which optimise carbon sequestration, including the role of agroforestry.	2020	This is ongoing. The Scottish Government and Scottish Forestry launched the Integrating Trees Network in 2021. This demonstrator network of farms, crofts and estates across Scotland raises awareness of the multiple benefits that planting trees can bring to agricultural businesses. The aim of the network is to encourage more trees to be planted on Scottish land, in the right place, for the right reason and to give guidance on how this can be practically achieved. The network has hosted twelve online events since March 2021. A total of 1062 people signed up to those events. We are now looking at options to build on the success of the Integrating Trees network to reduce barriers and stimulate more farmers to plant trees and consider how CAP replacement could support woodland creation. Scottish Forestry has established a sub-group of its Customer Representative's Group which will assist the development of both these approaches by advising on ways of encouraging more farm businesses to plant trees through facilitating cross-sectoral working and engagement with practitioners.	No new indicators	The Integrating Trees Network will continue to host events for farmers and crofters throughout 2022. Sub-group of Scottish Forestry's Customer Representative's Group to meet quarterly. A new Scottish Agriculture Bill will be brought forward in 2023 to provide a replacement for the Common Agricultural Policy (CAP).
Investigate the feasibility of payment for carbon sequestration taking into	CCP 2018	We know that both public and responsible private investment in Scotland's natural capital will be essential to meet the pace	No new indicators	A UK Farm and Soil Carbon Code is being developed

account any existing schemes such as the woodland carbon code as a means of encouraging the uptake of carbon sequestration on farms.		and scale of the challenge of delivering on our climate change targets and wider land use and environmental objectives. At COP26, the Cabinet Secretary for Finance and the Economy committed to developing a values-led, high-integrity market for natural capital in Scotland. Across the UK, around half of the current projects registered to the Woodland Carbon Code (WCC) are located in Scotland. Scottish projects make up the significant majority (around 82%) of the total area of projects. A large majority of registrations under the WCC are from farmers or intermediaries where farmers are doing the planting. We are funding research through the ClimateXChange to consider the potential for agroforestry to reduce net GHG emissions in Scotland through the Woodland Carbon Code.		and piloted with funding support provided by DEFRA's Natural Environment Investment Readiness Fund (NEIRF). The project aims to propose the Code in 2022, providing a quality assured standard for monetising farm carbon, particularly through regenerative agricultural practices that enhance carbon sequestration in soils. Scottish Government will review the voluntary code once it is published and decide whether to support its application in Scotland.

				The ClimateXChange Agroforestry research will continue until summer 2022.
Increase woodland cover on suitable agricultural land.	CCP 2018	Some farmers are already integrating woodland creation into their agricultural business model, some 60% of applications to the Forestry Grant scheme (FGS) are for schemes of less than 20Ha. We are looking at options to build on the success of the Integrating Trees network to reduce barriers and stimulate more farmers to plant trees and consider how CAP replacement could support woodland creation. Scottish Forestry has established a sub-group of its Customer Representative's Group which will assist the development of both these approaches by advising on ways of encouraging more farm businesses to plant trees through facilitating cross-sectoral working and engagement with practitioners.	No new indicators	Sub-group of Scottish Forestry's Customer Representative's Group to meet quarterly. A new Scottish Agriculture Bill will be brought forward in 2023 to provide a replacement for the Common Agricultural Policy.
Building on the successful work integrating woodland with farming businesses, help remove barriers for those on agriculture holdings,	CCPu 2020	Scottish Forestry, in partnership with the Scottish Tenant Farmers Association (STFA) and a Crown Estate Scotland tenant, has produced a woodland creation financial analysis, including the woodland carbon code, based on full rotations of	No new indicators	Will continue development throughout 2022

particularly in the tenanted sector who want to engage in woodland creation, including exploring the potential to reform legislation where appropriate.		different forestry types. The models contained within this document are fully worked examples based on a real tenanted farm, prepared as if they had gone through the normal process and through the lifetime of the woodland. Scottish Forestry - Helping tenant farmers grow trees for their business This output was part of the Tenant and Trees group. Case study to be highlighted in next edition of STFA magazine Scottish Land Commission are taking on the work of the Tenants and Trees group from Crown Estate Scotland and will lead further co-ordination/discussions involving stakeholders in this topic via the Tenant Farming Advisory Forum (TFAF).		
Work with stakeholders on options to increase peatland restoration on suitable agricultural and crofting land, to support delivery of policies in the LULUCF chapter. We will map peatland against this land which will allow modelling options for land-use change and inform opportunities for targeted support of peatland restoration and management.	CCPu 2020	Currently assessing levels of peatland and peatland degradation on common grazings on Scottish Government Crofting Estates. On completion of desk-based assessments pilot studies will be chosen from high-risk cases and dialogue initiated with graziers and grazing committees. This work is ongoing including on analysis to support decision making and engagement, and a survey with the crofting community concerning peatland restoration. Work is underway to establish a pilot for peatland	No new indicators	Will continue development throughout 2022, linking to development of policies in the LULUCF chapter.

		restoration on crofting land.		
Explore options for land-use change to optimise uses beyond traditional farming and food production to multi-faceted land use including forestry, peatland restoration and management and biomass production.	CCPu 2020	We have continued with the development of our five Regional Land Use Partnership (RLUP) pilots. Scotland's third Land Use Strategy was published in March 2021. For the first time the strategy deploys a landscape approach to looking at issues of land-use, presenting a more holistic understanding of our land in Scotland. By showcasing the range of demands and benefits we get from our land the intention is to reset our focus on to the integrated nature of land use. It is only though understanding these multiple and sometimes conflicting relationships we can look to secure the fine balance that will be needed to allow our land to contribute sustainably to our multiple long term national priorities.	No new indicators	The five pilot RLUPs have each been tasked developing a regional land use framework by the end of 2023 - aimed at understanding how to optimise the role our land plays at a regional level in addressing the national priorities relating to climate and the environment.

Chapter 8: NETs

Part A - Overview of sector

This sector was new to the CCPu. To date NETs technologies have not been deployed as they rely up carbon capture and storage (CCS) to deliver negative emissions. Whilst some technologies that could deliver negative emissions are currently active, such as energy from waste, these facilities would require retrofitting with carbon capture technology and route to storage to be considered a NETs technology. The CCPu includes policies and proposals for early deployment from 2029 onwards. However, once we have clarity on the UK Governments support to deliver CCS in Scotland, we will provide a comparison of emissions reduction against the envelope as laid out in the CCPu.

The updated Plan sets out the following policy outcomes for the sector. Given how new this sector chapter is, there are no indicators for these outcomes.

Detailed feasibility studies on NETs will assess the opportunities for negative emissions in Scotland, and identify applications with the greatest potential, including specific sites where possible

CCUS: the continued development of CCUS technologies and systems is prioritised to ensure these can be rolled out commercially and at scale by the late 2020s.

Bioenergy: a cross-sectoral approach for the appropriate and sustainable use of biomass in energy applications is agreed and implemented (taking into account competing land and feedstock uses).

Just transition and cross economy impacts

We wish to understand and report on the broader just transition and cross-economy impacts of our emissions-reduction activities in addition to these sector specific policy outcomes and indicators. To do this, we use data from the Office of National Statistics (ONS): Low Carbon Renewable Energy Economy (LCREE) publication. The LCREE is based on survey data of businesses which perform economic activities that deliver goods and services that are likely to help generate lower emissions of greenhouse gases, for example low carbon electricity, low emission vehicles and low carbon services.

The LCREE indicator is narrowly defined and, while useful within its limited scope, does not give us the full picture of the impacts on workforce, employers and communities and progress towards a just transition.

This year we have also included ONS experimental statistics that look at green activity in the economy. These stats reflect green activities in both LCREE and non-LCREE sectors.

Over the next few years we will work to develop a meaningful set of success outcomes and indicators aimed at tracking the impacts of our policies on a just transition to net zero.

Sector commentary on progress

The CCPu included Negative Emissions Technologies (NETs) as a sector chapter for the first time, recognising the important role that, as recently recognised by the IPCC Working Group 3 report, emissions removals will need to play in reaching net zero. The 'learning by doing' approach set out in the CCPu more widely was also identified as being particularly important in the case of this sector, given the considerable uncertainties around technological development and dependencies on UK Government action, particularly with regards to carbon capture and storage.

Policies included in the NETs chapter recognised these challenges and uncertainties and sought to acquire an evidence base to allow for further policy development. We have now undertaken an initial review of evidence.

The review indicates that NETs in Scotland can deliver at scale in due course but not at the pace assumed in the CCPu. This is due to various shifts in evidence since the time of the CCPu, including:

- The UK Government's decision to not allocate the Scottish Cluster as a Track-1 cluster for delivery in the mid-2020s, impacting on when carbon storage underpinning NETs will be available, and industries' appetite to invest in NETs technologies. The Scottish Government are still pushing the UK Government to reverse this decision;
- The availability of home grown sustainable biomass to supply large scale power bioenergy with CCS (BECCS); and
- No public commitment to date by a commercial operator to employ a NETs model for a single large power station in Scotland. Given lead in times for development of such a facility and proposals for CCS deployment for the Peterhead CCGT power project, it is unlikely that a new NETs power facility will be developed in the 2020s.

We are now gaining further knowledge and evidence of what scale of NETs can be delivered within Scotland and to what timescale, through undertaking a NETs feasibility study. This further evidence will be worked up over 2022 and will be considered as we develop the refreshed Energy Strategy and next full Climate Change Plan. The 2023 monitoring reports on the CCPu will also provide an opportunity to consider further the evolving evidence around the role of NETs.

Developments in monitoring arrangements since last report:

No changes.

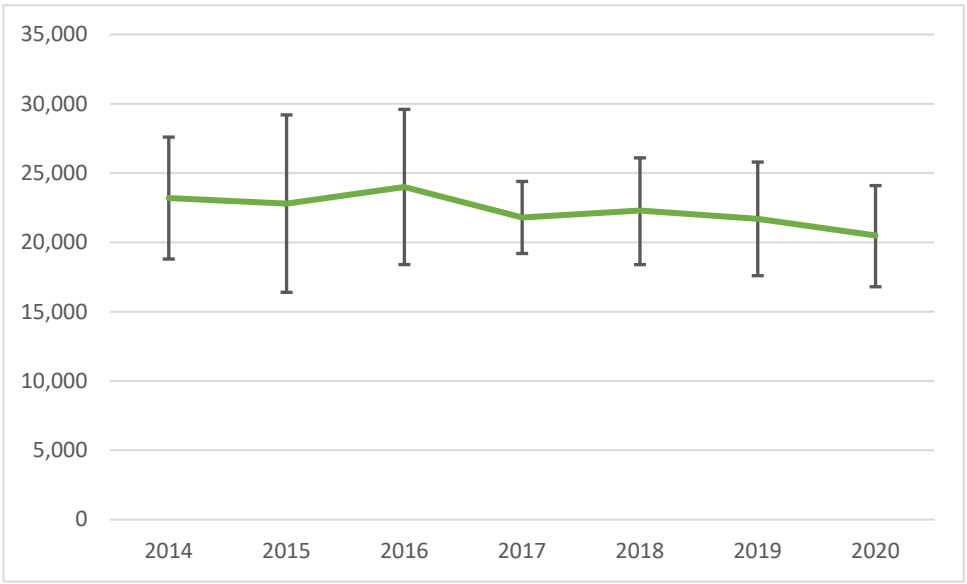
Part B - Progress to Policy Outcome Indicators

Policy Outcome:	Indicator	On-Track Assessment (Milestone/Targets)
Cross-sectoral social and economic indicator	FTE employment in Low Carbon Renewable Energy Economy	Year-to-year change

Most Recent Data: 2020
Data Source(s): Office of National Statistics: Low Carbon Renewable Energy Economy (LCREE), Time spent of Green Tasks
Assessment : Too early to Say

- In 2020, the Scottish low carbon renewable energy (LCREE) sectors were estimated to directly provide 20,500 jobs, down from 21,700 in 2019 and from a high of 24,000 in 2016.
- The estimates of LCREE are based on a relatively small sample of businesses and hence are subject to wide confidence intervals. LCREE employment in Scotland in 2020 is similar to previous years and the difference is not statistically higher or lower than any previous year.

Employment in Low Carbon Renewable Energy Economy, FTE

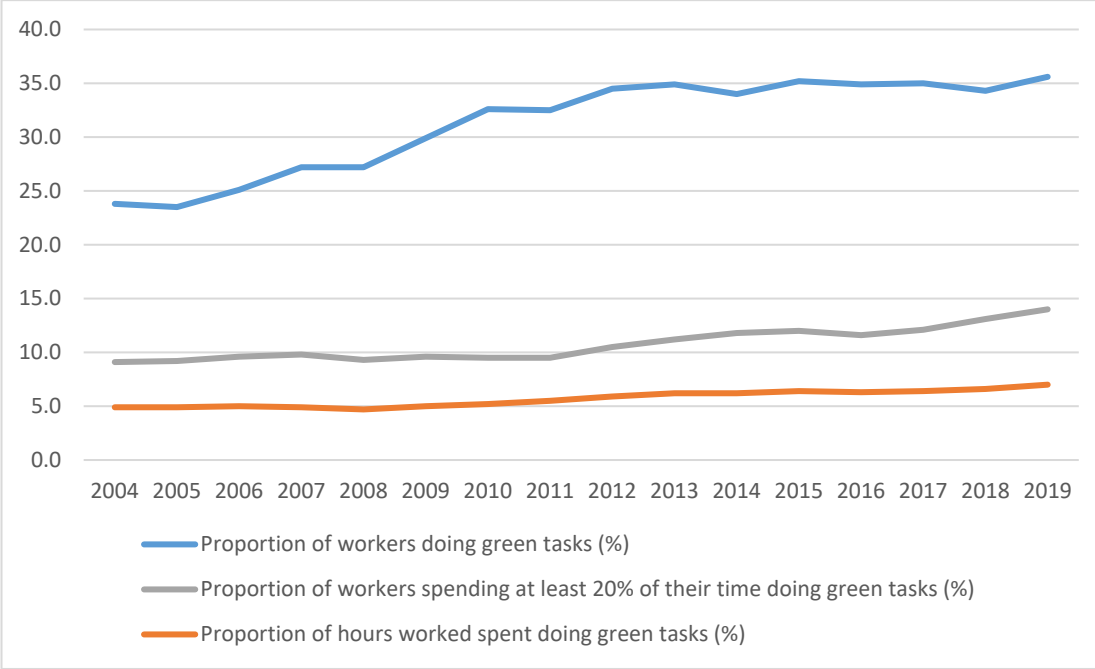


Source: Scottish Government presentation of ONS stats

- The ONS also released experimental statistics on a wider perspective of green activity in the economy with their time spent on green tasks release. These stats reflect green activities in both LCREE and non-LCREE sectors.
- This release showed that in 2019 Scotland achieved an all-time high of hours spent on green tasks and proportion of workers doing green tasks, including workers who spend more than 20% of their time on green tasks.
- The proportion of workers doing green tasks in Scotland was 36% in 2019, up from 23.8% in 2004. Workers who have spent more than 20% of their time doing green tasks was 14%, up from 9% in 2004.

- The proportion of overall hours spend doing green tasks in Scotland was 7%, up from 4.9% in 2004.

Green Tasks Statistics, percentage



Source: Scottish Government presentation of ONS stats

Part C- Information on implementation of individual policies

Outcome 1: Detailed feasibility studies on NETs will assess the opportunities for negative emissions in Scotland, and identify applications with the greatest potential, including specific sites where possible.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
In 2021/22 carry out a detailed feasibility study of opportunities for developing NETs in Scotland ready for the early 2030s. This will identify specific sites and applications of NETs, including developing work to support policy on Direct Air Capture and its role within NETs in our future energy system	CCPu 2020	Studies to build our evidence on NETs and inform the scope of a detailed feasibility study have been commissioned and published within 2021/22. These outputs include research on bioenergy feedstock availability (include link) and a horizon scan of international deployment of NETs (link). A detailed feasibility study has been scoped and is currently out for tender.	N/A	The feasibility study is currently out for tender, with a successful consultancy expected to be identified and commence work in early June. Through the subsequent months, the study will assess the existing NETs evidence base, interview NETs stakeholders and conduct analysis into the opportunities and barriers to NETs deployment. An output containing recommendations to

				government and proposed NETs implementation pathways is expected by the end of 2022.
From 2022, based on the outcomes of the feasibility work, we will provide support for commercial partners to develop NETs proposals.	CCPu 2020	We have continued to build our evidence of NETs feasibility through studies on bioenergy feedstock availability and international NETs deployment. This work will be bolstered by a detailed feasibility study that has now been scoped and issued for tender. We are simultaneously engaging with those key stakeholders which have the ability to implement NETs in Scotland to better understand the support that the Scottish Government may be able to offer.	*Initiated in 2022 supported by the EETF.*	*Initiated in 2022 supported by the EETF* A successful consultancy will be identified and commence work on a feasibility study in early June. This work is expected to report in late 2022. As evidence on NETs accrues via the feasibility study and further stakeholder engagement throughout 2022, we will begin to formulate support measures for commercial partners.
Put in place a continual process to review the development of NETs and progress against its envelope.	CCPu 2020	This is assured by internal governance boards.	N/A	Timing and arrangements to be confirmed.

We will work with UK Government to ensure that they bring forward suitable mechanisms to support the development of NETs business cases in relevant sectors.	CCPu 2020	*New to the CCPU* Recognising that many NETs support mechanisms are reserved to the UK Government, we are working with relevant departments to ensure support for prospective NETs developers in Scotland. In particular, and following the outcome of the UK government's cluster sequencing process in which it failed to award the Scottish CCS cluster track 1 status, we have championed the timely deployment of Scottish CCS infrastructure as being essential to enabling development of NETs. Work with the UK has further involved engaging with relevant consultations. In March 2021 we responded to the Call for Evidence on greenhouse gas removals (GGRs), and are currently engaging with a new call for evidence regarding the possible inclusion GGRs in the UK emissions trading scheme (ETS).	Scottish Government response to UK Government Greenhouse Gas Removals consultation submitted in March 2021	We will continue working with UK Government to foster the necessary support for NETs in Scotland. The UK Government recently indicated that the process for Track 2 CCS cluster applications will open later this year, and we will continue to promote the rapid deployment of the Scottish cluster as being essential to both Scottish and UK NETs ambitions. We will remain involved in UK Government-led stakeholder engagement on the GGR ETS call for views up to its conclusion in June 2022, and work to ensure subsequent steps are suitable to the development of NETs business cases in Scotland.

Outcome 2: CCUS: the continued development of CCUS technologies and systems is prioritised to ensure these can be rolled out commercially and at scale by the late 2020s.

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
Support the development of NETs technologies within Scotland.	CCPu 2020	This has been significantly impacted by the UK Government decision on the CCUS cluster, as discussed in Part A. 80m funding has been made available via the Emerging Energy Technologies Fund to enable the Scottish CCUS cluster to continue and accelerate the deployment of carbon capture technology.	N/A	£80m funding has been made available via the Emerging Energy Technologies Fund to enable the Scottish CCUS cluster to continue and accelerate the deployment of carbon capture technology.
Support the inclusion of NETs in the development of strategic, industry lead pathways for CCUS infrastructure in Scotland.	CCPu 2020	This has been significantly impacted by the UK Government decision on the CCUS cluster, as discussed in Part A.	N/A	N/A
Funding through the Scottish Industrial Energy Transformation Fund to consider the development of NETs demonstrators	CCPu 2020	NETs demonstrators to be considered for inclusion in subsequent calls of SIETF.	As for SIETF	As for SIETF
Provide a focus on integrating NETs projects	CCPu 2020	This has been significantly impacted by the UK Government	N/A	£80m funding has been made available via the

with CCS infrastructure through the Emerging Technologies Fund.		decision on the CCUS cluster, as discussed in Part A. 80m funding has been made available via the Emerging Energy Technologies Fund to enable the Scottish CCUS cluster to continue and accelerate the deployment of carbon capture technology.		Emerging Energy Technologies Fund to enable the Scottish CCUS cluster to continue and accelerate the deployment of carbon capture technology.

Outcome 3: Bioenergy: a cross-sectoral approach for the appropriate and sustainable use of biomass in energy applications is agreed and implemented (taking into account competing land and feedstock uses).

Policy	**Date announced**	**Progress on implementation since time of last report / CCPu**	**Have any implementation indicators / milestones been set for this policy? If so, most recent data for progress against these.**	**Timeframe and expected next steps**
We will publish a Bioenergy Update in early 2021, laying out our current position and understanding of the role of bioenergy in the energy system and setting out in more detail how we will move forward.	CCPu 2020	We published the Bioenergy Update on 24 March 2021	N/A	We published the Bioenergy Update on 24 March 2021
In 2021, building on the Bioenergy Update, we will establish a cross	CCPu 2020	We have stablished an internal bioenergy policy working group working to review the availability of	N/A	Ongoing meetings of the working group and expert panel over the next 24

sectoral Bioenergy Expert Working Group to consider and identify the most appropriate and sustainable use for bioenergy resources across Scotland. It will also assess the volume of bioenergy resources that we can grow or produce within Scotland, and confirm the level of import that we believe is compatible with a sustainable global trade in bioenergy		sustainable biomass and the most appropriate use of these finite resources across the whole energy system. This group will also consider how best we can engage with the broad range of experts and interested parties relating to bioenergy.		months. Gathering evidence and sharing knowledge across multiple sectors. Engagement with UK Government in the lead up to their Biomass Strategy due to be published by 2022.
By 2023, in time to inform the next Climate Change Plan, we will publish a Bioenergy Action Plan, incorporating the learning developed by the expert working group and our understanding of the options to use Bioenergy in both NETs and other applications.	CCPu 202	See above	See above	To be developed from the findings and recommendations from the Working Group and Expert Panel (see above).

This publication is available at **www.gov.scot**

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