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Update to the Climate Change Plan - Background Information and Key Issues

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This briefing relates to the Scottish Government's draft Update to the 2018 Climate Change Plan. It provides background information on climate change, related targets and key issues.



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Executive Summary

The Scottish Government's draft Update to the Climate Change Plan 2018 - 2032 sets out Scotland's path, across eight key sectors, to achieving a 75% reduction in greenhouse gas emissions by 2030, and ultimately net-zero emissions by 2045. The draft update is a crucial staging post in Scotland's trajectory to net-zero, as it encompasses the interim 2030 target, which independent advisers the Climate Change Committee consider to be "extremely challenging".

Scotland's greenhouse gas emissions have nearly halved in the last 30 years, and they will need to more than half again in the next 11. Emissions have reduced notably in the electricity, industry and waste sectors, but less so in buildings, transport and agriculture.

The release of greenhouse gases is causing global temperatures to rise and long-term changes in our climate - including the average temperature of the Earth's surface rising by over 1°C since the pre-industrial period. 2020 tied with 2016 as the hottest year on record, and 17 of the 18 warmest years on record occurred this century. Impacts include sea level rise, flooding, and heat-waves.

The United Nations Framework Convention on Climate Change commits industrialised countries to limit and reduce greenhouse gas emissions in accordance with agreed individual targets. However, the global response to climate change has been fraught with difficulty, and whilst agreed action at an international level has been notable, implementation at a national level has been uneven.

The United Nations Paris Agreement agrees to limit global temperature rises to "well below" 2°C and to "pursue efforts" to limit temperature increase to 1.5°C above pre industrial levels. Subsequent scientific evidence has shown that going past 1.5°C would seriously affect the planet's liveability; therefore global net-zero emissions must be achieved by 2050.

Recent modelling has shown that new climate promises from some nations, along with plans from the USA to re-enter the Paris Agreement mean that the rise in world temperatures could be held to 2.1°C by the end of this century. There is however an implementation gap between what has been agreed, and concrete action.

Green recovery seeks to achieve the dual aims of lifting an economy out of recession, and society out of a crisis, alongside protecting and improving the environment. Rebuilding from the Covid-19 pandemic provides an opportunity for green recovery. Any transition to a decarbonised economy must be a Just Transition, to ensure that decent, fair and high-value work is created in environmentally and socially sustainable industries.

COP 26, a major UN climate conference is scheduled to be held in Glasgow in November 2021. It will have to put real targets in place to phase out coal, protect forests, and to champion clean energy and transport so that the world can transition to net-zero in a way that is fair and just.

The Scottish Government has received advice on green recovery from their Just Transition Commission, Infrastructure Commission, and the Advisory Group on Economic Recovery. A new Scottish National Investment Bank has a core mission to address the climate emergency, "and to invest in rebalancing the economy towards leadership in sustainable technology, services and industries".

Introduction

The [Climate Change \(Scotland\) Act 2009](#) set a target for Scotland to cut emissions by 80% by 2050 and required annual emissions targets to be set. The 2009 Act also requires the Scottish Government to produce a plan setting out proposals and policies for meeting future greenhouse gas (GHG) emissions reduction targets. Known as the Climate Change Plan (CCP), it is published every five years and generally covers a 15 year timespan. The most recent CCP was published in 2018, and covers the period out to 2032 ¹.

The [Climate Change \(Emissions Reduction Targets\) \(Scotland\) Act 2019](#) amends the Climate Change (Scotland) Act 2009 and significantly increases Scotland's GHG emissions reduction target (against a 1990 baseline) to net-zero emissions by 2045 ⁱ, with interim targets for reductions of:

- 56% by 2020
- 75% by 2030
- 90% by 2040.

The net-zero target is in line with independent advisers, the Climate Change Committee's (CCC), scientific advice as set out in their report, *Net Zero – The UK's contribution to stopping global warming* ².

The Scottish Government had undertaken to revise the 2018 CCP within 6 months of the 2019 Act, however this was postponed due to the Covid-19 pandemic, and *Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018–2032 - update (draft CCPu)* was finally published on 16 December 2020 ³.

In the same week as the draft CCPu, a *Scottish Biodiversity Strategy post-2020: statement of intent* was also published. This sets out the Scottish Government's direction for a new biodiversity strategy, and recognises an "increased urgency for action to tackle the twin challenges of biodiversity loss and climate change", which are inextricably linked ⁴.

The draft CCPu is widely regarded as a crucial staging post in Scotland's trajectory to net-zero emissions, as it encompasses the interim 2030 target, which CCC considers to be "extremely challenging", and "may not be feasible" ⁵. In oral evidence to the Scottish Parliament's Environment, Climate Change and Land Reform Committee, the CCC's Chief Executive Chris Stark stated ⁶:

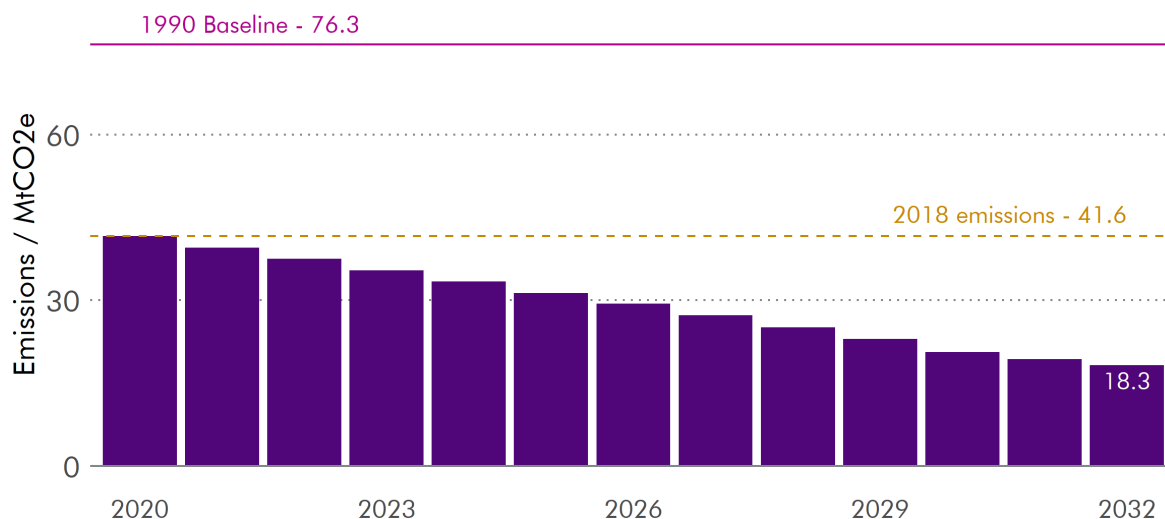
“ The Net Zero target set a challenging new legal objective for GHG emissions in 2045, but Scotland's legislated target of a 75% reduction in emissions by 2030 – which went beyond the Committee's recommendation for a 70% target – will likely be even more challenging to achieve. [...] Scotland has halved its emissions in the past 30 years, which has been a slog, but the new target requires us to halve them again in the next decade.”

ⁱ Net zero refers to achieving a balance between the amount of GHG emissions produced and the amount removed from the atmosphere. To achieve this, existing emissions have to be reduced, as well as actively removing GHG

Expected emissions reductions for the lifetime of the draft CCPu are shown below:

Figure 1 - Anticipated Emissions Reductions 2020 - 2032

MtCO₂e - million tonnes of carbon dioxide equivalent - explained in more detail in [Global Science and Policy](#)



The draft CCPu provides further clarity on Scotland's path to net-zero emissions across the following key sectors:

- Electricity
- Buildings
- Transport
- Industry
- Waste
- Land Use, Land-Use Change and Forestry (LULUCF)
- Agriculture
- Negative Emissions Technologies (a new sectoral chapter).

The draft CCPu also contains new information in chapters on Green Recovery from Covid-19, and Coordinated Approach, which encompasses cross-sectoral issues such as energy systems, circular economy, transport, planning and a wellbeing economy.

This briefing provides background information on climate change, related targets and key issues in Scotland. It should be read in conjunction with SPICe Briefing [Update to the Climate Change Plan – Key Sectors](#).

Draft CCPu Supporting Documents

Such is the scale and challenge of the need to decarbonise that a number of supporting documents have also been published to provide more detail in key areas. These include:

Net Zero Nation: draft public engagement strategy - consultation. This sets out a vision where everyone recognises the implications, fully understands and contributes to mitigation and adaptation, and "embraces their role in the transition to a net zero and climate ready nation". It has three strategic objectives: Communicating Climate Change Policy; Enabling Participation in Policy Design; and Encouraging Action ⁷ .

Research into public attitudes to climate change policy and a green recovery. This builds on previous work, e.g. the 2019 [Big Climate Conversation](#), to find out how public opinion may have changed as a result of Covid-19, and to gain more evidence on public views on green recovery ⁸ .

A Climate Emergency Skills Action Plan 2020-2025 sets out key issues and priority actions for skills development in energy transition, construction, transport, manufacturing, agriculture and land use management ⁹ .

The draft CCPu's **Draft Strategic Environmental Assessment** assesses the environmental impact of new outcomes/policies/ proposals, and identifies the likely impacts of 'boosts' to current outcomes/policies/proposals in the form of increased scale or shortened timescales for delivery ¹⁰ .

A Hydrogen Policy Statement sets out how Scotland can become a leader "in the production of reliable, competitive, sustainable hydrogen". It provides the framework for the development of a Hydrogen Action Plan in 2021 ¹¹ . This statement is published with an accompanying suite of research, including:

- The **Scottish Hydrogen: Assessment Report** examines how hydrogen-based technologies can best be deployed across all sectors ¹²
- An **Offshore Wind to Green Hydrogen Opportunity Assessment** which recognises that green hydrogen production could "unlock significant Scottish offshore wind resource in regions with constrained electricity grids, but also significantly contribute towards national and international net-zero targets by decarbonising 'hard-to-abate' sectors such as heat, industry and transport, as well as providing surplus green hydrogen to continental Europe" ¹³
- A **Deep decarbonisation pathways for Scottish industries: research report** which outlines potential decarbonisation pathways for Scottish industry. Hydrogen and electrification are considered, and both found to have similar results in terms of cost and carbon reduction potential ¹⁴ .

The **Annual Energy Statement: 2020** sets out key developments in delivering the Scottish Government's Energy Strategy ¹⁵ .

Further publications are expected later this year, including:

- Bioenergy Update

- Local Energy Policy Statement
- Trade Vision
- Heat in Buildings Strategy.

Parliamentary Scrutiny

Building on the collaborative scrutiny of previous Reports on Proposals and Policies (now known as Climate Change Plans), four Parliamentary Committees have agreed a joint approach to reviewing the draft CCPu, looking at the sectors that relate to their remit.

A [call for evidence was launched on Thursday 17 December](#).

Ordinarily, as set out in the [Climate Change \(Scotland\) Act 2009 \[as amended\]](#), scrutiny of a draft CCP must take place within 120 days (of which no fewer than 60 must be days on which the Parliament is not dissolved or in recess).

As previously noted, this is an extraordinary update rather than a new CCP, as part of the regular 5-year cycle, therefore the laying, and scrutiny of this draft CCPu does not fall within the purview of the Act. Nevertheless, Committees aim to report in early March 2021.

Global Science and Policy

The release of GHG emissions is causing global temperatures to rise and long-term changes in our climate. The main GHGs are:

- Carbon dioxide (CO₂) from burning fossil fuels e.g. oil, gas and coal, and from deforestation
- Methane from waste management, ruminant digestion (e.g cows, sheep and deer) and animal waste
- Nitrous oxide from agricultural practices
- Fluorinated gases (F-gases) from industrial processes.

Each gas is weighted by its global warming potential (its warming influence relative to CO₂), so that total GHG emissions can be reported on a consistent basis in units of carbon dioxide equivalent (CO₂e); most commonly as millions of tonnes of carbon dioxide equivalent (MtCO₂e).

Effects of Climate Change

The [Intergovernmental Panel on Climate Change](#) (IPCC) is the UN body for assessing the science related to climate change. It was established in 1988 to provide policymakers with regular scientific assessments concerning climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation strategies; it has 195 member states. IPCC assessments provide governments, at all levels, with scientific information to develop climate policies, and are a key input into relevant international negotiations. International teams of scientists, including those from Scottish universities, draft and review IPCC reports in several stages to ensure objectivity and transparency.

The effects of unchecked climate change are already extremely serious, representing a significant threat to the Earth's natural systems, and those who rely on them. The impact of burning fossil fuels, and releasing other GHGs on the climate system is clear, and evidence shows that it is "extremely likely" that human influence has been the dominant cause of increased global temperatures, and related climate change since the middle of last century¹⁶.

Measurements show that 2020 tied with 2016 as the hottest year on record, that each of the last 3 decades have been hotter than the previous one, and 17 of the 18 warmest years on record have occurred in the 21st century^{17 16}. A recent IPCC Special Report on the Ocean and Cryosphereⁱⁱ notes that it is virtually certain that the global ocean has warmed unabated since 1970 and has taken up more than 90% of the excess heat in the climate system. The IPCC states with high or very high confidence¹⁸ that:

“ Over the last decades, global warming has led to widespread shrinking of the cryosphere, with mass loss from ice sheets and glaciers, reductions in snow cover and Arctic sea ice extent and thickness, and increased permafrost temperature.”

ii Part of the earth's surface characterised by the presence of frozen water

The UK is already affected by rising temperatures. The average temperature in the UK is now about 1°C higher than in the 1960s. All 10 of the warmest years in the UK have occurred since 1990 with the 8 warmest occurring since 2002. The potential impacts of this include sea level rise, flooding, and heat-waves ¹⁹ .

The IPCC state that ¹⁶ :

“ Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.”

These facts are not disputed by any scientific body of national or international standing ²⁰ .

Global Response

United Nations climate change conferences have grown significantly since the first in 1997, and they are now among the largest international meetings in the world, taking place at least twice and sometimes three or four times a year ²¹ .

The Kyoto Protocol was adopted in December 1997, however owing to a complex ratification process, it only entered into force in February 2005. This protocol puts the [United Nations Framework Convention on Climate Change](#) (UNFCCC) into operation, and commits industrialised countries to limit and reduce GHG emissions in accordance with agreed individual targets. It places a heavier burden on developed countries under the principle of “common but differentiated responsibility and respective capabilities”, because it recognises that they are largely responsible for the current high levels of GHG emissions in the atmosphere ²¹ .

The global response to climate change has been fraught with difficulty, and whilst agreed action at an international level has been notable, implementation at a national level could, at best, be described as uneven. Since the 1990s, global emissions and global temperatures have continued to rise ^{21 22} . World Politics Review notes ²³ :

“ Persistent climate skepticism from key global figures, motivated in part by national economic interests, is slowing diplomatic efforts to systematically address the drivers of climate change.”

Paris Agreement

In December 2015 the [Paris Agreement](#) was adopted under the UNFCCC. The key provisions of the agreement are:

- Global temperature rises should be limited to “well below” 2°C and to “pursue efforts” to limit temperature increase to 1.5°C above pre industrial levels
- Parties to the agreement are to aim to “reach global peaking of greenhouse gas emissions as soon as possible”
- Parties are to take action to “preserve and enhance” carbon sinks

- To conduct a “Global Stocktake” every five years, starting in 2023
- Developed countries to provide financial support for developing countries to mitigate climate change
- Creates a goal of “enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change”.

Following the adoption of the agreement, Scotland's First Minister (who attended the Paris summit) welcomed the agreement and said ²⁴ :

“ COP21 has, as we had hoped, achieved a big step forward in the international fight against climate change. [...] Devolved administrations, like the Scottish Government, will be strong drivers of a progressive climate agenda. We look forward to working with our international partners to secure the successful implementation of the Paris agreement.”

Warming to 1.5°C

For many years, limiting global warming to no more than 2°C above pre-industrial levels was the de-facto target for global policymakers. However in 2015, the UN published a new report that warned that the 2°C limit was not adequate for avoiding some of the more severe impacts of climate change ²⁵ .

As a result of the 2015 report, in October 2018 the IPCC published a Special Report on Global Warming of 1.5°C ²⁶ . This notes that every extra bit of warming matters to the Earth's ecosystems and those who depend on them, and sets out in detail the difference between allowing temperatures to rise towards 2°C, or keeping them nearer to 1.5°C. Key points include:

- Going past 1.5°C would seriously affect the planet's liveability, and on the current trajectory, this temperature "guard rail" could be exceeded by 2030
- By 2100, global mean sea level rise will be around 10cm lower for warming of 1.5°C compared with 2°C. This could mean up to 10 million fewer people exposed to the risks of rising seas
- In a world that is warmed by up to 1.5°C, about 14% of the population are exposed to a heat wave every five years. That increases to 37% of the population at 2°C.

To stay within the 1.5°C "guard rail", all of the following must happen:

- Global emissions of GHG must decline by 45% from 2010 levels by 2030
- Renewables should provide up to 85% of global electricity by 2050
- Coal use must reduce to close to zero
- Up to seven million km² of land will be used for energy crops (a bit less than the size of Australia)
- Global net zero emissions must be achieved by 2050.

This study differs from previous IPCC approaches in that it clearly links lifestyle choices with warming. The report's authors say that rapid changes must take place in four key parts of society:

- Energy generation
- Land use
- Cities
- Industry.

The report is clear that whilst new technologies have a role to play, many of these are unproven at scale, expensive and uncertain. [Professor Jim Skea](#), an IPCC co-chair, and former member of the CCC states ²⁷ :

“ Frankly, the more we are prepared to make changes to behavioural patterns that reduce greenhouse gas emissions, the less we would need to rely later on more difficult options that we don't yet fully understand [...].”

Room for Optimism, not Complacency

The past three months have seen some key developments and cause for optimism according to a report by Climate Action Trackerⁱⁱⁱ (CAT) ²⁸ .

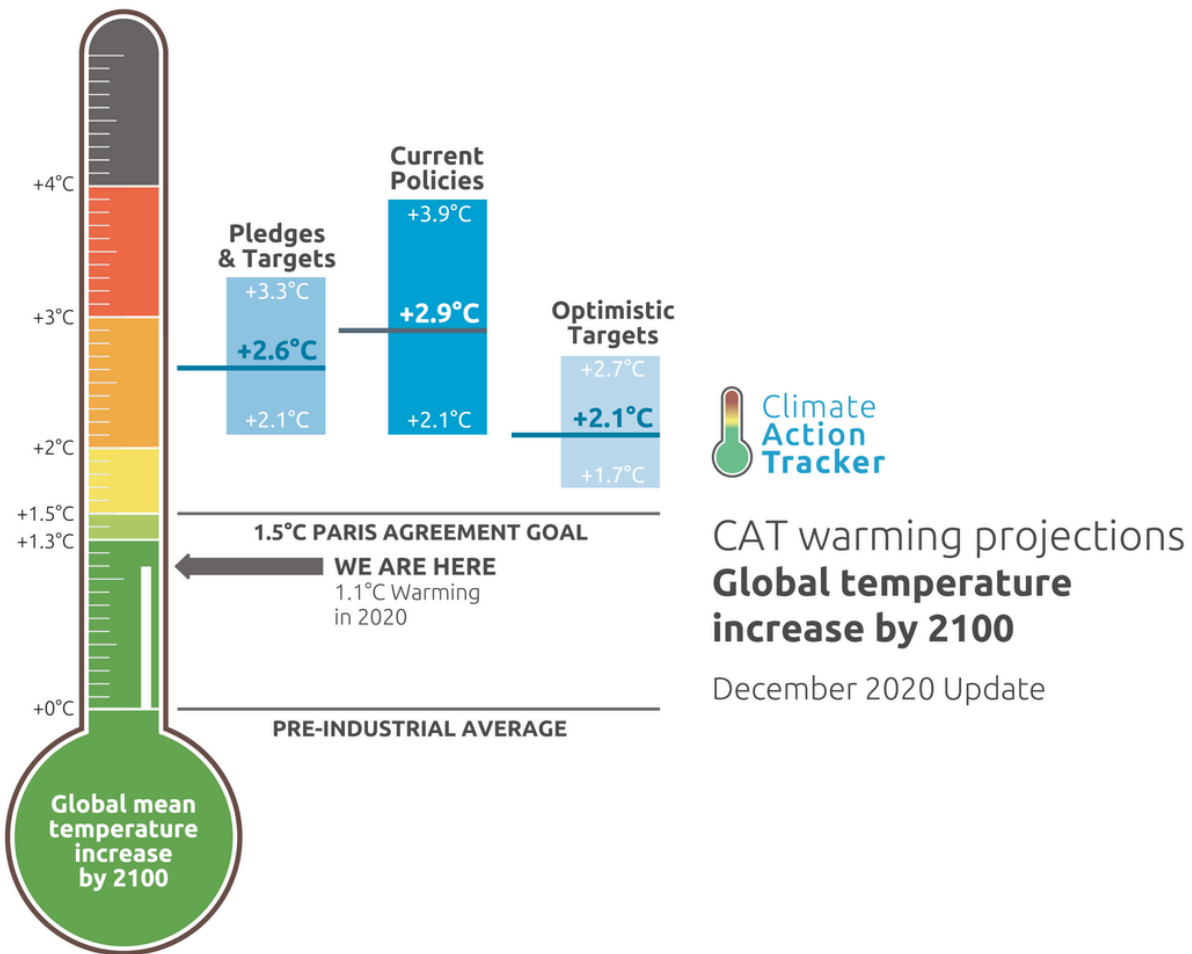
New climate promises from some nations, along with plans from the USA to re-enter the Paris Agreement mean that the rise in world temperatures could be held to 2.1°C by the end of this century. Previous estimates indicated up to 3°C of heating, with disastrous impacts. CAT states ²⁸ :

“ Included in our new modelling is the announcement by China in September 2020 that it intends to reach carbon neutrality before 2060, which reduces the CAT end of century warming estimate by 0.2 to 0.3°C alone. Assuming carbon neutrality in the USA by 2050, as proposed by President-Elect Biden, would reduce warming by another 0.1°C. South Africa, Japan, South Korea and Canada have also recently announced net-zero targets. In total, 127 countries responsible for around 63% of emissions are considering or have adopted net zero targets.”

The following figure shows CAT's most recent modelling ²⁸ :

iii The Climate Action Tracker is an independent scientific analysis that tracks government climate action and measures it against the globally agreed Paris Agreement

Figure 2 - Climate Action Tracker Warming Projections



Nevertheless, there are also significant concerns that this long-term optimism is not matched by short-term plans to cut greenhouse gas emissions; [Professor Niklas Höhne](#) who worked on the modelling, and is a founding partner of [NewClimate Institute](#) states ²⁹ :

“ Countries have not yet adjusted their short-term actions to be on a pathway towards the long-term target [...] Long-term targets are easier, they are far away. But short-term actions are happening right now and they affect citizens, they affect voters. And that’s why this is much more difficult.”

The recent UN Emissions Gap Report 2020 notes that GHG emissions continued to increase in 2019, and makes the following key points ³⁰ :

- Emissions could decrease by about 7% in 2020 compared with 2019 levels, due to Covid-19, however this will not contribute significantly to emissions reductions by 2030 unless countries pursue an economic recovery that incorporates strong decarbonisation
- In line with CAT's assessment (above), recently announced net-zero commitments are welcome, but current policies and associated actions remain seriously inadequate, and are not consistent with achieving net-zero
- Covid-19 related spending is unprecedented in its scale, currently amounting to

roughly 12% of global gross domestic product in 2020. To date, the use of fiscal rescue and recovery measures to stimulate the economy while simultaneously accelerating a low carbon transition has largely been missed

- Lifestyle changes are a prerequisite for sustaining reductions in GHG emissions and for bridging the emissions gap; this requires both system change and individual action - it must also be equitable. The emissions of the richest 1% of the world's population account for more than twice the combined share of the poorest 50%.

In relation to this emissions gap, and the extraordinary economic slowdown that has occurred in 2020, alongside a similar drop in emissions, Professor Niklas Hohne stated ³¹ :

“ The reductions that we have seen in 2020 are in the order of magnitude of the reductions that we need to achieve each year until 2030 or even longer; but they need to be structurally completely different to the reductions that have happened now. Right now we are addicted to fossil fuels, Our whole economy is running on coal, oil and gas.”

Green recovery from Covid-19 in Scotland is explored in detail [later in this briefing](#).

COP 26

The [26th United Nations Conference of the Parties](#) (COP 26), to be held in Glasgow in 2021, is the largest international negotiation ever to be held in the UK.

This summit, chaired by the UK Government and held in partnership with Italy, aims to bring heads of state, climate experts and campaigners together to "accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change".

Originally scheduled for November 2020, this is considered to be one of the most important climate conferences ever. Based on the Paris Agreement, 2020 was when all nations would accelerate their emissions reduction ambitions (known as Nationally Determined Contributions - NDCs). For many countries, this has been delayed, especially due to the failures of COP 25; when COP 26 is finally held, it could be the final determination of whether the world can achieve the goals of limiting warming to 1.5°C or even 2°C ^{32 33 34} .

At the [UN Climate Ambition Summit](#) in December 2020, Alok Sharma UK Secretary of State for Business, Energy and Industrial Strategy, and President of COP 26 recognised that some recent progress had been made with 75 world leaders announcing new commitments to climate action. This includes the publication of intended NDCs, net-zero commitments, and adaptation and resilience plans ³⁵ . However he recognised that this is not "enough to put the world on track to limit warming to 1.5 degrees, and protect people and nature from the effects of climate change".

Every country will therefore have to "step up", and the COP will have to put real targets in place to phase out coal, protect forests, and to champion clean energy and clean transport. Key outcomes will include ensuring transparency in reporting, common timeframes for decarbonisation, and crucially agreeing rules for carbon markets and

international cooperation (known as Article Six). Adaptation to climate change, and addressing loss and damage to habitats are also vital ³⁵ .

The draft CCPu considers that ³ :

“ this important international event must be a milestone in delivering increased collaboration and action needed for a global transition to net zero in a way that is fair and just.”

And the Draft Public Engagement Strategy for Climate Change ⁷ recognises that this negotiation is a unique opportunity to engage the public, encourage collaboration, to demonstrate leadership on an international stage and to show Scotland's commitment to "social justice, just transition, and a wellbeing economy".

Previously, Scotland and the UK were part of a joint European Union (EU) NDC, which set an EU-wide emissions target. As a result of leaving the EU, the UK Government formally submitted an individual NDC in December 2020; this commits to reducing GHG emissions by at least 68% by 2030, compared to 1990 levels ³⁶ .

As part of the UK, Scotland does not need to calculate or submit an NDC, however the Scottish Government has undertaken to publish an indicative NDC in the spirit of the Paris Agreement as ³⁷ :

“ a clear indication of Scotland’s commitment to joining and leading the international effort on tackling climate change and ensuring a more sustainable future for our planet.”

Christiana Figueres believes that ³⁸ :

“ If governments put health, nature regeneration and climate action at the core of every decision they make in recovering from this pandemic, we can emerge as a stronger and more resilient society, and ensure the COP26 puts us on track to a safer climate future.”

Climate Change in Scotland

[Adaptation Scotland](#), the Scottish Government funded programme which provides advice and support to adapt to climate change impacts states ³⁹ :

“ The last century has been a period of rapid climate change across Scotland. In particular, records show that over the last few decades: temperatures have increased - with the last decade the warmest ever recorded; rainfall patterns have changed - with increased rainfall and more heavy downpours; sea-level rise is accelerating; and there have been fewer days with frost and snow cover.”

Key statistics include:

- Average temperatures in Scotland are now around 0.7°C higher than they were a century ago (this is in line with global trends)
- The average temperature in the first decade of the twenty first century in Scotland was 0.9°C warmer than the average for the thirty-year period 1961-1990 and it was warmer than any other decade since records began in 1910
- Scotland's warmest year on record was 2014
- In 2016 the average temperature was 0.8°C higher than the average for 1961-1990
- Scotland's annual rainfall has increased since the 1970s and is now 13% above the average for the early decades of the twentieth century. All seasons have contributed to this increase
- Long-term monitoring of sea level at stations around the UK including Aberdeen shows the mean sea level for 2006 - 2008 was more than 10cm higher than during the 1920s.

Adaptation

Whilst the changes noted above bring both risks and opportunities, projections for the next century indicate that climate trends observed over the last century will both continue and intensify. Adapting to climate change is therefore necessary regardless of how swiftly emissions are cut. In oral evidence to the Parliament's Environment, Climate Change and Land Reform Committee, Baroness Brown of Cambridge, chair of the CCC's Adaptation Committee stated ⁴⁰ :

“ We would very much like to see all Government departments and all businesses thinking about the possible implications of being on a 1.5°C to 2°C trajectory, because we absolutely have to be looking at the risks that are associated with that. Even with a 1.5°C trajectory, the climate will go on changing beyond the end of the century. People should also be looking at what would happen under a 3.5°C to 4°C trajectory, because that is still a significant probability. For every decision that could be affected by a climate change impact, which could cover almost anything, those two assessments ought to have been done. People need to have faced up to what the weather and the world could look like and to have asked whether what they are doing is robust against that backdrop. That is the kind of logical risk assessment that everybody should be doing, but not everybody is looking at the 2°C trajectory, let alone thinking about the 4°C one.”

In 2019, the Scottish Government published the second Scottish Climate Change Adaptation Programme 2019 – 2024 ⁴¹ . This has three overarching themes, with related priorities:

Table 1 - Scottish Climate Change Adaptation Programme 2019 – 2024; Key Themes

Overarching Theme	Adaptation Priority	
Natural Environment	Terrestrial species and habitats	Freshwater rivers and lochs
	Forestry	Marine and coastal ecosystems
	Soils and agriculture	
Buildings and Infrastructure Networks	Flooding and coastal erosion risk management	Energy networks – generation, transmission and distribution
	Surface water and sewer flooding	Public water supplies
	Development in flood risk areas	Ports, airports and ferry services
	Resilience of buildings to extreme wind and rain	Roads and the rail network
	Water demand in the built environment	Digital infrastructure
	Design and location of new infrastructure	Infrastructure interdependencies
Society	Resilience of the population to changes in temperature	Health and social care services
	Resilience of people to pathogens, air pollution, UV radiation	Business impacts from extreme weather
	Public understanding of climate related risks	Business opportunities from climate change
	Emergency planning and response Recovery from extreme weather events	Supply chain disruptions Water demand by industry

The draft CCPu ³ recognises that "adaptation and resilience are key components of our green recovery", and that "adaptation investment is also a key driver of economic growth and jobs [...] and presents opportunities [...] to attract inward investment". Furthermore, the value of nature based solutions, and of the land as "the cornerstone of our society and economy" is recognised:

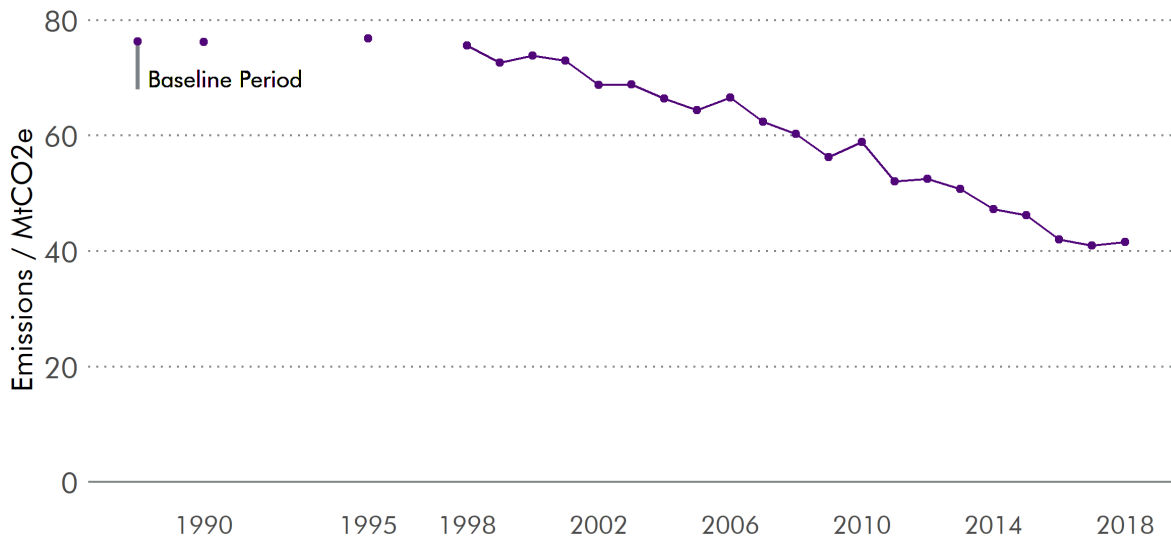
“ Climate change is one of the main drivers of biodiversity loss, and nature-based solutions can also protect, sustainably manage, and help restore ecosystems. These solutions have the potential to enable climate change mitigation, resilience, adaptation and positive social change, providing benefits for both people and biodiversity.”

Scotland's Emissions Reductions to Date

According to the most recent calculations⁴², Scotland's GHG emissions were estimated to be 41.6 MtCO₂e^{iv} in 2018^v. This is 0.6 MtCO₂e higher than in 2017, equivalent to a rise of 1.5%, and mainly due to increased emissions from fossil fuel power stations.

Figure 3 - Total Scottish Greenhouse Gas Emissions, 1990 - 2018

MtCO₂e - million tonnes of carbon dioxide equivalent



Scottish Government, 2020⁴²

From 1990 - 2018, there was a 45.4% reduction in emissions. The most significant contributors to this overall reduction were:

- A 70% reduction in Energy Supply emissions i.e. from power stations
- Land use, Land use change and forestry (*LULUCF*) becoming a greater sink, offsetting nearly 13 times more CO₂e than in 1990.
- A 72% reduction in waste management emissions
- A 32% reduction in business emissions (mostly included in the Industry sector of the draft CCPu).

The Scottish Government states⁴²:

“ The largest factor slowing the overall reduction is 'Transport (excluding international)'. This sector was the largest contributor in 2018 at 12.9 MtCO₂e, however has shown only a 4.9 percent decrease since 1990, compared to the overall trend of a 45.4 per cent decrease.”

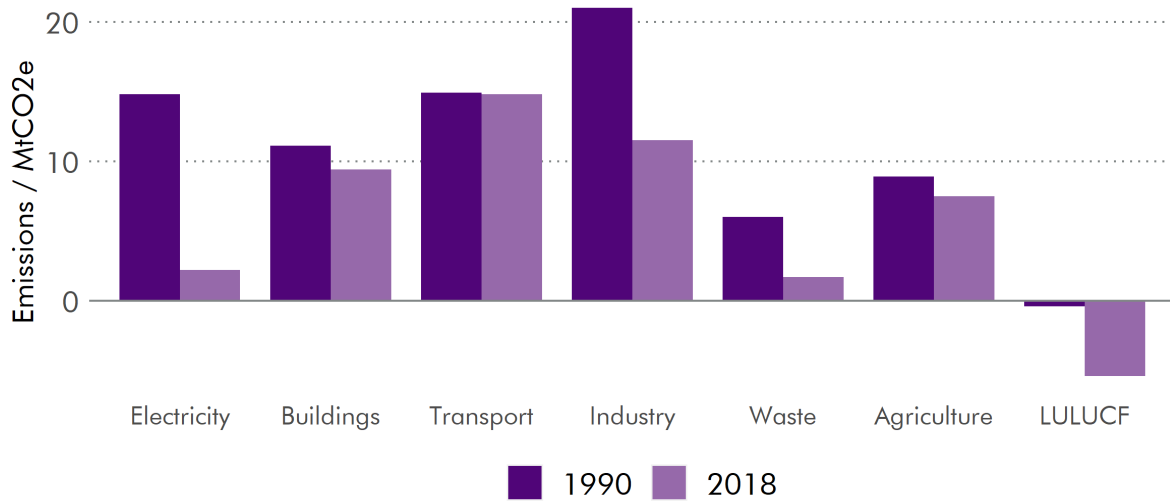
iv Millions of tonnes of carbon dioxide equivalent - explained in more detail in [Global Science and Policy](#)

v Adjusted to include international aviation and shipping, but not adjusted for the EU Emissions Trading Scheme, which is no longer used to track progress against statutory emissions reduction targets

Sectoral emissions from the baseline year, and most recent modelling are shown below:

Figure 4 - Sectoral Scottish Greenhouse Gas Emissions Reductions, 1990 and 2018

MtCO₂e - million tonnes of carbon dioxide equivalent



Green Recovery from Covid - 19

One of the leading architects of the 2015 Paris Agreement, Christiana Figueres believes that ⁴³ :

“ Moments of crisis are always moments of opportunity. Many crucial decisions will be made over the next few months. As options are considered, we should ask ourselves what is the most effective way to overcome the immediate threat and how to dovetail those decisions into the making of a future where we not only survive, but actually thrive together with nature.”

Green recovery seeks to achieve the dual aims of lifting an economy out of recession, and society out of a crisis, alongside protecting and improving the environment. The concept first emerged after the 2008-2009 financial crisis. Several years of research on the impacts of green recovery policies employed through and after that recession have revealed that, what was promised in many nations, did not fully live up to expectations.

Twelve years on, the context has changed - there is now a very different degree of understanding of environmental problems and solutions, and awareness of both climate and biodiversity challenges. For climate change especially, there is a visibility of climate impacts, higher level of societal ambition, more readiness for structural change, financial viability of new low-carbon technologies, and a shared global aspiration under the 2015 Paris Agreement ⁴⁴ .

The Scottish Parliament's Environment, Climate Change and Land Reform Committee carried out an Inquiry into Green Recovery in the autumn of 2020 ⁴⁵ . Their report makes specific sectoral recommendations.

A number of overarching findings and recommendations were also made in relation to climate governance and cohesive policy making, including that "Scotland has shown it can be bold in the face of a crisis", and must be "equally bold in putting systemic change at the heart of the climate and ecological crises". There is considered to be an "implementation gap" between what has been recommended to the Scottish Government (e.g. by the Just Transition Commission and the Infrastructure Commission), and what is actually taking place. Overall budgetary alignment with net-zero was also found to be vital. Furthermore:

- A green recovery should be about building a more resilient Scotland. This is vital to ensure Scotland is better equipped to deal with multi-faceted and complex shocks and challenges e.g. pandemics, climate change, biodiversity loss and geopolitical change - and to deliver a more just, equitable and healthy society and environment
- A human rights based approach to recovery is necessary, this should be underpinned by the key principles of participation, accountability, non-discrimination, empowerment and law
- Covid-19 has demonstrated that policy realignment can be done at pace when required. A green recovery brings significant opportunity to improve public policy alignment.

The draft CCPu states ³ :

“ [...] the Scottish Government has committed to a green recovery from COVID-19: a recovery which sets us on a path to meeting our world-leading emissions reduction targets in a way that is just and improves the outcomes for everyone in Scotland, ensuring no one is left behind. COVID-19 has demonstrated the risks of abrupt, unplanned shifts and how these exacerbate inequalities in our society. However, a green recovery offers opportunities to address these inequalities, create and maintain good, green jobs right across Scotland, and empower people and communities to make decisions about their future through community wealth building. A green recovery drives action to reduce our emissions and protect and restore our natural environment.”

Just Transition

The Just Transition concept features in the Paris Climate Agreement, and has been high on the agenda in Scotland for several years, in part due to the efforts of a broad coalition of trade unions and environmental charities organising under the banner of the [Just Transition Partnership](#). It is particularly aligned with declining industries or regions undergoing transitions, for example coal mining or oil and gas.

[Section 35C](#) of the Climate Change (Emissions Reduction Targets) (Scotland) Act 2009 [as amended] sets out "just transition principles" as the importance of taking action to reduce net Scottish emissions of greenhouse gases in a way which:

- Supports environmentally and socially sustainable jobs
- Supports low-carbon investment and infrastructure
- Develops and maintains social consensus through engagement with workers, trade unions, communities, non-governmental organisations, representatives of the interests of business and industry and such other persons as the Scottish Ministers consider appropriate
- Creates decent, fair and high-value work in a way which does not negatively affect the current workforce and overall economy
- Contributes to resource efficient and sustainable economic approaches which help to address inequality and poverty.

The Scottish Government must have regard to these when setting out plans to reduce emissions.

To support the application of just transition principles, the Scottish Government established a [Just Transition Commission](#) in 2018. This commission is tasked with providing practical and independent advice on how to maximise the economic and social benefits of decarbonisation whilst managing the risks and challenges.

Recent publications have included [Advice for a Green Recovery](#), and a letter to Ministers [regarding Government support for the renewable supply chain](#).

The draft CCPu states ⁷ :

“ The transition to net zero emissions will transform our society and economy, therefore the manner of our transition will be crucial. If we plan and prepare, building consensus about our collective future through dialogue and engagement, then we can ensure Scotland benefits from the opportunities of net zero. The transition can realise green jobs, a better environment and a healthy economy that supports our wellbeing. Failure to plan risks abrupt shifts, the loss of key industries and jobs, and deepening inequalities. This is why Scotland has committed to a just transition to net zero.”

Infrastructure Commission for Scotland

In early 2019, to support the delivery of a [National Infrastructure Mission](#), and a new [Infrastructure Investment Plan](#) Scottish Ministers established an independent [Infrastructure Commission for Scotland](#).

Overarching objectives include:

- Delivering sustainable inclusive economic growth across Scotland
- Managing the transition to a more resource efficient, lower carbon economy
- Supporting delivery of efficient, high quality, modern public services
- Increasing industry competitiveness, whilst tackling inequality
- Enhancing societal living conditions now and in the future
- Ensuring alignment with the new National Planning Framework.

In January 2020, a [Key Findings Report](#) was published, followed by a more detailed Delivery Findings Report in July. The Delivery Findings Report made a series of recommendations including the need to ⁴⁶ :

- Prioritise an inclusive net-zero economy; independent long-term advice for this should be available
- Enable sustainable places; National Planning Framework 4 should align national, regional and local needs through cross-portfolio, robust evidence-based, land use appraisal and prioritisation
- Deliver a thriving construction sector; there is a need for a high performing construction sector, that underpins the National Infrastructure Mission and includes sharply focussed and coherent skills training.

Scottish National Investment Bank

The [Scottish National Investment Bank](#) (SNIB) is expected to play a key role in green recovery. It is to have a "mission oriented approach", set by Scottish Ministers to steer its investments.

It is not intended that SNIB will be a short-term lender to provide working capital to rescue

business, but will play an important role in financing the long-term recovery and re-balancing the economy⁴⁷.

Missions for the Bank were set in December 2020, with three Grand Challenges, and associated missions, as follows⁴⁸:

1. Climate Emergency - Net Zero Mission to achieve a Just Transition to net zero by 2045 and to invest in rebalancing the economy towards leadership in sustainable technology, services and industries
2. Place-Based Opportunity - Place Mission to extend equality of opportunity through improving places by 2040 to regenerate and reduce inequality, and improve opportunities and outcomes for people and communities
3. Demographic Change - People Mission to harness innovation to enable people to flourish by 2040 by investing in innovation and industries of the future for a healthier, more resilient and productive population.

Advisory Group on Economic Recovery

The [Advisory Group on Economic Recovery](#) (AGER) was established in April 2020 to provide expert advice on Scotland's economic recovery once the immediate emergency, created by coronavirus, had subsided. Specifically the Group was asked to advise on the economic recovery from the coronavirus pandemic, including:

- Measures to support different sectoral and regional challenges the economy will face in recovery
- How business practice will change as a result of coronavirus, including opportunities to operate differently and how Government policy can help the transition towards a greener, net-zero and wellbeing economy.

Towards a Robust, Resilient Wellbeing Economy for Scotland: Report of the Advisory Group on Economic Recovery was published in June 2020. It makes a series of detailed recommendations, and recognises that responding to climate change needs to be a "thread through every policy action", and that "there is a real opportunity to use circular economy principles to promote new ways of reducing our use of scarce natural resources". It recommends that⁴⁹:

- The green economic recovery is central to recovery overall. The Scottish Government now needs to establish a priority on delivering transformational change with clear sector plans, where the coincidence of emissions reductions, the development of natural capital and job creation is the strongest.

Further recommendations are consistent with those of the Infrastructure Commission and SNIB's missions, and the work of the UK Climate Change Committee in this area is "strongly endorsed".

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