

WHY SCOTLAND NEEDS A CLIMATE EMERGENCY BILL



Report for Scottish Green MSPs
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Summary

Across the world, extreme weather events and temperature fluctuations caused by climate change are becoming more frequent. There is growing scientific consensus about significant negative impacts global temperature rise will have on the environment and human society if countries around the world do not rapidly increase their ambitions to reduce greenhouse gas emissions. We are facing a climate emergency.

The Scottish Government have introduced a new Climate Change Bill to update Scotland's greenhouse gas emission reduction targets, but it is lacking in ambition and doesn't respond to the latest scientific evidence. It proposes Scotland reduces its greenhouse gas emissions by 90% by 2050.

This target would see Scotland lagging behind other countries who have already committed to reducing greenhouse gas emissions by 100% by 2050 or earlier. This is known as a net-zero target. Net-zero targets are important because they place a deadline for ending our contribution to global climate change.

To meet a net-zero target, we must step up our effort to mitigate and adapt to climate change during the next decade. To be effective the Bill must also set a stretching target for 2030 to ensure we do not miss out on existing opportunities to invest in low carbon technologies.

We must respond to the most up to date scientific evidence and maintain Scotland's position as a world leader on tackling climate change.

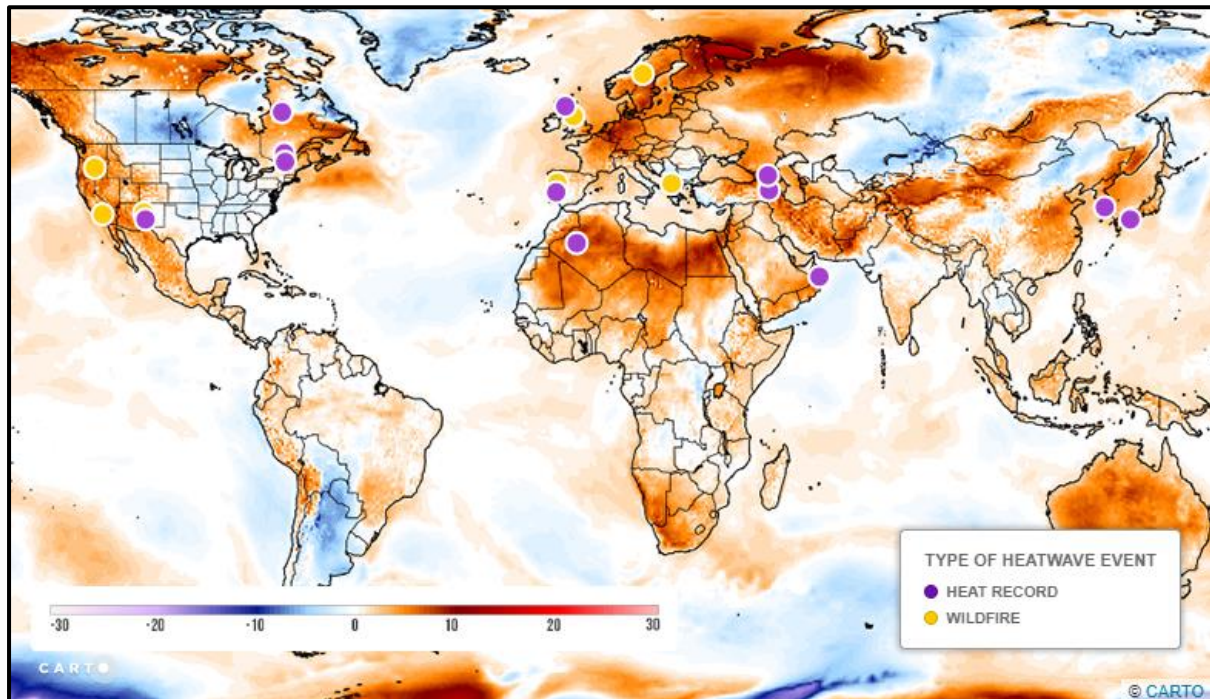
The Scottish Government's Climate Change Bill establishes a long-term target that is based on a narrow interpretation of 'technical feasibility' rather than climate science, and does nothing to accelerate action in the near-term, which was one of the key recommendations made in the recent report by the Intergovernmental Panel on Climate Change report.

This report sets out the case for why Scotland needs this Bill to be upgraded to a Climate Emergency Bill that is built on three pillars:

1. A long-term target of net-zero greenhouse gas emissions by 2040.
2. An ambitious interim target of 77% reduction in greenhouse gases by 2030.
3. Catalysing immediate action by introducing a commitment to update and accelerate existing plans within one year of the Bill passing.

Introduction

The summer of 2018 saw prolonged heatwaves and wildfires break out across several countries, following rapidly on from one of the coldest winters in Europe for decades.¹ Across many developed countries, including Scotland, such climate extremes are being felt ever more frequently.



The global heatwave of Summer 2018

Map created by [Carbon Brief](#)

In May 2018, the Scottish Government introduced a draft Climate Change (Emissions Reduction Targets) (Scotland) Bill to the Scottish Parliament which sets out proposed changes to greenhouse gas emissions reduction targets and improvements for how emissions are measured in Scotland. The new bill amends the Climate Change (Scotland) Act 2009 which was widely hailed as world-leading legislation at the time it was passed, granting Scottish Ministers powers to address climate change through a range of policy initiatives as well as setting ambitious reduction targets.

The new draft bill, by contrast, is tightly drawn, focussing on boosting Scotland's emissions reduction targets based on updated scientific advice. Environmental campaigners across Scotland have been left disappointed that no specific date has been set for Scotland to meet a net-zero greenhouse gas target and that the SNP Government is missing its opportunity to deliver its 2016 manifesto commitment to bring forward a bill to deliver on the Paris Agreement.² Instead the draft bill opts to grant Scottish Ministers the powers to set such a target at a later date.

¹ World Meteorological Organization, 2018. *Arctic Warmth Contrasts with Europe-wide Chill* [blog]. Available at: <https://public.wmo.int/en/media/news/arctic-warmth-contrasts-europe-wide-chill>

² BBC News, 2018a. 'Disappointment' over climate change target. Available at: <https://www.bbc.co.uk/news/uk-scotland-scotland-politics-44237777>.

However, emerging scientific consensus and political ambition in other countries shows that a net-zero target can no longer be delayed by the Scottish Government. Countries around the world are already committing to introduce net-zero targets, including Sweden and New Zealand. There is a growing scientific evidence base that bolder targets and action are needed from all countries, with the Intergovernmental Panel on Climate Change (IPCC) recently reporting the dire consequences that can be expected if countries do not rapidly scale up their actions to reduce emissions.³ In addition, the Scottish Government's latest report card from its statutory advisers, the Committee on Climate Change (CCC), raises concerns about the policies currently in place to reduce emissions, particularly in the transport and agriculture sectors.⁴

The Scottish Government have stated that their target for a 90% reduction is at "the current limits of feasibility"⁵ and that a net-zero target should not be set until a clear policy pathway can be mapped to that point. However, Scotland has previously set ambitious targets without having a year-by-year pathway set in advance, including recent targets to reduce child poverty and the climate targets set by the previous Climate Change (Scotland) Act 2009. Setting stretching, ambitious targets now is also important for encouraging new investment and innovation to meet future climate challenges.

We are fast approaching a breaking point on climate change; failing to set appropriate near, interim and long-term targets now could mean Scotland faces greater challenges to adapt to climate change in the years ahead, and misses the major economic opportunity of being at the front of a global transition to a zero carbon economy. The Scottish Greens believe the proposed Climate Change Bill must be upgraded, so that it rises to the emergency of climate change and the opportunities that rapid decarbonisation poses to Scotland. We are calling for a Climate Emergency Bill.

This is a critical period in which Scotland's approach to the challenges of the decades ahead will be determined. The countdown to achieving the international targets set for 2050 has begun, and crucial decisions on net-zero targets cannot be put off for another decade.

This report sets out the case for setting more ambitious Scottish emissions reduction targets that will end Scotland's contribution to climate change. Part 1 outlines why the Scottish Greens are calling for a Climate Emergency Bill with a net-zero greenhouse gas target set for 2040. The case has already been won in countries and regions around the world, as covered in Part 2. The final part of this report argues that setting stretching climate targets can spark the policy innovation needed to solve this highly complex problem. In sum, this report makes the case for Scotland to step up its ambition and respond to the climate emergency as early as possible.

³ IPCC, 2018a. *Global Warming of 1.5°C: an IPCC special report – Summary for Policymakers*. Available at: http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf. Section B.

⁴ Committee on Climate Change, 2018. *Reducing emissions in Scotland: 2018 Progress Report*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2018/09/Reducing-emissions-in-Scotland-2018-Progress-Report-to-Parliament.pdf>

⁵ Scottish Government, 2018. *Net-zero greenhouse gas emissions target year: information and analysis*. p.1. Available at: <https://beta.gov.scot/publications/set-net-zero-greenhouse-gas-emissions-target-year-information-analysis/pages/2/>

1. Why Scotland needs a Climate Emergency Bill

1.1 To meet our international obligations under the Paris Agreement

In December 2015, countries around the world came to an agreement on the level of effort required to reduce the impacts of global climate change, known as the Paris Agreement.⁶ 195 countries have ratified the Paris Agreement, including the UK, pledging to introduce domestic policies and plans to reduce greenhouse gas emissions and adapt to the effects of climate change. The overall target for the Paris Agreement is to keep global temperature rise to “well below 2°C” on pre-industrial levels by 2050, preferably limiting the rise to 1.5°C.⁷

1.2 To reflect the most up-to-date scientific evidence

Despite progress that has been made since Paris, there is emerging scientific evidence that all countries must do much more to limit emissions in order to prevent deeply damaging impacts of climate change. There has been a shift towards seeing 1.5°C as the upper limit for global temperature rise rather than 2°C as set out in the Paris Agreement. The IPCC published a Special Report in October 2018 investigating the different outcomes that can be expected if global temperature rise is limited to 1.5°C compared to 2°C. The results are striking and include:

- Limiting temperature rise to 1.5°C above pre-industrial temperatures would see “10 million fewer people lose their homes to rising seas, 2 million km² of permafrost saved, 50% reduction in global population experiencing water scarcity” than would be expected at 2°C of warming.⁸
- The number of sea-ice-free summers in the Arctic would be reduced to once per century rather than once per decade.⁹
- Oceans will warm, with between 70-90% of coral reefs lost by mid-century, and sea level rises expected to continue into the 2100s.¹⁰
- Biodiversity loss is expected to increase but limiting warming to 1.5°C would see the rate of species losing 50% of their geographical range reduce by half compared to a warming of 2°C.¹¹
- Temperature changes will have knock-on effects on ecosystem services¹² – the ‘free’ services provided to society by nature, such as pollination and soil fertility.

⁶ UNFCCC, 2018. *What is the Paris Agreement* [Blog]. Available at: <https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement>

⁷ UNFCCC, 2018.

⁸ BBC News, 2018b. *What does 1.5C mean in a warming world?* Available at: <https://www.bbc.co.uk/news/science-environment-45678338>

⁹ IPCC, 2018a. Section B4.1.

¹⁰ IPCC, 2018a. Section B4.2.

¹¹ BBC News 2018a.

¹² IPCC, 2018a. Section C2.5.

- High temperatures will pose a threat to human societies, with some infectious diseases spread by mosquitoes predicted to rise as urban areas experience intense heatwaves.¹³

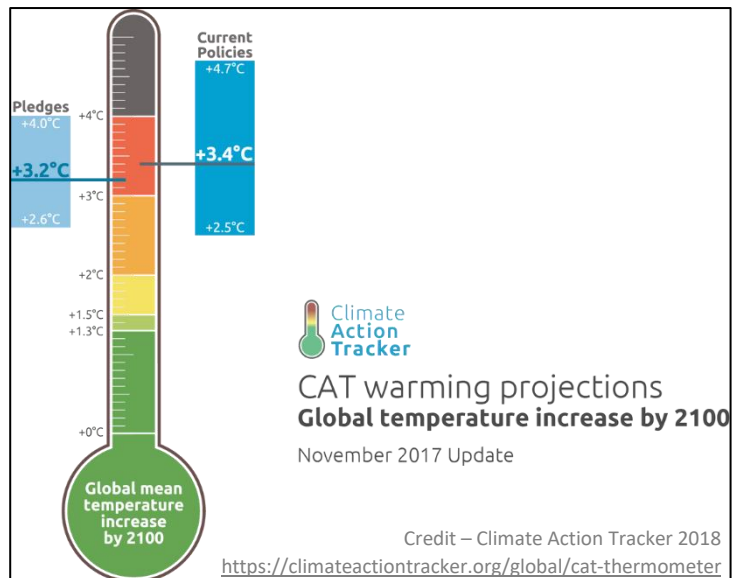
“Two degrees is no longer the two degrees we thought it was. It’s increasingly becoming meaningless as a climate goal when you look at the risks that would come with it and what we are already witnessing with one degree – why would you have a goal that doesn’t protect anything we care about?”

Kaisa Kosonen, IPCC campaign lead at Greenpeace International¹⁴

Furthermore, the IPCC authors advise that the world will surpass 1.5°C by 2040 if countries do not strengthen their existing climate change targets.¹⁵ Avoiding this catastrophic scenario requires all countries to rapidly initiate a transformation to a low-carbon economy – particularly developed nations who bear a greater responsibility for reducing historical greenhouse gas emissions. The IPCC Special Report makes clear that poor and vulnerable populations will suffer the greatest impacts.¹⁶

As one of the first countries to industrialise, Scotland ought to follow a *Fair Shares* approach to reducing its emissions earlier than others.¹⁷ This approach reflects the fact some countries have greater levels of wealth, development and technological innovation than others. It also takes into account that some countries have had much higher levels of historic greenhouse gas emissions as they industrialised early and have benefitted financially from this.¹⁸

The IPCC report is also clear that actions to reduce emissions in the 2020s will determine whether we can meet the 1.5°C limit advised by the Paris Agreement.¹⁹ The next decade will be crucial for determining how effectively we can mitigate the impacts of climate change and we can no longer postpone making difficult political decisions. By committing to a net-zero greenhouse gas target early and accelerating emission reductions now, Scotland can take the advantage of being amongst the first wealthy nations to act.



Based on existing climate targets around the world a catastrophic increase in mean global temperature of 3.2°C is projected

¹³ IPCC, 2018a. Section B5.2.

¹⁴ BBC News 2018a.

¹⁵ IPCC, 2018b. *Global Warming of 1.5°C: an IPCC Special Report – Chapter 1*, p.45. Available at: http://report.ipcc.ch/sr15/pdf/sr15_chapter1.pdf

¹⁶ IPCC, 2018b. p.5.

¹⁷ Oxfam, 2015, *Fair Shares: A Civil Society Equity Review of INDCs*. Available at: <https://oxfamlibrary.openrepository.com/bitstream/handle/10546/579848/ib-civil-society-review-climate-indcs-191015-en.pdf;jsessionid=6670ABD12707E979CC08680D78B68798?sequence=1>

¹⁸ Oxfam, 2015. p.1.

¹⁹ IPCC, 2018a. Section D1.1.

The Scottish Government's current target for a 90% reduction in emissions by 2050 is based on advice it received from its statutory adviser, the CCC. Stop Climate Chaos Scotland (SCCS), a broad coalition of non-governmental organisations, have highlighted some problematic assumptions inherent in the CCC's advice on the targets for Scotland's new Climate Change Bill.

In 2016, the CCC stated that global CO₂ emissions should be net-zero by 2040, requiring the Scottish Government to set a target of between 89-97% greenhouse gas reductions by 2050 to meet the Paris goal of keeping us to 1.5°C.²⁰ SCCS highlight that in the CCC's advice on setting targets for the draft bill, the lower end of this scale has been recommended.²¹ Furthermore, this recommendation by the CCC is based on data from 2015.²² Recent scientific and technical developments cannot therefore have been fully taken into account.

The CCC's scenario also assumes that we will 'overshoot' 1.5°C warming before returning to that level by 2100. The recent IPCC report is clear that this would have disastrous consequences:

"The implications of overshooting are large for risks to natural and human systems, especially if the temperature at peak warming is high, because some risks may be long-lasting and irreversible, such as the loss of many ecosystems."²³

SCCS have highlighted areas where there is scope for the Scottish Government to go beyond the CCC advice. For example, the CCC assume that some fossil fuel vehicles will still be on the road by 2050, despite the Scottish Government pledging to "phase out the need for petrol and diesel vehicles by 2032."²⁴ The CCC's scenario also assumes around 38% of Scottish electricity will come from fossil fuels by 2050, despite Scotland being on track to meet its target of 100% electricity from renewable sources by 2020. SCCS also highlight that the CCC assume no change in diets or demand for air travel.²⁵

²⁰ Committee on Climate Change, 2016. *UK climate action following the Paris Agreement*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/10/UK-climate-action-following-the-Paris-Agreement-Committee-on-Climate-Change-October-2016.pdf>

²¹ Stop Climate Chaos Scotland, 2018. *Written evidence on Climate Change (Emissions Reduction Targets) (Scotland) Bill to Environment, Climate Change and Land Reform Committee*. Available at: <http://www.stopclimatechaos.org/sites/www.stopclimatechaos.org/files/SCCS-ECCLR-written-evidence-CCBill-final.pdf>

²² Committee on Climate Change, 2015. *The Fifth Carbon Budget: The next steps towards a low-carbon economy*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2015/11/Committee-on-Climate-Change-Fifth-Carbon-Budget-Report.pdf>

²³ IPCC, 2018c. *Global Warming of 1.5°C: an IPCC Special Report – Chapter 3*, p.173.

²⁴ Scottish Government, 2017. *Programme for Government 2017-18*, p.7. Available at: <https://www.gov.scot/Resource/0052/00524214.pdf>

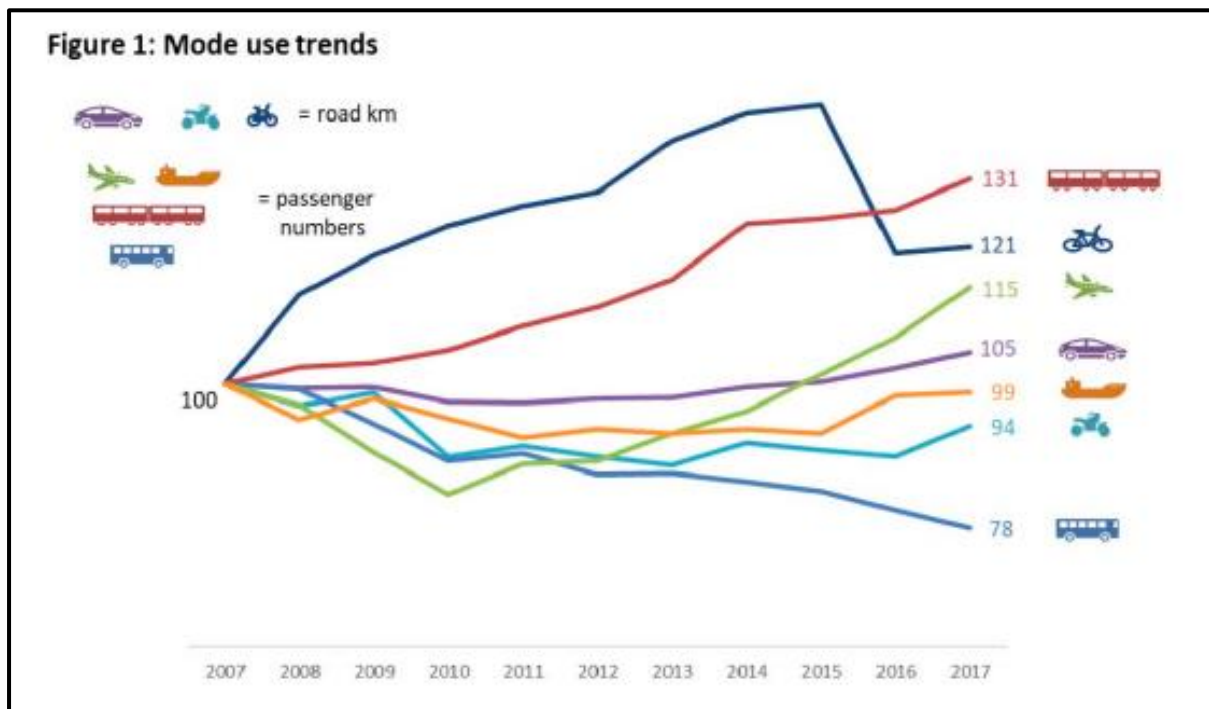
²⁵ Stop Climate Chaos Scotland, 2018.

A further study by the Tyndall Centre for Climate Change Research also highlights that under the CCC's projections, Scotland will not meet its Fair Shares commitments to reduce the burden on developing nations.²⁶

1.3 To improve policies that will be implemented in the 2020s

Scotland is currently underperforming in efforts to reduce emissions in some key sectors, as highlighted by the CCC's most recent Progress Report to the Scottish Government.²⁷ The Committee argue that recent reductions of greenhouse gas emissions are largely due to the closure of Scotland's coal-fired power stations and improvements in waste collection.

This "masks a lack of progress in other areas" particularly transport and agriculture.²⁸ In transport, latest data shows that daily car journeys have increased in Scotland while cycling and bus travel have fallen.²⁹ The CCC also note that the Scottish Government is "relying on voluntary measures alone" to reduce emissions from agriculture, while tree planting rates are lagging behind their targets.³⁰



Source: <https://www.transport.gov.scot/media/43105/sct08183658301.pdf>

²⁶ Tyndall Centre for Climate Research and Uppsala University, 2018. *Quantifying the implications of the Paris Agreement: What role for Scotland?* Available at:

<http://www.stopclimatechaos.org/sites/www.stopclimatechaos.org/files/TyndallReport.pdf>

²⁷ Committee on Climate Change, 2018.

²⁸ Committee on Climate Change, 2018, p.6.

²⁹ Transport Scotland, 2018. *Transport and Travel in Scotland 2017*. Available at:

<https://www.transport.gov.scot/media/43105/sct08183658301.pdf>.

³⁰ Committee on Climate Change, 2018. p.7.

Scottish Greens recommend a net-zero CO₂ target for 2040

Given the evidence from the IPCC Special Report, concerns about the basis for CCC projections and the need for radical low carbon transformation in sectors beyond electricity generation, the Scottish Green MSPs are calling for a net-zero CO₂ target to be set for 2040 in the new Climate Change Bill.

It's clear that big changes need to be made in the short term, particularly during the 2020s. Aiming for a low carbon transformation by 2040 gives us a better chance of keeping Scotland's share of global emissions within the limits set by the Paris Agreement, reducing the impact of climate change on our environment and society.

Bringing forward a net-zero CO₂ target to 2040 will also allow time for extra efforts to be made to achieve a net-zero target for all greenhouse gas emissions by 2050. This includes a final push to reduce emissions from agriculture and strengthen our carbon sinks, reducing the risk that we overshoot.

Setting higher targets also requires a re-evaluation of the policies and proposals for reducing emissions outlined in Scotland's most recent Climate Change Plan 2018-2032. Boosting targets to net-zero CO₂ requires greater reductions in emissions over the next decade and revised policies across transport, agriculture and the built environment to achieve this. Scottish Greens therefore recommend that the Climate Change Plan is updated within twelve months of the new legislation being passed.

2. Will Scotland still be considered a climate leader?

Other countries around the world are already reacting to the warnings from the international scientific community. Norway, Sweden, Iceland, France and New Zealand have all announced ambitions to set net-zero targets by 2050 at the latest, and more are expected to follow. Many of the countries that have committed to net-zero target have been pushed to higher ambition by Green coalition governments. Details on some of these international targets are given below:

2.1 Sweden

In 2017, Sweden's parliament passed legislation setting a net-zero greenhouse gas emissions target for 2045. Sweden plans for at least 85% of its emission reductions to be achieved through domestic effort, including boosting levels of low carbon transport, rapidly decarbonising the heat sector and having highly energy efficient buildings. The remaining reductions to achieve net-zero – assuming they cannot be achieved entirely through domestic effort – will be delivered by afforestation and offsetting by investing in projects abroad.³¹ Scotland also retains the right to use carbon credits in its draft legislation, though to its credit the Scottish Government has tightened up the rules around using these to achieve our emission targets.

As a result of this legislation, during 2018 more than 15 industrial sectors in Sweden have drawn up plans to break away from fossil fuels. This demonstrates how setting ambitious long-term emission targets sends a clear signal to industries that the government is committed to a course of action and encourage early innovation in key sectors.³²

It should also be noted that Sweden has deliberately not included the land use sector in its emissions accounting. This is because Sweden's forests and peatlands are a net carbon sink and including these would actually see Sweden achieve its net-zero goals ahead of 2045. By not including this sector, Sweden has set a more ambitious goal for reducing emissions by making cuts in other sectors.

Isabella Lövin, Sweden's former Minister for Climate Change and Swedish Green Party member, has also been clear that the recent IPCC Special Report demands countries to commit to net-zero targets:

³¹ Wong, S., 2017. Sweden commits to becoming carbon neutral by 2045 with new law. *New Scientist*. Available at: <https://www.newscientist.com/article/2138008-sweden-commits-to-becoming-carbon-neutral-by-2045-with-new-law/>.

³² Nyström, S., 2018. Stefan Nyström: Follow Sweden's example on climate change. *The Scotsman*, October 2018. Available at: <https://www.scotsman.com/news/environment/stefan-nystrom-follow-sweden-s-example-on-climate-change-1-4817711>

"It will clearly be untenable [following the publication of the IPCC Special Report] for any western government that does not have a net-zero target with an appropriate date and means of delivering it to claim to be a 'climate leader'... Certainly it is not acceptable for any government or statutory adviser to say that net-zero cannot be done. It has to be done."³³

2.2 New Zealand

New Zealand's Labour-Green coalition government is currently drafting new climate change legislation. In contrast to Scotland, its commitment to a net-zero target has been clear from the outset. Its public consultation on draft legislation set out three forms that a net-zero target could take: focussing on reducing CO₂ emissions exclusively, reducing CO₂ while stabilising the emission levels of other greenhouse gases, or by setting a net-zero target for all greenhouse gases.³⁴ The third option would be the strongest route for New Zealand to adopt as the country's non-CO₂ agricultural emissions account for almost half its total output.³⁵

While the process of setting a new target is still underway, it is striking to see the huge efforts the New Zealand government is making to build an inclusive public conversation around climate change. For example, the Climate Minister has hosted town hall meetings across the country to meet the demand for public engagement.³⁶

By committing to some form of net-zero target from the outset of their consultation process, the New Zealand Government has sent a clear message that all sectors must play their part. This has been backed up by extensive economic studies commissioned by the government to demonstrate the economic impacts different target options could have.³⁷

2.3 Iceland

Iceland's Left-Green-led coalition government has pledged that the country will become carbon neutral by 2040, the earliest of any western European nation.³⁸ It will do this by limiting urban sprawl and boosting the use of public transport in its cities, Iceland already

³³ Lovin, I., 2018. To lead on climate, countries must commit to zero emissions. *The Guardian*, April 2018. Available at: <https://www.theguardian.com/environment/2018/apr/17/to-lead-on-climate-countries-must-commit-to-zero-emissions>

³⁴ New Zealand Government, 2018a. *Our Climate, Your Say! Discussion Document*. Available at: <http://www.mfe.govt.nz/sites/default/files/media/Consultations/FINAL-%20Zero%20Carbon%20Bill%20-%20Discussion%20Document.pdf>

³⁵ New Zealand Government, 2018a.

³⁶ Piddock, G., 2018. New Zealand to become the world's first zero emission food producer – James Shaw. *Stuff NZ*. Available at: <https://www.stuff.co.nz/business/farming/104788826/new-zealand-to-become-the-worlds-first-zero-emission-food-producer--jame-shaw>

³⁷ New Zealand Government, 2018b. *Zero Carbon Bill economic analysis: A synthesis of economic impacts*. Available at: <http://www.mfe.govt.nz/node/24280>

³⁸ Ćirić, J., 2017. Prime Minister Announces Plan for Carbon-Neutral Iceland by 2040. *Iceland Review*. Available at: <http://icelandreview.com/news/2017/12/13/prime-minister-announces-plan-carbon-neutral-iceland-2040>.

having fully decarbonised heat and electricity sectors.³⁹ The challenges Iceland faces to lower transport emissions are similar to those faced by the Scottish Government, with similar plans to increase the number of electric vehicles on the roads. Iceland is also looking to bring forward new plans to reduce emissions from land use, including actions to produce biofuels on degraded land, protect wetlands and increase forest cover.⁴⁰ Again, Scotland could benefit from similar action plans on land use.

2.4 Sub-national regions

Increasing numbers of cities and regions are making pledges to go carbon neutral by 2050, including the states of California (the world's fifth biggest economy)⁴¹ and America's largest city, New York City.⁴²

³⁹ Boztas, S., 2016. Reykjavík: the geothermal city that aims to go carbon neutral. *The Guardian*, October 2016. Available at: <https://www.theguardian.com/sustainable-business/2016/oct/03/reykjavik-geothermal-city-carbon-neutral-climate>.

⁴⁰ From talks held at the 2018 Arctic Circle Assembly in Iceland.

⁴¹ Roberts, D., 2018. California Gov. Jerry Brown casually unveils history's most ambitious climate target. *Vox*. Available at: <https://www.vox.com/energy-and-environment/2018/9/11/17844896/california-jerry-brown-carbon-neutral-2045-climate-change>.

⁴² Mathiesen, K., 2017. New York City aims to be carbon neutral by 2050. *Climate Home News*. Available at: <http://www.climatechangenews.com/2017/10/03/new-york-city-aims-carbon-neutral-2050/>.

3. We need a climate target that drives innovation

The Scottish Government has stated that the current proposed target of 90% emissions reduction by 2050 is extremely stretching and at the “limits of feasibility” based on current knowledge.⁴³ However, there is rarely a clear pathway for governments to follow in order to achieve transformational policy goals and this has not been a barrier to setting ambitious targets in the past. This section outlines how adopting a mission-oriented approach to setting targets can overcome some of the challenges in setting targets where there are large unknowns.

3.1 Adopting a ‘mission-oriented’ approach

There is rarely a clear pathway for governments to follow in order to achieve transformational goals. When President John F. Kennedy announced in 1961 that the USA would commit to getting a man on moon by the end of the decade, there was no thought-out plan for how this would be achieved. However, there was a political urgency that spurred the setting of this ambitious goal and it was widely agreed that the collaborative effort of many sectors would be required to achieve it.

Climate change can be viewed in a similar light to the mission to put man on the moon, as outlined by Professor Mariana Mazzucato in her discussion of mission-oriented policy.⁴⁴ Avoiding dangerous levels of climate change is similar in nature to the first moon landing: it is extremely urgent, has never been attempted before and requires many sectors to get involved in solving the challenge.

Following the example of the man on the moon mission, a similar mission-oriented approach can be adopted to address challenges such as climate change. Mazzucato argues that following this approach, governments can set the broad direction for innovation in a top-down fashion while leaving industries, researchers and local-level policy-makers the flexibility to innovate solutions from the bottom-up. Just as the US Government announced the broad mission to place a man on the moon within a decade, setting the direction of travel, it was left to multiple sectors across the US’s science and technology fields to devise solutions for a myriad of smaller hurdles that stood in the way of achieving this goal.⁴⁵

As Mazzucato outlines: “such policies, by definition, give explicit technological and sectoral directions to achieve the ‘mission.’ At the same time, to be successful, they must also enable bottom-up experimentation and learning.”⁴⁶ When it comes to funding, governments can “tilt the playing field” in favour innovative projects that are aiming to contribute to the top-level goal.⁴⁷

⁴³ Scottish Government, 2018. p.1.

⁴⁴ Mazzucato, M. 2017. *Mission-Oriented Innovation Policy: challenges and opportunities*. RSA Action and Research Centre (London). Available online at: <<https://www.thersa.org/globalassets/pdfs/reports/mission-oriented-policy-innovation-report.pdf>>

⁴⁵ Mazzucato, 2017. p.6.

⁴⁶ Mazzucato, 2017. p.8.

⁴⁷ Mazzucato, 2017. p.9.

Adopting a similar mission-oriented approach to setting Scotland's new climate change targets could unlock the much-needed innovation required to reduce greenhouse gas emissions in our transport, agriculture and built environment sectors. We could step away from viewing climate change as an intractable, wicked problem and instead view it as the next 'man-on-the-moon' mission to be achieved; a political necessity, requiring creativity and leadership to meet it. A net-zero greenhouse gas target by 2040 would drive the mission to produce solutions that lower emissions from transport, agriculture, buildings and other critical sectors. The prize would not just be avoiding a climate catastrophe, but positioning Scotland at the forefront of green innovation will yield substantial economic gains too.

Scotland's climate change targets therefore become important signals – both for government departments and economic sectors, giving long-term certainty about the direction of policy.⁴⁸ The targets would continually influence all levels of decision making to achieve its long-term mission.

Under such a framing, the setting of a net-zero greenhouse gas target by 2040 at the latest becomes more about setting the bar for innovation over the next few decades rather than the end-point of a projected scenario. The target is the driver of change, rather than the anticipated final outcome.

3.2 Previous targets have been set without clear pathways

Scotland has set targets before with no clear pathway for how they will be achieved, in recognition of the seriousness of the challenge. The Child Poverty (Scotland) Act 2017 sets ambitious targets for reducing child poverty, including for less than 10% of children to be living in households in relative poverty by April 2030, with reporting mechanisms in place to ensure key milestones are met. There is no year-by-year route map for how this target will be achieved, but it sets a clear goal for policy on social security, food, health and education.

Such an approach was also taken in 2009, when Scotland's climate targets for 2020 was set in the Climate Change (Scotland) Act 2009. At that time "there was no clear and evidenced pathway to reach [the 2020 target]. Parliament at the time understood the scale of the challenge and the moral obligation to act, and accordingly set ambitious targets which have already been surpassed."⁴⁹ There was recognition that Scotland had to do more to address an urgent problem.

⁴⁸ Rutter, J. and Knighton, W., 2012. *Legislated policy targets: Commitment device, political gesture or constitutional outrage?* Institute for Government. Available online at: <https://www.instituteforgovernment.org.uk/sites/default/files/publications/Legislated%20policy%20targets%20final.pdf>

⁴⁹ Stop Climate Chaos Scotland, 2018. p.4.

Conclusion

The world is seeing the effects of climate change disrupt environments and human societies on an ever more frequent basis. The latest research from the IPCC presents a stark warning about the impacts that might be expected should countries fail to increase their current targets to reduce greenhouse gas emissions by the middle of this century. We are entering a climate emergency.

Other countries around the world are already stepping up to respond to this emergency by announcing plans for net-zero targets to be set by 2050 at the very latest. If Scotland does not increase its ambitions in its new Climate Change Bill it risks, at least, its position as a world leader on climate action, and our ability to respond to the challenges of climate change in the years ahead.

The Scottish Greens are calling for a net-zero greenhouse target to be set for 2040, with the 2030 interim target increased to a 77% reduction in greenhouse gas emissions to ensure rapid action over the next decade. This requires an update to existing policies and plans to reduce emissions, which is why an update to Scotland's Climate Change Plan is needed within a year of the legislation being passed by Parliament.

Setting ambitious targets does not underestimate the very real technological and societal problems climate change poses us. However, by adopting a mission-oriented outlook and setting emissions targets as a way to encourage cross-sectoral collaboration, a Climate Emergency Bill could drive a new era of innovation to reduce climate risks.

The importance of this was recognised when, in 2009, the Scottish Parliament passed its first Climate Change Act. We want the Scottish Government to regain that sense of urgency and commit to delivering a Climate Emergency Bill that sets a net-zero target and spurs immediate action now.

Bibliography

BBC News, 2018a. 'Disappointment' over climate change target. Available at: <https://www.bbc.co.uk/news/uk-scotland-scotland-politics-44237777>.

BBC News, 2018b. What does 1.5C mean in a warming world? Available at: <https://www.bbc.co.uk/news/science-environment-45678338>

Boztas, S., 2016. Reykjavik: the geothermal city that aims to go carbon neutral. *The Guardian*, October 2016. Available at: <https://www.theguardian.com/sustainable-business/2016/oct/03/reykjavik-geothermal-city-carbon-neutral-climate>.

Ćirić, J., 2017. Prime Minister Announces Plan for Carbon-Neutral Iceland by 2040. *Iceland Review*. Available at: <http://icelandreview.com/news/2017/12/13/prime-minister-announces-plan-carbon-neutral-iceland-2040>.

Committee on Climate Change, 2015. *The Fifth Carbon Budget: The next steps towards a low-carbon economy*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2015/11/Committee-on-Climate-Change-Fifth-Carbon-Budget-Report.pdf>

Committee on Climate Change, 2016. *UK climate action following the Paris Agreement*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/10/UK-climate-action-following-the-Paris-Agreement-Committee-on-Climate-Change-October-2016.pdf>

Committee on Climate Change, 2018. *Reducing emissions in Scotland: 2018 Progress Report*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2018/09/Reducing-emissions-in-Scotland-2018-Progress-Report-to-Parliament.pdf>

IPCC, 2018a. *Global Warming of 1.5 °C: an IPCC special report – Summary for Policymakers*. Available at: http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf.

IPCC, 2018b. *Global Warming of 1.5 °C: an IPCC Special Report – Chapter 1*. Available at: http://report.ipcc.ch/sr15/pdf/sr15_chapter1.pdf

Lovin, I., 2018. To lead on climate, countries must commit to zero emissions. *The Guardian*, April 2018. Available at: <https://www.theguardian.com/environment/2018/apr/17/to-lead-on-climate-countries-must-commit-to-zero-emissions>.

Mathiesen, K., 2017. New York City aims to be carbon neutral by 2050. *Climate Home News*. Available at: <http://www.climatechangenews.com/2017/10/03/new-york-city-aims-carbon-neutral-2050/>.

Mazzucato, M. 2017. *Mission-Oriented Innovation Policy: challenges and opportunities*. RSA Action and Research Centre (London). Available online at: <https://www.thersa.org/globalassets/pdfs/reports/mission-oriented-policy-innovation-report.pdf>

New Zealand Government, 2018. *Our Climate, Your Say! Discussion Document*. Available at:

<http://www.mfe.govt.nz/sites/default/files/media/Consultations/FINAL-%20Zero%20Carbon%20Bill%20-%20Discussion%20Document.pdf>

Nyström, S., 2018. Stefan Nyström: Follow Sweden's example on climate change. *The Scotsman*, October 2018. Available at:

<https://www.scotsman.com/news/environment/stefan-nystrom-follow-sweden-s-example-on-climate-change-1-4817711>

Oxfam, 2015, *Fair Shares: A Civil Society Equity Review of INDCs*. Available at:

<https://oxfamlibrary.openrepository.com/bitstream/handle/10546/579848/ib-civil-society-review-climate-indcs-191015-en.pdf;jsessionid=6670ABD12707E979CC08680D78B68798?sequence=1>

Piddock, G., 2018. New Zealand to become the world's first zero emission food producer – James Shaw. *Stuff NZ*. Available at:

<https://www.stuff.co.nz/business/farming/104788826/new-zealand-to-become-the-worlds-first-zero-emission-food-producer--jame-shaw>

Roberts, D., 2018. California Gov. Jerry Broen casually unveils history's most

ambitious climate target. *Vox*. Available at: <https://www.vox.com/energy-and-environment/2018/9/11/17844896/california-jerry-brown-carbon-neutral-2045-climate-change>.

Rutter, J. and Knighton, W., 2012. *Legislated policy targets: Commitment device, political gesture or constitutional outrage?* Institute for Government. Available online at:

<https://www.instituteforgovernment.org.uk/sites/default/files/publications/Legislated%20policy%20targets%20final.pdf>

Scottish Government, 2017. *Programme for Government 2017-18*, p.7. Available at:

<https://www.gov.scot/Resource/0052/00524214.pdf>

Scottish Government, 2018. *Net-zero greenhouse gas emissions target year:*

information and analysis. Available at: <https://beta.gov.scot/publications/set-net-zero-greenhouse-gas-emissions-target-year-information-analysis/pages/2/>

Stop Climate Chaos Scotland, 2018. *Written evidence on Climate Change*

(Emissions Reduction Targets) (Scotland) Bill to Environment, Climate Change and Land Reform Committee. Available at:

<http://www.stopclimatechaos.org/sites/www.stopclimatechaos.org/files/SCCS-ECCLR-written-evidence-CCBill-final.pdf>

Transport Scotland, 2018. *Transport and Travel in Scotland 2017*. Available at:

<https://www.transport.gov.scot/media/43105/sct08183658301.pdf>.

Tyndall Centre for Climate Research and Uppsala University, 2018. *Quantifying the implications of the Paris Agreement: What role for Scotland?* Available at:

<http://www.stopclimatechaos.org/sites/www.stopclimatechaos.org/files/TyndallReport.pdf>

UNFCCC, 2018. *What is the Paris Agreement* [Blog]. Available at: <https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement>

Wong, S., 2017. Sweden commits to becoming carbon neutral by 2045 with new law. *New Scientist*. Available at: <https://www.newscientist.com/article/2138008-sweden-commits-to-becoming-carbon-neutral-by-2045-with-new-law/>.

World Meteorological Organization, 2018. *Arctic Warmth Contrasts with Europe-wide Chill* [blog]. Available at: <https://public.wmo.int/en/media/news/arctic-warmth-contrasts-europe-wide-chill>