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Dear Minister,

I am delighted to hear of your recent recovery and, on behalf of the Climate Change Committee, I welcome you back to your Ministerial role in good health. In this crucial year for global climate action, I extend my support to you and your department as you work towards legislating a set of greenhouse gas emissions targets for Northern Ireland.

This letter is a response to a request from your officials in February 2021 for further evidence on the economic costs of setting and delivering a 2050 emissions target for Northern Ireland.

In December 2050, we recommended that any climate legislation for Northern Ireland include a target to **reduce all greenhouse gas (GHG) emissions by at least 82% by 2050** as part of a fair contribution to the UK Net Zero target in 2050 and our international obligations under the Paris Agreement. This remains our clear recommendation.

This contribution to the UK Net Zero target would require Northern Ireland to reach **net-zero CO₂ emissions by 2050**, as well as significantly reducing emissions of other GHGs including methane.¹

Achieving net-zero GHG emissions for the whole of the UK by 2050 does not necessitate that every sector or area of the UK reaches absolute zero emissions by that date. Some parts of the UK will be 'net sources' of greenhouse gases by 2050 with emissions offset in other parts of the UK that are 'net sinks'.

¹ In our Balanced Pathway, methane emissions in Northern Ireland fall by 42% from 2020 to 2050.

Our analysis shows that Northern Ireland's position as a strong agri-food exporter to the rest of the UK, combined with more limited capabilities to use 'engineered' greenhouse gas removal technologies, means that it is likely to remain a small net source of greenhouse gas emissions – almost entirely from agriculture – in any scenario where the UK reaches Net Zero in 2050. It is fair that those residual emissions should be offset by actions in the rest of the UK.

At this time, **our assessment is that a Net Zero target covering all GHGs cannot credibly be set for Northern Ireland.** Targets should be ambitious, but must be evidence-based and deliverable with a fair and equitable route map to achieving them.

Our recommendations on the UK's Sixth Carbon Budget take into account a set of considerations defined in the Climate Change Act.² As new evidence on climate science, behaviours or low-carbon technologies (particularly in low-carbon farming measures) emerges and/or the UK's international climate commitments change, it may be prudent to tighten a 2050 target in Northern Ireland.

Northern Ireland's climate legislation should allow emissions reductions to go beyond our current assessment by requiring *at least* an 82% reduction, and should contain clear provisions to tighten the target if there is evidence to support such a decision. We have already seen similar provisions used to increase climate targets for the UK, Scotland and Wales since 2019.

Our responses to specific requests from your officials are summarised below, with further detail set out in the Annex that accompanies this letter.

We have also set out additional recommendations on setting targets, which should cover international aviation and shipping, be focused on domestic efforts to reduce emissions rather than credit purchase, and define stretching interim targets on the route to 2050 that are in line with our recommended Balanced Pathway.

We also recommend that - like the UK, Scotland and Wales - the Northern Ireland Executive produces and monitors statistics on its overseas consumption footprint.

Economy wide costs of meeting both the 82% target and a Net Zero target by 2050.

Our analysis demonstrates that the costs of deep decarbonisation are affordable and achievable for Northern Ireland and for the whole of the UK.

Northern Ireland's contribution to our recommended UK Sixth Carbon Budget involves a large sustained increase in investment in Northern Ireland, adding around £1.3 billion annually by 2030. The largest increases are for low-carbon power capacity, retrofit of buildings and the added costs of batteries and infrastructure for electric vehicles.

This required increase in investment can be delivered largely by the private sector.

Operational savings from fuel costs and increased efficiency will offset the investment costs in later years. As a result, our estimate of the annualised resource cost (which measures the net additional cost each year to deliver the same services with lower emissions) peaks at around £300 million per year in the early 2030s. Resource costs are less than 1% of 2018 GDP in Northern Ireland in every year from now through to 2050.

² This includes scientific knowledge; technology; economic circumstances; fiscal circumstances; energy policy and supply; differences between England, Scotland, Wales and Northern Ireland; international circumstances; and international aviation and shipping.

Our analysis has not produced a scenario for UK Net Zero in 2050 that sees Northern Ireland reach Net Zero in the same year. We are not therefore able precisely to calculate the costs of Northern Ireland reaching Net Zero, but they will almost certainly be higher than those of the 82% reduction target, by up to £900 million per year by 2050 if engineered removals technologies are used.

The context of a Net Zero 2050 target for the whole of the UK is also important. Rather than leading to additional overall reductions in UK GHG emissions, there is a risk that a Net Zero target for Northern Ireland in the same year or earlier could simply shift a greater share of the UK-wide costs of reaching Net Zero to Northern Ireland.

The economic context for the proposed interim targets for the advised 82% target by 2050.

The context of COVID-19 and the falling costs of low-carbon electricity favour a decisive transition for Northern Ireland, quickly switching resources away from high-carbon activity and into low-carbon investments with lower operating costs than high-carbon alternatives.

Northern Ireland must act swiftly to deliver a green recovery and avoid the substantially higher costs of delayed climate action. If successful, Northern Ireland has the capability to become a climate leader, driving action from Westminster by setting the benchmark in Belfast.

How does a 2050 emissions target in Northern Ireland feed into the UK-wide and global economic benefits?

The Northern Ireland Executive can support UK action by setting equally stretching targets into law. More importantly, Northern Ireland must develop ambitious policies that are aligned to the UK pathway to Net Zero via our recommended Sixth Carbon Budget.

Our recommendations to Northern Ireland from December 2020 support a leadership-driven global pathway that reflects the goals and requirements of the Paris Agreement, recognising the UK's responsibilities as a richer developed nation and its capabilities.

Additional information on the overall costs and benefits to Northern Ireland of setting a realistic target in line with the CCC's advice – and risks of aiming too high too soon.

In addition to green recovery opportunities and the investment requirements and operational savings, there is overwhelming evidence that reducing greenhouse gas emissions will be beneficial to public health in Northern Ireland.

Our scenarios require that almost all new purchases and investments in Northern Ireland are in zero-carbon solutions by 2030 or soon after, and virtually all technology in Northern Ireland is zero-carbon by 2050.

Going further to reach Net Zero in 2050 would likely require either (or both) of the following:

- A **larger reduction in output from Northern Ireland's livestock sector** compared to the rest of the UK. Even our most stretching Tailwinds scenario – which entails a 50% fall in meat and dairy production in Northern Ireland by 2050 and significantly greater levels of tree planting on the land released – is not enough to get Northern Ireland to Net Zero emissions in 2050. Without a corresponding reduction in consumption of such produce, this would simply shift emissions overseas.
- A **much greater than equitable share of all UK greenhouse gas removal technologies** being located in Northern Ireland.

The greatest risks are associated with failing to act quickly enough. Delays to action are likely to increase global **climate risk**, increase **uncertainty** for businesses and households, lead to **unnecessary costs** in future, and could lead to Northern Ireland **missing out on the benefits** of climate investment that takes place elsewhere in the UK.

However, going too fast, and in particular aiming to decarbonise significantly faster than the rest of the UK, also poses several risks:

- Setting emissions reduction targets that are too ambitious to be delivered can **undermine their credibility**.
- Going beyond the natural rate of stock turnover would lead to **premature scrappage** of assets (e.g. vehicles, boilers). This may be costly, risks undermining popular support for transition, and could cause increased embedded emissions.
- Unfair **distributional impacts**, particularly if Northern Ireland's targets are out of line with HM Treasury actions to support a Just Transition to the UK target.

I would like to reaffirm the Committee's support for the Executive's increasing action on climate in the past year, even in the face of significant external challenges. We remain ready to support the Northern Ireland Executive as you develop and pursue targets that support UK Net Zero and the Paris Agreement.

We also note recent developments in climate legislation in the Republic of Ireland, and welcome opportunities to work more closely with the Climate Change Advisory Council in future to support our shared goals of global action on climate change.

Yours,



Lord Deben
Chairman

This Annex sets out responses to a request from your officials in February 2021 for further evidence on the economic costs of setting and delivering a 2050 emissions target for Northern Ireland.

A set of detailed scenario data for Northern Ireland is provided in the Sixth Carbon Budget Dataset, available on our website.³

1. Economy wide costs of meeting both the 82% target and a Net Zero by 2050.

a) Resource and investment costs of reaching an 82% reduction in emissions by 2050

As part of the Committee's analysis carried out for the UK Sixth Carbon Budget,⁴ published in December 2020, we modelled the costs associated with five scenarios for decarbonisation, including the Balanced Net Zero Pathway on which we base our recommended targets.

The costs we include in this analysis fall into the following categories:

- **Change in capital investment.** Additional capital investment reflects the in-year spending required to deploy a given measure of abatement (excluding cost of capital). Much of the costs of this investment will be annualised through financial products and services, meaning that end payers (e.g. electricity users) will likely spread payments over longer time periods and also incur an additional cost of capital.
- **Change in operational costs.** Additional operating costs refer to the difference in in-year running costs between an abatement measure and the technology it replaces. For example, the difference in cost between buying fuel for a boiler and electricity for a heat pump that replaces it. In most cases operating costs fall due to improved efficiency or lower energy costs.
- **Annualised resource costs.** Annualised resource costs are estimated by adding up costs and savings from carbon abatement measures and comparing them to costs in an alternative scenario of no-further-climate-action. Capital investments are annualised and include costs of capital so that capital-intense and fuel-intense technologies are more easily compared. Broadly, annualised resource costs measure the extra amount that needs to be spent each year to deliver the same services with lower emissions.

The Balanced Pathway to deliver a reduction of at least 82% in Northern Ireland involves a large **sustained increase in investment, adding around £1.5 billion annually by 2030**, as part of UK-wide required increase in investment of around £50 billion (compared to current UK-wide investment of nearly £400 billion). The largest increases are for low-carbon power capacity, retrofit of buildings and the added costs of batteries and infrastructure for electric vehicles.

This required increase in investment can be delivered largely by the private sector. These investment costs should not be interpreted as capital expenditure that would be delivered solely through the Northern Ireland Budget, nor as costs that only Northern Irish businesses and consumers have to bear. Many of the actions to reduce emissions will likely be paid for at UK level and/or socialised across the whole of the UK.⁵

³ <https://www.theccc.org.uk/wp-content/uploads/2021/02/The-Sixth-Carbon-Budget-Dataset.xlsx>

⁴ CCC (2020) *The Sixth Carbon Budget: The UK's path to Net Zero*.

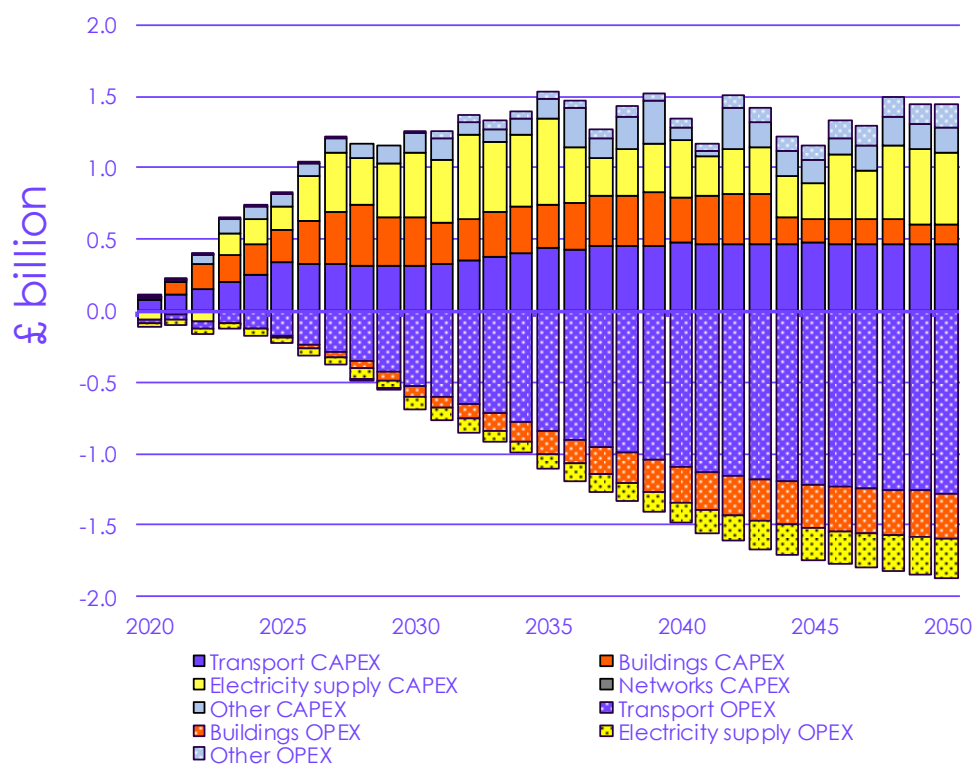
⁵ For example, through UK-wide taxation and/or carbon pricing, research and innovation expenditure with spillover benefits to Northern Ireland, or the costs of decarbonising goods in Northern Ireland being passed through to the price paid by consumers across the UK.

The role of Government in securing this investment in Northern Ireland is to set a consistent and **clear long-term direction**, provide **investable incentives**, implement sector-specific **enabling measures** and tackle **non-financial barriers** to investment, and take actions to ensure that the transition is **fair**.

The total level of investment required to reach Net Zero for the whole of the UK is well within the range of historical changes in UK total investment. The sectoral increases have broadly been seen before, for example, in the transport sector as car-buyers shifted towards larger cars, in the power sector as renewable investment increased in the last decade, and in the housing sector as spending on refurbishments increased. It can be financed at low cost if policies are constructed to give long-term clarity to consumers and confidence to investors.

We are also able to demonstrate that increased savings in fuel costs and improved efficiency will largely offset the investment costs in later years (Figure 1).

Figure 1 Capital investment costs and operating costs savings in the Balanced Pathway for Northern Ireland

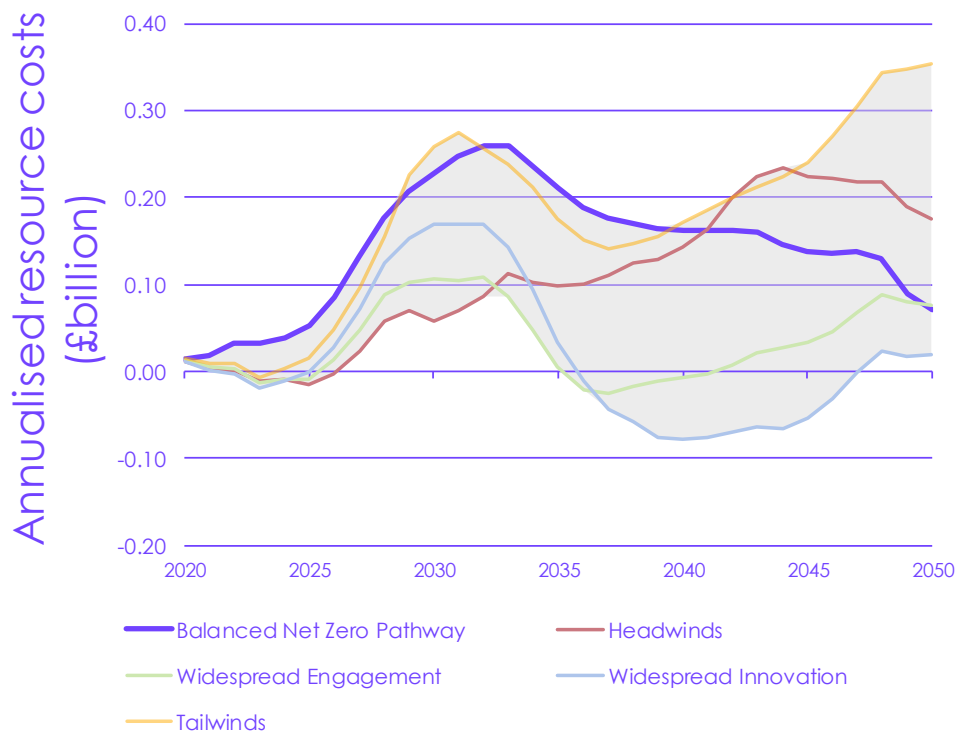


Source: CCC analysis.

Notes: Costs of electricity are included in the energy supply sector, whereas costs of other low-carbon fuels such as hydrogen and bioenergy are included in the sectors that use these fuels. Northern Ireland's share of UK electricity decarbonisation costs and savings is allocated based on electricity consumption rather than where generation takes place. The 'Other' category includes manufacturing, construction, fuel supply, agriculture, land use, waste and F-gases. CAPEX refers to additional annual capital investment. OPEX refers to costs and savings due to operational cost changes.

The investment requirements and operational cost savings are combined to form our central estimate of the annualised resource cost (which measures the net additional cost each year to deliver the same services with lower emissions).⁶ Our estimate of the annualised resource cost peaks at around £300 million per year in the early 2030s. Resource costs are projected to be less than 1% of 2018 GDP in Northern Ireland in every year from now through to 2050 (Figure 2).

Figure 2 Estimate of annualised resource costs of the transition in Northern Ireland



Source: CCC analysis.

Notes: Annualised resource costs are capital investment costs spread over their lifetimes using a suitable cost of capital, added to in-year operating cost savings and increases.

⁶ The sum of capital and operating costs is not exactly equal to the annualised resource/abatement costs, as annual abatement costs are annualised over the lifetime of an asset, and include the costs of financing.

b) Macroeconomic impacts and other co-impacts



The added resource costs will not necessarily reduce GDP by an equivalent amount, particularly given the spare capacity in the economy following the COVID-19 pandemic (see Section 2).

Modelling commissioned for the Committee suggests that the level of UK GDP could be around 2% higher than it would have been by 2035 as resources are redirected from fossil fuel imports to UK investment.⁷ The complex and dynamic macroeconomic impacts of such an investment programme are uncertain, and more so when considering sub-national impacts. Positive or negative growth impacts could be highly concentrated in some regions of the UK. The UK Government and Northern Ireland Executive both have key roles to play in delivering a just transition that ensures the costs of UK Net Zero are spread fairly and the benefits shared widely.

Long-term decarbonisation can also bring substantial co-benefits, particularly for the natural environment, climate change adaptation, and public health.

Our Expert Group review⁸ of the health impacts of decarbonisation showed that the near-term benefits to public health of taking action on climate change are manifold, but good policy is needed to ensure those benefits can be experienced by all. The actions required to decarbonise Northern Ireland can bring vastly improved air quality, healthier ways of travelling, more comfortable and efficient homes and workplaces, and better-quality diets.

c) Additional costs of reaching Net Zero in Northern Ireland

Our analysis has not produced a scenario for UK Net Zero that sees Northern Ireland reach Net Zero in or before 2050. We are not therefore able precisely to calculate the costs of Northern Ireland reaching Net Zero, were this to be feasible. The costs of doing so would be higher than those of the recommended 82% reduction target, for example by up to £900 million per year by 2050 if engineered greenhouse gas removal technologies are used to meet the gap between the Balanced Pathway for 82% and Net Zero in 2050.⁹

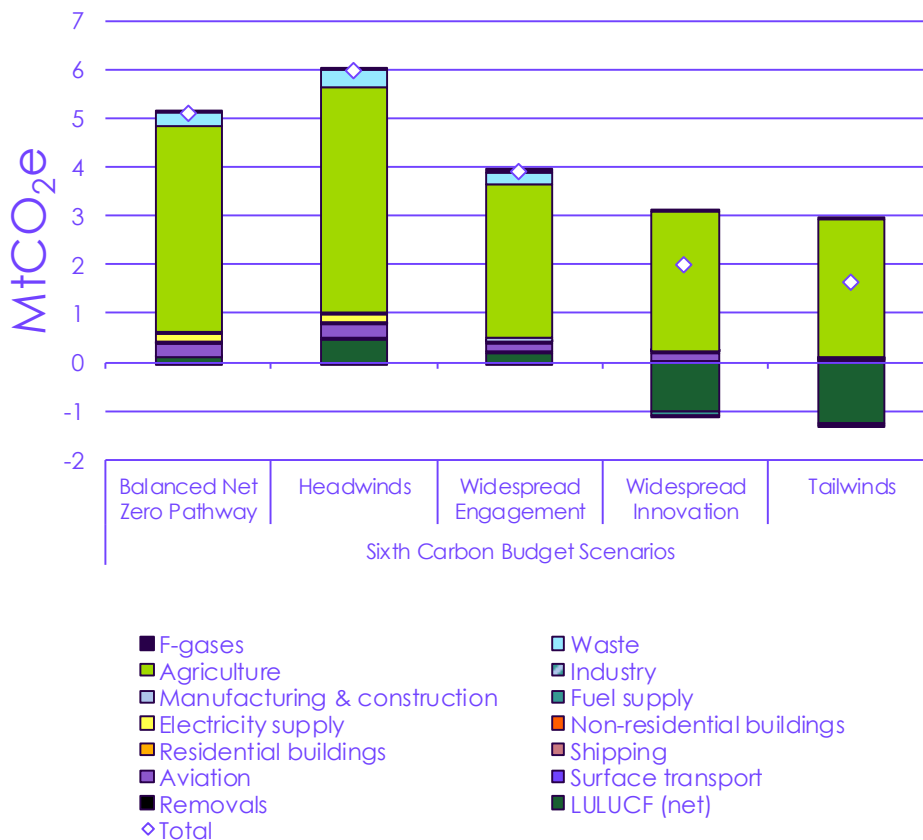
Our scenarios require that almost all new purchases and investments in Northern Ireland are in zero-carbon solutions by 2030 or soon after, and virtually all technology in Northern Ireland is zero-carbon by 2050. However, this is insufficient to reach Net Zero in Northern Ireland, due to residual emissions from agriculture and the relatively limited potential of land use emissions sinks to offset those emissions (Figure 3).

⁷ Cambridge Econometrics for the CCC (2020) *Economic impact of the Sixth Carbon Budget*

⁸ CCC Advisory Group on Health (2020) *Sustainable Health Equity: Achieving a Net Zero UK*.

⁹ This estimate assumes a marginal cost of £180/tCO₂ for engineered removals to meet Net Zero in 2050 compared to our Balanced Pathway in 2050.

Figure 3 Emissions in Northern Ireland in 2050 in The Balanced Pathway and exploratory scenarios.



Source: CCC analysis.

Going further to reach Net Zero in 2050 would require one (or both) of the following:

- **A substantial reduction in output from Northern Ireland's livestock** farming sector that goes beyond even the more stretching scenarios we developed in 2020. A reduction in output does not necessarily entail a direct economic 'resource cost', but there are clear distributional and social impacts that would need to be managed. Without a corresponding reduction in consumption of such produce, this would simply shift emissions overseas.
- **A much greater than equitable share of all UK greenhouse gas removal technologies** being located in Northern Ireland compared to the size of Northern Ireland's current emissions, population, land area or economy. In pure resource cost terms, this would require an additional £900 million per year in Northern Ireland by 2050. However, there may be strong strategic reasons to locate these technologies outside of Northern Ireland (for example near carbon capture and storage clusters and sources of sustainable biomass elsewhere in the UK).

Our exploratory Tailwinds scenario - a highly optimistic scenario, stretching feasibility in a wide range of areas and going beyond the current evidence in others - shows Northern Ireland achieving a 94% reduction in emissions by 2050. Compared to the Balanced Pathway, this exploratory scenario would require additional capital investment of £450 million in every year on average between 2030 and 2050. This scenario also has greater operating cost savings than the

Balanced Pathway, resulting in overall annualised resource costs that are around £300 million higher than the Balanced Pathway by 2050.¹⁰

This highly optimistic scenario is – in part – designed to explore what is possible under favourable conditions with low technology costs and widespread behaviour changes. As we set out in our advice on the UK Sixth Carbon Budget, it is the Committee's assessment that the Tailwinds scenario is very unlikely to be deliverable in its entirety and should not be used as the basis for setting legally-binding emissions targets. If those optimistic assumptions do not materialise, the costs of reaching a 94% reduction in Northern Ireland would be considerably higher than our analysis for the Sixth Carbon Budget suggests.

In the context of a Net Zero 2050 target for the whole of the UK, setting a Net Zero target for Northern Ireland in the same year – or earlier – might not lead to additional overall reductions in UK GHG emissions, but rather act to shift a greater share of the UK-wide costs of reaching Net Zero to Northern Ireland.

2. The economic context for the proposed interim targets for the advised 82% target by 2050

Our advice comes at a time of heightened uncertainty in Northern Ireland due to the dual impacts of COVID-19 and the UK's departure from the European Union, but with widespread public and business support for climate action and a major opportunity for low-carbon investment to support international action and be at the heart of the post-pandemic economic recovery.

The economic and social context for climate action has changed in important ways since our 2019 Net Zero report:

- **The COVID-19 pandemic** and measures taken in response to it have sharply changed the economic backdrop in Northern Ireland, across the rest of the UK, and globally. These impacts have likely led to considerable spare capacity in the economy, and measures to increase capital investment can support Northern Ireland's economic recovery.
- **EU exit.** Northern Irish climate policy in coming years will undoubtedly be affected by the UK's departure from the EU. Its lasting impacts, particularly in relation to Northern Ireland, remain highly uncertain at this stage. Of particular importance will be the future of emissions trading in Northern Ireland, product standards, the successor to the Common Agricultural Policy, and environmental governance.
- **UK Net Zero and Nationally Determined Contribution (NDC).** The UK Government has formally adopted a Net Zero target into law and set an enhanced NDC for 2030, strengthening the case for Northern Ireland to adopt new emissions targets in line with UK commitments.
- **Wider Net Zero commitments** by other countries and businesses clearly demonstrate momentum building towards greater climate action. This should drive down low-carbon technology costs that themselves can enable further commitments to action, while also reducing risks of emitting activities moving elsewhere in the world. These commitments are a demonstration that future markets lie with low-carbon products. Business models that are not compatible with a Net Zero future are increasingly risky.
- **Costs of key low-carbon technologies** have continued to fall. For example, the contracted price for electricity generated by offshore wind fell again in the latest GB auction round by around a third compared to the previous auction two years earlier. These cost reductions are driven

¹⁰ The additional resource costs to go beyond even the Tailwinds scenario and reach Net Zero using engineered removals could be an additional £300 million.

by large scale manufacturing, investor confidence and 'learning-by-doing' during deployment within an effective low-risk policy framework. These effects can be replicated in other areas of the economy, as markets scale up globally and the costs of low-carbon technologies continue to fall.

a) Supporting a 'green recovery' from COVID-19

COVID-19 is a public health crisis with tragic consequences for many. It brings uncertainty for the future, but also shows how rapidly things can change when necessary and has brought renewed attention to the role of investment in driving economic recovery. The period ahead is therefore an opportunity to make rapid progress.

The steps that Northern Ireland takes to rebuild following the COVID-19 pandemic and its economic damage can also accelerate the transition to low-carbon activities and improve our climate resilience. Green stimulus policies can be economically advantageous in the short run when compared to traditional fiscal stimulus. They have been shown to create more jobs and have higher short-run multipliers. In the long run, investments in low-carbon and adaptation technologies can create a 'virtuous reinforcing cycle' as initial investments lower costs and help to accelerate deployment and innovation.¹¹

The pandemic has also demonstrated how quickly social changes can occur, and the role of government in driving that change. Social and behavioural changes will make a crucial contribution to decarbonising the economy.¹²

Setting climate targets during the COVID-19 pandemic brings with it the risk that the projections we have used for the level and nature of economic activity in Northern Ireland are significantly out of line with the reality that emerges as we recover from its impacts, particularly in the nearer term.

In our 2020 Progress Report¹³ we outlined the opportunities for a 'green' recovery - many climate investments can be delivered quickly, have high economic multipliers (i.e. they in turn stimulate further boosts to economic activity), create high numbers of jobs, and boost spending in the UK (rather than overseas). They can also bring a range of wider benefits, including for health and well-being. There are clear economic, social, and environmental benefits from immediate expansion of the following measures:

- Investments in low-carbon and climate-resilient infrastructure.
- Support for reskilling, retraining and research for a net-zero, climate-resilient economy.
- Upgrades to our homes and other buildings ensuring they are fit for the future.
- Action to make it easy for people to walk, cycle, and work remotely.
- Tree planting, peatland restoration, and investment in green spaces and other green infrastructure.

This background favours a decisive transition for the UK and for Northern Ireland, quickly switching resources away from high-carbon activity and into low-carbon investments with lower operating costs than high-carbon alternatives. This is reflected in our proposed pathway for Northern Ireland, which transitions as rapidly as possible within constraints of stock turnover, supply chain capacity and time required to design effective policy.

¹¹ Advisory Group on the Costs and Benefits of Net Zero for the CCC (2020) *Supplementary report: economic impacts of COVID-19*.

¹² CCC (2020) *Net Zero after Covid: Behavioural Principles for Building Back Better* (Nick Chater).

¹³ CCC (2020) *Progress Report to Parliament*.

3. How does Northern Ireland setting a 2050 emissions target feed into UK-wide and global economic benefits?



While Northern Ireland has not yet defined legal emissions reductions targets, these reductions will anyway be necessary to contribute to the delivery of the UK's Net Zero goal and its international obligations, including those under the Paris Agreement.

The Northern Ireland Executive can support UK action by setting equally stretching targets into law and by pursuing ambitious devolved policies that are well aligned to the UK's path to Net Zero via the Sixth Carbon Budget. Doing so will provide additional certainty to Northern Ireland's businesses and householders and set a clear direction for policymakers in areas where powers are devolved.

If successful, Northern Ireland has the capability to become a climate leader within the UK, driving action from Westminster by setting the benchmark in Belfast.

a) Northern Ireland's contribution to UK targets

The credibility of the UK's Sixth Carbon Budget and Net Zero rests on action in all parts of the UK, including Northern Ireland. The technological and behavioural challenges and solutions to tackling greenhouse gas emissions are broadly similar across the UK.

This does not mean that Northern Ireland will follow the exact same emissions reduction pathway as the rest of the UK, nor does it lessen the need for policies that are tailored for national, regional and local needs.

Equal effort towards UK Net Zero will lead to different emissions pathways. The balance of activity across different sectors - particularly aviation, agriculture and land use, manufacturing and construction, fuel supply and greenhouse gas removals - means different levels of emissions reduction are possible in different parts of the UK through the Sixth Carbon Budget period and by 2050.

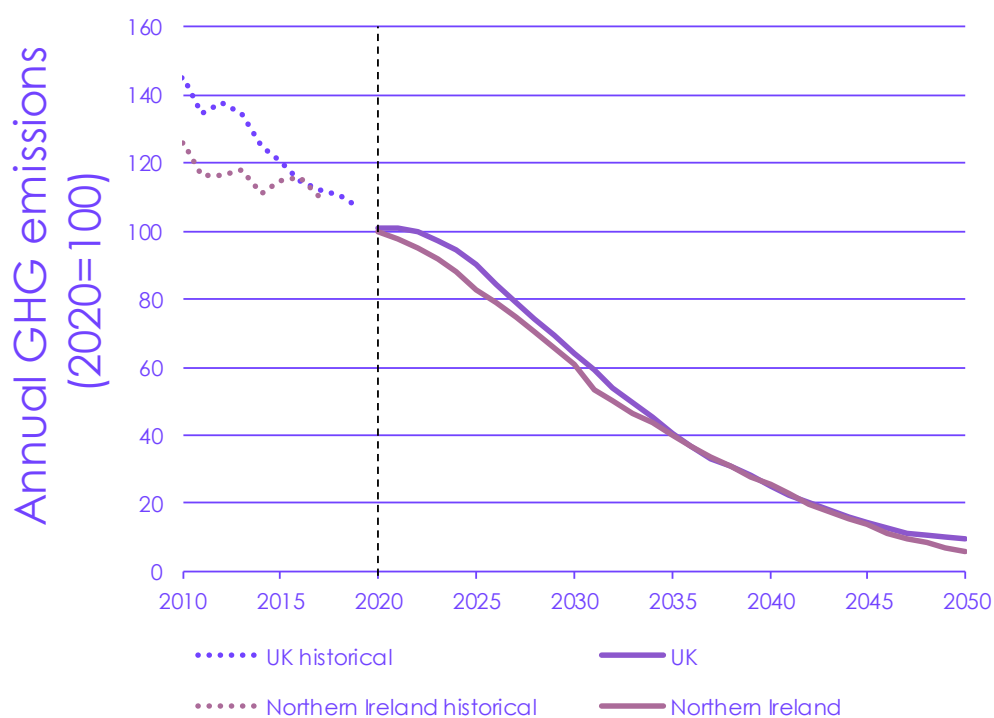
The key factors determining the rate at which Northern Ireland can reduce its emissions relative to the UK are: different levels of activity and emissions in each sector today; existing land usage and opportunities for land-based removals; existing infrastructure; and opportunities to remove CO₂ from the atmosphere:

- Higher or lower shares of **current emissions and activity** in each sector mean that the pace and scale of mitigation actions - or failures to act - will have a proportionally higher or lower impact on the economy-wide emissions pathways for Northern Ireland compared to the rest of the UK. In particular, around 10% of all UK emissions are from agriculture, compared to 27% in Northern Ireland.
- **Differences in land use.** The livestock sector results in a higher proportion of grassland in Northern Ireland and lower proportion of cropland. Forest coverage is also lower than the rest of the UK at around 8% (including small woodland area), and significant emissions from peatlands mean that land use is currently a much larger net source of emissions in Northern Ireland compared to the rest of the UK. Northern Ireland must plant trees and restore peatland to build a net land use sink over time, but the starting point means that the total size of the net sink will be smaller in Northern Ireland than in other parts of the UK by 2050.
- Some **differences in infrastructure** will continue as far as 2050. In particular, the natural gas network is much less developed in Northern Ireland – representing less risk of stranded assets as the energy system is decarbonised – and the electricity network is part of the all-island I-SEM. Our analysis also takes into consideration the existing housing stock, clusters of heavy industry, and airport infrastructure.

- Potential to store CO₂.** Greenhouse gas removal technologies could – in theory – be located anywhere in the UK and would count towards UK emissions reductions. However, there are strategic reasons why bioenergy with carbon capture and storage (BECCS) and direct air capture (DACCS) might be best located in certain areas of the country – such as co-location with industrial CCS clusters, in close proximity to CO₂ storage sites, or in close proximity to sources of biomass. Due to more limited access to CO₂ storage sites and a smaller industrial sector, Northern Ireland is less likely to have a major UK CCS cluster by 2050, and therefore does not appear to be the most ideal place to locate greenhouse gas removal technologies.

Our analysis takes into account these differences in circumstances wherever possible. The dynamics of the transition in Northern Ireland outside of the agriculture and land use sectors are very similar to the rest of the UK, with Northern Irish emissions falling at a comparable rate over time to similar levels by 2050 (Figure 4). The effort required from the agriculture and land use sectors is also equivalent, with very similar emissions reduction profiles seen for Northern Ireland and the UK as a whole in the agriculture sector (Figure 5).¹⁴

Figure 4 Emissions in Northern Ireland and the UK in the Balanced Pathway for all sectors excluding agriculture, land use and GHG removals.



Source: CCC analysis.

¹⁴ We have not produced a chart of land use, land-use change and forestry (LULUCF) trajectories on a like-for-like basis, because the transition from net source of emissions to net sink makes percentage reduction comparisons difficult. The actions in our scenarios for Northern Ireland in land use are broadly comparable to the UK.

Figure 5 Emissions in Northern Ireland and the UK in the agriculture sector



Source: CCC analysis.

When combined - and assuming that the UK's engineered GHG removals will be mostly deployed at scale in Great Britain but not in Northern Ireland - these actions will get the UK as a whole to Net Zero in 2050, but Northern Ireland to a reduction of 82% compared to 1990 levels. This figure does not mean lower effort, ambition or policy action - it represents equivalent effort being applied to Northern Ireland's specific circumstances.

b) The UK's contribution to the Paris Agreement



Our recommended Sixth Carbon Budget and the UK's newly-set Nationally Determined Contribution (NDC) reflect the goals and requirements of the Paris Agreement, recognising the UK's responsibility as a richer developed nation and its respective capabilities:

- Our recommended pathway has been explicitly designed to reflect the UK's '**highest possible ambition**' within the UK's particular capabilities, as required by the Paris Agreement.
- It would reduce the UK's annual **per capita emissions** by 2035 to under 3 tCO₂e per person, in line with global pathways consistent with meeting the Paris 1.5°C goal.
- The **actions** required to meet the budget and NDC would go beyond those required from the world on average in line with the UK's responsibility as a richer nation with larger historical emissions. The timing of these actions would align to that required from other climate leaders.
- A '**leadership-driven**' global pathway sees comparable action from other developed countries, with developing countries following slightly later (i.e. where they generally adopt low-carbon measures later, achieve lower percentage reductions to 2030 and reach Net Zero emissions after 2050), and would limit warming well below 2°C.
- The policies and actions in our pathways have important crossovers with the need to **adapt to climate change**, which is also included as a key part of the long-term response to climate change in the Paris Agreement.

c) The UK's contribution to global benefits

The actions needed to develop and deploy deep decarbonisation options over the 2020s in the Balanced Net Zero Pathway can have significant global benefits in the decades thereafter.

Our Balanced Pathway deploys most **low-carbon options at scale** before they must reach similar scales for the world as a whole, but in line with emerging commitments from other climate leaders. That is particularly important for deep decarbonisation options including widespread electrification in industry, carbon capture and storage (CCS) and low-carbon hydrogen, some of which are currently relatively expensive and need early-stage support before a global scale-up would be credible.

The UK can and should do more to **support the global effort than just delivering its domestic emissions reduction pathways**. In particular, the UK's role as host of COP26 and President of the G7 group in 2021 give it an opportunity and a responsibility to coordinate efforts to align the economic responses to COVID-19 with the significant shifts in investment patterns needed over the coming decade to keep the Paris Agreement long-term temperature goal within reach. The UK is an important provider of climate finance for both mitigation and adaptation; the UK's role as a global financial hub provides additional opportunities to do so through financial system reform.

Part of the UK's effort to support global decarbonisation should involve actions to **track and reduce its overseas consumption footprint**. A variety of levers are available to the UK to support reductions in the overseas emissions that help meet UK consumption. Under successful efforts to reduce global emissions in line with the Paris Agreement, exploratory modelling indicates that the UK's consumption emissions footprint could be reduced as much as 90% below 1990 levels by 2050. The Government should track these emissions against a target trajectory consistent with global outcomes achieving the Paris Agreement.

We recommend that - like the UK, Scotland and Wales - the Northern Ireland Executive produces and monitors statistics on its overseas consumption footprint.



4. Other relevant Northern Ireland-specific information indicating why the 82% reduction target is the right one for Northern Ireland. Anything relevant on overall costs and benefits to Northern Ireland of setting a realistic target in line with the CCC's advice – and risks of aiming too high too soon.

Section 3 sets out how the 82% target is an equitable contribution to the UK Net Zero goal in 2050. Setting a long-term target that goes beyond this level of effort may pose additional risks to Northern Ireland, but failure to act also brings substantial risks.

In this section, we also set out further recommendations on the coverage and design of targets for Northern Ireland.

a) Risks of delaying action

A slower path to decarbonisation in Northern Ireland would bring large-scale risks that would be difficult to manage:

- As COP26 president the UK is uniquely placed to lead a more rapid global transition. Less ambitious domestic targets could lead to a slower global programme and, ultimately, **higher levels of climate change**.
- Our proposed Balanced Pathway implies a decisive and clear pathway supported by policies that can give businesses confidence that their investments will be future-proofed. A slower path could introduce more **uncertainty and more room for indecision** in Northern Ireland that will increase costs of capital and lead to more capital scrappage as high-carbon investments continue unnecessarily.
- Slow progress can also lead to **unnecessary costs**. For example, the historical failure to ensure that new homes are built to high zero-carbon standards has meant that over a million homes have been built that will require more expensive retrofit in later years and that have higher than necessary energy bills for their occupants.
- A slower path would **miss opportunities for increased investment** to provide a boost to the recovery and to use under-utilised resources in the economy. In particular, a failure to act decisively could have distributional impacts if the rest of the UK accelerates action, with Northern Ireland missing out on the growth and job-creation benefits of low-carbon investment.
- The recent increase in **climate commitments in other countries** also emphasises there are risks attached to moving too slowly. For example, the EU are considering introducing border tariffs targeted at high-carbon imports and has signalled raising its 2030 emissions reduction target to 55%.

b) Risks of going too fast

There are risks of Northern Ireland trying to go too fast that could backfire and undermine a more ambitious target:

- Unfair **distributional impacts**, particularly if Northern Ireland's targets are out of line with HM Treasury actions to support a Just Transition to the UK target. A smooth transition is more likely to be a just transition, avoiding stop-start programmes for the jobs market and investment. An attempt to make the transition too quickly could make a just transition more difficult to achieve as it would imply stop-go replacement profiles and give less time for appropriate supply chains to fully develop and be sustained. Going beyond the fair contribution to UK Net Zero targets would potentially put unfair constraints on Northern Ireland's agriculture sector, or drive higher costs associated with

engineered GHG removals into Northern Ireland that may not have otherwise been distributed there in an optimal path to UK Net Zero.

- Requiring an extremely rapid transition to Net Zero could have **unintended consequences**, as feasible options to reduce emissions are limited. This could lead to a dash for options to fill the gap, which could include large-scale use of biomass (e.g. with CCS to provide greenhouse gas removals). This may imply a high reliance on imported biomass, potentially beyond what can be supplied sustainably and driving unwelcome land-use changes in other countries.
- Going beyond the natural rate of stock turnover would lead to **premature scrappage** of assets (e.g. vehicles, boilers), which could be costly and risk undermining popular support for transition and increasing embedded emissions.
- Setting emissions reduction targets that are too ambitious to be delivered can **undermine their credibility**. A significant aspect of the UK's international influence comes from the expectation that once set our targets will be met or outperformed. Our Balanced Net Zero Pathway has been designed to be ambitious on emissions reductions over the next 15 years, but fully achievable given real-world constraints and uncertainty on how supportive people will be of the transition in their choices and behaviours and how quickly technologies will develop.

c) Target design and coverage

When carbon targets are set, the level of ambition embodied within them does not depend on whether they are set in a percentage form (e.g. an 82% reduction on 1990 levels by 2050) or in absolute terms (e.g. a reduction to 5.0 MtCO_{2e} in 2050).

The two forms of target do diverge if the estimate of emissions in 1990 changes (e.g. as a result of changes to the methodology for estimating emissions). That estimate is based on the UK inventory of greenhouse gas emissions.

There is no single best basis on which to set targets. Percentage targets tend to mean that the amount of policy effort required to meet a target is less affected by changes to the emissions inventory, while absolute targets remain more aligned to the underlying climate science that links megatonnes of emissions to the extent of climate change.

Neither method is clearly correct or incorrect. However, the mix of percentage and absolute targets that existed in Scotland prior to 2019 proved unsatisfactory. It is therefore preferable to specify targets on one basis or the other.

The Committee's assessment is that the most important function of emissions targets is to provide clarity to policymakers and investors on the necessary decarbonisation actions. The whole UK is covered by a set of targets expressed in total MtCO_{2e}, while Scotland and Wales have defined targets on a percentage basis. Percentage reduction targets have the advantage of being less sensitive to changes in the GHG inventory, and therefore can be a more stable measurement of underlying and required progress in reducing emissions. This is particularly important in Northern Ireland where there is relatively greater uncertainty in the inventory due to the relative size of the agriculture sector and share of UK's emissions from peatland.

As new evidence on climate science, behaviours or low-carbon technologies (particularly in the agriculture sector) emerges and/or the UK's international climate commitments change, it may be prudent to tighten emissions reductions targets in Northern Ireland.

Northern Ireland's climate legislation should allow emissions reductions to go beyond our current assessment by **requiring at least an 82% reduction, and should contain clear provisions to tighten the target** if there is evidence to

support such a decision. We have already seen similar provisions used to increase climate targets for the UK, Scotland and Wales since 2019.

Targets should be set well in advance – our statutory recommendations on UK targets are given fifteen years before the middle of the budget period. In order to provide certainty and investable signals, Northern Ireland should also look to **define a set of interim targets or carbon budgets on the pathway to the 2050 target that are in line with our recommended Balanced Pathway, covering at least the next fifteen years.**

The scope of those targets is also an important consideration. Our recommended pathway is defined such that it is focused on domestic action, includes Northern Ireland's share of international aviation and shipping, and allows for the potential use of engineered removals. Targets should be defined on this basis. These are in line with equivalent legislation in Wales and In Scotland:

- **Domestic action.** The aim should be to meet targets through domestic effort in Northern Ireland, without relying on international carbon units (or 'credits').¹⁵ Emissions trading – including potentially within a UK scheme – can be a useful policy lever to drive down actual Northern Irish emissions (net of land use sinks and any engineered removals) by ensuring greenhouse gas emitters face a stable and predictable carbon price.
- **International aviation and shipping.** Northern Ireland's share of emissions from international aviation and international shipping should be included within the scope of its targets.
- **Engineered removals.** We recommend that engineered CO₂ removal is allowed to contribute to meeting Northern Ireland's carbon targets. This will require sustainable, verified greenhouse gas removals.

¹⁵ Our 2020 Sixth Carbon Budget Report sets out how using international carbon units in place of domestic action to meet the UK's Balanced Pathway poses several risks:

- The UK has an internationally influential record of domestic emissions reductions. The usage of international carbon units to substitute for emissions reductions that could be achieved domestically could undermine this influence and legitimise other countries to weaken their commitments to domestic actions.
- Usage of credits could impair the clarity of the sectoral actions required to meet the budget by suggesting possible flexibility in the need to deliver emissions reductions.
- Substituting domestic effort with purchased emissions reductions from outside the UK could make it more difficult to achieve the necessary domestic transitions needed to reach Net Zero by 2050.