ENVIRONMENT, CLIMATE CHANGE AND LAND REFORM COMMITTEE

AGENDA

35th Meeting, 2018 (Session 5)

Tuesday 27 November 2018

The Committee will meet at 9.30 am in the Robert Burns Room (CR1).

1. **Decision on taking business in private**: The Committee will decide whether to take item 7 in private.

2. **Climate Change (Emissions Reduction Targets) (Scotland) Bill**: The Committee will take evidence on the Bill at Stage 1 from—
   
   Roseanna Cunningham, Cabinet Secretary for Environment, Climate Change and Land Reform, Clare Hamilton, Deputy Director, Decarbonisation Division, Sara Grainger, Team Leader, Delivery Unit, Decarbonisation Division, and Simon Fuller, Deputy Director, Economic Analysis, Office of the Chief Economic Adviser, Scottish Government.

3. **European Union (Withdrawal) Act 2018**: The Committee will consider a proposal by the Scottish Government to consent to the UK Government legislating using the powers under the Act in relation to the following UK statutory instrument proposals—
   
   The Health and Safety (Amendment) (EU Exit) Regulations 2018;
   The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2018;
   The Floods and Water (Amendments etc.) (EU Exit) Regulations 2018;
   The Justification of Practices for Ionising Radiation, Radioactive Contaminated Land (England) (Northern Ireland) and Nuclear Reactors (Environmental Impact Assessment for Decommissioning) (Miscellaneous Amendments) (EU Exit) Regulations 2018; and
   The Leghold Traps (Amendment) (EU Exit) Regulations 2018.

4. **Subordinate legislation**: The Committee will consider the following negative instrument—
   
   The Environmental Noise (Scotland) Amendment Regulations 2018 (SSI 2018/342).

5. **Climate Change (Emissions Reduction Targets) (Scotland) Bill (in private)**: The Committee will review the evidence heard earlier in the meeting.
6. **European Union (Withdrawal) Act 2018** The Committee will take evidence on the Storage of Carbon Dioxide (Amendment) (EU Exit) Regulations 2018 from—

   Stuart McKay, Head of Carbon Capture, Utilisation and Storage, Scottish Government.

7. **European Union (Withdrawal) Act 2018**: The Committee will review the evidence heard at agenda item 6.

   Lynn Tullis
   Clerk to the Environment, Climate Change and Land Reform Committee
   Room T3.40
   The Scottish Parliament
   Edinburgh
   Tel: 0131 348 5240
   Email: ecclr.committee@parliament.scot.

The papers for this meeting are as follows—

**Agenda item 2**

Climate Change (Emissions Reduction Targets) (Scotland) [ECCLR/S5/18/35/1]
PRIVATE PAPER [ECCLR/S5/18/35/2] (P)

**Agenda item 3**

Statutory Instrument Notification - cover note [ECCLR/S5/18/35/3]
PRIVATE PAPER [ECCLR/S5/18/35/4] (P)

**Agenda item 4**

SSI 2018/342 The Environmental Noise (Scotland) Amendment Regulations 2018 [ECCLR/S5/18/35/5]

**Agenda item 5**

PRIVATE PAPER [ECCLR/S5/18/35/6] (P)

**Agenda item 6**

Statutory Instrument Notification - cover note [ECCLR/S5/18/35/7]
PRIVATE PAPER [ECCLR/S5/18/35/8] (P)
Introduction

1. The Climate Change (Emissions Reductions Targets) (Scotland) Bill was introduced on 23 May 2018 and under rule 9.6 of the Standing Orders, the Parliamentary Bureau referred the Bill to the Environment, Climate Change and Land Reform Committee to consider and report on the general principles.

2. The Scottish Government has published the following documents in relation to the Bill:
   - Climate Change (Emissions Reductions Targets) (Scotland) Bill
   - Policy Memorandum
   - Explanatory Notes
   - Financial Memorandum
   - Delegated Powers Memorandum
   - Statement on Legislative Competence

3. In addition, the Cabinet Secretary for Environment, Climate Change and Land Reform wrote to the Committee to highlight an information and analysis document to support discussion of the Bill. This is included at Annexe A.

4. No secondary Committee was appointed to scrutinise the Bill. However, the Finance and Constitution Committee will consider the Financial Memorandum to the Bill. Provisions relating to delegated powers within the Bill will be considered by the Delegated Powers and Law Reform Committee at Stage 1.

5. This paper sets out the purpose of the meeting and background to the Bill and the Environment, Climate Change and Land Reform Committee’s approach to consideration of the Bill at Stage 1.

Purpose of the Meeting

6. At this meeting, the Committee will hear from the Cabinet Secretary for Environment, Climate Change and Land Reform on the Scottish Government’s development of the Bill and plans for the future of the proposed legislation.

7. The Committee has received various pieces of correspondence from the Scottish Government throughout its consideration of the Bill and these are included at Annexe B.
Background


9. The key provisions of the agreement were:

- 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 (See Article 2);
- 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;
- For developed countries to provide financial support for developing countries to mitigate climate change;
- Creation of goal of “enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change”.

10. Following the adoption of the agreement, the First Minister (who attended the summit) welcomed the agreement and said:

“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.”

11. In its Programme for Government 2016-17, the Scottish Government signalled its intentions to legislate to create new, more pressing climate change targets via new legislation in order to address the Paris Agreement. In its 2017-18 Programme for Government, the Scottish Government stated the Bill would be included in the programme of legislation that year and said:

“The Climate Change Bill will respond to the historic Paris Agreement by setting more ambitious targets to reduce greenhouse gas emissions. The Bill will increase transparency, demonstrate our commitment to sustainable economic growth and signal to the international community that Scotland is the place to do low carbon business.

12. The Scottish Government requested advice from the Committee on Climate Change (CCC) in October 2016 and received this advice in March 2017. Between 30
June and 22 September 2017, the Scottish Government consulted on provisions and policy for inclusion in the Bill. The main themes of the consultation were:

- Updating the 2050 target in the Climate Change (Scotland) Act 2009 by increasing this from 80% to 90% lower than baseline levels;
- Whether the Bill should contain provisions to allow for a net zero emissions target to be set at a later date;
- To update the interim target for 2020 contained in the Climate Change (Scotland) Act 2009 from 42% to 56% lower than baseline levels;
- To add further interim targets of 66% by 2030 and 78% by 2040;
- To change the presentation of annual targets from tonnes of emissions to percentages to be consistent with the interim targets;
- For these annual targets to be presented as equidistant linear points between the interim targets;
- For targets to be set on the basis of actual emissions, rather than adjustments for crediting systems such as the European Union Emissions Trading Scheme (EU ETS);
- Whether the interim and 2050 emissions targets should be allowed to be changed;
- Reporting, including Climate Change Plans; and
- The impacts of the Bill on people, businesses and the environment.

13. The Scottish Government received 19,365 responses, of which 273 were non-campaign generated. An analysis document published in December 2017 highlighted the views of consultees.

14. In October 2017, the Scottish Government sought further advice, due to revisions to emissions estimates, which was received in December 2017. The Environment, Climate Change and Land Reform Committee took evidence on this advice from the Cabinet Secretary for Environment, Climate Change and Land Reform on 8 May 2018.

Content of the Bill

15. The Bill proposes to increase the 2050 target for reduction of greenhouse gas emissions from the 1990 baseline from 80% (as laid out in the Climate Change (Scotland) Act 2009) to 90%. The Bill also allows for a target of the 100% reduction (known as a net zero target) from the baseline to be created at a future date.

16. The Bill contains 5 Parts and 1 Schedule.

- **Part 1** allows for the creation of a net zero emissions target at a future date and updates the 2009 Act 2050 target from 80% to 90%. It also creates new interim targets for 2030 and 2040, as well as updating the previous
2020 interim target. The Bill creates a new provision for modification of these targets. Part 1 also includes sections proposing annual targets be presented in percentage terms in future and on advice the Scottish Government must seek in setting targets.

- **Part 2** is concerned with Emissions Accounting and how the emissions will be calculated in relation to the targets. This includes restricting the use of carbon units which can be purchased to contribute towards emissions reductions.

- **Part 3** is about the reporting and planning duties of the Scottish Government on the targets. It also includes detail of proposals for how reports on policies and proposals, suggested to be renamed Climate Change Plans, will be created and published in the future.

- **Part 4** provides further detail on the meaning of terms within the Bill and further consequentials to the 2009 Act.

- **Part 5** contains final general and miscellaneous provisions such as:
  1. Meaning of the 2009 Act
  2. Ancillary Provision
  3. Commencement
  4. Short title

**Environment, Climate Change and Land Reform Committee Scrutiny**

17. The Committee has agreed to conclude its evidence taking at Stage 1 of the Bill prior to Christmas 2018. The Committee’s timetable for consideration of the Bill at Stage 1 is:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>19 June 2018</td>
<td>Bill team evidence session</td>
</tr>
<tr>
<td>26 June 2018</td>
<td>Consideration of approach paper</td>
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<tr>
<td>June – August 2018</td>
<td>Call for views</td>
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<tr>
<td>October – November 2018</td>
<td>Evidence sessions</td>
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18. In addition, the Committee held a call for views in July and August 2018. You can read the responses received [here](#).

19. The Committee plans to consider its draft Stage 1 report following the Christmas recess 2018 and report to Parliament by the end of January 2019.
Evidence sessions

20. The Committee took evidence from stakeholders at meetings between 19 June and 20 November 2018. A full list of those who gave evidence as well as links to the official reports can be found in Annexe C.

Clerks, Environment, Climate Change and Land Reform Committee
24 May 2018

Dear Graeme,

When to set a net-zero greenhouse gas emissions target year: Information and analysis to support discussion of the Climate Change (Emissions Reduction Targets) (Scotland) Bill.

As you will be aware the Climate Change (Emissions Reduction Targets) (Scotland) Bill was introducted to the Scottish Parliament on 23 May 2018.

The Bill includes the target levels that were advised by the UK Committee on Climate Change and that the Scottish Government consulted on last year, including a 90% emission reduction target for 2050.

The Bill establishes a net-zero target but it does not set a date for that target. In light of the large number of consultation responses calling for a net-zero target to be set for 2050 or sooner, the Bill requires that Ministers regularly consider the earliest achievable year for such a target.

I considered a range of information and analysis in coming to my view on the target levels, and to support the Committee in debating the issue I have today laid a paper in Parliament that summarises that information and analysis. The paper is annexed to this letter for your ease of reference.

Yours,

ROSEANNA CUNNINGHAM

PAPER LAID IN SCOTTISH PARLIAMENT – “WHEN TO SET A NET-ZERO GREENHOUSE GAS EMISSIONS TARGET YEAR: INFORMATION AND ANALYSIS TO SUPPORT DISCUSSION OF THE CLIMATE CHANGE (EMISSIONS REDUCTION TARGETS) (SCOTLAND) BILL”
LETTER FROM THE CABINET SECRETARY FOR THE RURAL ECONOMY AND CONNECTIVITY ON THE ADVICE OF THE COMMITTEE ON CLIMATE CHANGE

May 2018

Thank you for your correspondence dated 25 April 2018.

The role of the Committee on Climate Change (CCC) is set out in the Climate Change (Scotland) Act 2009. As such this includes a requirement for Ministers to request the CCC’s advice in relation to setting emissions reduction targets under Part 1 of the Act, and to make or publish a statement if that advice is not followed.

As part of its advice on target setting, the CCC also advises on certain aspects of how targets should be met – in terms of the balance of domestic effort and credit use, the balance of effort between the traded and non-traded sectors of the economy and the balance of effort between the various sectors of the economy. [The 2009 Act also requires Scottish Ministers to request annual reports from the CCC on progress towards emissions reduction targets, and any recommendations set out therein are carefully considered.] Independent, expert advice from the CCC forms an important part of the Scottish Government’s (SG) response to tackling climate change – alongside other considerations such as stakeholder views and available resources including financial budgets.

In regard to their advice for agriculture, the CCC have identify five categories in which it is feasible to deliver abatement in namely; crop and soil management, livestock health, livestock diets and breeding, waste and manure management and fuel efficiency.

I am pleased to say that these five categories have been taken on board by the SG and can been seen within the policies, proposals and milestones of the agriculture chapter of the Climate Change Plan. These policies, proposals and milestone have been developed to help us to achieve our five overarching policy outcomes:

- **Policy outcome 1**: More farmers, crofters, land managers and other primary food producers are aware of the benefits and practicalities of cost-effective climate mitigation measures and uptake will have increased.
- **Policy outcome 2**: Emissions from nitrogen fertiliser will have fallen through a combination of improved understanding, efficient application and improved soil condition.
- **Policy outcome 3**: Reduced emissions from red meat and dairy through improved emissions intensity.
- **Policy outcome 4**: Reduced emissions from the use and storage of manure and slurry.
- **Policy outcome 5**: Carbon sequestration on agricultural land has helped to increase our national carbon sink.

Our aim is to foster a cultural and behavioural shift throughout the agricultural sector even though this is a time of great uncertainty as the UK Government struggles to articulate what leaving the EU means for farming. In addition to this uncertainty, we must
also accept the fact that there is no universal or “silver bullet” solution that can be placed upon Scottish farming, what works on one farm may not be practical or effective on another. That is why we continue to support the Farm Advisory Service (FAS), Farming For a Better Climate (FFBC) and the Soil Nutrient Network. This support allows high quality advice and information on the potential benefits of a range practices such as soil testing, nutrient planning, carbon audits and integrated land management plans to be available to all farmers, crofters and land managers.

It is through the provision of this information and advice on the potential benefits of low carbon farming practices such as soil testing and nutrient planning that we will see lasting change within the industry. That is why knowledge transfer is a key theme running through the agricultural chapter.

With regard to the approach that has been taken on soil testing in agriculture and what may happen should we not be on track to meet our targets. I am sure you will recall that I have already gone on record with you and the committee as per my letter dated 8 March 2017 in saying “The timetable set out in the draft climate change plan envisages the proportion of improved land tested increasing by a sixth each year, until all improved land is covered in 2023. In 2020 we will check on the progress we are making towards this. If we are not on track, we will look at possible incentives to realign ourselves with the targets”.

When addressing the economic benefits that can be gained from adopting relevant low carbon farming practices our FFBC focus farms are a fantastic example. The most recent of these farms is Woodhead in Newmilns Ayrshire, Woodhead is a dairy farm run by John and Anne Kerr.

John and Anne saved around £63,000 whilst reducing their carbon footprint by nearly 6%. Through actions such as

- Installation of a biomass boiler to produce heat from woodchip, which has reduced electricity use by 32 per cent
- Making more use of the smaller tractor on the feed wagon, saving around 4,400 litres of fuel a year
- Nutrient budgeting saving around £5,000 in fertiliser costs
- Improvements to cow housing ventilation and light levels have been improved by removing some of the side sheets from the cubicle shed. Now lighting can be switched off during the day and the cows have well-ventilated accommodation, reducing disease risk.

More information on the practices adopted and the benefits gained on the other focus farms that have gone through the programme is available at [https://www.farmingforabetterclimate.org/](https://www.farmingforabetterclimate.org/).

As you have highlighted, we are in the process of evaluating our FFBC programme and this shall be achieved in two ways. Firstly to look at the impact it has had on those that have attended events through a follow up survey. Secondly through a longer term aspiration to establish what effects FFBC may have had on the wider agricultural sector here in Scotland. Work to establish this evaluation began in late 2017 and at the time of drafting the final plan was still in its early stages therefore we did not include a timeframe.
However, we expect to have early results on the effects that FFBC has had on those that attended events in the summer of this year.

In answer to your queries on transport. The SG will shortly introduce a Transport Bill to Parliament which will provide local authorities with a viable and flexible set of options to ensure that their bus services meet local users’ needs whether they wish to pursue partnership working, local franchising, running their own buses or developing multi-operator ticketing arrangements using smart ticketing technology. The Bill will also aim to improve the information and, through improved governance and guidance, ticketing choices available to passengers so that bus travel is more accessible and attractive.

Meanwhile, we will continue to support the bus network and the adoption of cleaner, greener technologies, through the Bus Service Operators Grant (BSOG), the BSOG Low Carbon Vehicle Incentive and the Scottish Green Bus Fund, and is working with operators to identify congestion hotspots which can hinder the delivery of more reliable, faster services that would help attract patronage, including from modal shift. The national concessionary travel schemes will continue. They support around 142 million journeys a year, a proportion of which would otherwise have been made by car.

In terms of progress towards the national cycling action plan. Progress towards meeting the headline shared vision of 10% of everyday journeys being made by bike has been disappointing. In response, we are undertaking a broad programme of analytical work and engagement with delivery partners to better understand; i) where we are making progress in improving rates of active travel (walking as well as cycling) such as that in some cities and how to maximise those gains and; ii) what obstacles we face to further progress and how we might overcome those obstacles. This work will help us and our partners to gain a better understanding of the feasibility of the CAPS vision and shape and prioritise our work on active travel.

The Programme for Government (PfG) doubled the already record investment in walking and cycling, from £39.2 million from 2014 per annum to £80 million this financial year. The doubling of the active travel budget – further bolstered by match funding from local authorities and other partners - will allow us to invest in major capital infrastructure projects to be funded in tandem with an increase in successful behaviour change and education programmes. So far our Community Links programme has delivered 267 miles of walking and cycling paths, including 242 miles of completely new infrastructure. As funding for active travel increases, we are looking at the evidence and learning from experience inside and outside of Scotland to help us target our investment and ensure that it genuinely drives behaviour change. And we are working across policy areas to ensure that other measures, such as the introduction of low emission zones, or climate change adaptation measures can be used facilitate a longer term shift to more active forms of transport.

With regards to the distribution of the carbon envelopes across the plan. This was achieved through the use of the Scottish TIMES model. The TIMES model is a high level strategic model, covering the entire Scottish energy system and containing many thousands of variables covering existing and future technologies and processes. This model is rapidly becoming the de-facto standard tool for whole-systems energy modelling in Europe and North America.
The emission reduction pathway, and associated policies and proposals set out in the Plan have been agreed by Scottish Ministers as the most beneficial to Scotland. The emissions envelopes and the pathway are different to those in the draft Plan, however the final pathway was developed in light of recommendations by the Scottish Parliament, engagement with stakeholders, data revisions and new modelling, and new policies and proposals.

Turning to the point about different modelling assumptions regarding transport, whilst the assumptions appear to differ (Element Energy refer to the “growth in the vehicle parc”, we refer to “economic growth” and the CCC refers to “income growth”), they are essentially manifestations of the same thing. Economic growth typically leads to household income growth and growth in household income typically leads to a rise in car ownership. All of these typically generate a growth in travel demand.

I understand that my colleague the Cabinet Secretary for the Environment, Climate Change and Land Reform has made further information on the TIMES model available in the form of a technical annex of the Climate Change Plan.

Yours Sincerely

FERGUS EWING

LETTER FROM THE BILL TEAM TO THE CONVENER IN ADVANCE OF THE EVIDENCE SESSION ON 19 JUNE 2018

12 June 2018

Dear Convener,

Climate Change (Emissions Reductions Targets) (Scotland) Bill

Thank you for your letter of 30 May requesting further information on aspects of the Climate Change (Emissions Reduction Targets) (Scotland) Bill. I apologise that we were not able to meet your requested response date, I hope this does not cause too much inconvenience.

Our response to each question is set out in the Annex to this letter.

Yours sincerely

Calum Webster
Bill Manager
ANNEX
RESPONSES TO QUESTIONS IN LETTER OF 30 MAY

SCOPE

Were other parts of the 2009 Act reviewed for inclusion in the consultation?

The Bill proposals derive from the Government’s commitment to set a new target to reduce emissions by more than 50 per cent by 2020 and to increase transparency and accountability by basing Scotland’s targets on actual emissions from Scotland. The Bill’s focus is therefore on Part 1 of the 2009 Act and increasing emissions reduction targets and improving the accountability of these targets. As amendments were being made to targets and reporting, it was sensible to make other changes to improve the target and reporting framework in Parts 1 and 3 of the 2009 Act.

What are the stakeholder views on the scope?

The written consultation on the Bill did not ask for views on the scope of the Bill, therefore some respondents did not express a view on scope. However some respondents chose to comment on issues wider than the policy proposed in the consultation paper and suggested that the Bill could be an opportunity to legislate more widely on issues that relate to climate change, for example by including delivery measures in the Bill. The campaigns that fed into the Bill consultation process made calls for delivery measures to be included in the Bill. We have undertaken some initial engagement with stakeholders on delivery proposals and will continue to work with them to understand their proposals. The Scottish Government’s view is that the appropriate place to capture policies and proposals for delivery is in the Climate Change Plans that are produced regularly.

When is the next Intergovernmental Panel on Climate Change report due and how will this impact on the passage of the Bill?

The IPCC’s special report on global warming of 1.5 degrees is due to be published in October 2018. The Scottish Government’s approach has always been to base targets on the best scientific understanding, which is evolving all the time, and will continue to evolve. Ministers have written to the UK Government to request that the Committee on Climate Change (CCC) are commissioned jointly to provide advice on UK and Scottish targets in response to the special report. The Bill sets a strategic direction with provisions that are designed for the targets to be updated regularly in response to independent advice that takes into account evolving science and to our commitment to the Paris Agreement.

The next full IPCC Assessment Synthesis Report on all areas of climate science is expected in the first half of 2022, in advance of the first Paris Agreement stocktake process in 2023. The Bill provisions ensure that advice from the CCC on target levels will be sought and published at least every five years.
How does the Scottish Government intend to implement its commitment to create a Just Transition Commission, and why is this not included on the face of the Bill?

The Scottish Government is committed to establishing a Just Transition Commission to advise Scottish Ministers on adjusting to a more resource-efficient and sustainable economic model in a fair way which will help to tackle inequality and poverty, and promote a fair and inclusive jobs market.

The form that the Commission will take, and its membership, are currently being considered and will be announced later this year. We have considered carefully whether our resources at this time should be focused on setting up the commission and supporting it to begin its work or diverted into drafting the necessary measures to give it statutory effect, a process which will take up most of the year, before the Commission can begin its work. We consider the former approach to be the more effective one - providing a statutory basis for the Commission would delay the work we want it to undertake.

Our intended, non-statutory, approach to the Commission is in line with how other nations have sought to undertake just transition initiatives, for example the Canadian Just Transition Task Force and the New York State Environmental Justice & Just Transition Working Group, and will provide flexibility for the commissioners and stakeholders to guide the focus and priorities of the Commission’s work.

What are the current requirements of, or what information does the Scottish Government currently receive from, the private sector in terms of its climate change mitigation activities?

There are a number of requirements on the private sector to report on their climate change activities.

The Scottish Environment Protection Agency (SEPA) collects a range of data on pollutants on a statutory (annual) basis, most notably site-specific emissions from large emitters of greenhouse gas emissions in Scotland under the EU-Emissions Trading System (EU ETS).

These EU ETS data are reported to the EU and are also used in the production of Scotland’s greenhouse gas inventory. The GHG inventory also employs a range of additional data sources in its construction from official Government surveys, through administrative data collected by regulatory bodies, to data collected by trade bodies and industry associations. Some important data sources relating to the private sector in Scotland include: fuel supply and consumption, vehicle kilometres, livestock populations and waste management data.

There are a range of other ways in which information is currently gathered and reported in the UK. Examples include:

- The UK regulations requiring UK quoted companies to include greenhouse gas in their annual Strategic or Directors’ reports to Companies House
- The Carbon Reduction Commitment (CRC) requires organisations to report emissions to Scottish Ministers. The UK Government intends to replace this in
2019 by extending reporting within annual Strategic or Directors’ reports to unquoted companies of a certain size

- The Energy Savings Opportunity Scheme (ESOS) – a UK wide scheme which transposes part of the Energy Efficiency Directive. This requires the private sector to have an energy audit every 4 years including recommendations for measures to save energy

**PART ONE – EMISSIONS REDUCTION TARGETS**

**Section 1 – Net Zero Emissions Target**

A1(3)(b) – what is the “extent to which” the target setting criteria have been considered”? Is it envisaged this would be consistent throughout reports?

A1(3)(c) – Does this mean the reasons why it is not consistent with the advice or the reasons why the Government are choosing to do so despite the advice?

The requirement in new section A1(3)(b) to set out the ‘extent to which’ the net-zero emissions target year takes account of the target-setting criteria is consistent with new section 2A(6) (inserted by section 5) as regards the modification of the 2050 and interim targets. It is also consistent with the approach which applies currently in relation to the setting of annual targets under section 5(4) of the Climate Change (Scotland) Act 2009.

The Scottish Ministers currently meet this requirement (in relation to the setting of annual targets) by setting out the extent to which each proposed target takes account of each of the target-setting criteria. For example, a statement under section 5(4) of the 2009 Act would set out the extent to which the proposed target takes account of, among other things, “scientific knowledge about climate change”.

We would expect a similar approach to be adopted under new section A1(3)(b) in the event that the Scottish Ministers lay draft regulations before Parliament which propose to specify the net-zero emissions year. In addition, subsection (3)(b) of this new section, also requires the Scottish Ministers to set out their reasons for proposing to specify this year.

As regards “the reasons why” in new section A1(3)(c), this refers to the Scottish Ministers’ reasons for proposing a net-zero emissions target year that is different from the year set out in the advice received from the relevant body (the CCC).

A1(5) – What are the circumstances in which you might do this?

The Bill requires the Scottish Ministers to seek advice from the CCC on the earliest achievable net-zero emissions target year. This requirement applies even after a target year has been set through secondary legislation. If the advice is that the earliest achievable date has changed, this power allows the date to be moved accordingly. For example, if an unforeseen change in technology makes an earlier date achievable, then the net-zero emissions target year could be brought forward. The CCC could also advise that a net-zero emissions target year that has been specified is no longer achievable and recommend that a later year is set. Scottish Ministers could only propose setting a later net-zero emissions target year than has already been specified if this was consistent with
the advice from the CCC as to the earliest achievable year. Any proposals by the Scottish Ministers would be subject to affirmative procedure secondary legislation and subject to the agreement of Parliament.

Section 3 – Interim Targets

Will the interim targets also be expressed in megatonnes of carbon?
The Committee requests a note of the annual targets in percentages and megatonnes of carbon.

No targets in the Bill will be expressed in megatonnes. The CCC advised in March 2017 that all targets should be set as percentage reductions, so as to be consistent with one another if there are changes to the inventory (as you are aware, under the 2009 Act, some are set as percentages and some in tonnes, and these have diverged). The percentage reduction is considered less sensitive to changes in the greenhouse gas inventory and easier to understand. This change was supported by consultation respondents, as set out in our response under section 9 below.

Emissions will continue to be reported annually in tonnes of carbon dioxide equivalent in the Scottish emissions statistics, as certain of the reporting requirements in new sections 33 and 34 (as inserted by section 16 and 17 of the Bill) are required to be report in terms of tonnes of carbon dioxide equivalent.

A table showing the megatonne equivalents of the percentage reduction targets is provided in Appendix 1.

Section 6 – Duty to seek advice from the relevant body

Will an inventory change ever suggest an exceeded a target? Will it only ever identify further sources of carbon?

- If so, do the targets take into account the fact they might find more?
- If not, would that represent a bonus (forestry example from the CCP draft to final)?

A vital element of the CCC’s proposal is that targets can be modified, in either direction, should re-alignment to substantial changes in measurement methods be needed. Data revisions can affect target achievability in both directions, they can either make them too easy, or so hard as to be unachievable regardless of the policies introduced. Inventory changes do not only involve identifying further sources of carbon.

We are clear that any lowering of target levels should not represent a drop in ambition. The Bill proposals therefore require that Ministers could only propose a lowering of target levels if the CCC has advised that this should occur. The final decision on any change in target levels would be for Parliament, through affirmative procedure secondary legislation.

The targets themselves cannot be set to take into account future inventory changes. The framework proposed in the Bill allows for a balance between responsiveness to science and the need for stability for strategic planning purposes. Targets are therefore fixed against a set inventory for five years. The Bill provides that Ministers must seek advice
from the CCC on target levels at least every 5 years. This will ensure that targets are regularly reviewed and that they are able to be aligned with the most up-to-date inventory at the time the advice is received. Advice from the CCC on target levels will be based on the most recent inventory available to them.

The CCC will consider the entire range of target-setting criteria, including inventory revisions, when providing advice on target levels in the future. The effect of an inventory change on future targets levels will depend on its impact relative to the other target-setting criteria.

Section 9 – Annual Targets – 2021 – 2049

What are the advantages and disadvantages of the approach to rounding up and down?

The advantages of rounding up or down a target are around transparency and consistency. The majority of annual target levels are unlikely to need to be rounded up or down because they are one-tenth the difference between two whole integers (i.e. the target of 66% for 2030 and 78% for 2040), a calculation which will never require more than one decimal place. However, it is possible that a net-zero emissions target year could be set for mid-decade which could lead to annual target levels ending in very long or endlessly recurring numbers of decimal places (e.g. 86.66666666 ... %). As an example, this could happen if annual targets were calculated as the difference between three years, e.g. between 2040 and 2043 (if the net-zero emissions target year had been set as 2043). In the absence of a rounding rule, it would be unclear how these levels are to be treated and they could become confusing.

Is tonnes of carbon not a more consistent measurement (as stated in the 2015 report on emissions?)

In its advice on the Bill, the CCC says: “The Committee’s assessment is that percentage reduction targets provide a more consistent, stable basis from which to drive decarbonisation, as changes to the emissions inventory have a smaller impact.” The Scottish Government agrees with this assessment, and is keen to follow the advice of the expert advisors on this and indeed, other matters. The written public consultation asked whether respondents agreed that annual emission reduction targets should be in the form of percentage reductions from baseline levels. 172 of the 196 non-campaign respondents (88%) who answered this question agreed with the proposal.

Section 10 - Annual Targets 2017, 18 and 19

The Committee requests the figures for these new proposals in megatonnes for comparison with the current regulations.

A table showing the megatonne equivalents of the percentage reduction targets is provided in the Appendix along with the other comparative figures requested.
Section 12 – Publication of the targets

What is the purpose of publication of a list of targets?

The Bill proposes that annual targets are calculated as the difference between interim targets; or the difference between interim targets and the 2050 target or net-zero emissions target year (if set). The annual targets will be recalculated if the interim or 2050 targets are amended. They will also be recalculated when a net-zero emissions target year is set. It was decided not to include a list of the annual targets on the face of the primary legislation as this could cause confusion if these targets are subsequently recalculated, to reflect shifts in science, knowledge and understanding in this field. Publishing a list of the targets will ensure up to date target levels are freely available and easily accessible to all at any time.

PART TWO – EMISSIONS ACCOUNTING

Section 13 – Net Emissions Account – Restrictions on the use of carbon accounting

Are there costs associated with the potential to purchase carbon credits?

The estimated cost of using credits to make up the gap between what is technically feasible domestically here in Scotland and a net-zero emissions target in 2050 could be around £15 billion over the period to 2050. This is derived from the annual difference in emissions between the CCC’s 90% pathway and a pathway to 100%, based on linear interpolation, multiplied by the annual cost of permits as calculated by BEIS\(^1\). Discounting reduces this value to £6bn. All values are in 2017 prices.

PART THREE – ANNUAL REPORTING CYCLE

Section 16 – Reports on emissions reduction targets

Has the requirement to explain how domestic effort contributed been omitted?

- If so, why?
- What is the impact of this?

The requirement to report on the domestic effort target is not in the revised reporting provisions under the Bill as the Bill establishes a default position that targets must be achieved through domestic effort alone (unless at some point in the future the Scottish Parliament passes legislation to allow for carbon units to be purchased and credited to the net Scottish emissions account). New section 34(1)(b)(iv), inserted by section 17 of the Bill, still requires the percentage of any year-on-year reduction due to domestic effort to be reported annually in a report under section 33.

New section 13A(2), inserted by section 14 of the Bill, provides that, should regulations be made to allow carbon credits purchased by the Scottish Ministers to be credited to the net Scottish emissions account for a year, the regulations cannot set a limit that would be

\(^1\) table 3 in Data Tables 1-19: https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal
greater than 20% of the planned reduction for that year (i.e. 20% of the difference between the target for year x and the following year, not 20% of the reduction from baseline). This limit effectively replaces the domestic effort target that currently requires the Scottish Ministers to ensure that net Scottish emissions account for at least 80% of reductions in the net Scottish emissions account.

What does “amount” mean – percent or tonnes?

Any reference to “amount” in section 16 refers to tonnes of carbon dioxide equivalent.

Section 18 – Provision of further information

Will there still be reports on all the same elements elsewhere? What is the justification behind removing the requirement to report on these elements?

This section amends section 42 of the 2009 Act (Reports: provision of further information to the Scottish Parliament) to update references to the report required under section 33 of the 2009 Act which is amended by the Bill.

It also repeals section 42(2) of the 2009 Act which refers to the following reports:

(a) section 33(1) (report on annual targets)
(b) section 36(2) (report on proposals and policies to compensate for excess emissions)
(c) section 40(1) (report on interim targets)
(d) section 41(1) (report on interim targets)

The section 33 report will continue to be made, however the other three reports are no longer required.

The report required under section 36 of the 2009 Act is no longer required because alternative provision is made in new section 35(2) (inserted by section 19 of the Bill) to ensure that the proposals and policies in climate change plans compensate for any excess emissions.

The reports required under sections 40 and 41 of the 2009 Act are no longer required as the new reporting functions established by section 16 of the Bill require a report for every year for which an emissions reduction target has been set. This means there is no longer a requirement to have a separate provision covering the interim target or the 2050 target.

Section 19 – Climate Change Plans

What percentage of respondents thought that the time available for the CCP should be 60 to 120 days and what percentage considered that it should be open ended?

As this was a free text question, the consultation analysis report does not provide percentage figures. Officials have therefore separately analysed these responses and
have provided some figures below, noting that many responses are descriptive and do not always neatly answer the question.

Of the 165 responses to this question:

- 81 gave a response indicating support for a specific timescale of up to 120 days. The most common figure suggested was 90 days or at least 90 days
- 7 gave a response indicating support for a specific timescale of more than 120 days but which should not be open-ended
- 15 gave a response indicating support for an open-ended timescale
- 62 gave a response that either did not specifically answer the question or were unclear as to the specific timescale they supported

Are the statistics for the figures used in the draft plan available (2017 figures)?

We have committed to producing annual monitoring reports in respect of the Climate Change Plan, with the first report in October 2018. The monitoring framework will report progress against the indicators contained in the final Plan that was published on 28 February 2018.

**PART FOUR – CONSEQUENTIAL**

**Why are the reporting requirements in sections 38 – 41 of the Climate Change (Scotland) Act 2009 (electricity consumption) being removed? Will reporting on these elements take place elsewhere?**

The sections referred to in this question are being repealed as they are no longer required, or they are reported on elsewhere.

Section 38 of the 2009 Act, which requires the Scottish Ministers to report on the impact on emissions of the exercise of electricity generation related functions, is being repealed as the information will be published in the annual Energy Strategy Statement. This also makes it possible to provide the statutory report, currently produced in October, on a statutory basis as soon as reasonably practicable after the greenhouse gas emissions statistics are available. This is because the information on electricity generation may not be available at the time the emissions statistics are reported. This approach was proposed by stakeholders and discussed in the Technical Discussion Group meetings with stakeholders ahead of the Bill being introduced.

Section 39 of the 2009 Act previously required a report to be laid before the Scottish Parliament by the end of December 2015, and is therefore no longer applicable.

The reports required under sections 40 and 41 of the 2009 Act are no longer required as the new reporting functions established by section 16 of the Bill require a report for every year for which an emissions reduction target has been set. This means there is no longer a requirement to have separate provision covering the interim target or the 2050 target.
**FINANCIAL MEMORANDUM**

The Committee requests detail of analysis the Scottish Government has done to arrive at indirect costs from the Bill of £13 billion?

The Scottish TIMES model is a high-level strategic model, covering the Scottish energy system (which includes Residential and Non-Domestic Buildings, Industrial Processes, Electricity Generation and Transport), as well as non-energy sectors, including Agriculture, Land Use, Land Use Change and Forestry, and Waste. The Scottish TIMES model, at its simplest, is a diagnostic tool to help understand the key inter-relationships across systems. Scottish TIMES belongs to a group of models that were developed by the International Energy Agency to examine long term energy dynamics. There are now more than seventy country versions of TIMES and TIMES modelling has underpinned a large number of studies in both environmental and energy economics, produced by governments, NGOs and in academia.

This approach captures the key characteristics of the Scottish energy system today, and considers the impacts on the future energy and emission flows that result from the deployment of a range of processes and technologies. There are over two thousand technologies and carbon abatement measures that the model can deploy to meet these final demands, and each has a series of associated technical variables, such as operating and investment costs, or technical efficiency, amongst others.

TIMES identifies the least-cost pathway of meeting a set of final energy demands, given a set of technical and policy constraints, including the Scottish Government’s climate change targets.

The Scottish TIMES model has been used to derive the indicative cost of increasing the Greenhouse Gas reduction target from 80% to 90%, estimating it to be approximately £13 billion in the period 2030 to 2050. This is the additional net system cost (which consists of the cost of all technologies and energy sources over the period) of setting a 90% climate change target in comparison to an 80% target, discounted to 2017 prices. Critically, TIMES provides us with an estimate of the system cost of meeting a set of final demands. It therefore does not provide an assessment of how these costs will be allocated amongst businesses, individuals and government.

As with any model with a long term horizon up to 2050, the results are subject to uncertainty, in particular as we move further away from the present day. The pace of technological change and advances in engineering and information technology across the economy and the energy sector over the next three decades, will have a huge bearing on the energy system and the ways in which we interact with it.

Please provide the Committee with all costs associated with the policies and proposals in the most recent Climate Change Plan.

The Scottish TIMES approach helps identify the most efficient parts of the system to remove carbon and allocates sector envelopes accordingly. Sectors then develop their proposals and policies to ensure their emissions remain within these limits. Cost information from TIMES therefore relates to the technological resource costs; the cost of
purchasing the equipment and fuels to deliver the pathway. Critically, TIMES provides us with estimates of the system wide resource cost of meeting a set of final demands, and therefore does not provide an assessment of how these costs will be allocated amongst businesses, individuals and government.

We have estimated the system wide resource cost of meeting the Scottish Government climate change targets using Scottish TIMES. To do this, we have subtracted the system cost of a TIMES model run with no targets from the cost of the model run underpinning the Climate Change Plan (covering the period to 2050). This gives us the indicative cost of meeting the 80% climate change target over and above the cost of taking no action. The resulting indicative resource cost is the equivalent of approximately 1% of cumulative GDP out to 2050, and is in line with international estimates, such as those set out in Stern Review.

**What are the costings of not acting to increase climate change mitigation targets?**

If the targets are not amended, then the costings would be consistent with the current legislation (i.e. a target of 80% reduction by 2050). This is set out in the answer above.

The Financial Memorandum includes information from a review of key global assessments of the costs of climate change action, including the costs of the damages that will occur if climate change is not mitigated.

The review finds that, amongst studies looking at the impact of global warming of between 2.5 to 3 degrees higher than pre-industrial levels, and presenting the results in terms of GDP, the mean (average) estimate of costs is 2.2% of GDP. The median (middle value of the range) is 1.5%, and the 10th and 90th percentiles are 0.0% and 3.5% respectively. There are no estimates specifically for Scotland.

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2 Provided for the purpose of Bill consideration, this equates to approximately £33 billion between 2018 and 2050 (discounted to 2017 prices).
## TABLE SHOWING MEGATONNE EQUIVALENTS OF PERCENTAGE REDUCTION TARGETS

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<tr>
<th>Year</th>
<th>2009 Act (emissions adjusted for the EU-ETS)</th>
<th>Bill (actual emissions)</th>
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<tbody>
<tr>
<td></td>
<td>Annual Targets (expressed as % reduction using original inventory)</td>
<td>Annual Targets (expressed as % reduction using current inventory)</td>
<td>All targets (as proposed)</td>
<td>Annual Targets (expressed as amounts based on current inventory)</td>
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<td>Baseline</td>
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<td>2017</td>
<td>37.4%</td>
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Baseline: 0%

2009 Act: 70,201,000 (2008 inventory)

Bill: 77,091,000 (2015 inventory)
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<th>Year</th>
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<td>Interim / 2050 Targets (as set)</td>
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2018
38.8%
44.3%
54.0%
42,966,000
35,462,000

2019
40.2%
45.6%
55.0%
41,976,000
34,691,000

2020
42%
42.0%
47.2%
56.0%
40,717,000
44,712,780
33,920,000

2021
43.7%
48.8%
57.0%
39,495,000
33,149,000

2022
45.4%
50.3%
58.0%
38,310,000
32,378,000

2023
47.1%
51.8%
59.0%
37,161,000
31,607,000

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49.0%
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2027
56.2%
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2028
57.5%
61.3%
64.0%
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2029
58.7%
62.4%
65.0%
28,958,000
26,982,000

2030
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63.6%
66.0%
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26,211,000
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Comparisons based on amounts of emissions (tCO2e)

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<th>Year</th>
<th>Interim / 2050 Targets (as set)</th>
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LETTER FROM THE BILL TEAM FOLLOWING THE 19 JUNE 2018 MEETING

27 June 2018

Dear Environment, Climate Change and Land Reform Committee Members,

Climate Change (Emissions Reduction Targets) (Scotland) Bill – 19 June 2018

Thank you for your letter of 26 June requesting further information following the officials’ evidence session. The majority of that information is given in Appendix 1. Appendix 2 is a note on costs associated with the Bill, providing the information that you requested within the context of broader information about global costs of climate action and inaction, and which it is important the figures are understood within. The information relating to costs is provided in this form as we considered it would be the most comprehensive and useful way to answer your questions.

In addition I am attaching a Keeling Schedule of the Bill showing the provisions of the Climate Change (Emissions Reduction Targets) (Scotland) Bill within the Climate Change (Scotland) Act 2009, which I hope will prove useful to you.

Yours sincerely

Sara Grainger
Decarbonisation: Delivery Unit Team Leader

APPENDIX 1

RESPONSES TO REQUESTS FOR FURTHER INFORMATION

Details of all the scientific sources of information which the Scottish Government took into account in considering setting target levels and the extent to which each influenced thinking.

The Scottish Government’s approach to tackling climate change is guided by the best available scientific evidence, in the form of the synthesis reports of the Intergovernmental Panel on Climate Change. These reports review the science of climate change and implications for mitigation at a global level. Advice on how this evidence should be translated into Scottish target levels was sought from the UK Committee on Climate Change (CCC). The CCC was designated by the Scottish Parliament’s 2009 Act as an independent, statutory advisory body to Scottish Government on matters related to climate change. The Committee comprises recognised international experts in a range of fields, including climate science. Given this expertise and its statutory role under current legislation, the CCC is uniquely well placed to provide advice on setting evidence-based target levels.

Copies of the reports you referred to containing analysis of international approaches to setting targets and meeting the ambitions of the Paris Agreement.
The reports referred to were produced by ClimateXChange and can be found on their website at the links below:

- A review of greenhouse gas reduction aspirations and their legislation across selected countries and regions. (July 2017)
Further information on why other aspects of the 2009 Act were not reviewed for consideration in the 2018 Bill, specifically including Public Sector Reporting Duties, Land Use Strategy and Local authority energy efficiency discount schemes.

The Scottish Government’s intention has always been for a strategic Bill that increases ambition and transparency of target reporting. These aims can be achieved through amendment of Parts 1 and 3 of the 2009 Act. Other aspects of the 2009 Act were not reviewed for consideration as they are not directly related to ambition and transparency of target reporting.

The Scottish Government will be reviewing the Public Sector Reporting Duties over the coming year, in collaboration with representatives from the Public Sector and other stakeholders. If the review concludes that changes to the Duties are required, a proposal will be developed, consulted on, and secondary legislation brought forward as appropriate. Primary legislation is not needed to amend the Duties.

Scottish Government does not consider that any changes are currently needed to the provisions in section 57 of the 2009 Act (Duty to produce a land use strategy). The Committee, following consideration of the draft Plan, suggested that the connections between the Strategy and the Climate Change Plan could be made more explicit. This recommendation was acted on with the final Plan including explicit references to other strategies, including the Land Use Strategy.

The Energy Efficient Scotland Route Map provides the overall strategy for energy efficiency schemes, and is currently being consulted on. The consultation paper is available at https://consult.gov.scot/better-homes-division/energy-efficient-scotland/

Which organisations were being referred to in relation to why the Bill was not setting more pressing targets sooner and the technological advances that would be required to do so

The Scottish Government engages regularly with a wide range of organisations in the development and delivery of policy, and works in a co-ordinated way across Directorates to ensure that policy development in one area is consistent with that in other areas. Development of the policy for the current Bill was a good example of this and the Bill Team liaised with officials across multiple directorates, who in turn fed in information from stakeholder organisations that they engage with regularly,
and stakeholder groups. Specific examples in relation to the technological advances that more ambitious targets will require include Scottish Carbon Capture and Storage, Scottish Hydrogen Fuel Cell Alliance, the Scottish Energy Advisory Board and the Oil and Gas Industry Leaders Group. We also drew on work that had been previously commissioned in development of the Climate Change Plan and Energy Strategy, which evaluated the impact of climate change mitigation targets on Scottish businesses. This work was conducted by EY and discussed at the National Economic Forum in May 2017, and subsequently fed into the Business and Regulatory Impact Assessment for the Bill proposals. The report produced by EY can be seen at http://www.gov.scot/Topics/Environment/climatechange/meetingemissiontargets/climate-change-plan/transitioning-to-a-low-carbon-economy

The Business and Regulatory Impact Assessment for the Bill is available at http://www.gov.scot/Publications/2018/05/2691

The public consultation relating to Scotland’s Energy Strategy provided a wide range of views from over 250 companies, organisations and individuals which has informed the development of the Scottish Government’s long term policy and target framework. The consultation posed a number of questions which are directly related to technological advances and the feasibility of ambitious targets for decarbonisation of energy supply (especially Questions 3, 4 and 7). A report summarising the findings of an independent analysis of the consultation responses is available here: http://www.gov.scot/Resource/0052/00527583.pdf

The Parliament’s Committees’ reports on the draft Climate Change Plan were also an important source of evidence, bringing together stakeholders’ evidence on the challenges of deliverability in areas such as heat decarbonisation in advance of the UK Government’s decision on the future of the gas network, and highlighting concerns about reliance on new technologies.

**Detailed information on the development of the target setting criteria in the passage of the 2009 Act and the creation of the 2018 Bill, including how the specific sectors (such as energy) were included and why others were excluded.**

The Scottish Government consulted on what factors should be taken into account when setting the level of budgets (annual targets) prior to bringing forward the Climate Change (Scotland) Bill in 2008. The consultation in 2008 highlighted a number of factors that would need to be considered, including but not limited to:

- likely economic growth;
- likely population growth;
- likely technological progress;
- social impacts, including impact on rural areas;
- environmental impacts;
- impacts on the economy and business competitiveness;
- international circumstances; and
- scientific knowledge about climate change.
In light of the consultation responses received in 2008, the following set of criteria were developed and introduced in the Bill:

(a) scientific knowledge about climate change;
(b) technology relevant to climate change;
(c) economic circumstances, in particular the likely impact of the target on—
   (i) the Scottish economy;
   (ii) the competitiveness of particular sectors of the Scottish economy;
   (iii) small and medium-sized enterprises;
(d) fiscal circumstances, in particular the likely impact of the target on
taxation, public spending and public borrowing;
(e) social circumstances, in particular the likely impact of the target on those living in poverty;
(f) the likely impact of the target on those living in remote and rural communities;
(g) energy policy, in particular the likely impact of the target on energy supplies, the renewable energy sector and the carbon and energy intensity of the Scottish economy;
(h) European and international law and policy relating to climate change.

Opposition amendments were made at Stages 2 and 3 and, as a result, the criteria in the 2009 Act are:

(a) the objective of not exceeding the fair and safe Scottish emissions budget;
(b) scientific knowledge about climate change;
(c) technology relevant to climate change;
(d) economic circumstances, in particular the likely impact of the target on—
   (i) the Scottish economy;
   (ii) the competitiveness of particular sectors of the Scottish economy;
   (iii) small and medium-sized enterprises;
   (iv) jobs and employment opportunities;
(e) fiscal circumstances, in particular the likely impact of the target on taxation, public spending and public borrowing;
(f) social circumstances, in particular the likely impact of the target on those living in poorer or deprived communities;
   (g) the likely impact of the target on those living in remote rural communities and island communities;
   (h) energy policy, in particular the likely impact of the target on energy supplies, the renewable energy sector and the carbon and energy intensity of the Scottish economy;
   (i) environmental considerations and, in particular, the likely impact of the targets on biodiversity;
   (j) European and international law and policy relating to climate change.

The consultation on the current Bill sought views on the most important criteria to be considered by the CCC when providing advice and by Ministers when setting or updating emission reduction targets.

A wide range of views were put forward, including suggestions that further, more specific criteria should be added, and suggestions that the number of criteria should be reduced, or prioritised. The Scottish Government took the view that there was not a clear case for fundamentally amending the criteria in the 2009 Act.
This issue was discussed with stakeholders as part of the Technical Discussion Group meetings (a group of stakeholders established to discuss technical elements of the Bill proposals in detail). Members of that group considered that the criterion “European and international law and policy relating to climate change” should be altered to make it clearer that it includes the United Nations Framework Convention on Climate Change and protocols to that Convention, and that a criterion of “current international carbon reporting practice” should be added to ensure the advice from the Committee on Climate Change advice explicitly refers to the current inventory. The Bill makes these changes, but otherwise leaves the target-setting criteria as set out in the 2009 Act.

The Bill also retains the existing requirements under the 2009 Act that a request from the Scottish Ministers for advice from the Committee on Climate Change must request their views on the respective contributions towards meeting each relevant target that should be made by sectors of the Scottish economy (section 2C(3)(d) of the 2009 Act, as inserted by section 6 of the Bill). The advice request must also seek views on the respective contributions that should be made by energy efficiency, energy generation, land use and transport (section 2C(3)(e) of the 2009 Act, as inserted by section 6 of the Bill).

It is our view that these headings allow the Committee on Climate Change to provide advice across all sectors with flexibility for the advice to adapt as the respective importance of sectors changes over time.

The Bill also retains the power in the 2009 Act for the Scottish Ministers to modify the target-setting criteria through affirmative procedure regulations in the event that they need to be updated in the future.

**APPENDIX 2**

**RESPONSES TO REQUESTS FOR FURTHER INFORMATION ON COSTS**

**Global Literature: Stern Review Summary**

The Stern Review (2006), which is considered an authoritative study on the economic impact of global climate change, estimated the potential cost of climate change damages from continuing on a business-as-usual path, to be equivalent to at least 5% of global Gross Domestic Product (GDP), now and forever. Stern noted that this estimate would be much higher, potentially around 20% of global GDP now and forever, if a range of further impacts were taken into account, such as impacts on human health and the disproportionate burden of climate change on poor regions of the world.

Stern estimated the global cost of climate change mitigation (stabilisation at around 550 ppm CO2e) to be around 1% of global GDP by 2050, with a range from -1% to +3.5% of GDP. Costs could be lower than the 1% if there are major gains in efficiency or strong co-benefits e.g. from reduced air pollution. Stern noted that costs could be higher than the 1% if innovation in low-carbon technologies is slower than expected.

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4 550 parts per millions carbon dioxide equivalent (ppm CO2e) is equivalent to global temperature rise of 2°C.
Global Literature: ClimateXChange Rapid Evidence Review

ClimateXChange (CXC), on behalf of the Scottish Government, commissioned a Rapid Evidence Assessment (REA) and synthesis of key global assessments of the costs and benefits of climate change action to give context to work on the new Climate Change Bill. The study focuses on literature that has emerged since the Stern Review of the Economics of Climate Change, and are largely focused on global estimates.

The report can be read at: https://www.climatexchange.org.uk/research/projects/international-assessments-of-the-economic-impacts-of-climate-change/

A key message arising from this review is that estimates of climate impacts are inherently uncertain, so climate policy needs to be assessed in terms of risk management, rather than straight-forward cost-benefit analysis.

The balance of evidence suggests that although the mid-point estimates of abatement cost\(^5\) may be higher than the mid-point damage estimates, it is reasonable to conclude that there is a considerable risk of much higher-than-expected damages, which would justify the cost of ambitious abatement action. This is in line with the conclusion arising from climate risk literature, suggesting that reducing the risk of exceeding tipping points\(^6\) is a key reason to aim for strong abatement targets globally. Tipping points become much more likely at higher levels of warming but cannot be ruled out at low-to-moderate warming levels.

CXC drew heavily from the Intergovernmental Panel on Climate Change (IPCC) fifth assessment report (AR5)\(^7\), which contains the results of 19 separate studies.

To draw out damage costs as a percentage of GDP, the IPCC results were restricted to 14 studies that assumed a similar degree of warming, in the range 2.5-3°C. Many of these do not specify a timeframe; CXC assumed these warming levels and the resulting damages relate to end-of-century timeframes. These studies show reasonably close agreement on GDP impacts, with a mean of 2.2%, median 1.5% and 10th to 90th percentile range of 0.0% to 9.5%. Excluding a single study with outlying results from the sample further narrows the range across 13 studies to a mean of 1.5%, median 1.5% and 10th to 90th percentile range of 0.0% to 3.5%.

The IPCC study, however, assumes that GDP will continue to grow unabated over the course of the century. This assumption means that climate damages, while large in absolute terms, appear modest in comparison with GDP. Emerging literature is beginning to challenge this by assessing whether climate change can reduce GDP growth rates, rather than just incurring instantaneous damages. Because growth

\(^5\) Abatement costs relate to the cost incurred by reducing Greenhouse Gas Emissions
\(^6\) TEEB (2009) (http://www.teebweb.org/media/2009/09/TEEB-Climate-Issues-Update.pdf) notes that a tipping point is a threshold of irreversibility, beyond which the ecosystem ceases to function. They note that we have reached this point with coral reefs, whereby gradual reduction in future greenhouse gas emissions will not stop their imminent loss. At the tipping point, decisions should no longer be based around marginal costs and benefits, but should capture the ethical and other consequences of losing the ecosystem
rates accumulate exponentially over time, this leads to the strikingly higher damage costs found by Burke, Hsiang and Miguel (2015)\textsuperscript{8}, who assessed damages associated with median temperature rise of 4.5°C by 2100 and found a median cost of about 9% of GDP in 2050.

Damage costs are contrasted with the global cost of abatement: For studies included in IPCC (2014)\textsuperscript{9}, consistent with about a 50% chance of limiting warming to below 2°C, median global abatement costs were 3.4% of Gross Domestic Product (GDP) by 2050, with an upper (90th percentile) estimate of 6.2% of GDP by 2050. Rogelj et al. (2015)\textsuperscript{10} found abatement costs in a similar range to achieve the more ambitious target of limiting warming to 1.5°C.

As noted above, however, while the median global abatement cost from the IPCC study does exceed the median damage cost of climate change, the risk of much higher-than-expected damages justifies the cost of climate action. The Rapid Evidence Review notes that these higher-than-expected damages or thresholds beyond which abrupt changes can be triggered, are much more likely at higher levels of warming\textsuperscript{11}.

### The Scottish TIMES Model

The Scottish TIMES model is a high-level strategic model, covering the Scottish energy system (which includes Residential and Non-Domestic Buildings, Industrial Processes, Electricity Generation and Transport), as well as non-energy sectors, including Agriculture, Land Use, Land Use Change and Forestry, and Waste.

At its simplest, it is a diagnostic tool to help understand the key inter-relationships across the energy system. TIMES identifies the least-cost pathway (energy mix) of meeting a set of final energy demands, factoring in the impact of technical, practical and policy constraints, including the Scottish Government’s climate change targets.

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\textsuperscript{10} [http://adsabs.harvard.edu/abs/2015NatCC...5..519R](http://adsabs.harvard.edu/abs/2015NatCC...5..519R)

\textsuperscript{11} Kriegler et al. (2009) ([http://www.pnas.org/content/106/13/5041](http://www.pnas.org/content/106/13/5041)) studied the possibility of tipping points including:

- Ice sheets on Greenland and West Antarctica
- Atlantic Meridional Overturning Circulation (The Atlantic Meridional Overturning Circulation is a system of ocean currents driven by differences in temperature and salt content. As warm water flows north, it cools and some evaporation occurs, increasing salt content. Lower temperature and higher salt content makes the denser water sink and spread south. This will eventually get pulled back to the surface and warm. This process makes heat and energy are distributed around the earth. The process is expected to slow as the surface of the ocean becomes warmer and increased rainfall and ice melt also mean it becomes fresher. These changes will make the ocean lighter and reduce the sinking effect ([https://www.metoffice.gov.uk/learning/ocean/amoc](https://www.metoffice.gov.uk/learning/ocean/amoc))
- Dieback of Amazon rainforest
- El Niño/Southern oscillation (The warming of the sea surface temperature in the central-east equatorial Pacific. La Niña is the opposite, where there are cooler-than-normal sea surface temperatures. These alternate in a cycle called the El Niño Southern Oscillation. This has weather impacts across the world ([https://www.metoffice.gov.uk/learning/ocean/el-nino](https://www.metoffice.gov.uk/learning/ocean/el-nino)). Increasing levels of CO2 could contribute to increasing frequency of extreme El Niño events ([http://www.nature.com/articles/nclimate3351](http://www.nature.com/articles/nclimate3351)))
TIMES is accepted as an international standard for long term energy system analysis, and has been widely used in the context of climate change. There are a number of advantages of the TIMES modelling framework. Analysis within TIMES can be highly detailed, as it belongs to a family of “bottom-up” technology rich energy models which contain thousands of technologies to derive system insights.

TIMES provides a system-wide view, considering decarbonisation options across the whole energy system to devise an optimal pathway. It therefore provides a structured way to consider the system wide impacts of energy system change, capturing the complex interactions that take place within that system. The TIMES methodology is well documented and publicly available online, with a large community of users spanning academia, government, and international organisations. As a result, the model is continually refined and improved upon.

However, TIMES cannot be used to prescribe the specific policies or proposals that feature in Climate Change Plans, nor the costs associated with them. Policies and Proposals are instead developed drawing on the insights from TIMES, but with a focus on sector specific modelling and analysis.

**TIMES and Uncertainty**

As with any model with a long term horizon up to 2050, considerable uncertainty surrounds any TIMES run, in particular as we move further away from the present.

Each TIMES run relies on current information about the expected future cost evolution of current and developing technology. The longer the modelling time horizon, the less likely that current estimates of future technologies will be realised in the real world. The pace of technological advances in engineering and information technology will have a huge bearing on the energy system and cannot be accurately predicted. This is evidenced by the recent changes in the cost of renewable technologies, such as solar, that have fallen to a degree that energy system models would not have anticipated 20 years ago. Likewise, the costs of anticipated future technologies which are currently not deployed at scale could turn out to be higher than currently anticipated. For example, the cost of building new nuclear power stations in Europe has been characterised by budget overruns in recent years. Significant uncertainty surrounds the estimation of cost trends over time, with cost reviews finding evidence of cost reductions as deployment rises, but with a number of variables (such as fuel prices or supply chain issues) able to delay and even reverse this process\(^\text{12}\).

Recognising this uncertainty in long-term energy analysis, and responding to feedback on this subject from stakeholders, the Scottish Government produced two different energy system scenarios out to 2050 for the Scottish Energy Strategy, published in December 2017. One of these had a system with a high degree of electrification, whereas the alternative relied on low carbon hydrogen replacing fossil

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fuels. The below figure presents the energy flows within the system in 2050 in each of these.

These scenarios did not intend to provide any specific prediction regarding the future, but were instead designed to generate discussion about how the future could look, the high degree of uncertainty and variability of the future path of the energy system, and the range of infrastructure and behaviours that might be required under different scenarios.

These scenarios serve to highlight how different the energy system may look in 2050, with the likelihood that it will share some characteristics of both. This uncertainty about future costs, demand and technological progress means that the TIMES framework can only be used to provide a broad indication of cost, and is most helpful for framing what the magnitude of cost could be.

**Costs in TIMES**

TIMES models use linear programming (LP) to identify the least-cost pathway for meeting our climate change demands over a specific time horizon. There are over two thousand technologies and processes in the Scottish TIMES model, both existing and future. Each of these has a series of costs associated with it, including fixed operating and maintenance costs, investment and activity costs. There are also flow costs in the model, associated with the import, export and extraction of energy sources. The model deploys a series of technologies and fuels, so that the cost of meeting the Scottish energy demands, across all years and sectors, is the lowest possible, subject to a number of constraints imposed. For example, the model constraints electricity generation from renewable sources to the latest available statistics on installed capacity.

The Scottish TIMES model was built by an international consortium of experts from E4SMA, KANORS, SYSTRA and University College London (UCL). The initial
structure of the model and technical parameters (including costs) were inherited from the UK TIMES model operated by the Department of Business, Energy and Industrial Strategy (BEIS).

The model was then modified to incorporate Scottish data and characteristics, to better reflect the structure of the Scottish energy system. The model has also been periodically updated as new data and analysis becomes available. For example, in the residential sector, cost data was originally based on UK TIMES but, subsequently, the investment costs of conservation measures were updated to be consistent with Scottish National Housing Model outputs, based on data from the Scottish House Condition Survey. Details of this process has been submitted as evidence to the Committee13 and in a technical annex to the final Plan14.

TIMES specifies the most cost effective energy mix, and the associated cost, for achieving a given climate change target. It does not consider the policy options for achieving this energy mix or where the costs of doing so should ultimately fall (e.g. government, local authority, businesses or consumers).

Who the costs fall to will be determined by the future design of policies and proposals that will deliver emissions reductions to achieve these stretching targets. There are many ways in which costs can be distributed. For example, currently the cost of supporting renewable technologies in the electricity system is not entirely borne by the consumers in the geographical area in which a generating station is located, but are instead paid for by domestic and non-domestic electricity consumers across the integrated GB wholesale market. Alternatively, the Renewable Heat Incentive, a scheme for promoting the uptake of alternative heating technologies such as Biomass Boilers and Heat Pumps, is paid for through general taxation.

The future distribution of costs will depend on a number of factors outside Scotland’s influence. As international efforts to decarbonise intensify, global bioenergy demand could increase resulting in higher costs and lower availability of Scottish imports of bioenergy inputs. Furthermore, international and European action will also substantially influence the development of technology costs and how are they borne, via global investments and the potential development of global carbon markets.

As discussed, TIMES aims to minimise the total cost of the energy system. This system cost figure in TIMES can be disaggregated into a number of cost categories:

- Variable costs – These consist of activity and flow costs. Activity costs are variable operating and maintenance (O&M) costs associated with some technologies that are dependent on their activity. Flow costs are variable costs of a technology associated with its production or consumption of energy. They include import and resource production costs, costs associated with distribution networks, as well as export revenues

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- Fixed O&M costs – These are fixed operating and maintenance costs per unit of capacity of a specific technology installed, according to the installation year
- Investment costs: These are capital costs that arise if the model chooses to deploy new capacity of a technology (such as a new boiler), and if the model chooses to dismantle a technology. They are spread over the economic lifetime of said technology

**Increasing Climate Ambition in TIMES**
To provide an indicative assessment of the relative cost of increasing the targets, we assessed the total cost of two TIMES runs; one with a 90% target in 2050 and the other with an 80% target. The result showed that achieving a 90% target would result in an estimated cumulative additional cost of around £13 billion (2017 prices, discounted using the social discount rate) between 2030 and 2050. Presenting cost information in this manner is best practice when considering costs and benefits which incur in the future, and is the approach adopted in prominent international studies and consistent with HMT Green Book guidance on appraising long term costs. Unadjusted for inflation, the cost of moving to a 90% target is estimated to be approximately £25bn. Discounting is a technique used to compare costs and benefits occurring over different periods of time on a consistent basis, providing an estimate in present value terms. It reflects two components, firstly “time preference”, the concept that people prefer value goods and services in the current time period over future time periods, and secondly “the wealth effect”, where income grows over time, and future consumption will increase, so the value of each individual pound will be lower than it is today. Removing the impact of discounting is not best practice, and contrary to the approach taken in many international studies, particularly given the modelling approach makes decisions based on the concept, nevertheless, adjusting for inflation and removing the impact of discounting, the estimated cost of moving to a 90% target is approximately £59bn.

The table below allocates the additional cost according to the cost categories above, with additional information about what these costs may represent, subject to the uncertainties described earlier.

Finally, as highlighted above, there is a very large degree of uncertainty when assessing the energy system that will be in place by 2050. The below costs are indicative only. They represent one pathway for the evolution of the energy sector, while relying on the best information on current and future technologies and fuels we have today.

The increase in our climate ambitions results in an increase in costs of £13 billion largely due to the higher levels of electrification of the energy system, with a greater degree of bioenergy also consumed than would be required with an 80% target.

However, as discussed in the Energy Strategy, that is only one of the potential outcomes that can take place. Should hydrogen become the dominant fuel input, particularly for the supply of heat, then the distribution of costs could look different in 2050. In such a scenario, investment in electricity generating assets and consumer technologies that utilise electricity would be replaced by investments in technologies that manufacture hydrogen at scale and consumer technologies that utilise this fuel
source. However, given the on-going research into the potential role for hydrogen at scale, the assessment of hydrogen costs is an area still under development.

LETTER FROM THE SCOTTISH GOVERNMENT ON THE FINANCIAL MEMORANDUM

7 November 2018

Dear Convener,

Climate Change (Emissions Reduction Targets) (Scotland) Bill – Financial Memorandum

Thank you for your letter of 1 November requesting further information on aspects of the Climate Change (Emissions Reduction Targets) (Scotland) Bill. Our response to each question raised is set out in the Annex to this letter.

Yours sincerely

Sara Grainger
Decarbonisation: Delivery Unit Team Leader.
ANNEX

In evidence to the Committee, you said:
We came up with that £13bn figure by running TIMES under the assumptions of the CCP for the 80% end target for 2050. We then ran the figures again using the 90% target. We took the system costs from both and subtracted one from the other to find the difference, which was £13bn. That is above and beyond the cost that would happen anyway through society continuing to function. It is the additional cost of moving from a target of 80% to one of 90%.

However, it is not clear from the evidence given, nor from your subsequent response, whether the same assumptions and inputs used to develop the final CCP were also used when you ran the figures again using the 90% target. I would be grateful if you could provide the Committee with detail of the constraints placed on the TIMES model for the run based on a 90% target scenario.

The starting point for both runs was the Climate Change Plan (CCP) final model run\(^{15}\), with updated assumptions on land use, land-use change and forestry (LULUCF) emissions to reflect emerging findings from new sectoral models currently being developed by the Centre for Hydrology and Ecology. These take into account the expected impact of a fundamental change in the scope of future inventories resulting from adoption of the Wetlands Supplement guidance published by the IPCC. Whilst the underpinning scientific research continues, the Centre for Ecology and Hydrology currently estimate that these changes, which include incorporating new emission factors and categories of peatland condition is likely to substantially increase emissions from LULUCF in Scotland. By increasing overall emissions, and the scale of abatement required, these revisions also increase the cost of meeting both a 90% and 80% reduction in emissions.

TIMES was not able to find a pathway to a 90% target with the constraints of the Climate Change Plan included. In order for the model to find a solution to achieve a 90% target it was necessary to alter the constraints of the model. The constraints altered were chosen on the basis that they would allow for a 90% target to be met and a cost to be produced, as required for the Financial Memorandum. They do not represent a change in Scottish Government policy, or a revision to the Climate Change Plan. The changes to the model were:

- We allowed the model to draw on carbon capture and storage technologies post-2025 (relative to post-2035 in the Climate Change Plan),
- We allowed the model to deploy bioenergy with carbon capture and storage (a negative emission technology),
- The lower output bound for refineries was revised downwards in the period to 2050 to allow for potentially greater decarbonisation in industry by 2050,
- We modified the constraint on exports and imports of electricity to ensure that the system maintained sufficient capacity to continue exporting to the rest of the UK.

In order that the cost differential between the 80% target and a 90% target could be provided in the most objective way, the 80% and 90% runs were conducted using the same set of assumptions and constraints, i.e. the relaxed constraints above that allowed for a 90% target to be met by TIMES. For this reason, the cost of meeting the 80% target given here is not the same as the cost of delivering the Climate Change Plan.

The Committee requests details of the figure for 80% (which was subtracted) and the figure for 90%, which were used in this calculation to arrive at £13bn.

Achieving an 80% target under the relaxed constraints necessary to achieve a 90% target, is estimated to cost £47 billion (relative to a baseline of no-action) whilst achieving a 90% target would result in additional costs of £13 billion. The £47 billion figure is higher than that previously calculated due to additional emissions in the LULUCF sector. It is not the cost of delivering the Climate Change Plan, because different constraints were also included in the model.

In your letter, you also said: Adjusting for inflation and removing the impact of discounting, the estimated cost of moving to a 90% target is approximately £59bn. The Committee seeks details of the two figures used to arrive at this figure.

The £13 billion estimate is in 2017 prices, discounted using the social discount rate. Presenting cost information in this manner is best practice when considering costs and benefits which incur in the future, and is the approach adopted in prominent international studies\(^\text{16}\) and consistent with HM Treasury Green Book guidance on appraising long term costs.

By allowing the impact of expected inflation in both runs, such that costs in 2050 would be equal to costs in 2017 plus the cumulative expected impact of inflation between 2017 and 2050, the cost of moving to a 90% target is estimated to be approximately £25bn.

Discounting is a technique used to compare costs and benefits occurring over different periods of time on a consistent basis, providing an estimate in present value terms. It reflects two components: firstly ‘time preference’, the concept that people value goods and services in the current time period over future time periods; and secondly, ‘the wealth effect’, where income grows over time, and future consumption will increase, so the value of each individual pound will be lower than it is today.

It is worth noting that removing the impact of discounting is not best practice and contrary to the approach taken in many international studies, particularly given the modelling approach makes decisions based on the concept. However I understand that the Committee wants this information following discussion on 19 June and exchange of letters on 26 June and 27 July so am happy to provide it: removing the impact of discounting, as well as allowing the impact of inflation, the estimated cost of moving to a 90% target is approximately £59bn.

\(^{16}\) For examples, see https://www.nature.com/articles/s41586-018-0071-9 and http://www.legislation.gov.uk/ukia/2016/177/pdfs/ukia_20160177_en.pdf
Can you confirm whether the TIMES model has removed discounting and adjusted for inflation in order to arrive at the £13 billion?

The £13bn figure has been discounted and adjusted for inflation, i.e. it is in constant 2017 prices.

During consideration of the draft CCP, the Committee became aware that not all sectors had been modelled within TIMES and that transport, agriculture, land use and waste had all been modelled externally before the results were added into the TIMES runs. In order to better understand how this impacts on the costs which TIMES predicts, the Committee requests clarification as to how each sector was considered and modelled when running the TIMES model for the 90% target. This should include information about whether modelling done externally to TIMES for non-energy sectors was updated from modelling done for the 80% target under the current CCP.

The assumptions and model inputs (including non-energy emission projections) used in TIMES are identical in the 80% and 90% scenarios, with the exception of the overall emission constraint across both runs. This was intentionally done, to ensure that the cost differential between an 80% and a 90% scenario only arose as a result of moving to a tighter emission pathway.

As discussed in the Technical annex to the Climate Change Plan, TIMES is an energy system model of the Scottish economy but incorporates non-energy sectors’ emission projections. The same non-energy emission projections were used in the Climate Change Bill runs up to 2032, but were then extended and built on out to 2050. The exception to this is LULUCF, where we updated emissions to reflect emerging findings from sectoral models, to ensure we were using the most up-to-date information.

In your letter of 27 July 2018, you provided further details of where the additional costs might lie in moving from 80% to 90%. The largest cost category is an additional £10bn on investment costs, which describes broadly where investment will be required in the energy and transport sectors. The Committee requests details of:

- Why investment is only highlighted for these sectors?

Cost figures within TIMES represent the cost of meeting final energy demands (such as hot water, transport or appliances) over the period to 2050 across the demand-driven sectors (electricity, industry, transport, residential, services and parts of agriculture), and therefore costs in all of these are reflected in the £13 billion figure.

The increase in investment costs by 2050 is the result of a number of broad changes. Firstly, there is greater investment in renewable energy for electricity generation and in the upgrading and processing of the additional volumes of bioenergy that are either imported or domestically produced. Secondly, there are also higher investment costs as a result of further electrification of the residential, services and transport sectors, with expenditure in the transport sector also increasing due to additional spending on hydrogen technologies.
• How has the TIMES model developed cost pathways for sectors modelled outwith TIMES (Land use, agriculture, waste and Transport)?

The transport sector is constrained by an emission envelope and fuel shares sourced from sector-specific modelling in the period up to 2032. After 2032, the emission envelopes and fuel shares for the transport sector are entirely determined by the TIMES model.

As sector emission pathways in non-energy sectors (LULUCF, waste and most of agriculture) have not been modified between the 80% and 90% targets, there are no additional costs borne out by these in the £13 billion figure.

• What investment is envisaged in sectors other than energy, and does this form part of the £10 billion?
• If not part of the £10 billion, how much additional cost does it represent?

The answers to these questions are covered above.

Previously, in its report on the draft CCP, the Committee suggested that the final CCP should include more detail on the estimated costs of each of the policies and proposals, including the estimated costs to the public and business sectors. The Committee understands that the TIMES model cannot provide this information, however it is asking the SG to move beyond a high level assessment and provide the Committee detail of:
• An assessment of the potential costs to the public or other sectors of meeting a 90% target.

As set out in my letter of 27 July 2018, where the costs fall will be determined by the future design of policies and proposals that will deliver emissions reductions in order to achieve the targets. There are many ways in which costs can be distributed. For example, currently the cost of supporting renewable technologies in the electricity system is not entirely borne by the consumers in the geographical area in which a generating station is located, but are instead paid for by domestic and non-domestic electricity consumers across the integrated GB wholesale market. Alternatively, the Renewable Heat Incentive, a scheme for promoting the uptake of alternative heating technologies such as Biomass Boilers and Heat Pumps, is paid for through general taxation.

The future distribution of costs will also depend on a number of factors outside Scotland’s influence. As international efforts to decarbonise intensify, global bioenergy demand could increase resulting in higher costs and lower availability of Scottish imports of bioenergy inputs. Furthermore, international and European action will also substantially influence the development of technology costs and how are they borne, via global investments and the potential development of global carbon markets.

As such, it is not possible to provide an assessment of the potential costs to the public or other sectors of a meeting a 90% target beyond the estimates given in the financial memorandum.
• Whether it plans to set out estimated costs (or a range of costs) to the public and other sectors in the next draft CCP, as previously recommended by the Committee?

I note the Committee’s recommendation that future draft Climate Change Plans should provide estimated costs to the public and other sectors, and can assure the Committee that this recommendation will be given serious consideration ahead of Ministers making decisions about future Climate Change Plans.

In evidence received by the Committee, it has been presented that the cost of acting will be less than the cost of failing to act. The Committee has also been told that action sooner, rather than later, will be less burdensome. In evidence to the Committee, Jim Skea of the IPCC and Andy Kerr of ClimateXChange both spoke of the co-benefits to be derived from action to mitigate climate change. The Committee requests details of the social and economic cost-benefits and risk analysis for which the SG has undertaken in relation to a move from an 80% target to a 90% or 100% target, and how benefit and cost savings are impacted by the rate at which action is taken. If this work has not been undertaken, the Committee seeks clarification as to why and recommends the SG carry out this work in order to provide the findings to the Committee. The Committee also seeks this information in relation to analysis of the difference in cost of achieving a limit of global temperature rises of 1.5 degrees and 2 degrees.

ClimateXChange, on behalf of the Scottish Government, commissioned a Rapid Evidence Assessment (RES) and synthesis of key global assessments of the costs and benefits of climate change action. A key message of this review was that estimates of climate impacts are inherently uncertain, such that climate policy needs to be assessed in terms of risk management, rather than straightforward cost-benefit analysis.

To estimate damage costs, the authors drew on the Intergovernmental Panel on Climate Change (IPCC) fifth assessment report (AR5), and specifically on 14 studies that assumed warming in the range 2.5-3°C by the end of the century. The studies estimated a mean damage cost as percentage of GDP of 2.2% with a median of 1.5%. The IPCC study assumed that GDP will grow over the course of the century, meaning that climate damages, while large in absolute terms, appear modest in comparison with GDP. Emerging literature is beginning to challenge this view. A study that assumed climate change can reduce GDP growth rates, rather than just incurring instantaneous damages, estimated a median damage cost of about 9% of GDP in 2050.

Studies in IPCC (2014)\textsuperscript{20}, consistent with a 50\% change of limiting warming to below 2°C, estimated median global abatement costs at 3.4\% of GDP by 2050.

While the balance of evidence suggests that the mid-point estimates of abatement cost may be higher than mid-point damage estimates, it is reasonable to conclude that there is a considerable risk of much higher-than-expected damages, which would justify the cost of ambitious climate action. This is in line with the conclusion arising from climate risk literature, suggesting that reducing the risk of exceeding tipping points\textsuperscript{21} is a key reason to aim for strong abatement targets globally. Tipping points become much more likely at higher levels of warming but cannot be ruled out at low-to-moderate warming levels. Such tipping points include ice sheets on Greenland and West Antarctica, for example, as well as dieback of the Amazon rainforest.

On the potential wider benefits of climate policy, the Scottish Government published three independent evidence reviews of the potential wider impacts of climate change mitigation options, focussing on Agriculture, Forestry, Waste and related Land Use\textsuperscript{22}; the Built Environment\textsuperscript{23}; and Transport\textsuperscript{24}. The reviews were published alongside the draft Climate Change Plan and highlighted the potential for positive social, economic and environmental impacts to result from climate action.

The Scottish Government has also published research commissioned from EY on the challenges and opportunities associated with transitioning to a low carbon economy\textsuperscript{25}.

The Scottish Government has also commissioned the University of Strathclyde, via ClimateXChange, to link UK versions of an economic model that they have to TIMES. This piece of work, to be completed over the next twelve months, will allow further analysis of the wider economic impacts of TIMES scenarios.

Finally, advice that the Cabinet Secretary for Environment, Climate Change and Land Reform has commissioned from the UK Committee on Climate Change (CCC), following the IPCC Special Report, specifically requests that evidence should be given on how reductions in line with the CCC’s recommendations might be delivered in key sectors of the economy, and the expected costs and benefits across the spectrum of scenarios, in comparison to the costs and benefits of meeting the current targets.

\textsuperscript{20} [http://www.ipcc.ch/report/ar5/wg3/]
\textsuperscript{21} TEEB (2009) (http://www.teeweb.org/media/2009/09/TEEB-Climate-Issues-Update.pdf) notes that a tipping point is a threshold of irreversibility, beyond which the ecosystem ceases to function. They note that we have reached this point with coral reefs, whereby gradual reduction in future greenhouse gas emissions will not stop their imminent loss. At the tipping point, decisions should no longer be based around marginal costs and benefits, but should capture the ethical and other consequences of losing the ecosystem.
\textsuperscript{22} [https://beta.gov.scot/publications/evidence-review-potential-wider-impacts-climate-change-mitigation-options-agriculture/]
\textsuperscript{24} [https://beta.gov.scot/publications/evidence-review-potential-wider-impacts-climate-change-mitigation-options-transport/]
\textsuperscript{25} [https://www2.gov.scot/Topics/Environment/climatechange/meetingemissionstargets/climate-change-plan/transitioning-to-a-low-carbon-economy]
The Committee considers that there is a difference between the actions which would be taken as a result of progress and technological advances, and actions which are proposed to be taken specifically to meet the objectives of the Bill and future CCPs. The Committee requests detail of the SG’s assessment of what will occur anyway and what action will arise specifically as a result of the Bill and future CCPs.

The actions necessary to meet the targets will be set out in future Climate Change Plans.
### Additional Cost of 90% Target in 2050 Relative to 80% (Broken down by Cost Category):

<table>
<thead>
<tr>
<th>Type of cost</th>
<th>Additional cost (£bn 2017 prices, discounted) 2030-2050:</th>
<th>Impact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable costs</td>
<td>-0.6</td>
<td>The net impact on variable costs in a 90% run compared to an 80% run is a marginal reduction. Increased targets result in a greater degree of decarbonisation, with increased variable expenditure on renewable electricity generation and low carbon resources and technologies. In particular, there is an increase in expenditure in imports and domestic production of biomass and bioenergy. Expenditure on electricity imports also increases, though Scotland remains a net overall exporter, due to the greater demand for electricity in a 90% scenario. These increases in costs are however offset by a fall in variable expenditure to source fossil fuel inputs, as a result of lower volumes of gas used by the system.</td>
</tr>
<tr>
<td>Fixed operating and maintenance costs</td>
<td>3.9</td>
<td>The increase in these costs is the result of: Greater expenditure in renewable electricity generation (wind, geothermal and hydro); bioenergy upgrading and manufacturing, which results in higher levels of electricity; and bioenergy use. There is also a slight increase in expenditure on hydrogen manufacturing. The increase in cost also results from the replacement of technologies using gas in the residential sector and services and towards electric heat pumps, electric cooking, and biomass and hydrogen boilers. Finally, the electrification of road transport (and greater expenditure in hydrogen hybrids for trucks) also results in higher levels of fixed O&amp;M costs.</td>
</tr>
<tr>
<td>Investment costs</td>
<td>10.0</td>
<td>The increase in investment costs by 2050 is the result of greater investment in renewable energy for electricity generation and in the upgrading and processing of the additional volumes of bioenergy that are either imported or domestically produced. Higher investment costs are also the result of the further electrification of the residential, services and transport sector, with expenditure in the transport sector also increasing due to expenditure on hydrogen technologies.</td>
</tr>
</tbody>
</table>
Cost of the Climate Change Plan TIMES Run – equivalent to around 1% of cumulative GDP to 2050.

The Climate Change Plan covers the period between 2018 and 2032, and as a result policies and proposals for each sector are only devised to cover this period. The Plan is a strategic document providing the framework for policies and proposals, with the detail of policies being set out when those policies are developed and implemented. The TIMES model used to support the development of the Climate Change Plan was run to 2050 as is standard practice, to ensure continuity in efforts beyond 2032 consistent with our overall climate change ambition of, at the time, an 80% target.

The TIMES model cannot be used to directly set policies and proposals, or critically, assess their cost. Its outputs (in particular the sector envelopes and energy system mix) were instead used to support the development the policies and proposals necessary to reduce emissions in each sector.

The cost of the TIMES run that supported the Climate Change Plan is estimated to amount to £33 billion over the period 2018 to 2050, in 2017 prices and discounted. This is equivalent to around 1% of cumulative GDP out to 2050. This should be seen in the context of the estimated cost of taking no action, which as discussed above has been estimated to potentially cost around 2.2% of global GDP26 according to the IPCC.

As discussed in the Climate Change Plan, to estimate this figure the system cost of a TIMES run with no targets (out to 2050) was subtracted from the cost of the model run that underpinned the Plan.

The table below provides a breakdown of the additional cost of the run that supported the Climate Change Plan over the TIMES model run with no targets. As discussed above, these figures represent the additional system cost to 2050, which includes investment and fuel costs derived using current estimates of costs and potential of existing and future technologies.

They therefore do not provide an indication of who the costs will fall to, as that would be determined by current and future policies and proposals designed to deliver the emission reductions associated with the targets.

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26 This is the IPCC’s mean value, the median cost value has been estimated to be 1.5% of global GDP.
### Additional Cost of Climate Change Plan Relative to TIMES Run with No Climate Change Targets (Broken down by Cost Category):

<table>
<thead>
<tr>
<th>Type of cost</th>
<th>Additional cost (£bn 2017 prices, discounted) 2018-2050</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable costs</td>
<td>7.7</td>
<td>The increase in variable cost in the energy system is the result of decarbonisation. There is an increase in expenditure on imported electricity, given the greater degree of electrification, while there is a fall in revenues due to lower volumes of fossil fuel exports. Variable costs also increase due to larger volumes of bioenergy resources being demanded by the energy system.</td>
</tr>
<tr>
<td>Fixed operating and maintenance costs</td>
<td>5.5</td>
<td>The net increase in fixed O&amp;M results from the higher levels of expenditure on renewable electricity and natural gas plants fitted with CCS. Another significant component of the additional fixed O&amp;M costs is the result of increased expenditure on hydrogen manufacturing and distribution. In the building sector, costs also increase due to expenditure on distribution networks and electric heating technologies, including heat pumps.</td>
</tr>
<tr>
<td>Investment costs</td>
<td>19.5</td>
<td>Investment costs represent the most significant component of the overall increase in expenditure. In line with the above fixed costs, they are the result of increased investment in renewable electricity and natural gas plants with CCS, bioenergy processing and upgrading plants, as well as hydrogen manufacturing. Within the building sectors, higher investment on electricity distribution networks, and electric heat (including heat pumps) also leads to the overall net increase. Finally, within the transport sector the transition away from fossil fuels and towards hybrids and electric vehicles also results in an overall increase in the levels of investment.</td>
</tr>
</tbody>
</table>
At its meeting on 19 June 2018, the Committee heard from the Scottish Government Bill Team. In advance of the meeting, the Committee wrote to the Bill Team and received a response on 12 June 2018. The Committee also wrote to the Bill Team after the session and received a response on 27 July 2018.

On 23 October, the Committee heard from:

- ClimateXChange
- Intergovernmental Panel on Climate Change
- The Committee on Climate Change

The Official Report of the meeting can be found here.

Following the meeting, the Committee wrote to the Scottish Government on the Financial Memorandum to the Bill and to the Committee on Climate Change.

On 30 October, the Committee heard from:

- Anders Wijkman, Chair, Climate-KIC and former Swedish Parliamentarian; and
- Stefan Nyström, Director of Department for Climate Change and Air Quality at the Swedish Environment Protection Agency

The Official Report of the meeting can be found here.

On 6 November the Committee heard from:

**Panel One - Behaviour Change**

- Dr Rachel Howell, Lecturer in Sociology/Sustainable Development
- Mary Sweetland, Chair, Eco-Congregation Scotland
- Shane Donnellan, Senior Behaviour Change Specialist, Changeworks
- Jamie Stewart, Policy Officer, Citizens Advice Scotland

**Panel Two - Governance**

- Chris Wood-Gee, Chair of the Sustainable Scotland Network
- Mai Muhammad, Energy Manager, Aberdeen City Council
- Tom Thackray, Director of Infrastructure and Energy, CBI Scotland
- Paul Gray, Chief Executive, NHS Scotland
The Official Report of the meeting can be found [here](#).

On 13 November, the Committee heard from:

*Panel One – Agriculture and Land Use*

- Andrew Midgley, Environment and Land Use Manager, NFUS;
- Pete Ritchie, Director, Nourish Scotland;
- Katy Dickson, Head of Policy, Scottish Land and Estates;
- Kate Rowell, Chair, Quality Meat Scotland;
- Patrick Krause, Chief Executive, Scottish Crofters Federation;
- Professor David Reay, University of Edinburgh;
- Professor Eileen Wall, SEFARI;

*Panel Two – Commercial and Freight Transport*

- Dr Andy Jefferson, Programme Director, Sustainable Aviation;
- Rebecca Kite, Environment Policy Manager, Freight Transport Association;
- Martin Reid, Policy Director, Road Haulage Association;

*Panel Three – Active Travel and Public Transport*

- Ian Findlay, Chief Officer, Paths for All;
- Keith Irving, Chief Executive, Cycling Scotland;
- Andy Cope, Director of Insight, Research & Monitoring Unit, Sustrans;
- Bruce Kiloh, Head of Policy and Planning, Strathclyde Partnership for Transport;
- Jess Pepper, Enterprise Manager, Transform Scotland.

The Official Report of the meeting can be found [here](#).

On 15 November, the Committee heard from:

- John Ferguson, EcoideaM Ltd;
- Dave Moxham, Deputy General Secretary, STUC, on behalf of Just Transition Partnership;
- Suzy Goodsir, Greener Kirkcaldy;
• Angus McCrone, Chief Editor, Bloomberg New Energy Finance (via tele conference).

The Official Report of the meeting can be found [here](#).

On 20 November, the Committee heard from:

• Teresa Anderson, Policy and Communications Officer on Climate and Resilience, Action Aid International (via remote conferencing);

• Jim Densham, Senior Land Use Policy Officer, Royal Society for the Protection of Birds on behalf of Scottish Environment LINK;

• Gina Hanrahan, Head of Policy, WWF Scotland;

• Dr Tahseen Jafry, Director, Centre for Climate Justice;

• Alan Munro, Member, Young Friends of the Earth Scotland;

• Siri Pantzar, Policy Operational Volunteer, 2050 Climate Group;

• Caroline Rance, Climate Campaigner, Friends of the Earth Scotland;

and then from—

• Dr Diana Casey, Senior Advisor, Energy and Climate Change, Mineral Products Association;

• Professor Paul Jowitt, Heriot Watt University;

• Elizabeth Leighton, Director, Existing Homes Alliance Scotland;

• Fabrice Leveque, Senior Policy Manager, Scottish Renewables;

• Will Webster, Energy Policy Manager, Oil and Gas UK.

The Official Report can be found [here](#).
Introduction

1. This paper details recent consent notifications sent by the Scottish Government and provides links to related correspondence on the following UK statutory instruments—

*Genetically modified organisms and control of major accident hazards*
- The Health and Safety (Amendment) (EU Exit) Regulations 2018;

*Environment*
- The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2018;

*Water environment, water supply and flood risk management*
- The Floods and Water (Amendments etc.) (EU Exit) Regulations 2018;

*Ionising radiation*
- The Justification of Practices for Ionising Radiation, Radioactive Contaminated Land (England) (Northern Ireland) and Nuclear Reactors (Environmental Impact Assessment for Decommissioning) (Miscellaneous Amendments) (EU Exit) Regulations 2018; and

*Leghold traps*
- The Leghold Traps (Amendment) (EU Exit) Regulations 2018.

2. The Committee is invited to consider the consent notifications and agree whether it is content for the Scottish Government to give its consent for UK Ministers to lay the instruments.

Background

3. In anticipation of the UK leaving the EU, changes are required to devolved legislation by way of statutory instruments. Under the European Union (Withdrawal) Act 2018, and where the Scottish Government considers a UK-wide approach to the legislative changes would be appropriate (for example, to avoid duplication of effort, or where only technical or minor amendments are required), the UK Parliament can legislate on behalf of the Scottish Parliament.

4. For each UK statutory instrument which relates to a devolved matter, Scottish Ministers have undertaken to write to the Scottish Parliament setting out its proposed consent in a consent notification.

5. A protocol has been agreed which sets out the shared understanding between the Scottish Government and the Scottish Parliament on the process for obtaining the approval of the Scottish Parliament to the Scottish Ministers’ consent to the UK Parliament legislating on these devolved matters. The protocol states that the Scottish Parliament will normally have 28 days to consider a consent notification.
6. The protocol also categorises UK statutory instruments as category A (minor or technical amendments), category B (more significant policy decisions) or category C (matters which should be subject to the existing joint procedure (an SI laid in both the UK and Scottish Parliaments)).

7. Under the protocol, following its consideration of a consent notification, a committee can—

- Write to the Scottish Government confirming its agreement with the consent notification; or

- Report to Parliament and recommend that—
  - it is content for consent to be given for a UK SI to be made in the UK Parliament only.
  - It is not content with the Scottish Government granting its consent and that the proposals should be made by an SSI; or
  - It is not content with the Scottish Government granting its consent and that the proposals should be included as a UK SI made under the joint procedure.

8. Where a different way of dealing with EU withdrawal, or a different policy outcome, is required in Scotland, the Scottish Government will pursue Scottish statutory instruments in the Scottish Parliament.

**Genetically modified organisms and control of major accident hazards**

9. The Cabinet Secretary and Minister for Rural Affairs and the Natural Environment wrote to the Committee on 1 November 2018. The 28-day deadline is 28 November 2018. The Scottish Government has determined this is a category A notification and information about the legislative changes the SI seeks to make are set out in the consent notification.

10. The Committee wrote to the Cabinet Secretary and Minister on 7 November and a response was received on 13 November.

**Environment**

11. The Cabinet Secretary and Minister for Rural Affairs and the Natural Environment wrote to the Committee on 5 November 2018. The 28-day deadline is 2 December 2018. The Scottish Government has determined this is a category A notification and information about the legislative changes the SI seeks to make are set out in the consent notification.

12. The Committee did not write to the Scottish Government seeking further information relating to this consent notification.

**Water environment, water supply and flood risk management**

13. The Cabinet Secretary and Minister for Rural Affairs and the Natural Environment wrote to the Committee on 5 November 2018. The 28-day deadline is 2 December 2018. The Scottish Government has determined this
is a category A notification and information about the legislative changes the SI seeks to make are set out in the consent notification.

14. The Committee wrote to the Cabinet Secretary and Minister on 12 November and a response was received on 19 November.

**Ionising radiation**

15. The Cabinet Secretary wrote to the Committee on 9 November 2018. The 28-day deadline is 6 December 2018. The Scottish Government has determined this is a category A notification and information about the legislative changes the SI seeks to make are set out in the consent notification.

16. The Committee did not write to the Scottish Government seeking further information relating to this consent notification.

**Leghold traps**

17. The Cabinet Secretary wrote to the Committee on 13 November 2018. The 28-day deadline is 10 December 2018. The Scottish Government has determined this is a category A notification and information about the legislative changes the SI seeks to make are set out in the consent notification.

18. The Committee did not write to the Scottish Government seeking further information relating to this consent notification.

**For Decision**

19. The Committee is invited to consider the consent notifications and agree whether it is content for the Scottish Government to give its consent for UK Ministers to lay the following statutory instruments in the UK Parliament—

- The Health and Safety (Amendment) (EU Exit) Regulations 2018;
- The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2018;
- The Floods and Water (Amendments etc.) (EU Exit) Regulations 2018;
- The Justification of Practices for Ionising Radiation, Radioactive Contaminated Land (England) (Northern Ireland) and Nuclear Reactors (Environmental Impact Assessment for Decommissioning) (Miscellaneous Amendments) (EU Exit) Regulations 2018; and
- The Leghold Traps (Amendment) (EU Exit) Regulations 2018.

Clerks/SPICe
Environment, Climate Change and Land Reform Committee
Title of Instrument: Environmental Noise (Scotland) Amendment Regulations 2018

Type of Instrument: Negative

Laid Date: 8 November 2018

Circulated to Members: 15 November 2018

Meeting Date: 27 November 2018

Minister to attend meeting: No

Motion for annulment lodged: No

Drawn to the Parliament’s attention by the Delegated Powers and Law Reform Committee? No

Reporting deadline: 10 December 2018

Recommendation
1. The Committee is invited to consider any issues which it wishes to raise on these instruments/this instrument.

Background
2. European Union directives are binding on Members States as to the result to be achieved, but leave them to decide on the method of achieving that result. Directives are transposed into domestic law. Further details on the EU Legislative Process can be found in the Scottish Parliament Information Centre Briefing of May 2016.


4. A copy of the Scottish Government’s Explanatory and Policy Notes are included in Annexe A.
Purpose


Delegated Powers and Law Reform Committee

6. At its meeting on 20 November 2018, the Committee considered the following instrument and determined that it did not need to draw the attention of the Parliament to the instrument on any grounds within its remit.

7. A copy of the Explanatory Notes and the Policy Notes are included with the papers.

Procedure for Negative Instruments

8. Negative instruments are instruments that are “subject to annulment” by resolution of the Parliament for a period of 40 days after they are laid. All negative instruments are considered by the Delegated Powers and Law Reform Committee (on various technical grounds) and by the relevant lead committee (on policy grounds). Under Rule 10.4, any member (whether or not a member of the lead committee) may, within the 40-day period, lodge a motion for consideration by the lead committee recommending annulment of the instrument. If the motion is agreed to, the Parliamentary Bureau must then lodge a motion to annul the instrument for consideration by the Parliament.

9. If that is also agreed to, Scottish Ministers must revoke the instrument. Each negative instrument appears on a committee agenda at the first opportunity after the Delegated Powers and Law Reform Committee has reported on it. This means that, if questions are asked or concerns raised, consideration of the instrument can usually be continued to a later meeting to allow correspondence to be entered into or a Minister or officials invited to give evidence. In other cases, the Committee may be content simply to note the instrument and agree to make no recommendation on it.

Clerks
Environment, Climate Change and Land Reform Committee
Annexe A

Scottish Government Explanatory Note

As per purpose above and including:


The Regulations also make an amendment to regulation 5(2)(b) of the 2006 Regulations to clarify the intended application of the supplementary noise indicators defined in schedule 3 of those Regulations.

Scottish Government Policy Note

POLICY NOTE

THE ENVIRONMENTAL NOISE (SCOTLAND) AMENDMENT REGULATIONS 2018 SSI 2018/342

The above instrument was made in exercise of the powers conferred by section 2(2) of the European Communities Act 1972. The instrument is subject to negative procedure.

Policy Objectives


The 2002 Directive requires Member States to undertake five yearly cycles of strategic noise mapping followed by development of Action Plans based on the maps. The maps estimate people’s exposure to noise from road, rail and aviation, as well as from industry in large urban areas. The 2015 Directive establishes a new common assessment methodology for noise mapping. This takes account of
technological and other developments since 2002 and is the mandatory methodology for the next round of strategic noise mapping. There is very little flexibility in applying the new methodology as the Directive sets out in detail the methods and equations which must be used.

The instrument amends The Environmental Noise (Scotland) Regulations 2006 to refer to the new methodology replacing the assessment methods formerly set out in Schedule 2. It also makes an adjustment to the national supplementary noise indicators in Schedule 3 to ensure compatibility with the new methodology.

Consultation

No consultation was undertaken as the regulation only affects the technical methods to be used for modelling calculations. Stakeholders have been aware of the new methodology since its publication in 2015 and have been informed of the Scottish Government’s intention to transpose the Directive into domestic legislation in relation to Scotland by the end of 2018, as required.

Impact Assessments

There is no significant impact on business, charities, voluntary bodies or the public sector therefore no impact assessments have been prepared.

Financial Effects

The Cabinet Secretary for Environment, Climate Change and Land Reform confirms that no BRIA is necessary as the instrument has no financial effects on the Scottish Government, local government or on business.

Scottish Government
Directorate for Environment and Forestry

November 2018
Introduction

1. This paper provides detail of a recent consent notification sent by the Scottish Government on The Storage of Carbon Dioxide (Amendment) (EU Exit) Regulations 2018. It also provides background on the process for consideration of consent notifications and detail on carbon capture and storage.

2. The Minister for Energy, Connectivity and the Islands wrote to the Committee on 22 November 2018 providing detail on the consent notification and indicating that the UK Department for Business, Energy and Industrial Strategy (BEIS) intend to lay the Statutory Instrument (SI) on Thursday 29 November.

3. The Scottish Government has determined this is a category A notification. Information about the legislative changes the SI seeks to make are set out in the consent notification.

4. The Committee received additional information, on carbon capture and storage, from the Scottish Government, set out in annexe A, and will hear evidence from Scottish Government officials on the consent notification on 27 November. The Committee will consider whether it is content for the Scottish Government to give its consent for UK Ministers to lay the SI.

Background

5. In anticipation of the UK leaving the EU, changes are required to devolved legislation by way of statutory instruments. Under the European Union (Withdrawal) Act 2018, and where the Scottish Government considers a UK-wide approach to the legislative changes would be appropriate (for example, to avoid duplication of effort, or where only technical or minor amendments are required), the UK Parliament can legislate on behalf of the Scottish Parliament.

6. For each UK statutory instrument which relates to a devolved matter, Scottish Ministers have undertaken to write to the Scottish Parliament setting out its proposed consent in a consent notification.

7. A protocol has been agreed which sets out the shared understanding between the Scottish Government and the Scottish Parliament on the process for obtaining the approval of the Scottish Parliament to the Scottish Ministers’ consent to the UK Parliament legislating on these devolved matters. The protocol states that the Scottish Parliament will normally have 28 days to consider a consent notification.

8. The protocol also categorises UK statutory instruments as category A (minor or technical amendments), category B (more significant policy decisions) or category C (matters which should be subject to the existing joint procedure (an SI laid in both the UK and Scottish Parliaments)).
9. Under the protocol, following its consideration of a consent notification, a committee can—
  - Write to the Scottish Government confirming its agreement with the consent notification; or
  - Report to Parliament and recommend that—
    - it is content for consent to be given for a UK SI to be made in the UK Parliament only.
    - It is not content with the Scottish Government granting its consent and that the proposals should be made by an SSI; or
    - It is not content with the Scottish Government granting its consent and that the proposals should be included as a UK SI made under the joint procedure.

10. Where a different way of dealing with EU withdrawal, or a different policy outcome, is required in Scotland, the Scottish Government will pursue Scottish statutory instruments in the Scottish Parliament.

**Carbon capture and storage**

11. Carbon Capture and Storage (CCS) is intended to prevent certain industrial-scale sources of human-generated carbon dioxide (CO2) from being released to the atmosphere. It involves three steps:
  - CO₂ capture - from a large point source, such as a power station or other industrial installation.
  - Transport of CO₂ – by pipeline or ship.
  - CO₂ storage – within underground geological formations.

12. CCS is also more recently being referred to as CCUS – the ‘U’ is for utilisation and refers to various ways in which CO₂ might be used e.g. in the manufacture of cement or as a chemical feedstock, instead of or before being stored.

13. The Oil and Gas Authority is the licensing authority for offshore storage in the UK, except within the territorial sea adjacent to Scotland, which Scottish Ministers authorise. In addition to applying for a licence, developers in Scotland must obtain a grant of the appropriate rights from the Crown Estate Scotland.

14. The most advanced CCS projects in the UK are:
  - Peterhead CCS Project at Peterhead gas-fired power station, in Aberdeenshire
  - White Rose CCS Project at Drax coal-fired power station, in North Yorkshire

15. A Feasibility Study has also recently been published for the Summit Power Caledonia Clean Energy Project at Grangemouth. None of these projects are currently operational.
16. The UK Government has set out its approach to CCS and published guidance on meeting climate change requirements if there’s no Brexit deal on 12 October.

17. In oral evidence to the Business, Energy and Industrial Strategy Committee at Westminster, Claire Perry the Minister for Climate Change and Industry stated that she “would like to see an at-scale [CCS] plant in operation by the mid-2020s”, and that these should be part of “industrial clusters”. The evidence session recognised that Carbon Capture and Use, as well as CCS was “an absolutely fundamental part of decarbonising heavy industry”. These comments were similar to those heard in oral evidence on the Climate Change Bill by the ECCLR Committee on 20 November.

18. A major conference on Accelerating Carbon Capture Use and Storage will be held in Edinburgh on 28 and 29 November 2018.

Recent correspondence from the UK Government on the Greenhouse Gas Emissions Trading Scheme (Amendment) (EU Exit) Regulations 2018

19. The ECCLR Committee recently considered the notification to consent to the Greenhouse Gas Emissions Trading Scheme (Amendment) (EU Exit) Regulations 2018. As part of its consideration it wrote to the UK Government raising concerns about the UK’s licensing regime for geological storage of CO2 in a no deal scenario. The UK Government responded stating:

“Currently, the licensing regime defines obligations and liabilities with reference to domestic legislation on EU ETS and relies on EU legislation for MRV requirements under the EU ETS. Changes made to the EU ETS regime in the context of the UK’s withdrawal from the EU will therefore have a corresponding effect on associated requirements under the licencing regime for geological storage of CO2. In a no deal scenario, the Government is planning to restore functionality of the licensing regime for geological storage of CO2 in areas where the Oil and Gas Authority licenses storage. This will include ensuring alignment with relevant changes being made in relation to post-exit arrangements for the EU ETS. Elsewhere (that is, in Scotland and Northern Ireland) restoring functionality would require devolved administrations to modify their respective licensing regulations.”
Additional Briefing Paper from the Scottish Government

ECCLR COMMITTEE: Update on CCUS Policy - 27th November 2018

UK Government - New activity and approach to development of Carbon Capture Utilisation Storage (CCUS) Policy

CCS is now more commonly referred to as CCUS – the ‘U’ is for utilisation and incorporates the various methods in which CO2 molecules can be used i.e in the manufacture of cement or as a chemical feedstock, or in fermentation processes etc.

With the UK’s Clean Growth Strategy document (published Oct 2017) the UK Government set out an ambition to have the option to deploy CCUS at scale in the 2030’s. To achieve the deployment of CCUS, the UK Government have:

- Established a Ministerial-led CCUS Council with industry.
- Set up an industry-led CCUS Cost Challenge Taskforce.
- Committed to publish a Deployment Pathway for CCUS in 2018.
- Allocated a £20m fund for CCUS development (see annex A)
- Committed to hold a Global Summit and Conference on CCUS in 2018

UK Ministerial –led CCUS Council

The CCUS Council was established in January 2018 – the Council is co-chaired by Ms Claire Perry UK Energy Minister and James Smith chair of the Carbon Trust. The purpose of the CCUS Council is to review progress of the UK government’s new approach to CCUS, its new ambition and the commitments as set out in the Clean Growth Strategy.

Professor Stuart Haszeldine chair of Scottish Carbon Capture Storage (SCCS) and Tom Shields chair of Chemical Sciences Scotland are members of the CCUS Council. SG officials also attend the CCUS Council.

CCUS Cost Challenge Taskforce

The CCUS Cost Challenge Taskforce was established in February 2018. The CCUS Council oversaw the work of the Taskforce which attended to the four work-streams set out below to collectively contribute recommendations on a CCUS Deployment Pathway for the UK Government’s consideration.
The purpose of the CCUS Cost Challenge Taskforce was to inform and propose a strategic plan for supporting the development of CCUS in the UK. SG officials were members of the Taskforce. The Task Force presented a report to the UK government in July 2018, setting out the industry’s view on how best to progress CCUS in the UK:

A web-link to the report is set out below:

Delivering clean growth: CCUS Cost Challenge Taskforce report

KEY TASKFORCE RECOMMENDATION: CCUS Deployed in Clusters by 2025

The CCUS CC Taskforce Report recommended that the UK Government make plans to deploy at least two operational CCUS clusters by 2025.

The report also recommends that carefully targeted funding be made available to support the clustering of CCUS projects. This is suggested alongside a policy framework and commitment from central Government, and industry to work with the devolved administrations and regional and local Government (including local authorities, Local Enterprise Partnerships, and City Mayors, where appropriate), to develop innovative, detailed, and costed CCUS cluster proposals.

Both Grangemouth and St. Fergus industrial complexes are listed in the report as potential CCUS Clusters going forward.

The full recommendations from the Taskforce Report are attached at Annex B.
CCUS GLOBAL SUMMIT EDINBURGH - Wednesday 28th Nov. 2018

A Global Summit on CCUS will be held in The Assembly Rooms, 54 George Street, Edinburgh on the afternoon of 28th November 2018. This will be a high-level event which plans to bring together world energy leaders including international Ministers and CEO’s from major energy, industrial and financial companies with a remit to focus on how best to accelerate the deployment of CCUS.

The event will be co-hosted by the UK Government and the International Energy Agency (IEA). Energy Minister Mr Wheelhouse will attend this event.

RECEPTION & DINNER : EDINBURGH CASTLE Wed 28th Nov. 2018

The Great Hall at Edinburgh Castle has been booked for the evening of 28th November 2018 to allow Scottish Ministers to host the delegates from the CCUS Global Summit for a reception and dinner event.

GLOBAL CONFERENCE ON CCUS – Thursday 29th Nov. 2018

Organised by the UK Government and the Global CCS Institute this event will be held in central Edinburgh (The Hub) on 29th November 2018. This will be a large international event with expectations of around 200 delegates attending.

Energy Minister Mr Wheelhouse will speak at this event.

ANNEX A

UK GOVERNMENT FUNDING - CCUS (£20 Million)

The UK Department for Business, Energy & Industrial Strategy (BEIS) has allocated funds of £20 Million to fund the design, construction and demonstration of Carbon Capture and Utilisation in the UK. The CCU Demonstration Programme (CCUD), announced in the Clean Growth Strategy, is divided into three phases:

- **Phase 1**: a 6-month Scoping Study, carried out by a third-party engineering supplier in collaboration with participating companies that wish to capture and/or utilise the CO₂, or provide the necessary equipment.
- **Phase 2**: The techno-economic result from phase 1 will be used to allow BEIS and the project developers to confidently determine if the CCU projects should progress to a detailed Front-End Engineering Design (FEED) study. These will produce cost estimates for the construction and operation of demonstrating CCU at the host site.
- **Phase 3**: Will focus on construction and demonstration of a number of CCU projects
**Phase 3A** - a £14 million Call of the £20 million CCUD Innovation programme. It will provide grant funding for a number of construction and demonstration projects.

These projects will provide learning opportunities about the optimal way to configure the plants and crucial operational data on performance and degradation. These plants will act as the “lead unit” for the demonstration of the technology, providing tens of thousands of hours of operational data and experience.

**Process Timetable**

- Applications are now open and will close on 7th December 2018.
- Grant Awards will be offered to successful candidates 25th January 2019.

**ANNEX B**

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<tr>
<th>UK CCUS COST-REDUCTION TASKFORCE – RECOMMENDATIONS JULY 2018</th>
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<tbody>
<tr>
<td>1. Government to publish the CCUS Deployment Pathway by the end of 2018, including a commitment to have at least two carbon capture, usage and storage clusters operational from the mid – 2020’s.</td>
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<td>2. Industry and Government to work together to develop a CCUS roadmap for the UK as part of the Deployment Pathway publication by the end of 2018.</td>
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<td>3. Government to publish a policy framework and criteria to enable and prioritise CCUS clusters in the first half of 2019.</td>
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<td>4. Government to respond to the Taskforce’s recommended business models for CCUS through its Review of Delivery and Investment Frameworks for CCUS.</td>
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<tr>
<td>5. Industry, Government, and local partners to work together to support the development of innovative business plans for the development of CCUS clusters.</td>
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<tr>
<td>6. Industry and Government to identify North Sea and East Irish Sea oil and gas infrastructure at risk of being decommissioned in the next 5-10 years which could be maintained as “strategic assets” for CCUS use in the future. A cross Governmental working group, including the OGA and the devolved administrations, to review these assets and include them in the CCUS Deployment Pathway to be published by the end of 2018.</td>
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<tr>
<td>7. Industry, Government and the regulator to develop the mechanisms by which hydrogen projects could be funded through the RIIO 2 mechanisms before gas distribution networks business plans are due for submission (September 2019).</td>
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8. Government to support the timely achievement of an exemption to the Gas Safety (Management) Regulations (GS(M)R) specification to enable a higher blend of hydrogen to be included in the gas distribution and transmission networks, and to consider developing a policy that requires including a steadily rising percentage of hydrogen (produced by low carbon methods) in gas supplied to customers.

9. Working with industry, Government to more fully assess value of CCUS to the wider UK economy (including in terms of utilising existing infrastructure, skills capacity, and supporting opportunities for future clean growth and development).

10. Industry and Government to work with the CCUS Council to monitor and recommend ways to maintain UK’s leadership in CCUS nationally and internationally.

11. Industry and Government to develop and consult with the finance community on an agreed risk allocation for CCUS projects through the Review of CCUS Delivery and Investment Frameworks.

12. Industry and Government to engage with the finance community and the Green Finance Taskforce to establish the agreed parameters for debt and equity (and any new green financing mechanisms) for CCUS projects (including accreditation requirements for a green bond, and a tax credit option).

13. Industry to foster sharing of innovation in CCUS technologies and processes in line with the foundations set out in the Industrial Strategy. Recommended actions for longer term to unlock ambition.

14. Industry and Government to promote international cooperation, including accelerating the option of shipping CO2 across international borders to enable the development of pan-European CO2 storage services.

15. Working with sector regulators, industry and Government to assess opportunities for regulatory coherence and innovation across the heating, transport, gas and electricity sectors in the development of a decarbonised economy.

16. Industry to lead the creation of the decarbonised product mark, a clean industrial products certification system, to certify the low carbon USP of decarbonised industrial products and Government to encourage their domestic use and global export.