

Scottish Annual Targets – Call for Evidence

QUESTION PROFORMA

a. CLIMATE SCIENCE AND INTERNATIONAL CIRCUMSTANCES

The Committee has previously set out advice for a 2010-2050 cumulative budget (1,250 Mt CO₂e CO₂e) for net Scottish emissions consistent with:

- meeting the 2050 target;
- a ‘fair and safe’ Scottish emissions budget - whereby Scotland would contribute appropriately to stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

This would largely be met through domestic abatement, according to a path characterised by a 60% emissions cut in 2030.

The Committee’s [report](#) on the scientific and international context for the UK fifth carbon budget covering the period 2028-32 (October 2015) examines the latest climate science and international circumstances. It finds that the UK’s target to reduce emissions on 1990 levels by at least 80% in 2050 remains in line with the international commitment to 2°C. Regarding safety, this target is based on global pathways estimated to keep a likely chance of staying below 2°C. Regarding fairness, it assumes that the UK does not take more than the global average level of emissions per person in 2050. As an input to the international process, the EU has pledged to reduce 2030 emissions by at least 40% on 1990 levels. Our best estimate for a UK share of that pledge is a reduction of 54%, within a range of 51-57%.

Globally, more will be required to give a reasonable likelihood of keeping below 2°C.

The Committee will provide advice on the level of the UK 5th carbon budget (2028-32) at the end of November.

Question 1: *How does the international, EU and UK context affect the setting of the Scottish annual targets*

ANSWER:

Scotland’s Climate Change Act is a unilateral policy framework and targets must be consistent with climate science. While Scotland’s ability to deliver on its climate commitments is linked to policy decisions at an EU and UK level in many areas it also holds multiple policy levers for domestic delivery, which are increasing with the evolving devolution settlement.

Irrespective of the pace of international, EU or UK action, we recommend that Scotland continues to maximise the multiple environmental, economic and social benefits that result from its legal framework by following a clear, ambitious trajectory to 2032 consistent with a likely chance of limiting warming to 2°C and taking into account the Paris Agreement's aim of pursuing efforts to limit warming to 1.5°C. These benefits include reduced air pollution, reduced ill health, increased job creation, reduced fuel poverty and enhanced energy security, all of which align closely with the Scottish Government's other domestic priorities.

In any event, as the CCC's recent report on the international context makes clear, international climate action has substantially gathered pace in recent years, both through the UNFCCC and multiple sub-national commitments, and increased penetration of renewable and low carbon technologies, while the EU has set a 2030 target of delivering reductions of 'at least' 40% by 2030. However, as the Committee also highlighted "to stay on a cost-effective track to the agreed 2°C objective, guided by the latest climate science, more effort will be required across the world by 2030 than currently pledged, including from the EU." INDCs submitted ahead of COP 21 are still inadequate to limit warming to 2°C.¹

Of particular note in a Scottish context is the current weak EU-ETS trajectory, which will see emissions reductions of 43% by 2030 on 2005 levels. This is inconsistent with the Scottish Government's commitment to decarbonise the power sector to 50g CO₂ by 2030, and indeed with the real world pace of power sector decarbonisation already taking place in Scotland.²

Question 2: *Does the latest evidence on climate risks, pathways of future global emissions and methods to decide effort between nations support the current Scottish emissions budget, or suggest a change?*

ANSWER:

Scotland's 'fair and safe' cumulative emissions budget of 1250 MT CO₂e as advised by the CCC is based on determining a cost effective pathway to 2050, taking the 2020 interim 42% target and the at least 80%

¹ <http://climateactiontracker.org/news/224/INDCs-lower-projected-warming-to-2.7C-significant-progress-but-still-above-2C-.html>

² <http://www.gov.scot/Resource/0048/00487828.pdf>

2050 targets in the Act as a given. At the time, the CCC advised that the cost effective pathway involved equal annual percentage reductions of around 3.5% per annum.³

Minimum Conceivable Ambition

However, the ambition in Scotland's Climate Change Act and the cumulative budget represent the minimum conceivable contribution that Scotland should make as part of a global effort to prevent dangerous climate change.

The Paris Agreement has committed parties to limit warming to "well below 2°C above pre-industrial levels" and to "pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels". The Agreement also incorporates a goal of emissions neutrality or "balance" between emissions sources and removals by "second half of this century, on the basis of equity...".⁴ This implies that Scotland and other developed country parties will have to go significantly further than the 'at least 80%' goal, potentially including negative emissions by mid-century. If anything this will require a tightening of the cumulative emissions budget.

The CCC's advice is not based on a global emissions pathway that would be likely (>66% chance) to avoid average global temperatures increasing by even the 2°C threshold, which is itself less ambitious than the 1.5 °C aspiration in the Paris Agreement. The Committee's recommendations are based on limiting the central expectation of temperature rise "as close as possible" to 2°C (which in practice implies a less than 50% chance of preventing temperature rises in excess of 2°C). In practice, its main criterion has been to select a pathway for global emissions which limits the risk that warming will exceed 4°C to less than 1%.

In addition to the aims of the Paris Agreement, the CCC's analysis of the international and scientific context for the UK Fifth Carbon Budget highlighted that G7 leaders recently endorsed a pathway consistent with a 'likely' (>66%) chance of limiting warming to 2°C, endorsing the lower end of the IPCC's Fifth Assessment Report (AR5) budget of global emissions in 2050 at 15-29 GtCO₂e, slightly less than the CCC's assumptions for 2050.

Changing Inventory and Climate Justice

Scotland's greenhouse gas inventory has also changed since the passage of the Act, highlighting that historical emissions in Scotland are higher than was realised when the original targets and the cumulative emissions budget were set. This should be taken into account in the setting of future targets for Scotland and, if anything, indicates that the cumulative emissions budget should be tightened to be consistent with

³ <https://www.theccc.org.uk/archive/aws2/Letter%20Lord%20Turner%20to%20Roseanna%20Cunningham%20-%20310111.pdf>

⁴ <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

a 'fair and safe' contribution to limiting warming to "well below 2°C" and working towards 1.5°C. Another factor that could suggest a tightening of the cumulative budget is Scotland's commitment to a climate justice approach, which was announced in 2012. This commitment to reducing the burden of climate change on the world's poorest suggests that Scotland may need to reduce emissions beyond a global average level per capita by 2050 to allow more 'emissions space' to developing countries. Scotland's per capita emissions are currently higher than both the UK and EU average.⁵

Question 3: *In the lead up to Paris COP21 how do Scotland's ambitious climate change commitments and targets affect engagement internationally?*

ANSWER:

Scotland's climate change commitments provide a positive international example to share of targets consistent with climate science, cross party political consensus, and a clear focus on climate justice, which increases Scotland's influence internationally. Moreover, the strong pace of electricity sector decarbonisation coupled with economic growth and job creation in Scotland is helpful in making the economic case for investment in renewables internationally. While the targets are ambitious through to 2020 by international comparison, beyond that they are a minimum needed to keep within the 2°C warming trajectory.

However, the full strength of Scotland's example internationally is hampered by a failure to deliver domestically on meeting binding annual targets and slow progress in areas like heat and transport, with the latter still languishing at roughly the same level of emissions as 1990. More policy change to deliver on annual targets, with an effort to learn lessons from other countries where progress is being made in sectors where Scotland is struggling to reduce emissions, would maximise Scotland's leverage internationally.

It is increasingly clear that Scotland is not acting alone, with similarly strong commitments and legislation already in place in many countries around the world and rapid clean energy deployment in developed and emerging economies.⁶

⁵ Energy in Scotland 2015

⁶ <http://www.lse.ac.uk/GranthamInstitute/publication/2015-global-climate-legislation-study/>;
http://www.ren21.net/Portals/0/documents/Resources/GSR/2014/GSR2014_full%20report_low%20res.pdf

b. COST EFFECTIVE PATH TO 2050

The annual targets must set a path that is achievable from today without leaving too much to be achieved in later periods to prepare for the 2050 target. In our latest advice to the Scottish Government (March 2015 progress report) we advised that good progress has been made in reducing emissions in Scotland, however further action is needed to be on track to meet current legislated targets. The Climate Change (Scotland) Act 2009 states that for each year in the period 2020-2050 the annual targets must be set at an amount that is –

- i. Consistent with a reduction over that period of net Scottish emissions accounts which would allow the 2050 target to be met; and
- ii. At least 3% less than the target for the preceding year.

Question 4: *In the area(s) of your expertise, what are the opportunities and challenges in reducing emissions to 2032, and at what cost? What may be required by 2032 to prepare for the 2050 target, recognising that this may require that emissions in some areas are reduced close to zero?*

ANSWER:

Overall Renewable Energy Targets

WWF Scotland, together with Friends of the Earth Scotland and RSPB Scotland, recently commissioned Ricardo AEA and UCL to examine least-cost renewable energy pathways across sectors consistent with meeting Scotland's climate change targets. Running a number of different scenarios through the cost-optimisation MARKAL model (cost optimised to 2050, at both UK and Scottish levels), the report shows that a minimum of 40% of heat, 18% of transport and around 145% of electricity demand will need to be from renewable sources in Scotland by 2030. This means that total energy consumption from renewables will need to be between 41% in an optimistic RPP delivery scenario and 45% in a realistic RPP delivery scenario by this point, with overall energy demand falling by approximately 1% a year. There is little difference in net cost to the Scottish economy between a baseline scenario and higher levels of renewable targets; although there are many co-benefits associated with higher renewables targets related to fuel poverty, air quality, increased energy security and job creation.

Ricardo AEA's cost-optimised approach to electricity indicates that by 2030 the electricity generation sector in Scotland will comprise almost entirely renewables, with a significant increase in installed onshore and offshore wind capacity (as it is cost effective to meet more than just Scottish demand), with a small amount of CCS (less than 400MW) and significant interconnection. New thermal plant is inconsistent with the Scottish Government's target of a 50g CO₂/kWh 2030 decarbonisation target.

In the report, decarbonisation of the heat sector is driven by the roll-out of heat pumps (standalone or

hybrid), and a small amount of biomass uptake for industrial heating. In the transport sector, there is some level of renewable transport in the 2020s, but less than expected because of the increased efficiency as a result of hybridisation and electrification.

Electricity

The Scottish Government has a clear commitment in the RPP to meet a power sector decarbonisation target of 50g CO₂/KWh by 2030, which is an essential foundation for wider decarbonisation. While Scotland is making good progress towards meeting the target, current scenarios in the Electricity Generation Policy Statement rely on a number of outdated assumptions on CCS particularly, undermined by the slow pace of CCS development, and the recent announcement to end the CCS competition funding. WWF Scotland therefore commissioned research by DNV GL to explore alternative scenarios in *Pathways to Power* (Jan2015).⁷ The report shows that Scotland can have close to 100% renewable electricity generation by 2030, assuming that CCS is not commercialised, and achieve security of supply, as long as the GB grid itself is secure. This depends on the build out of new grid reinforcements and some new renewables capacity, both well within the current pipeline, progress to reduce demand by approximately 1%/year, and progress to increase system flexibility through the build out of three new pumped storage facilities (2 of which are already consented or in the National Planning Framework), although alternative storage technologies could play a significant part.

This scenario would allow Scotland to continue as a net electricity exporter, and would be cheaper to deliver in terms of additional renewable generation capacity (£663m/year) compared to the cost of the Scottish Government's EGPS scenario, which relies on 2.5GW of new CCS (£1.85bn), due to the lower cost of wind compared to CCS. The analysis also shows that new unabated gas plant in Scotland (at a 1GW scale) is inconsistent with the Scottish Government's 2030 power sector decarbonisation target, unless it runs at a likely uneconomically low load factor. This is consistent with the Ricardo AEA report mentioned above.

Low Carbon Infrastructure

Putting in place the right infrastructure is central to ensuring Scotland meets its climate change targets. The Low Carbon Infrastructure Taskforce, of which WWF is a founding member and which brings together key organisations from across the infrastructure lifecycle in Scotland, seeks to inform Scottish

⁷ [http://assets.wwf.org.uk/downloads/pathwaystopower.pdf?_ga=1.254471560.1429379626.1447323578](http://assets.wwf.org.uk/downloads/pathwaystopower.pdf?_ga=1.254471560.1429379626.1447323578;);
http://assets.wwf.org.uk/downloads/implications_of_a_decarbonised_power_sector_in_scotland_by_2030_dnv_gl_wwfscotland_fi_1.pdf?_ga=1.219848729.1429379626.1447323578

Government thinking on funding and facilitating the right infrastructure transition. Analysis for the Taskforce by Green Alliance, entitled *Scotland's Way Ahead*⁸, shows that Scotland is currently falling short of even the global average minimum of public infrastructure investment (72%) required to keep within a 2 degree warming scenario (with the assumption that Scotland will have to deliver much more to be consistent with its Climate Change Act). The report shows that Scotland currently spends only 52% of its capital budget on low carbon infrastructure and a fundamental shift is therefore necessary to reorient investment decisions towards a low carbon future.

The report finds that Scottish infrastructure planning is currently failing to support strong progress on a number of key priorities and to give them coherence, prominence and security of funding. These include: energy efficiency, although the signal that a national infrastructure approach will be adopted is welcome; demand side approaches to infrastructure; a systems approach to renewable heat; and addressing emerging needs such as energy storage. While much investment will come from the private sector, the report makes clear that the public sector has a critical role to play as a direct investor in enabling infrastructure, emerging and novel infrastructure needs, innovation, demand side approaches and can play a key role in leveraging private sector funding.

Jacobs has produced a long-list of potential large scale low carbon infrastructure projects for the Taskforce, across a number of different sectors, and a final shortlist will be announced in January 2016⁹.

WWF Scotland would like to see every capital budget consistent with the Climate Change Act, and clear political support for transformational scale low carbon infrastructure projects outlined in the forthcoming Infrastructure Investment Plan.

Renewable Heat

Our homes and buildings will need to be near zero-carbon by 2050 but at present heating accounts for around half Scotland's energy use and carbon emissions. Currently, a quarter of end use emissions in Scotland are still attributable to homes, residential carbon emissions from heating have fallen only 12.4% since 1990, far short of the 37% 2020 ambition in RPP2, and only 4% of the heat Scotland uses is from renewables, with only 1% from district heating. This is despite the Scottish Government's intention to make 'significant progress towards decarbonising the heat sector by 2030.'

A report for WWF Scotland by Element Energy and EST "*The Burning Question – What is Scotland's Renewable Heat Future?*"¹⁰ shows that Scotland will have to significantly step up ambition on renewable

⁸ https://scotlands-way-ahead.s3.amazonaws.com/sites/55816da1126f04bc01000002/assets/55dd793f126f042e960000e1/Foundation_Report_1.pdf

⁹ <https://scotlandswayahead.org.uk/news/tenprojectsreport>

heat to be consistent with this 2030 ambition. There are multiple pathways to delivering a high abatement scenario (interpreted as 50% domestic renewable heat), though all require a significant scale up in heat pump and district heating roll out compared to business as usual. Heat pumps provide up to 40% of heat demand in one pathway, while up to 350,000 homes would need to be connected to district heating by 2030 in another. Continued funding through the RHI will be critical to deliver heat pump roll out, but changes need to be made to better target funding for the domestic and commercial sectors. District heating development will particularly require strong leadership from the public sector, including regulation (as called for by 70% of respondents to the Scottish Government's HGPS consultation). This should entail compulsions for buildings to connect where feasible, powers for local authorities to require connections for new developments, licencing of district heating network operators and clear consumer protection mechanisms. WWF Scotland believes that the Scottish Government should introduce a Warm Homes Act, encompassing many of these regulatory elements, to support the growth of district heating and renewable heat.

Energy Efficiency

Delivering improved fabric energy efficiency in buildings is an essential pre-requisite for the efficiency of renewable heat technologies but the Scottish Government is not on track to meet its intended reduction in housing sector emissions by 2020 (37%) and there is no clear plan on how the 51% reduction by 2027 envisaged in the RPP2 will be met, let alone beyond that point. Given that 85% of our existing homes will still be standing in 2050, building retrofit remains a critical challenge. It is welcome that the Scottish Government has made a commitment to designate energy efficiency a National Infrastructure Priority, which will help to cut emissions and tackle fuel poverty. However, there is still much detail to be fleshed out, including the ambition and funding scale for the NIP.

Along with over 50 civic organisations, WWF Scotland has argued that the ambition should be to support making all homes an EPC C standard by 2025¹¹, backed by a funding pot of over £10bn over the next decade (approximately a half and half split between loans and grants), of which approximately £4.5bn needs to come from the private sector. However, the Scottish Government should conduct its own analysis of the funding needs also. Funding should be backed by incentives, minimum standards regulation and behaviour change support programmes. The economic case for this investment is strong. It would represent a benefit cost ratio of over 2:1, and therefore falls into the category of 'high' value for money, and compares favourably in terms of value for money with other infrastructure projects,¹²

¹⁰ http://assets.wwf.org.uk/downloads/rh_web.pdf

¹¹ http://existinghomesalliancescotland.co.uk/wp-content/uploads/2015/10/EXHAS_jointstatement_Oct15.pdf

¹² Building the Future: The economic and fiscal impacts of making homes more energy efficient, 2014, Consumer Futures: <http://www.energybillrevolution.org/wp-content/uploads/2014/10/Building-the-Future-The-Economic-and-Fiscal-impacts-of-making-homes-energy-efficient.pdf>;

delivers up to 9,000 net jobs a year and reduces fuel bills for consumers by an average of £505/annum, according to research by Verco and Cambridge Econometrics.¹³

For new buildings, strong building regulations that deliver zero carbon buildings and meet the EU requirement for nearly zero energy buildings from 2019 (for non-domestic public buildings) and 2021 (all new buildings) will be essential for the delivery of climate targets and will play an important role in catalysing markets for renewable heat and energy efficient products. Clarity about the timetable for the introduction of a zero carbon standard is needed with urgency, following a watering down of the pace of ambition in 2013.¹⁴ For existing homes, beyond the infrastructure priority to 2025, more policy change and funding will be needed to deliver near zero carbon buildings by 2050.

Electric Vehicles

Research by Element Energy for WWF Scotland¹⁵ on future electric vehicle needs concluded that for the transport sector to make a proportionate contribution towards Scotland's 2020 target of at least a 42% reduction in emissions, we will need at least 290,000 EVs on the roads of Scotland by this date (around 11% of the Scottish car fleet). However, if we fail to halt the projected growth in number of km driven by cars in Scotland, we will need vastly more EVs. The same analysis suggested that a BAU EV growth curve would only result in approx. 1% of the Scottish car fleet being a battery electric or plug in hybrid electric by 2020. Further work by Atkins for WWF¹⁶ set out the key policy measures required to accelerate EV uptake. We would encourage the UK CCC to review these suggested policy measures against the steps being taken by the Scottish Government to increase adoption of EVs.

Question 5: *What, if any, is the role of local authority, business, consumer, individual or household behaviour in delivering emissions reductions between now and 2032? And, separately, after 2032?*

ANSWER:

Local authorities, businesses, consumers, individuals and households all have a significant role to play in delivering emissions reductions between now and 2032 through technological and behavioural change and new business and public service delivery models. While emission reductions can't be driven by government alone, the public sector and government has a critical role to play in catalysing and

¹³ <http://www.cas.org.uk/publications/economic-impact-improving-energy-efficiency-fuel-poor-households-scotland>

¹⁴ <http://www.gov.scot/Resource/0043/00437438.pdf>

¹⁵ See http://assets.wwf.org.uk/downloads/element_energy_ev_report.pdf

¹⁶ See http://assets.wwf.org.uk/downloads/electric_vehicles_driving_the_change.pdf

leveraging private sector investment and in creating the physical, policy and regulatory infrastructure necessary to enable change. District heating is a prime example – without the market certainty and consumer protection provided by an overarching public policy and regulatory framework, market transformation is not happening and progress is inadequate and piecemeal across Scotland. Equally, in terms of energy efficiency improvements, regulatory levers such as minimum standards regulation will be essential in driving behaviour change and new delivery models.

Question 6: *Is there evidence to suggest that actions to further reduce emissions after 2032 are likely to be more or less challenging to achieve than actions in the period up to 2032?*

ANSWER:

The most cost effective emissions reduction pathways assume that the power sector will be near decarbonised by 2030, with land use, heat and transport decarbonising at respectively slower paces. This implies that action to reduce emissions beyond 2032 will need to accelerate in these more challenging sectors, particularly transport. At the same time, the levels of renewable energy and technological change implied by the Ricardo AEA report cited above (which is optimised to 2050) indicates that market transformations and cost reductions will clearly need to have begun even in the more challenging sectors by 2030. This requires early action across these sectors to put in place the foundations for deeper emissions cuts in the 2030s and beyond.

Further evidence on the most cost effective pathway to 2032 and beyond will emerge from the Scottish Government's TIMES modelling exercise currently underway. WWF Scotland is a member of the steering group for this modelling exercise.

Energy Efficiency and Heat

Significant progress needs to be made to decarbonise heat by 2030. In the homes sector, the Scottish Government's intention is to reduce emissions by 51% by 2027, although the policies are not yet in place to deliver this objective with, for instance, delays to the proposal for minimum standards regulation and a heavy reliance on 'additional technical abatement potential' in the RPP2. However, given that homes will need to be zero carbon by 2050, early action to scale up in energy efficiency ambition and policy implementation is clearly required, with an ambitious approach to making all homes a C standard by 2025 as a crucial first step. More action will also be needed to deliver on low carbon heat, with a rapid increase in the number of heat pump installations by 2030, supported by the long-term continuation of the RHI

and strong building regulations.

Analysis by Element Energy for WWF Scotland on the renewable heat demand and technology mix in the Scottish domestic housing stock provided clear conclusions on the headline changes required to deliver the necessary transformation. For instance, if 30% of the Scottish housing sectors heat is to be provided by renewables, sales of renewable heating technologies will have to grow to account for more than half of all heating systems sales by 2030. The same research also highlighted that the Scottish Government expectation for the amount of renewable heat generated by the domestic sector in 2020 is approximately 30% lower than where a medium abatement scenario suggests we need to be by that date.

Transport

The bulk of decarbonisation of transport will need to happen in the decades between 2030 and 2050. Currently, the Scottish Government's RPP2 pathway is for 19% of emissions reduction in transport to 2027. However, even this low level of decarbonisation through to 2027 is heavily reliant on the decarbonisation of road vehicles, which is not happening at pace, and on unspecified 'lower emissions potential.' The Ricardo AEA report sees decarbonisation of road transport delivered in large part by a scale up in efficient and electric vehicles, as well as an increase in renewable energy from transport to 18% by 2030. However, these will need to be supported by strong policy interventions, which are currently lacking. Moreover, given the Scottish Government's predicted increases in vehicle kilometres of up to 20% by 2020 in the Infrastructure Investment Plan,¹⁷ reducing demand for road travel by modal shift will be a critical dimension of emissions reduction in this sector over the coming decades, offering multiple co-benefits including reduced air pollution, reduced ill-health and less congestion.

Aviation

Aviation is rightly included in Scotland's targets, but its contribution to emissions is expected to grow substantially and it is particularly challenging to decarbonise without reducing passenger miles.¹⁸ Therefore any short-term decisions about aviation expansion through cuts to Air Passenger Duty must be considered in terms of the impact on Scotland's targets on and other sectors' emissions reduction pathways.

c. ANNUAL TARGETS AND ACTION

¹⁷ <http://www.gov.scot/Resource/Doc/364225/0123778.pdf>

¹⁸ New Climate Economy (2015) Raising Ambition to Reduce International Aviation and Maritime Emissions

Scotland's statutory 2050 target requires actions across the economy to reduce emissions. Many of these actions will be driven by devolved government policy and implemented by businesses and consumers. There will be an important role of local authorities in successful delivery.

Although the annual targets do not require specific actions, they provide an important indication of the overall direction that policy will take in the future. Once set, targets can only be changed if there had been a significant change in the relevant circumstances set out in the Climate Change (Scotland) Act.

Question 7: *Do you think the existing targets should be revised given the failure to meet them to-date? If so, on what basis should they be revised?*

ANSWER:

It is disappointing that the first four annual targets under Scotland's Climate Change Act have been missed. This is due to a variety of factors, including significant inventory revisions, but also inadequate policy progress across multiple sectors. This has created a cumulative overshoot of approximately 17.5Mt CO₂e¹⁹, which will have to be redressed in future years. The Scottish Government has committed to doing this through the RPP3 process to keep within Scotland's 'fair and safe' cumulative emissions budget of 1250 Mt CO₂e to 2050. In its advice, the CCC should recommend future annual targets taking into account the need to compensate for the excess emissions to date.

The inventory revisions have made the annual targets harder to deliver and the particular revisions that have occurred have also brought the 2020 interim target of 42% closer. Conceivably the 42% target could be delivered earlier than 2020 through revisions to the 1990 baseline rather than exclusively through genuine emissions reductions resulting from policy progress driven by the Act. It is important to note that Scotland's historical (1990-2014) cumulative emissions are now higher than they were at the time the targets and cumulative budget were originally set, as inventory revisions have brought to light then unknown emissions.

Targets should not be changed simply because they are challenging to deliver but should be set to be consistent with science and equity. Moreover, as baselines are likely to continue to change year on year as methodologies are refined, it is difficult to see how a mechanism could be developed for dealing with this problem that retained the scientific credibility of the Act. For instance, moving exclusively to percentage-based targets would not adequately deal with cumulative emissions, which are ultimately the determinant of the pace of warming.

However, we believe that the UK CCC should consider providing advice on two possible sets of annual

¹⁹ <http://www.scottish.parliament.uk/parliamentarybusiness/report.aspx?r=10157>

targets. One that continues to follow the ETS ‘adjusted’ accounting approach and a second that is set against Scotland’s actual territorial emissions. This would be consistent with the CCC’s recent advice on the 5th Carbon Budget. Presenting ‘unadjusted’ emissions against the targets represents an opportunity to provide a clear account of actual year on year progress while remaining consistent with the principles of science and equity.

There is added value to counting territorial alongside ‘net’ emissions.

- It would help to overcome the challenge of setting targets and preparing RPPs to meet them with imperfect knowledge about future ETS allocation, which is becoming worse as new elements are introduced such as ‘backloading allowances.’
- It would help to reduce the disconnect between Scotland’s notional share of the ETS cap and actual emissions from Scotland’s ETS sector, which has been significant in several years and is likely to get much more pronounced with the closure of Longannet (which will strip approximately 9Mt CO₂e out of territorial emissions) and ongoing renewables deployment.
- It would help to provide a clear link between ETS sector policy development and emissions reductions.

Presenting targets under both adjusted and non-adjusted trajectories will not undermine the scientific integrity of the Act and protects the cumulative carbon budget and annual targets. The principle of territorial or domestic action budgets has already been conceded in Scotland, where the RPP accounts for territorial emissions from the electricity sector instead of ‘net’ emissions from 2021.²⁰ Moreover, this would also be consistent with the CCC advice that targets from 2023 onwards should be achieved through domestic action, without the purchase of credits, including from the EU ETS.²¹ Although this would not offset ongoing inventory revisions, it would help to bring future targets from 2016 onwards well within reach and mitigate the effects of the inventory revisions.

Question 8: As a business, local authority, or as a consumer, how do annual targets affect your planning and decision-making?

ANSWER: N/A

²⁰ See RPP2, Annex A p235

²¹ http://archive.theccc.org.uk/aws2/4th%20Budget/CCC-4th-Budget-Book_with-hypers.pdf (pg 12)

Question 9: *What would you consider to be important characteristics of effective annual targets? What is the evidence for their importance?*

ANSWER:

Annual targets are particularly valuable in providing opportunities for regular scrutiny of policy action and for red flagging areas where under-delivery is happening, to enable the introduction of new policies to get back on track. For the full benefit of annual targets to be realised the Scottish Government needs to put in place a much more responsive and comprehensive implementation monitoring programme so appropriate adjustments can be made in policy implementation. There should also be a much greater effort to reduce the delay in provision of emissions data for devolved administrations.

Effective annual targets for Scotland should be:

- Consistent with the trajectory required to deliver Scotland's 'fair and safe' cumulative emissions budget, which at present is the absolute minimum level of ambition required by 2050 (See Q 2). Future targets should reflect the need to compensate for excess cumulative emissions accrued to date.
- Consistent with an equitable share of global emissions by 2050, taking account of Scotland's commitment to climate justice. (see Q2)
- Consistent with the principle that early action reduces the cost of decarbonisation (See Q 11)

d. OTHER ISSUES

The Climate Change (Scotland) Act requires that in designing the annual targets we consider impacts on 'target setting criteria':

- 1) The objective of not exceeding the fair and safe Scottish emissions budget;
- 2) Scientific knowledge about climate change;
- 3) Technology relevant to climate change;
- 4) Economic circumstances, in particular the likely impact of the target on –
 - a. The Scottish economy;
 - b. The competitiveness of particular sectors of the Scottish economy;
 - c. Small and medium-sized enterprises;
 - d. Jobs and employment opportunities;
- 5) Fiscal circumstances, in particular the likely impact of the target on taxation, public spending and public borrowing;

- 6) Social circumstances, in particular the likely impact of the target on those living in poorer or deprived communities;
- 7) The likely impact of the target on those living in remote rural communities and island communities;
- 8) 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;
- 9) Environment considerations and, in particular, the likely impact of the targets on biodiversity;
- 10) European and international law and policy relating to climate change.

The criteria include not exceeding the fair and safe Scottish emissions budget and economic circumstances, in particular the likely impact of the targets on competitiveness, fiscal circumstances, social circumstances (e.g. fuel poverty), and rural and island communities. High level conclusions on these from our advice on the 2023-2027 annual targets were:

- **Competitiveness.** There are potential risks for energy-intensive industries in Scotland where these firms are subject to carbon costs and compete in global markets with firms who are not subject to such costs. Sectors most at risk in the period to 2022 accounted for 0.07% of GVA (2005) and less than 0.5% of employment.
- **Fiscal impacts.** Under current arrangements, the main direct fiscal impacts of decarbonising through the 2020s are likely to occur at the UK level. At the Scottish level, the primary fiscal implication relates to possible public expenditure to support emissions reduction programmes. Since these conclusions were made further powers have been devolved to the Scottish Government, including the ability to set income tax rates and bands and controlling a proportion of VAT raised in Scotland, although these won't be passed in legislation for a number of years.
- **Fuel poverty.** There is an expectation that fuel prices would increase further, reflecting projected increases in gas and carbon prices and support for investment in renewable generation. There is scope to offset costs through energy efficiency measures
- **Rural and island communities.** Particular opportunities exist for cost-effective investment in renewable heat generation for off-gas grid homes, in conjunction with energy efficiency measures. Remote and islands communities are also often located in areas particularly suitable for renewable power generation.

Question 10: *What evidence should the Committee draw on in assessing the impacts of the annual targets on fuel poverty and those living in rural or island communities?*

ANSWER:

The Verco/Cambridge Econometrics Report on the *Economic impact of improving the energy efficiency of fuel poor households in Scotland* sets out the macro-economic impacts (detailed in Q11 below) and fuel

bill impacts of an ambitious programme to upgrade the energy efficiency of fuel poor homes. It found that fuel bills could be reduced for consumers by an average of up to £505/annum.²² The Committee should also draw on the annual Scottish House Condition Survey, which shows that fuel poverty rates remain static at 35% of all homes, that energy efficiency improvements reduced dramatically following the shift to Green Deal and ECO, that 38% of all homes still have less than 200mm of loft insulation, that 29% of cavity walls remain uninsulated and that the rates of solid wall insulation remain high at 86% uninsulated²³.

Question 11: What evidence should the Committee draw on in assessing the impacts of the annual targets on economic circumstances (e.g. the economy, competitiveness, jobs and employment) and fiscal impacts?

ANSWER:

There is good evidence that strong climate action can support (rather than impact) the fiscal balance, job creation, fuel poverty reduction, and security of supply. Evidence from the Stern Review, the Fourth Carbon Budget Report, the IEA World Energy Outlook reports, the UNEP Emissions Gap Reports and the New Climate Economy Report all support the idea that early intervention and a planned low-carbon trajectory consistent with the 2°C limit of warming makes economic sense.²⁴ For instance, the New Climate Economy report finds that delayed action could cut global consumption growth by ~3% per annum from 2030 to 2040, compared to just 1% per annum as a result of action taken now.

Macroeconomy

The New Climate Economy report also draws attention to the weakness of many existing economic models, which overestimate the economic and other disadvantages of action, arguing that “many of the perceived short- to medium-term trade-offs between economic growth and climate action disappear

²² <http://www.cas.org.uk/system/files/publications/economic-impact-of-energy-efficiency-investment-in-scotland.pdf>

²³ <http://www.gov.scot/Resource/0049/00490947.pdf>

²⁴ UNEP, Emissions Gap Report (2015),

http://uneplive.unep.org/media/docs/theme/13/EGR_2015_ES_English_Embargoed.pdf

http://archive.theccc.org.uk/aws2/4th%20Budget/CCC-4th-Budget-Book_with-hypers.pdf

<http://www.worldenergyoutlook.org/weo2015/>

http://www.wwf.se/source.php/1169157/Stern%20Report_Exec%20Summary.pdf

<http://newclimateeconomy.report/>

when policy is examined in a dynamic context of change, and when existing economic inefficiencies and the multiple benefits of action are taken into account.”²⁵

Recent analysis for WWF-UK by UCL and Cambridge Econometrics, using the dynamic MDM-E3 model, shows that a 60% UK-wide reduction by 2030 offers clear macro-economic benefits compared to low ambition pathways, increasing UK GDP by 1.1% in net terms (or 0.8% under low fossil fuel price scenarios), resulting in at least 190,000 additional jobs, increasing UK Government revenues by £5.7bn per annum, and improving energy security by reducing fossil fuel imports by £8.5bn per annum.²⁶

Although RPP2 makes greater efforts to describe the wider benefits to the Scottish economy from the policies and proposals it still falls well short of offering a full account of the wider economic benefits from delivering low carbon policies. It would be particularly useful if the UK CCC highlighted the need for more work in this area.

Jobs and Investment

The benefits of strong climate targets and clear energy market signals are evident in Scotland, bringing in for instance over £1.04bn in renewables investment to in 2014 alone.²⁷ Recent evidence from BIS on the size of the low carbon economy shows the scale of existing low carbon employment in Scotland, totalling 44,800 jobs. This represents nearly 2% of all employment in Scotland; proportionally more than any other UK nation.²⁸ Of this, there are 21,000 jobs in renewables²⁹ and Scotland has proportionally higher shares of jobs in low carbon heat and electricity than its population share would suggest, although notably there is less than a pro rata share in the energy efficiency sector. However, a comprehensive programme to improve the energy efficiency of Scotland’s housing stock would deliver up to 9,000 additional jobs a year in this sector according to research by Verco and Cambridge Econometrics for Consumer Futures.³⁰

Carbon Leakage:

The Committee’s own 2013 analysis indicated that there had been little evidence of carbon leakage to date and its recent analysis of the competitiveness of the steel sector shows that UK Government

²⁵ http://2014.newclimateeconomy.report/wp-content/uploads/2014/08/NCE_Chapter5_EconomicsOfChange.pdf

²⁶ Cambridge Econometrics, The Economics of Climate Policy in UK (September 2014), http://www.camecon.com/Libraries/Downloadable_Files/WWF_Final_Report_1.sflb.ashx, p.5

²⁷ <https://www.scottishrenewables.com/sectors/renewables-in-numbers/#chart12>

²⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416240/bis-15-206-size-and-performance-of-uk-low-carbon-economy.pdf

²⁹ <https://www.scottishrenewables.com/sectors/renewables-in-numbers/>

³⁰ <http://www.cas.org.uk/publications/economic-impact-improving-energy-efficiency-fuel-poor-households-scotland>

measures will largely compensate for the additional cost of low carbon policies on energy bills for energy intensives.³¹

Question 12: *Is there anything else not covered in your answers to previous questions that you would like to add?*

ANSWER:

Although the UK CCC has provided clear recommendations as to where greater policy effort is required there has been limited acknowledgment of these from the Scottish Government. For instance, the Committee have made multiple recommendations that greater efforts are needed in the transport sector and on the demand side in particular and yet there has been no significant change in policy from the Scottish Government. In its forthcoming advice it would be useful in helping shape the development of RPP3 if the UKCCC was able to provide an assessment of the Scottish Government's policy response to its recommendations.

If we are to meet future annual targets, and compensate for the excess emissions to date, we will require at least the following building blocks be put in place:

- A clear, credible and action focused delivery plan. Too much in the current RPP is pushed down the timeline and attributed to new technical abatement without any explanation of what is actually required.
- A finance budget and Infrastructure Investment Plan that is aligned with delivering the Act and does not lock us into high carbon pathways.
- An effective governance structure across the Scottish Government that ensure all decisions are consistent with delivery of the Climate Change Act.

³¹ <https://d2kix2p8nxa8ft.cloudfront.net/wp-content/uploads/2015/11/Technical-note-low-carbon-policy-costs-and-the-competitiveness-of-UK-steel-production.pdf>