



The Scottish Parliament
Pàrlamaid na h-Alba

ENVIRONMENT, CLIMATE CHANGE AND LAND REFORM COMMITTEE

AGENDA

29th Meeting, 2019 (Session 5)

Tuesday 5 November 2019

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 items 4 and 5 in private.
2. **Climate change adaptation:** The Committee will take evidence from—

Baroness Brown of Cambridge, Chair, Adaptation Committee, Chris Stark, Chief Executive, and Kathryn Brown, Head of Adaptation, Committee on Climate Change.
3. **Scottish Water investment priorities:** The Committee will take evidence from—

Douglas Millican, Chief Executive, and Professor Simon Parsons, Strategic Customer Services Planning Director, Scottish Water;

Jo Dow, Chief Executive, Business Stream;

David Satti, Assistant Director, Network Regulation, Water Industry Commission for Scotland;

and then from—

Peter Peacock, Chair, and Sam Ghibaldan, Director, Customer Forum for Water.
4. **Scottish Water investment priorities:** The Committee will review the evidence heard earlier in the meeting.
5. **Climate change adaptation:** The Committee will review the evidence heard earlier in the meeting.

6. **Work programme (in private):** The Committee will review its climate change work programme.

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The papers for this meeting are as follows—

Agenda item 2

Paper by the clerk

ECCLR/S5/19/29/1

PRIVATE PAPER

ECCLR/S5/19/29/2
(P)

Agenda item 3

Paper by the clerk

ECCLR/S5/19/29/3

PRIVATE PAPER

ECCLR/S5/19/29/4
(P)

Agenda item 6

PRIVATE PAPER

ECCLR/S5/19/29/5
(P)

Environment, Climate Change and Land Reform Committee

29th Meeting, 2011 (Session 4), Tuesday, 5 November 2019

Climate Change Adaptation

Introduction

1. The Committee will hear from the Committee for Climate Change Adaptation Sub Committee (ASC)—

- Baroness Brown of Cambridge – Chair of the Adaptation Committee at the Committee on Climate Change;
- Chris Stark – Chief Executive of the Committee on Climate Change; and
- Kathryn Brown – Head of Adaptation at the Committee on Climate Change

2. In the evidence session the Committee will explore—

- The methodology for the ASC assessment of the Scottish Climate Change Adaptation Programme (SCCAP);
- Progress in adaptation priorities;
- Devolved/reserved responsibilities, and the necessary steps to collate relevant information and act on findings; and
- Overall ranking of the ASC's recommendations, and the extent to which the latest SCCAP addresses these.

Background

3. Adaptation Scotland, the Scottish Government funded programme which provides advice and support to adapt to climate change impacts states—

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

4. Key statistics include—

- Average temperatures in Scotland are now around 0.7°C higher than they were a century ago (this is in line with global trends).
- The average temperature in the first decade of the twenty first century in Scotland was 0.9°C warmer than the average for the thirty-year

period 1961-1990 and it was warmer than any other decade since records began in 1910.

- Scotland's warmest year on record was 2014.
- In 2016 the average temperature was 0.8°C higher than the average for 1961-1990.
- Scotland's annual rainfall has increased since the 1970s and is now 13% above the average for the early decades of the twentieth century.
- All seasons have contributed to the increase in rainfall. Long-term monitoring of sea level at stations around the UK including Aberdeen shows the mean sea level for 2006 - 2008 was more than 10cm higher than during the 1920s.

5. Whilst this brings both risks and opportunities, projections for the next century indicate that climate trends observed over the last century will both continue and intensify. Adapting to climate change is therefore necessary regardless of how swiftly emissions are cut.

6. The Climate Change (Scotland) Act 2009 placed a duty on ministers to lay a programme for climate change adaptation before the Scottish Parliament as soon as reasonably practicable after the UK Climate Change Risk Assessment, the latest of which includes a summary report for Scotland.

7. The Act also requires an annual report on progress, and for the advisory body, the Committee for Climate Change Adaptation Sub Committee (ASC), to prepare a report within two years, setting out its independent assessment of the progress made on objectives, proposals and policies set out in the programme.

8. The first Scottish Climate Change Adaptation Programme (SCCAP) was launched in 2014, with the aim of increasing the resilience of Scotland's people, environment and economy to the impacts of a changing climate. Annual progress reports have been published since 2015, with the most recent (5th) published in May 2019.

9. The Scottish Government published the second Scottish Climate Change Adaptation Programme 2019 – 2024 in September 2019.

10. The ASC has published two assessments of the SCCAP. The Final Assessment of Scotland's First Climate Change Adaptation Programme was published in March 2019. This focusses on what has changed since the Committee's first assessment in 2016, in implementing policies and actions set out in the SCCAP and in managing Scotland's vulnerability to climate risks. Annex A provides an Executive Summary of the most recent assessment, a summary of the recommendations from the first assessment and a summary of the recommendations from the second assessment.

Clerks

Final Assessment of Scotland's First Climate Change Adaptation Programme: Executive Summary

The climate in Scotland is changing, and the latest UK climate projections indicate further changes this century. Increases in seasonal temperatures, sea level and annual rainfall are all being observed in Scotland. Recent extreme weather events, such as storm Ali in September 2018, are expected to become more frequent under a changing climate.

This is the second independent assessment of progress of the Scottish Climate Change Adaptation Programme (SCCAP) by the Adaptation Committee of the Committee on Climate Change (CCC). This assessment focuses on what has changed since the Committee's first assessment in 2016, in implementing policies and actions in the SCCAP and managing Scotland's vulnerability to climate risks.

The most notable progress in managing current and future climate risk since the first assessment relates to peatland restoration, actions to increase marine resilience and an improved understanding of the number of people in Scotland living in areas at flood risk. Many SCCAP policies and actions have progressed since the Adaptation Committee's first assessment. There are monitoring frameworks in place covering a number of adaptation priorities, including the National Performance Framework, Scotland's Biodiversity Strategy, the National Marine Plan and the National Planning Framework.

The areas of greatest continued concern include increases in pests and diseases in Scottish forests, declines in seabird populations and soil health. A number of key targets and actions for soil conservation and sustainable land management are not on track and there are insufficient data to assess the vulnerability of soils to climate change. There is a lack of understanding, combined with a significant lack of reporting and data on the resilience of digital infrastructure and infrastructure interdependencies. There are fewer national targets and a lack of monitoring for the 'Society'-related actions in the SCCAP compared to the other themes and a lack of activities related to business impacts and opportunities from climate change.

There also remain key data and evidence gaps that make it difficult to assess progress for a number of priorities. Although mapping flood risk has improved, the extent of housing and other infrastructure development in flood risk areas and the uptake of sustainable drainage systems is still unknown. There is a lack of data and metrics against which to assess health impacts from climate change and vulnerability of people and infrastructure to extreme weather events other than flooding, as well as gaps in understanding what actions are taking place.

The draft second SCCAP currently out for consultation proposes an integrated approach to monitoring and evaluation and sets out principles and governance arrangements for such a framework. This is based on a research project by ClimateXChange and was initiated following the Adaptation Committee's first independent assessment of the SCCAP. The research project included an assessment of significant gaps in the current indicators.

Key messages: Natural environment

There is continued evidence of actions being taken that will help reduce vulnerability to climate change, including restoring larger areas of degraded peatlands than planned, achieving EU water quality objectives and the designation of new Marine Protected Areas.

Semi-natural habitats need to be in good condition in order to give species the best chance of adapting naturally as the climate changes. Measures that aim to protect and enhance the resilience of Scotland's natural environment are well embedded in key policies and strategies, with monitoring frameworks in place to assess progress. Extensive research has been conducted to quantify coastal change.

Some indicators of vulnerability are moving in a positive direction, for example Scotland's coastal waters are in good ecological condition and the condition of lochs is relatively stable with 64% of lochs in Scotland meeting Good Overall Status in 2016. The proportion of woodland features in favourable condition remains stable after an initial improvement in long-term condition.

Efforts in some policy areas have slowed since the first assessment and a number of indicator trends are negative. Progress with restoration of native woodland is not sufficient to meet current Scottish Government targets. There has been a scaling back of ambition for improvements in freshwater habitat condition since the publication of the River Basin Management Plans (RBMPs) due to resource constraints. Meanwhile the number of freshwater habitat features with invasive non-native species identified as a pressure is increasing. The presence of pests and diseases in Scotland's forests is increasing, and Dothistroma Needle Blight (DNB) in particular now appears to be endemic. Populations of seabirds and some specialist breeding farmland birds are in decline, though populations of other terrestrial breeding birds are increasing. The ecological status of estuaries in Scotland is poor and is not showing signs of improvement - 15% of estuaries did not meet Good Overall Status in 2016.

Conclusions cannot be made about vulnerability in some areas where there is a lack of data or gaps in understanding of the risks. For example, there is a lack of research or appropriate metrics to assess the vulnerability of Scottish soils to climate impacts and a recent review concluded that the full extent of erosion or compaction is not currently known. Updated information on the species mix and rate of planting of vulnerable forest species is also not available.

Key messages: Buildings and infrastructure networks

There is continued action to support resilience of buildings and infrastructure networks to flooding, such as the consideration of climate change in design and location of new infrastructure. More work is needed to assess and plan for coastal risks. The Scottish Environment Protection Agency (SEPA) published the second National Flood Risk Assessment (2018 NFRA) in December 2018, which uses an updated methodology to give a better understanding of current levels of risk from river, coastal and surface water flooding. The assessment identifies 284,000 homes, businesses and services which are currently vulnerable to river, coastal and surface water flooding in a 0.5% (1 in 200) annual probability event. Scotland's National Coastal Change Assessment - Dynamic Coast - was launched in 2017 and Phase 2 (2018-22) will investigate the anticipated impact of climate change on future coastal erosion and coastal flooding. Currently less than 10% of Scotland's shoreline is covered by a Shoreline Management Plan (SMP) and with 19% of Scottish coastline identified as erodible, this means not all areas of erodible coast are covered by a SMP, let alone the additional areas that are also at risk from coastal flooding. Better linkage of research is required so that priorities for SMP development are based on the research findings.

Investment in resilient energy, transport and water services continues to be encouraged and indicators of vulnerability show good progress in a number of areas including energy and water supply resilience. Flooding is at present a very minor factor in energy supply interruption, accounting for just 0.03% of all Customer Interruptions in 2016. The resilience of transport networks is included in the National Transport Strategy and public sector reporting on climate adaptation measures by Transport Scotland and local transport partnerships ensures transparency. Scottish Water's 25-year Water Resources Management Plan includes actions that could be taken to improve the resilience of public water supplies. The number of unplanned interruptions to water supply, non-domestic water consumption and leakage from the public water supply continues to decrease and leakage targets are being met.

Up to date building standards are in place for flood resilience, moisture penetration from heavy rain, heating and ventilation, but there is no strategy for retrofitting existing buildings with adaptation measures and only limited guidance is available on overheating in buildings. Levels of domestic building disrepair have declined over the last ten years though there has been no significant change in the number of homes showing dampness since 2002 – around 4% in 2016. Measures to protect Scotland's significant historic estate and risks to cultural heritage have been included in the new National Flood Risk Assessment but it is not yet possible to determine whether they are effective steps. There is limited reference to overheating in technical building standards.

Gaps remain in the policy framework for flooding and for digital infrastructure; there are opportunities for the next SCCAP to strengthen effort. There is no national assessment of whether actions identified in Flood Risk Management Strategies are sufficient to prevent flood risk increasing, or to identify the flood risk management interventions and investments needed. There is no national target to reduce the number of properties at risk of flooding. Local Flood Risk Management Plans do not monitor and report the number and location of new homes and other properties built in areas of flood risk. There are also no specific actions in the SCCAP for resilience of digital infrastructure and whilst investment in resilience through Ofgem is positive, the key SCCAP actions for energy sector resilience have not been taken up. Information on the extent to which data and telecoms facilities and services are exposed to extreme weather impacts is still hard to gather. There is also no evidence of specific measures taken to minimise risks of cascading failures between infrastructure sectors (transport, energy, digital and water) to improve systems resilience in Scotland, which is of particular importance in the context of rural communities where weather impacts can cause greater disruption.

A lack of metrics and targets against which to assess vulnerability continues to be an issue, particularly in relation to the design and location of new infrastructure and the use of sustainable drainage. There is still no evidence collected on whether new infrastructure is designed and located according to the sustainability and adaptation principles set out in the National Performance Framework. Although Key Performance Indicators (KPIs) for climate adaptation are under development by Network Rail and Transport Scotland, there are no data available on development in floodplains in recent years. The number and capacity of sustainable drainage systems (SuDS) installed in new developments and other developments retrofitted with SuDS is also not currently recorded.

Key messages: Society

Legislative duties and standards for organisational resilience are generally well defined for NHS Boards in Scotland and there is a good level of transparency regarding actions taken by health boards to adapt to climate change. Regional frameworks are in place to monitor the resilience of emergency services in Scotland. The UK National Risk Register was updated in September 2017, with climate change risks becoming more prevalent and extensive guidance exists for emergency responders in Scotland. New guidance is available in the Climate Ready Business Guide for businesses to increase their resilience against climate change impacts. A range of research projects are also underway to better understand climate risks for business and inform future policy.

The SCCAP contains a large number of policies and actions aimed at increasing awareness of climate risks but more could be done to make them more specific and to track progress. 'Adaptation Scotland' is a programme funded by the Scottish Government and delivered by the sustainability charity 'Sniffer'. Support provided by the Adaptation Scotland programme includes capacity building training programmes, support for partnership projects, providing expertise to inform policy relevant research online tools, resources and an enquiry service.

Awareness of climate risk appears to be increasing - the proportion of adults in Scotland who view climate change as an immediate and urgent problem has increased by one third between 2013 and 2017, from 46% to 61%.

There are fewer national targets and a lack of monitoring for the 'Society'-related actions in the SCCAP compared to the other themes. There are limited provisions in the standards for organisational resilience that extend to social care services, and there are no specific standards for climate resilience that social care providers have to conform to. While a suite of guidance on preparing for and responding to emergencies such as extreme weather exists, there are no national recovery goals or targets. Strategies and guidance for food-borne disease management have been developed. There is still no strategy or plan to reduce the health effects of UV radiation or vector-borne diseases, which could become more prevalent as the climate changes.

There are some positive trends in reducing vulnerability including fuel poverty (linked to risks to health from cold) in Scotland, which is at its lowest rate since 2005/06. There is continued evidence of improvements in water efficiency by specific industry sectors, such as food and drink manufacturing and whisky production. Non-domestic water consumption has decreased in recent years. Data are not currently available to assess trends in water abstraction by industry.

Many indicators of societal vulnerability to climate change are moving in the wrong direction and data limitations prevent assessment of specific actions, such as emergency response and actions to reduce the risk of overheating in buildings. Average temperatures across Scotland are increasing and the proportion of the population aged 75 and over has increased by 16% between 2007 and 2017. Older people are more vulnerable to climate-related health risks such as an increased risk of illness and death in both hot and cold weather. There is a lack of evidence on the impacts of extreme weather events on long-term health, the effectiveness of recovery plans, and the length of time it takes people and communities to recover. There is still a lack of data to assess the risk of overheating in buildings in Scotland and the extent to which the exposure and vulnerability of the population to pathogens is changing cannot currently be measured.

The impact of climate hazards on business is not currently known. There are no specific policies in the SCCAP focussed on business opportunities from climate change and no data to determine the extent to which such opportunities are being realised. Some Scotland-specific research on business opportunities from adaptation is underway to inform the next programme.

Measuring progress since the CCC's first assessment in 2016

As a comprehensive assessment of the adaptation policy landscape in Scotland was completed for the first assessment, this report focuses on what has changed since 2016. The two reports should therefore be considered in conjunction to present a full picture of the achievements of the SCCAP over its five-year lifespan. The findings from this assessment are presented in the context of an overall 'rating' for each priority area below. The purpose of this rating is to highlight the areas where we are most concerned about the direction or speed of travel in policies, actions and vulnerability indicators. This is intended to enable the Scottish Government to identify easily which areas require additional effort in the next iteration of the SCCAP.

The rating for each priority area is set out in Table 1. The analysis which sits behind these conclusions has been completed using the same assessment method that was used for the first assessment, which is explained in Chapter 1.

Table 1. Summary assessment of adaptation priorities in the SCCAP

Adaptation priority	CCC rating	Rationale for rating
Natural Environment (Chapter 2)		
Terrestrial species and habitats	Mixed progress	Targets for habitat condition and species abundance have been published and monitoring is in place. Notable successes have occurred in meeting peatland restoration targets, with 10,300 ha restored (against a target of 5,100 ha by 2020). Indicators of species abundance and distribution are moving in the wrong direction, suggesting that despite the action underway, the vulnerability of terrestrial species and habitats is increasing.
Forestry	Mixed progress	Whilst SCCAP policies and actions are progressing, the CCC has continuing concerns about the increasing prevalence of pests and diseases, including Dothistroma Needle Blight which is now considered endemic. Goals for woodland restoration are not being met. Further urgent efforts are needed in the second SCCAP to consider how to reduce vulnerability to pests and diseases through increasing the diversity of tree planting, moving away from vulnerable pine species, and publishing updated statistics. The establishment of the Centre of Expertise in Plant Health is a positive step and the next SCCAP should include specific actions to address the concerns raised.

Soils and agriculture	High concern	A number of key targets and actions for soil conservation and sustainable land management are not on track and there are insufficient data and metrics to assess the vulnerability of soils to climate impacts. The Committee feels that sufficient progress has not been made over the first SCCAP period in better understanding and addressing soil health, given its critical role as a fundamental natural asset.
Freshwater rivers and lochs	High concern	Targets and objectives are defined and progress of the actions set out in the SCCAP is on track, however there has been a scaling back of ambition for improvements in freshwater condition. Water quality in almost half of Scottish rivers is poor and not improving, and pressures on freshwater habitats from invasive non-native species are increasing, which suggests that current targets and actions may not be sufficient to address the rising risk. Loch condition remains relatively stable with 64% of lochs in Scotland meeting Good Overall Status in 2016.
Marine and coastal ecosystems	Mixed progress	SCCAP coverage of policies and progress of actions is mixed. Importantly, targets have been met to designate 10% of coastal waters as protected areas, and coastal waters are recorded as being in good condition. There has been a focus on research to develop a better understanding of coastal change. Some indicators show positive trends, but the ecological status of estuaries is not showing signs of improvement (15% of estuaries did not meet Good Overall Status in 2016) and declines in seabird populations are a serious cause for concern – seabird numbers have declined by 38% between 1986 and 2016 and climate change is considered to be one of the main reasons for the decline.
Buildings & Infrastructure Networks (Chapter 3)		
Flooding and coastal erosion risk management	Mixed progress	Some positive action has taken place through publication of the updated National Flood Risk Assessment and Flood Risk Management Strategies and Plans. The policy framework could be strengthened in some areas, for example through greater roll-out of Shoreline Management Plans. For the second SCCAP, information needs to be collected on the number and location of properties in flood risk areas and be maintained to record risks and impacts over time.

Surface water and sewer flooding	Mixed progress	There has been positive progress in implementing SCCAP actions and an updated assessment of surface water flood risk has been completed. Monitoring arrangements in the current SCCAP do not appear to be adequate for responsible agencies to implement, for example because there is no timescale for local authorities to map existing sustainable drainage systems (SuDS), and data are not collected on uptake of SuDS in new developments. Further work is needed to collect this information in the second SCCAP.
Development in flood risk areas	Mixed progress	While there are requirements to consider flood risk in planning new developments, the policy framework should be strengthened by requiring reporting on the number of new properties proposed and built in areas at flood risk, and trend information is needed on the extent of development in floodplains.
Resilience of buildings to extreme wind and rain	Mixed progress	There has been good progress in implementing SCCAP actions and the vulnerability of the housing stock to extreme wind and rain is declining. Levels of domestic building disrepair have gone down over the last ten years, though there has been no significant change in the number of homes showing dampness since 2002 – around 4% in 2016. There are limited provisions in building standards for retrofitting existing buildings with adaptation measures for the impacts of extreme wind and rain.
Water demand in the built environment	Mixed progress	Per capita consumption of water in Scotland remains high compared to many other European countries, at just over 150 litres per person per day. Plans are in place to reduce demand through lower consumption and leakage, and actions are underway to test water efficiency measures. The Committee would like to see demand fall further in the next SCCAP period.
Design and location of new infrastructure	Mixed progress	There is good coverage of climate change in policies such as the National Planning Framework, and SCCAP actions are progressing. There is a lack of information to assess vulnerability of new infrastructure to future climate risk.
Resilience of infrastructure services:		
A) Energy networks generation, transmission and distribution	Mixed progress	Whilst a regulatory framework is in place, two key SCCAP actions have not been taken up (Energy Sector Climate Change impacts research programme and Scottish Government Energy Sector Flood Risk workstream) and there is a lack of data to assess trends in electricity supply disruption caused by severe weather events other than flooding.

B) Public water supplies	Positive progress	SCCAP policies and actions are progressing well and have a long-term focus. Interruptions to water supply are decreasing. Trends in weather-related disruptions cannot be assessed due to a lack of data, and this could be a focus for the next SCCAP.
C) Ports, airports and ferry services	Mixed progress	There is limited provision in the SCCAP for adaptation actions related to ports, airports and ferry terminals, and there is a lack of data to assess whether steps are being taken to manage climate risk. Given the importance of these services for more remote communities in Scotland, more evidence on the scale of risk and action underway is needed as a priority for the next SCCAP.
D) Roads and the rail network	Positive progress	There are a large number of policies and actions in the SCCAP related to resilience of roads and rail and a number of actions are progressing as planned. Key Performance Indicators for climate adaptation are under development by Network Rail and Transport Scotland. Trends in road condition have remained static and around two thirds of road users are satisfied with the information provided on extreme weather and road condition.
E) Digital infrastructure	High concern	There are no specific actions in the SCCAP for digital infrastructure and strategies do not consider disruption from extreme weather. There is no information available to assess the vulnerability of data and telecommunication facilities.
Infrastructure interdependencies	Mixed progress	There has been positive progress in implementing some SCCAP actions, including the establishment of the Critical Infrastructure Resilience Partnership 2017 which provides a strategic policy forum for resilience issues. There is no evidence of specific measures taken across infrastructure sectors to improve systems resilience in Scotland. Some research is underway, which is anticipated to provide useful insights for the next SCCAP.
Society (Chapter 4)		
Resilience of the population to changes in temperature	Mixed progress	SCCAP actions are progressing, however there is limited provision for managing risks from hot and cold weather in the current SCCAP. Indicators of vulnerability show mixed results in the context of an ageing population, which is more vulnerable to both hot and cold weather. Fuel poverty is declining, which should be leading to reduced exposure to cold. Average temperatures are increasing and while this should reduce cold- related vulnerabilities, there is a lack of data to assess the corresponding risk of overheating in buildings under warmer conditions. There is limited reference to overheating in technical building standards.

Resilience of people to pathogens, air pollution, UV radiation	Mixed progress	Strategies are in place for managing the risks of foodborne illness but there are no firm policy actions in the SCCAP related to the potential increase in risks from air pollution or UV radiation due to climate change. There remains a lack of data against which to assess vulnerability.
Public understanding of climate related risks	Positive progress	SCCAP actions are progressing and awareness of climate risk is increasing. The proportion of adults in Scotland who view climate change as an immediate and urgent problem has increased by one third between 2013 and 2017, from 46% to 61%.
Health and social care services	Mixed progress	Progress is being made in implementing adaptation actions for the healthcare sector but the SCCAP does not address risks to delivery of social care services. There are no indicators to assess the vulnerability of health and social care services to climate change. A research programme is underway which is anticipated to address some of the data gaps.
Emergency planning and response	Mixed progress	Whilst SCCAP coverage and implementation of actions is positive, particularly in relation to managing flood risk, there remains a lack of information to assess vulnerability of emergency planning and response services.
Recovery from extreme weather events	High concern	Some positive actions have taken place to improve recovery capabilities, however there is a lack of national targets for recovery from extreme weather events and a lack of evidence on the impacts of extreme weather events on people, and the effectiveness of recovery plans.
Business impacts from extreme weather	Mixed progress	The risks to businesses from climate change are increasing and the current SCCAP is light on adaptation actions for business. Research has been initiated since the first assessment to address gaps in data availability in order to inform the next SCCAP.
Business opportunities from climate change	Positive progress	While there are no specific policies in the SCCAP which focus on business opportunities, specific research is underway to inform the next programme.
Supply chain disruptions	Mixed progress	While there is no overarching plan to address risks to Scottish businesses' supply chains from climate change, some sector specific strategies exist and actions are taking place. There is a lack of information however to assess the vulnerability of Scottish supply chains to climate impacts.

Water demand by industry	Positive progress	SCCAP actions for water efficiency are progressing and non- domestic water consumption has declined in recent years. Data are not available to assess trends in water abstraction by industry.
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Notes: The criteria for the ratings are:
 Positive progress (green): Based on the evidence available, the overall level of progress in managing risks and taking account of opportunities through the first SCCAP period is positive and there may be examples of best practice in adaptation. Where gaps have been identified, projects are in place to address them.
 Mixed progress (amber): Based on the evidence available, while there have been some examples of positive action or risk reduction, there are some specific areas that need further attention and this gives some cause for concern.
 High concern (red): Based on the evidence available, there is a major cause for concern, either through a lack of delivery of policies and actions, because vulnerability is increasing markedly, or because there is a lack of data to assess vulnerability in important areas.

Building on the findings of the first assessment

In completing the first assessment of the SCCAP in 2016, the Adaptation Committee identified the following high-level recommendations for the Scottish Government, in preparing the second iteration of the SCCAP:

- Address all of the urgent risks and opportunities for Scotland identified in the UK Climate Change Risk Assessment.
- Identify a senior owner for each objective to be held accountable for its delivery.
- List the specific actions that will be taken to achieve each objective together with appropriate milestones and timescales.
- Introduce an effective monitoring regime, to allow the impact of actions and delivery of each objective to be properly assessed.
- Present the actions being taken within each sector together and co-ordinate their delivery.

A number of recommendations pertaining to more specific areas of the SCCAP were also made in the first assessment. These recommendations have been revisited in the second assessment to assess what progress has been made, and responses to these are considered throughout the report. Overall, actions have been taken to address the recommendations from the first assessment. We have indicated throughout the report where we think further action is required.

As a result of this second assessment of progress, the Adaptation Committee presents the additional recommendations in Table 2 for the Scottish Government to consider in developing the second SCCAP – these are supplementary to the recommendations from the first assessment.

A full list of all recommendations is included in Annex A (first assessment, with responses) and Annex B (second assessment).

Table 2. Additional recommendations from the CCC's second assessment (in order of concern)			
Adaptation Priority	Recommendation	Owner	Timescale
All	<p>RECOMMENDATION 1: Work with partners to improve the measurement of vulnerability to climate change in Scotland, and the actions being taken, in:</p> <p>a) Areas where appropriate metrics have been identified but vulnerability and actions are not being measured or analysed: Impact of new development on long-term flood risks and risk management costs, including the use of Sustainable Drainage Systems to help manage surface water flood risks.</p> <p>b) Areas where appropriate metrics have not yet been identified or measured: Overheating risks in buildings, including monitoring of internal temperatures in hospitals and care homes. Rates of soil erosion including the uptake of soil conservation measures by farmers. Securing the performance of infrastructure networks in severe weather. Adequacy of actions being taken by Scottish businesses to prepare for extreme weather and adapt to climate change.</p>	Scottish Government	End 2020
Resilience of digital infrastructure (Chapter 3)	<p>RECOMMENDATION 2: Include specific actions in the next SCCAP with regards to the resilience of digital infrastructure. Information on the exposure of data and telecommunication facilities and services to extreme weather impacts is limited and there are no actions in the current SCCAP related to this.</p>	Scottish Government	Next SCCAP in 2019
Resilience of the population changes in temperature (Chapter 3)	<p>RECOMMENDATION 3: The next SCCAP should commit to more ambitious actions to address current and long-term risks from both heat and cold.</p>	Scottish Government and Health Protection Scotland	Next SCCAP in 2019
Forestry (Chapter 2)	<p>RECOMMENDATION 4: Increase efforts to manage and reduce the spread of disease in order to increase resilience to climate change, including Dothistroma Needle Blight (DNB) and other pests and pathogens.</p>	Forestry Commission Scotland	Next SCCAP in 2019

Surface water and sewer flooding (Chapter 3)	RECOMMENDATION 5: In preparing the next SCCAP, review monitoring and reporting arrangements for the uptake of Sustainable Drainage Systems. There may be an opportunity to collect information through public sector organisations.	Scottish Government and Scottish Environment Protection Agency	Next SCCAP in 2019
Flooding and coastal erosion risk management (Chapter 3)	RECOMMENDATION 6: Work with Local Authorities to identify the areas of coastline that are inhabited, at risk of erosion and/or at risk of flooding and ensure these are all covered by a Shoreline Management Plan.	Scottish Government	End 2020
Resilience of energy networks (Chapter 3)	RECOMMENDATION 7: Given that two programmes related to energy sector resilience in the current SCCAP were not taken up - Energy Sector Climate Change Impacts research programme and Scottish Government Energy Sector Flood Risk work stream – include actions in the next iteration of the SCCAP to ensure adaptation actions for energy sector resilience continue.	Scottish Government	Next SCCAP in 2019
Health and social care services (Chapter 4)	RECOMMENDATION 8: Include specific actions to understand and improve resilience of health and social care services in the next iteration of the SCCAP. Research such as that currently underway by ClimateXChange to provide data on the direct and indirect impacts of climate change on social care delivery and to understand risks and dependencies is crucial. The next SCCAP should commit to action to take the findings of this research forward.	Scottish Government	Next SCCAP in 2019
Health and social care services (Chapter 4)	RECOMMENDATION 9: Consider specific actions that can be incorporated into the next SCCAP to link adaptation to National Health and Wellbeing Outcomes. In particular, Outcome 4: 'Health and social care services are centred on helping to maintain or improve the quality of life of people who use those services'.	The Scottish Government	Next SCCAP in 2019
Notes: Recommendations are additional to those made in the first assessment. Refer to Annex A and B for the full set of recommendations from both SCCAP assessments.			

Next steps

The next SCCAP is currently under development and this report is a key input to that process. In June 2018, the Scottish Government sought the advice of the Adaptation Committee on adopting an outcomes based approach to climate change adaptation in Scotland for the next SCCAP.¹ The advice of the Adaptation Committee has been applied in developing the proposed framework and a period of stakeholder engagement and consultation on the next programme is underway. This report will add to the findings from the consultation and engagement activities to inform the next programme, which is due to be published later in 2019. The Adaptation Committee will be pleased to offer our support and advice during the delivery of the next SCCAP programme.

¹ The Scottish Government (2018) *Letter from the CCC to the Scottish Government*, <https://www.theccc.org.uk/publication/asc-writes-to-scottish-government-about-outcomes-based-approach-for-the-sccap/>

First Assessment of Scotland's Climate Change Adaptation Programme: Recommendations

Table A1. Full set of recommendations from first independent assessment, with responses

RECOMMENDATION 1: Scottish Government; By Next SCCAP in 2019

In preparing the next SCCAP the Scottish Government should: address all of the urgent risks and opportunities for Scotland identified in the 2017 UK Climate Change Risk Assessment; identify a senior owner for each objective that can be held accountable for delivery; list the specific actions that will be taken to achieve each objective together with appropriate milestones and timescales; introduce an effective monitoring and evaluation regime, to allow the impact of actions and delivery of each objective to be fully assessed; and co-ordinate the actions being taken within each sector especially where they appear within different themes of the SCCAP.

RESPONSE: The Scottish Government is developing the next SCCAP for publication in 2019. A programme of external engagement is currently underway. The outcome-based approach that is planned will address the urgent risks and opportunities identified in the UK CCRA. We are engaging with policy sectors throughout government and individual sectors will contribute and approve policies within their sector. We have appointed a Programme Board at senior level which will decide the governance arrangements for the new programme. When the development of the new programme is complete, we will be able to list specific actions however these are not confirmed as yet. A Monitoring and Evaluation regime is being developed to address all levels of the new programme from outcomes to actions. The engagement workshops currently underway include a monitoring and evaluation exercise to gather views and information from stakeholders.

RECOMMENDATION 2: Scottish Government/Scottish Natural Heritage; By End 2017

The Scottish Government and Scottish Natural Heritage should by the end of 2017 develop the 2020 Route Map into a clear action plan setting out how the outcomes in the Scottish Biodiversity Strategy will be delivered in the context of climate change.

RESPONSE: The Scottish Biodiversity Strategy: 2020 Challenge for Scotland's Biodiversity recognises the need to help nature adapt to climate change, for example through reducing pressures on ecosystems, habitats and species, and making space for natural processes. Ecosystem restoration priorities include peatlands, coastal sand dunes, native woodlands and establishment of saltmarsh to improve resilience to climate change. The Route Map to 2020 sets out large-scale, cooperative actions that will improve ecosystem health so helping nature to adapt to climate change. The second annual report identified that 96% of actions are on track to 2020; with over 10,000ha of peatland under restoration, additional funding allocated for native woodland planting and continued restoration of 19 river SACs through riparian planting to reduce water temperature fluctuations. While the Strategy

progress report to Parliament showed many species and habitats improving it also identified the need to focus on particular groups such as seabirds. Future priorities for action will take account of biodiversity pressures including climate change.

RECOMMENDATION 3: Scottish Natural Heritage; By Next SCCAP in 2019

Scottish Natural Heritage should commit to developing a monitoring system before the next SCCAP which can measure (a) the impact of climate change on the condition of sites and species and (b) the effectiveness of conservation interventions, thereby enabling the tracking of progress towards favourable ecological condition.

RESPONSE: Site Condition Monitoring as we currently operate it will not be with us very much longer. In line with the Protected Areas 2020 project, specialists are currently working on realigning our protected areas related monitoring to better fit with an ecosystem approach and thereby better contribute to Scottish Biodiversity Strategy delivery. In particular, we are considering how we best go about detecting the large-scale drivers of change – whether that be climate change or nitrogen deposition.

RECOMMENDATION 4: Scottish Government / Scottish Natural Heritage; By End 2017

The Scottish Government and Scottish Natural Heritage should by the end of 2017 establish a target in the Scotland National Peat Action Plan for the area of peatland that will be under restoration by 2030 and introduce and monitor a delivery programme for meeting this target.

RESPONSE: As per the Climate Change Plan, The Third Report on Proposals and Policies 2018-2032, published February 2018, which set out targets for the restoration and management of Scotland's peatlands of 250,000 hectares of degraded peatlands by 2030. The aim is to make significant progress on achieving restoration of degraded peatlands, from the 1990 baseline, to restore 50,000 hectares of degraded peatland to a healthy state by 2020 and 250,000 hectares by 2030. Restored areas will help mitigate flood risk and improve water quality, as well as helping to increase biodiversity in restored areas.

RECOMMENDATION 5: Scottish Government / Scottish Environment Protection Agency; By Next SCCAP in 2019

The Scottish Government and the Scottish Environment Protection Agency should, before the next SCCAP, assess whether the design and operation of the water abstraction regime is compatible with the risk of reduced water availability in coming decades, in a context of projected increases in demand.

RESPONSE: The River Basin Management Plans allow SEPA to review and manage the impacts of water abstraction. These are reviewed every 6 years with sector groups reviewing the measures during that period. The plans also have a section on managing the water environment and climate change. SEPA is looking at ways to include better low flow protection in licences which cover sites without physical limitations on the amount of water that can be taken in prolonged low flow periods. This includes links to the National Water Scarcity Plan and lessons learned from 2018. SEPA's National

Water Scarcity Plan sets out how they will manage water scarcity during prolonged dry periods and also says that they will continue to build in steps to make sure water users are better placed to cope with a changing climate. Part of this is to ensure they have resilience plans in place to cope with dry weather now and in the future. SEPA also link to the SCCAP in their plan. SEPA plan to update the Water Scarcity plan and abstraction controls with the output from UKCP18 due later this year. SEPA's Regulatory Evidence Strategy aims to review the information they receive from operators and they collect themselves to demonstrate compliance with licences but to also assess the impacts on the water environment. Having better monitoring of the things we are concerned about will allow us to adapt to climate change impacts in the future. SEPA work closely with Scottish Water to assess their future water needs and manage short term lack of supply through SEPA's fast track licensing procedures.

RECOMMENDATION 6: Scottish Government, By End 2017

The Scottish Government should assess by the end of 2017 the implications of increases in marine water temperatures and acidity (both actual and projected) for marine ecosystems, the MPA network, and the commercial fisheries and aquaculture sectors.

RESPONSE: Marine Science Scotland (MSS) contributes significantly to the UK Marine Climate Change Impact Partnership (MCCIP) climate change impact assessment process. MSS provides environmental and ecological monitoring data, assessments and research output to MCCIP products, and co-authors them. MCCIP report cards summarise the latest evidence relating to temperature, salinity and ocean acidification change and impacts. It also assesses current and future impacts on the aquaculture and fishing industries, and on the conservation of marine features and the MPA process. MCCIP reports were updated in 2017 and work is underway to update the full set for 2019. MSS research and monitoring programme aims to support the MCCIP process and is addressing specific identified knowledge gaps. The report cards can be found at: <http://www.mccip.org.uk/impacts-report-cards/> and were extensively cited by the UK CCRA Evidence Report (2017). MSS additionally publishes climate change impact related evidence (research and monitoring) in peer-reviewed Journals.

RECOMMENDATION 7: Scottish Government; By End 2017

The Scottish Government should, by the end of 2017, set a long-term target for the area of intertidal habitat to be created through managed realignment in Scotland and introduce appropriate policy mechanisms to achieve it.

RESPONSE: Although evidence suggests that intertidal habitat loss in response to rising sea levels is occurring in some areas, we still have a very partial picture of changes in Scotland. Whilst the Dynamic Coast project has informed our understanding of coastal changes to the upper shore, knowledge of lower coastal changes is currently insufficient to inform specific policies or targets for habitat creation. SNH is funding research to improve the evidence base on Scottish intertidal habitat change. This work will support policy development to conserve our important intertidal habitats and the benefits they provide to society.

RECOMMENDATION 8: Scottish Government; By Next SCCAP in 2019

The Scottish Government should take action to deliver the vision in its Soils Framework that “soils are safeguarded for existing and future generations”. An action plan should be published before the next SCCAP, which includes proposals for: establishing a scheme to monitor the health of agricultural soils and the uptake of soil conservation measures and taking enforcement action where poor management practices are found.

RESPONSE: Currently no action has been taken forward in developing an action plan, however further consideration will be given to this area in the new SCCAP.

RECOMMENDATION 9: Forestry Commission Scotland; By End 2017

Forestry Commission Scotland should consider by the end of 2017 whether additional action is needed to reduce the spread of pests and pathogens, particularly where they threaten native Caledonian pinewoods, and whether further action to increase species diversity in the Public Forest Estate would be beneficial in order to build resilience to climate change.

RESPONSE: Through the Land Management Planning Process, Forest Enterprise Scotland regularly reviews all plans to make sure they are fit for a changing climate and for the threat of pests and diseases. Key planning principles include planning at a landscape scale to include connectivity and improve tree species diversity - refer to page 13 ref 5 of FES Restocking Strategy. Through the Resilience Programme, Forest Enterprise Scotland is developing a decision-making framework to inform decisions about species choice, recognising the importance of maintaining productivity but also the need to prepare for a changing climate and threats of pests and diseases. Alternative species and mixture of species are being considered and used in Land Management Plans to help reduce the impact of catastrophic events on single tree species. To address windthrow risk, in large upland forests (where possible), Forest Enterprise Scotland aims to design coupes so that if one coupe suffers catastrophic wind damage the adjacent coupe can be independent and unaffected and can have a different intervention/fell date.

RECOMMENDATION 10: Scottish Government; In time to inform next FRMSs in 2021

The Scottish Government should assess the level of flood risk management interventions and investments that are likely to be needed to reduce risks in each part of Scotland to acceptable levels over the next 25 to 50 years, accounting for the impacts of climate change and sea level rise. This assessment should help ensure that the objectives set in the next Flood Risk Management Strategies, due in 2021, are compatible with reducing flood risk in the long term.

RESPONSE: SEPA's National Flood Risk Assessment and FRM Strategies allow our understanding of flood risk in Scotland to be updated over each 6- yearly cycle. The second NFRA for Scotland was published in December 2018. Embedded in it is an assessment of how risks might change due to climate change, which has allowed us to understand which areas might be more sensitive to climate change in future. Further, it embeds current information on flood disadvantage and coastal erosion. SEPA is seeking to develop the data and approaches which will allow us to track the impact of

flood risk management actions across and beyond planning cycles, including identifying short, medium and long-term actions to address flood risk. There is a Scottish Government commitment to allocate a minimum of £42 million per annum to Local Authorities for prioritised actions identified and agreed jointly between them, SEPA and SG. Investment decisions are made on the basis of the NFRA and FRM Strategies.

RECOMMENDATION 11: Scottish Environment Protection Agency; In time to inform next FRMSs in 2021

The Scottish Environment Protection Agency should ensure the next Flood Risk Management Strategies monitor and report:

- 1) The impact of local flood risk management plans in reducing surface water flood risk, including in relation to managing urban creep.
- 2) The number and capacity of SuDS installed in new developments and of other drainage assets retrofitted with SuDS.
- 3) The number of planning applications for new developments in the floodplain that were granted, and within these, the number of applications for which SEPA advice was sought and the number of applications to which SEPA objected.
- 4) The number and location of new homes and other properties built in areas of flood risk.

RESPONSE: (1) CREW is undertaking a project to develop a reproducible method for quantifying urban creep which will include a case study area in Scotland (<https://www.crew.ac.uk/project/quantifying-urban-creep>). Data currently available will allow SEPA to track reductions in surface water flood risk by actions put in place to address the risk, but not to quantify it. SEPA is seeking to develop data and approaches which will allow us to track the impact of flood risk management actions.

(2) SEPA does not monitor uptake of SuDS in new developments. SuDS are implemented where they are a legal requirement (i.e. when discharging to rivers and lochs) and SEPA states that this should be the case in our planning responses.

(3) There hasn't been progress on this since CREW completed their report in 2015. We don't routinely get decision notices from local planning authorities so there is no quick and comprehensive means of tracking our involvement through the planning process. Unless we get the information we require, either in form of individual decision notices or as an aggregated data set, we won't be able to quantify the number of decisions where our advice has been ignored.

(4) Currently this could be tracked at a strategic level via the NFRA and updates to the property dataset every six years, if new development can be identified via the property dataset. However, this misses out small catchments due to the mapping. It could be linked to (3) above if data capture and resourcing is sorted out.

RECOMMENDATION 12: Scottish Government/Scottish Water; By Next SCCAP in 2019

The Scottish Government should review before the next SCCAP whether further action is required to deliver and sustain reductions in average water consumption per person in Scotland. As part of this review, Scottish Water should publish the outputs of their water efficiency trials, including an assessment of the impact of metering.

RESPONSE: While metering is not promoted in Scotland, there is a number of ongoing and planned measures being undertaken by Scottish Water to improve efficiency and reduce water consumption, including a water efficiency trial of 200 households. Water meters were installed to record the impact of various measures/combinations of measures upon water usage. These measures included advice on reducing water consumption, installation of water efficient devices and financial incentives. Following analysis of the data, a report will be produced in late 2018. There is also a Water Saving Pack Project, where between 2017 and 2021 Scottish Water is engaging with 2% of Scottish householders through distribution of 49,000 water saving packs, which include an advice brochure and, depending on suitability, water efficiency devices. The packs are delivered in partnership with the Energy Saving trust, who manage Home Energy Scotland, the customer facing brand of the Scottish Government's energy efficiency programmes. Their network of energy advisors provides both water efficiency and energy advice. Scottish Water hopes to scale up this programme in its next business plan. Since 2013, Scottish building regulations mandate water efficiency measures for new buildings and new work to existing buildings.

RECOMMENDATION 13: Scottish Government; By Next SCCAP in 2019

The Scottish Government should work with all infrastructure sectors before the next SCCAP to develop consistent incident reporting, together with indicators of network resilience and performance, and the implementation of resilience measures, to allow improvements in resilience to extreme weather events to be measured over time.

RESPONSE: Regional Resilience Partnerships (RRPs) are currently undertaking their biennial Risk and Preparedness Assessment. This process gives partnerships (Cat 1 and 2 Responders) an understanding of the hazards they may be faced with, including extreme weather events such as low temperature and snow and storms and gales. This assessment is then used to inform their capability to deal with these events and identify the gaps that exist and the work needed to close those gaps. This next cycle will finish in March 2019 and a report for each region will be provided to Scottish Government Resilience Division. Following that RRP's will spend the next 18 months on work to close gaps before they move into another round of risk assessment.

RECOMMENDATION 14: Scottish Government; By Next SCCAP in 2019

The Scottish Government should, before the next SCCAP, assess the current level of capability within the emergency response system to deal with extreme weather events and take further steps as necessary to prepare for climate change.

RESPONSE: Regional Resilience Partnerships (RRPs) are currently undertaking their biennial Risk and Preparedness Assessment. This process gives partnerships (Cat 1 and 2 Responders) an understanding of the hazards they may be faced with, including extreme weather events such as low temperature and snow and storms and gales. This assessment is then used to inform their capability to deal with these events and identify the gaps that exist and the work needed to close those gaps. This next cycle will finish in March 2019 and a report for each region will be provided to Scottish Government Resilience Division. Following that RRP will spend the next 18 months on work to close gaps before they move into another round of risk assessment.

RECOMMENDATION 15: Scottish Government; By Next SCCAP in 2019

The Scottish Government should, before the next SCCAP, co-ordinate with local authorities to assess the impact on people, businesses and communities arising from flood events, including persistent health and wellbeing effects, and consider what further steps might be taken to help communities recover from extreme weather events more quickly.

RESPONSE: We have commissioned a 3-year study to assess the long-term social impacts of the flood events in Aberdeenshire during the winter of 2015/16. Findings from the study will feed into work with a range of stakeholders to develop an action plan to promote flood resilient properties. Flood resilience measures can help people return to their homes quicker after a flood event and lessen the social and economic impacts of a flood event. The approach to prioritise FRM actions currently being developed by SEPA will include improved consideration of social vulnerability to flooding as well as health and wellbeing.

RECOMMENDATION 16: Scottish Government; By Next SCCAP in 2019

The Scottish Government should, before the next SCCAP, review policies that address the current and long-term risks from both heat and extreme cold.

RESPONSE: In 2017, with funding from the National centre for Resilience, the Scottish Government commissioned Health Protection Scotland to conduct a study into health impacts of hot and cold temperatures.

RECOMMENDATION 17: Health Protection Scotland; By Next SCCAP in 2019

Health Protection Scotland should, before the next SCCAP, carry out new research into the current and future risks to the population from heat and UV radiation, and consider proportionate responses to the risk.

RESPONSE: In 2017, ClimateXChange, with support from Health Facilities Scotland and Health Protection Scotland, completed a scoping study to identify how to monitor overheating risk in buildings housing vulnerable people in Scotland.

RECOMMENDATION 18: Health Protection Scotland; By Next SCCAP in 2019

Health Protection Scotland should, before the next SCCAP, assess the changing risks to people from vector-borne diseases, making use of the second UK Climate Change Risk Assessment Evidence Report. This should consider priority areas for future monitoring and surveillance and whether current resources are aligned with the areas of greatest current and future risk.

RESPONSE: Health Protection Scotland routinely monitors new, emerging or re-emerging disease epidemiology and considers the role that climate change plays in developments. The report on the vector borne disease work will be completed by March 2019. It will include comments about gaps in surveillance but the main issues with inadequate surveillance are not related to identifying human illness. The gaps relate more to inadequate monitoring the insect vectors and pathogen carriage.

RECOMMENDATION 19: Scottish Government; By Next SCCAP in 2019

The Scottish Government should, before the next SCCAP, review the take-up and impact of guidance and tools for organisations, businesses and communities provided by Adaptation Scotland.

RESPONSE: Sniffer submits 6-monthly reports on the activities and objectives of the Adaptation Scotland programme, covering input and output indicators, milestones and impact indicators, which are reviewed by a Programme Board comprising Scottish Government Decarbonisation officials and Directors of the Adaptation Scotland programme.

RECOMMENDATION 20: Scottish Government; By Next SCCAP in 2019

The Scottish Government should, before the next SCCAP, develop policies to encourage businesses in high risk areas to become more flood resilient and report on the actions being taken by businesses as a result.

RESPONSE: We have commissioned a 3-year study to assess the long-term social impacts of the flood events in Aberdeenshire during the winter of 2015/16. The study also considers the impacts on businesses. Findings from the study will feed into work with a range of stakeholders to develop an action plan to promote flood resilient properties. Flood resilience measures can help people return to their homes quicker after a flood event and lessen the social and economic impacts of a flood event. The action plan will include specific actions to promote flood resilience in businesses. The action plan steering group includes representation from the insurance and construction industry and works closely with the Defra Roundtable set up to consider actions to promote resilient buildings in England.

RECOMMENDATION 21: Scottish Government; By Next SCCAP in 2019

The Scottish Government should include actions within the next SCCAP that will help businesses in Scotland understand and exploit the economic opportunities arising from climate change.

RESPONSE: In developing the next SCCAP, the Scottish Government is holding a series of workshops and Twitter sessions with stakeholders, including on business and the economy, to hear their views and priorities for the next SCCAP. Wider public consultation on the draft SCCAP will take place in early 2019.

RECOMMENDATION 22: Scottish Environment Protection Agency; By End 2017

The Scottish Environment Protection Agency should begin, by the end of 2017, to publish annual data on water abstraction by industry (separately from agriculture and energy generation) so vulnerabilities can be assessed and managed over time.

RESPONSE: SEPA's Water Resources Hydrology compile this data and produce the annual Water Quality report. This is put into the overall Water Information System for Europe (WISE) report, which is provided directly to the European Environment Agency. The submission normally takes place in the autumn and relates to the previous calendar year (e.g. the 2015 report was submitted in August 2016). The 2017 data was not submitted, as it is to be provided along with the 2018 report.

RECOMMENDATION 23: Scottish Government; By Next SCCAP in 2019

The Scottish Government should, before the next SCCAP, set out how the 'Scotland the Hydro Nation' programme incorporates SEPA's national water scarcity plan.

RESPONSE: The Hydro Nation Forum which advises Scottish Government on the content and direction of the Hydro Nation Strategy includes SEPA CEO Terry A'Hearn. The Forum's biannual meetings provide an opportunity for members to discuss relevant areas of policy and issues such as water scarcity. Hydro Nation officials work alongside colleagues with responsibility for Environmental Quality to discuss the operational aspects of the Water Safety Plan in relation to drinking water supply and wastewater treatment and participated in regular extraordinary Water Scarcity planning and response meetings with SEPA colleagues throughout the unusually dry, warm spell in summer 2018. The issue will be discussed and reviewed by the Hydro Nation Forum at its December 2018 meeting where further consideration will be given to appropriate alignment between the Plan and the Hydro Nation Strategy.

Notes: Progress in implementing these recommendations is assessed throughout the report.

Second Assessment of Scotland's Climate Change Adaptation Programme: Recommendations

Table B1. Additional recommendations from second assessment

RECOMMENDATION 1: Scottish Government; By End 2020

Work with partners to improve the measurement of vulnerability to climate change in Scotland, and the actions being taken, in:

a) Areas where appropriate metrics have been identified but vulnerability and actions are not being measured or analysed:

Impact of new development on long-term flood risks and risk management costs, including the use of sustainable drainage systems to help manage surface water flood risks.

b) Areas where appropriate metrics have not yet been identified or measured:

Overheating risks in buildings, including monitoring of internal temperatures in hospitals and care homes.

Rates of soil erosion including the uptake of soil conservation measures by farmers.

Securing the performance of infrastructure networks in severe weather.

Adequacy of actions being taken by Scottish businesses to prepare for extreme weather and adapt to climate change.

RECOMMENDATION 2: Scottish Government; By Next SCCAP in 2019

Include specific actions in the next SCCAP with regards to the resilience of digital infrastructure. Data on the exposure of data and telecommunication facilities and services to extreme weather impacts is limited and there are no actions in the current SCCAP related to this.

RECOMMENDATION 3: Scottish Government and Health Protection Scotland; By Next SCCAP in 2019

The next SCCAP should commit to more ambitious actions to address current and long-term risks from both heat and cold.

RECOMMENDATION 4: Forestry Commission Scotland; By Next SCCAP in 2019

Increase efforts to manage and reduce the spread of disease in order to increase resilience to climate change, including Dothistroma Needle Blight (DNB) and other pests and pathogens.

RECOMMENDATION 5: Scottish Government and Scottish Environment Protection Agency; By Next SCCAP in 2019

In preparing the next SCCAP, review monitoring and reporting arrangements for the uptake of Sustainable Urban Drainage Systems. There may be an opportunity to collect information through public sector organisations.

RECOMMENDATION 6: Scottish Government; By End 2020

Work with Local Authorities to identify the areas of coastline that are inhabited, at risk of erosion and/or at risk of flooding and ensure these are all covered by a Shoreline Management Plan.

RECOMMENDATION 7: Scottish Government; By Next SCCAP in 2019

Given that two programmes related to energy sector resilience in the current SCCAP were not taken up - Energy Sector Climate Change Impacts research programme and Scottish Government Energy Sector Flood Risk work stream – include actions are required in the next iteration of the SCCAP to ensure adaptation actions for energy sector resilience continue.

RECOMMENDATION 8: Scottish Government; By Next SCCAP in 2019

Include specific actions to understand and improve resilience of health and social care services are included in the next iteration of the SCCAP. Research such as that currently underway by ClimateXChange to provide data on the direct and indirect impacts of climate change on social care delivery and understand risks and dependencies is crucial. The next SCCAP should commit to action to take the findings of this research forward.

RECOMMENDATION 9: Scottish Government; By Next SCCAP in 2019

Consider specific actions that can be incorporated into the next SCCAP to link adaptation to National Health and Wellbeing Outcomes. In particular, Outcome 4: “Health and social care services are centred on helping to maintain or improve the quality of life of people who use those services”.

Environment, Climate Change and Land Reform Committee

29th Meeting, 2019 (Session 5), Tuesday, 5 November 2019

Scottish Water Investment Priorities

Introduction

1. The session will explore the process for establishing Scottish Water's investment priorities for the period of 2021-2027 and how these can be aligned with the need for longer-term investment, e.g. in relation to climate change.
2. The Committee will hear evidence from two panels:
 - Panel 1: Scottish Water, Business Stream and Water Industry Commission for Scotland
 - Panel 2: Customer Forum for Water in Scotland

Background

3. In Scotland, drinking water and sewerage services are provided by Scottish Water, which is a publicly owned company. Scottish Water operates within a regulatory framework and is accountable to Scottish Ministers who are in turn accountable to the Scottish Parliament. Since May 2016, Scottish Water comes within the remit of the ECCLR Committee.
4. The Committee heard evidence on Scottish Water's Annual Report 2016-17 from Scottish Water and Business Stream on 17 April 2018.
5. Further information about the Committee's recent work on water related issues is available on the [Committee's web-page](#).
6. Details of Scottish Water's current investment programme (2015-2021) can be found on their [web-page](#).
7. The Committee received two submissions ahead of this session. The submission from Customer Forum is available at Annexe A. The submission from Citizens Advice Scotland is at Annexe B.

Clerks

Environment, Climate Change and Land Reform Committee

Annexe A

Submission from Customer Forum for Water in Scotland

25th October 2019

Scottish Water Investment Priorities for 2021-27

The Customer Forum welcomes the opportunity to give oral evidence to the Committee with regard to the Scottish Water Investment Priorities for 2021-27. This short submission provides a note of the role and responsibilities of the Customer Forum in the Strategic Review of Charges (SRC21).

The Water Industry Commission methodology for this Strategic Review builds out of the success of the Customer Forum in agreeing Scottish Water's Business Plan at the last Strategic Review of Charges for the period 2015-21. The Forum worked effectively with Scottish Water to ensure that the interests of customers were at the heart of the agreed Business Plan.

In March 2017 a tri-partite agreement between, Scottish Water, Citizens Advice Scotland and the Water Industry Commission established the Customer Forum to again act as a conduit for the views of customers and communities in the SRC21 process. The Forum comprises 10 relevantly experienced individuals with a wide range of backgrounds selected for the purpose of effective participation in the SR21 process.

The Customer Forum performs the role of ensuring robust customer and community input into the development of Scottish Water's Strategic Plan. The Forum has been a full participant at all the key meetings of industry stakeholders within the resource intensive collaborative process Scottish Water has been leading to develop and test its forward thinking and strategy. Those discussions seek to work within the framework of ethical business regulation promoted by the Water Industry Commission.

The Forum frequently has to react to presentations and discussions within a range of collaborative and co-creative meetings and in doing so seeks to probe the question of why what is being proposed is in the interests of customers, and the Forum seeks outcomes that meet the interests of customers. That role is informed by customer research. The Forum has from time to time sought to help shape the discussions from a customer viewpoint, for example through the expression of what the 'social contract' between Scottish Water and its customers might comprise. The Forum's role sits firmly within the Objectives and Principles of Charging of the Scottish Ministers; the Forum is not a lobbying body on government policy.

Engaging with customers and communities across Scotland

The Forum has been asked by the Water Industry Commission for Scotland to work closely with Scottish Water to engage with different communities across Scotland. Over this Strategic Planning process Scottish Water and the Forum

have had a lead role in co-ordinating research effort and co-created and co-commissioned research with key partners including the Water Industry for Scotland, (WICS), the Scottish Environment Protection Agency (SEPA), Citizens Advice Scotland (CAS), and the Drinking Water Quality Regulator (DWQR), with the aim of sharing knowledge and expertise to ensure as much benefit as possible from the research. Over the last two years, through research and engagement programmes, Scottish Water, the Customer Forum, and other industry stakeholders, have sought the views and expectations of more than 25,000 people from across the diverse customer base, including householders, businesses, licensed providers, tourists, developers and community representatives, and across the length and breadth of Scotland.

Agreeing the Strategic Plan and price profiles

The Forum has been asked by the Water Industry Commission to seek to agree with Scottish Water their Strategic Plan and associated price profile for delivery by Scottish Water in 2021-27 which is fully consistent with the Ministerial Objectives. The Water Industry Commission for Scotland will set ranges for acceptable customer prices to meet Ministers' objectives. The Commission has indicated it is minded to accept any such agreed Strategic Plan and price profile that fits within the policy framework set as the basis of its Draft Determination for charges for the 21/27 period.

I hope you find the above note useful. My Director Sam Ghibaldan and I look forward to engaging with the Committee and its questions at the session on the 5th November.

Annexe B

Submission from Citizens Advice Scotland

Scottish Parliament's Environment, Climate Change and Land Reform Committee - Evidence Session with Scottish Water and Business Stream

5 November 2019

1. Citizens Advice Scotland is the consumer representative body for the water, energy and post sectors, and uses research and evidence to put consumers at the heart of policy and regulation in Scotland. We work with government, regulators and business to put consumers first, designing policy and practice around their needs and aspirations.
2. Citizens Advice Scotland is currently working on research and advocacy work focused on:
 - embedding the consumer voice within regulation;
 - promoting effective community engagement and empowerment;
 - advocating for the adoption of consumer principles to ensure that policy and practice reflect consumer needs and protects their interests within the domestic and non-domestic markets;
 - supporting the development and implementation of Strategic Review of Charges 2021-27 (SR21), jointly with industry stakeholders, to ensure that the consumer interest is represented;
 - ensuring water charges are fair and transparent, and protecting the interests and needs of low income households, particularly those on full Council Tax Reduction;
 - identifying the needs of private water communities and supporting the development of robust policy that supports them to achieve the minimum water quality standard.
3. We hold regular bilateral meetings with Scottish Water, the Water Industry Commission for Scotland (WICS) and the Scottish Government, and work in partnership with all three bodies in a number of strategic areas. This includes working with Scottish Water to promote the development of consumer-centric policy and service delivery, which is more likely to deliver better consumer outcomes and improve the consumer's experience.
4. We work jointly with Scottish Water and WICS within a tripartite agreement to support the second Customer Forum to increase customer representation within the SR21 process.
5. Citizens Advice Scotland supports the development of policy and strategy as a member of Government and industry led working groups, such as the Scottish Government's Outputs Monitoring Group (OMG) and the OMG Working Group, the Scottish Government's Long Term Charging Group

and as a member of the Scottish Government's Hydro Nation Forum. Laterally, this has included the newly formed Scottish Government group, the Investment Planning and Prioritisation Group which will support the delivery of SR21-27.

Fair outcomes for consumers in regulation

6. Over the past two years, Citizens Advice Scotland has worked with water industry stakeholders to review price setting for SR21, as part of a more open and collaborative process than previous review periods. This is largely due to adopting a 'co-creation' approach to promote greater discussion and involvement among stakeholders and a shared input in defining investment outcomes. The process has provided significantly greater opportunity to present consumer perspectives and to influence both the process and its outcomes.
7. Additionally, the principles of ethical business regulation (EBR) have been applied to SR21, which encourage all organisations to commit to 'doing the right thing' in a way that is open and fair, and designed to build trust. This has supported the development of regular and honest discussion between stakeholders that have allowed issues, previously unaired, to be discussed and addressed. Quarterly reviews of the process by the EBR Support Group have highlighted a number of improvements that could be made to further enhance the process, and by so doing, to deliver improved outcomes for both customers and the industry.
8. Both of the above processes have supported significant changes to the process of price setting. In time, it is hoped that the degree to which additional benefit for water customers has been achieved, can be assessed and clearly identified.
9. Citizens Advice Scotland fully welcomes the request by Ministers that stakeholders should develop a joint vision for the industry, and Scottish Water's commitment to a long-term Strategic Plan. We believe that this approach will more effectively address the future challenges that the industry faces, such as its commitment to achieve net zero emissions by 2040, and allow greater clarity on how each 6 year capital investment period supports the delivery of these longer term objectives.
10. We recognise that meeting these challenges will require increased investment in the industry, particularly to address the requirements for climate change mitigation and adaption and to meet the asset replacement challenge. Higher levels of investment will inevitably impact upon customer prices and it will remain important that customers receive value

for money through effective and efficient investment delivery. The impact of higher investment levels also highlights the need for robust affordability policy that adequately shields low income households, such as those on Council Tax Reduction, from any price shocks. Following research¹ undertaken for CAS in 2019 by Fraser of Allander into aspects of affordability for low income households, we understand that the Scottish Government is reviewing affordability within the process of developing the Principles of Charging for SR21.

Embedding new culture

11. Citizens Advice Scotland welcomes Scottish Water's ambitions to achieve net zero emissions by 2040. We acknowledge that this is a significant undertaking which will require new and innovative thinking to turn commitment into action. We also believe that there is an opportunity to embed customer services and how the capital investment programme is delivered within the narrative supporting climate change and net zero carbon principles. By doing so, we can change how customers and the industry think and feel about the services that are delivered and how they are used.
12. Furthermore, we believe that Scottish Water is ideally placed to demonstrate strong leadership in achieving environmental and service-related challenges, both to its customers and also to other sectors. Significant consideration has gone into the role of the water industry in contributing to wider national agendas, beyond service delivery, such as SEPA's One Planet Prosperity and the Scottish Government's National Outcomes. This has strengthened thinking around ways of delivering greater social and environmental benefit, such as adapting city and landscapes into blue/green spaces to address flooding issues, and contributing to social capital within a place making context.
13. Many communities that are dependent on private water are at risk of running out of water during long hot spells of weather, as seen in 2018. Climate change predictions indicate that this may become a more frequent event, which puts the future of these communities at risk without a dependable supply of water. Furthermore, many unregulated private water supplies remain untreated, which exposes those drinking the water to health related issues. Citizens Advice Scotland would welcome further consideration by Scottish Water of how it can use its expansive knowledge

¹ 'Affordability of water and sewerage charges, 2020/21 – 2027/28' Citizens Advice Scotland October 2019

and experience to support such communities to improve drinking water quality and quantity.

Empowering customers and communities

14. Citizens Advice Scotland welcomes Scottish Water's aspirations to move towards engagement methods that result in greater empowerment for customers and communities. We have worked jointly with Scottish Water and the Customer Forum this year to conduct research to identify the essential components which, if applied well, will deliver co-designed capital investment projects between Scottish Water and affected communities at the preplanning stage.
15. We believe that this will embed communities as a legitimate partner in the process, which in turn will help build Scottish Water's social and political licence to operate. This is particularly important as capital investment projects accelerate to meet net-zero targets and wider infrastructure demands. Case evidence suggests that such an approach will not only empower community members, but leave residual social benefit long after a project has been delivered. We are currently working with Scottish Water to support the delivery of its community engagement strategy within SR21 and beyond.