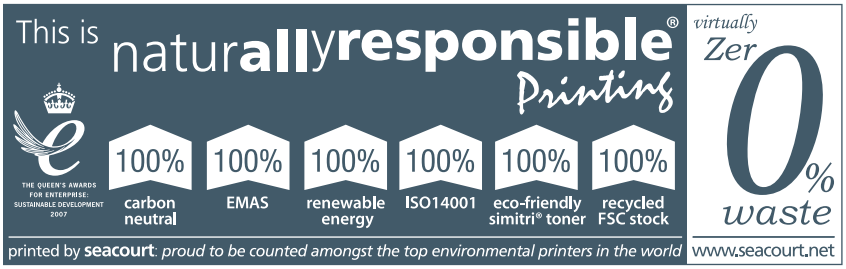
Reducing emissions and preparing for climate change: 2015 Progress Report to Parliament

Summary and recommendations

Committee on Climate Change
June 2015



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Committee on Climate Change
June 2015

Presented to Parliament
pursuant to sections 36 and 59
of the Climate Change Act 2008

Contents

Foreword

This is the Committee's first report to the new Parliament on progress towards meeting the UK's emissions reduction targets. It also includes the CCC's first ever statutory assessment of the National Adaptation Programme.

The most cost-effective approach to dealing with climate change requires steady progress over many years. The great benefit of the Climate Change Act is that it provides for sustained effort to reduce harmful emissions and prepare for the impacts of climate change over the course of many Parliaments.

Reducing emissions and adapting to the impacts of climate change provide the opportunity to drive innovation, support growth, contribute to improved health, develop effective and resilient infrastructure and minimise the disruptions caused by flooding, water scarcity and other climate change risks.

Policies in previous Parliaments delivered some good progress: reduced emissions from the power and transport sectors; about 180,000 homes better protected from floods; better planning of water resources and national infrastructure.

Two questions face the new Government.

First, what steps will the Government take during this Parliament to make sure that targets to reduce emissions for the 2020s and beyond are achieved in a cost-effective way? Virtually all policies or funding in these areas are due to expire during this Parliament. This includes the end of programmes and incentives to reduce energy bills through more efficient buildings, to support low-carbon power investment, to develop the market for low emission vehicles, and to promote low-carbon heat. Without significant new policies progress will fall behind what is required to meet legal obligations through the 2020s.

Second, how will Government address the increasing risks caused by past emissions? Welcome investment has been made in flood defences but the risk to some households continues to rise. In addition, higher temperatures pose risks to health and productivity that are not being properly addressed. Action will be needed in this Parliament to respond to these priorities.

This report recommends a number of specific actions that would reduce emissions and help to address climate risks at low cost, while recognising fiscal and other constraints. They also open up opportunities for new areas of economic growth, improved health and other benefits.

It reflects very wide engagement over the course of the past year. We are particularly grateful for extensive engagement and discussion with industry and private firms, governments and stakeholders across the entire country. For the first time, formal Committee meetings were held in Scotland and Wales, with detailed discussions also taking place in Northern Ireland. The actions, lessons and experience of all the UK nations greatly inform this report.

We look forward to discussing our recommendations with new and returning MPs, and colleagues in the House of Lords. Most of all, we look forward to seeing the Government taking the opportunity early in this Parliament to set a clear direction of travel for climate change policy in the UK for the coming decade.

Lord Deben
Chairman, Committee on Climate Change

Lord Krebs
Chairman, Adaptation Sub-Committee

Summary and recommendations

This is the Committee on Climate Change's first report, under sections 36 and 59 of the Climate Change Act, covering both progress towards meeting carbon budgets and progress on adaptation to climate change.

Our main recommendations are set out in Box 1 below.

The report is set out in three parts:

- This joint summary providing a high-level assessment of progress to reduce emissions and prepare for the impact of climate change, including recommended actions.
- A more detailed report on the progress to-date towards meeting carbon budgets and the UK's statutory target to reduce emissions in 2050 by at least 80% from 1990 levels.
- A more detailed report on the progress being made to prepare for and adapt to the impacts of climate change.

The two detailed reports are supported by further technical annexes.[1]

Exhibit 1 provides a representation of the framework for the analysis and discussion through the three volumes.

The remainder of this summary is set out in three sections:

1. Climate change and the UK
2. Latest progress
3. Next steps

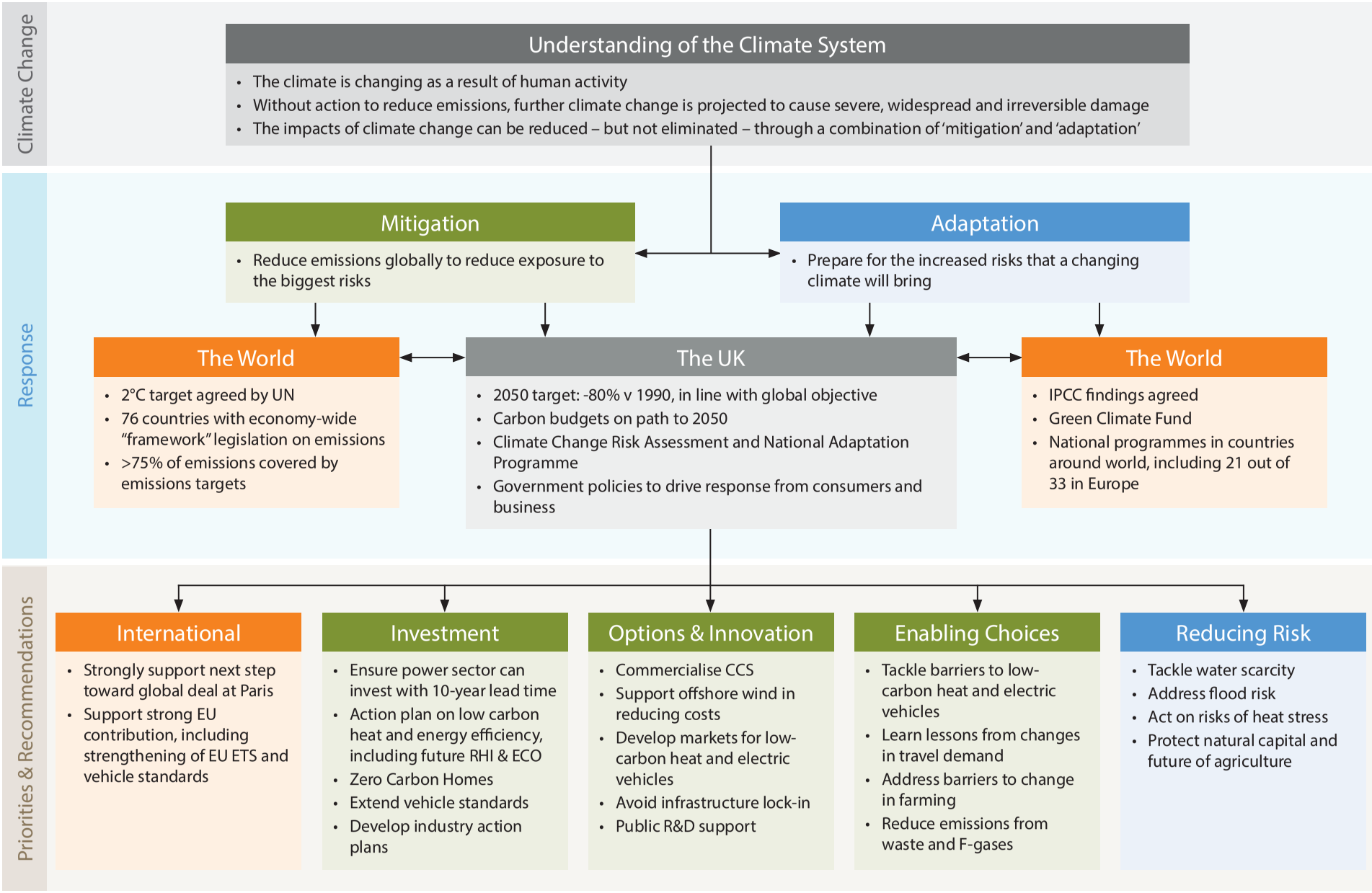
The full set of recommendations is included in an Annex to this document.

1 All documentation is available electronically from our website: www.theccc.org.uk

Box 1: Main recommendations

1. **Electricity: Ensure the power sector can invest with a 10-year lead time.** As soon as possible, set the Government's carbon objective for the power sector in the 2020s and extend funding under the Levy Control Framework to match project timelines (e.g. to 2025 with rolling annual updates).
2. **Buildings: Develop plans and policies that deliver low-carbon heat and energy efficiency, whilst also addressing the increasing risks of heat stress and flooding.**
    a. Develop an action plan to address the significant shortfall in low-carbon heat, ensuring a better integration with energy efficiency and fuel poverty. Commit to the Renewable Heat Incentive to 2020, or until a suitable replacement is found.
    b. Set out the future of the Energy Company Obligation beyond 2017, ensuring it delivers energy efficiency while also meeting fuel poverty targets.
    c. Implement the zero carbon homes standard without further weakening, ensuring investment in low-carbon heat.
    d. Introduce a standard to prevent new homes overheating, and promote passive cooling in existing buildings.
    e. Develop a strategy to address the increasing number of homes in areas of high flood risk, with the 'Flood Re' subsidised flood insurance scheme playing a central role.
3. **Transport: Maintain support for the up-front costs of electric vehicles**, while they remain more expensive than conventional alternatives and push for stretching 2030 EU CO_2 targets for new cars and vans.
4. **Infrastructure: Make decisions that help reduce emissions and improve the resilience of infrastructure networks and services during periods of extreme weather**. A range of infrastructure decisions to be made this Parliament could have significant impacts. Foremost amongst these is the need for carbon capture and storage (CCS). Others include requirements for infrastructure support for heat networks and electric vehicles. Decisions taken now need to avoid 'lock-in' to high carbon pathways and vulnerability to climate change risks.
5. **Land and water management: Preserve and enhance the country's natural capital**, in order to sustain agriculture productivity in a changing climate, maximise carbon sequestration, and safeguard the economic and amenity benefits the natural environment provides.
    a. Announce firm measures to preserve the fertility and organic content of important agricultural soils, to achieve the stated goal for all soils to be sustainably managed by 2030.
    b. Accelerate efforts to restore England's priority natural assets and counter long-term declines in the ecological condition of the farmed countryside.
    c. Review the effectiveness of agri-environment schemes in controlling damaging practices on internationally-protected peatland sites.

Exhibit 1: The Committee's framework: evidence, outcomes and proposed actions



RHI – Renewable Heat Incentive, ECO – Energy Company Obligation; ETS – Emissions Trading System; IPCC – Intergovernmental Panel on Climate Change

1. Climate change and the UK

The global climate is changing

Research over several decades, by thousands of scientists, provides the evidence for a changing climate that is caused by emissions from human activity and leads to significant global risks. It is supported by major scientific institutions across the world and summarised in detail by the Intergovernmental Panel on Climate Change (IPCC). The IPCC's latest report about climate change is the clearest yet.

The global climate is changing. Sea levels have risen about 20 cm and the average surface temperature has risen by about 0.8°C since the end of the 19th Century. Many other observed changes, such as retreating glaciers and arctic ice, and shifting distributions of species, are consistent with a warming world.

The main cause of the changing global climate is emissions of greenhouse gases from human activities. Detailed studies of alternative causes (such as variations in energy received from the sun) demonstrate that they cannot explain the sustained, widespread warming and other changes that are underway.

Scientists do not have complete knowledge of the climate system, but it is clear that continued emissions will lead to further warming and major changes in regional climate. Their magnitude will vary around the globe and will depend on the path of future emissions. However, continued warming increases the likelihood of severe, widespread and irreversible damage. Under scenarios without strong action to reduce emissions, projections suggest:[2]

- Average global temperature could rise between 2°C and 5.5°C by 2100 compared to the late 1800s. This is well beyond any global temperature change experienced during the course of human civilisation. Warming will be greater over land than the global average and especially pronounced in northern latitudes. Regional weather will change as phenomena such as monsoons, jet streams and storms change with the warming.
- Average sea level will increase between 0.5 and 1.1 m by 2100 compared to 1900. Hundreds of millions of people, from small islands to large coastal cities, are currently projected to be living in areas that could be submerged. There is potential for higher increases depending on how Antarctic ice sheets respond to further warming. Sea level will continue rising for many centuries even after greenhouse gas levels in the atmosphere have stopped increasing.
- Average ocean acidity will rise, as the sea absorbs carbon dioxide. This will affect the ability of corals and other shell-forming organisms to grow, posing substantial risks to marine ecosystems.
- Rainfall will change, generally increasing the contrast between wet and dry regions. Heavy rainfall rates will generally increase in intensity, even in regions that become drier.
- Coverage and thickness of ice and snow will decrease, with the Arctic Sea becoming nearly free of summer ice at some point this century.

These changes and associated impacts can be substantially reduced, but not fully eliminated, by deep reductions in emissions. The temperature increase is largely dependent on cumulative emissions of carbon dioxide, so the world is committed to some further warming even while emissions decrease. The IPCC has estimated that, in order to preserve a 50:50 likelihood of limiting warming to 2˚C, the remaining carbon budget available to the world from 2011 is around 1100 $GtCO_2$.[3] Global emissions in

2 These projected impacts are based on the IPCC's assessment of "likely" ranges of change for the scenarios RCP4.5, RCP6 and RCP8.5. The IPCC defines "likely" as a 66% chance of being within the range, specified in the bullets.

3 This figure applies to global emissions of carbon dioxide, accounting for projected emissions of other greenhouse gases and particles. To avoid 2°C with at least 66% likelihood, the IPCC estimated a smaller post-2011 budget of around 1000 $GtCO_2$.

2011 were 38 $GtCO_2$ and rising. Ultimately, stabilising global temperatures relies on achieving a zero-carbon world.

Greenhouse gas emissions affect lives in the UK

The changes caused by emissions will have an impact on lives in the UK, as well as the lives of people around the world. The UK's weather has always been, and will continue to be, variable. However, it is already being affected by climate change. In the UK, average sea levels are rising by around 3mm a year; plants and animals are experiencing the earlier onset of spring and summer; winter rainfall is arriving in more intense bursts. In future, scientists expect more severe flooding, more heatwaves in the summer, changes to water availability, and added pressures on the natural environment. These will affect our lives and cause disruption through additional financial and economic costs, and impacts on health and well-being.

There is also a risk of indirect impacts. Climate change is projected to have more severe consequences in other parts of the world, with implications for our foreign policy, security, access to resources and commodities, finance and trade, and health in the UK.[4]

The worst (but not all) impacts can be avoided through a strong response to reduce emissions. There is evidence that it is possible to reduce emissions while growing the economy, with the total cost likely to be small compared to the risks of unmitigated climate change (see next section).

The response

Faced with these impacts and future threats, countries have begun to take action:

- The energy intensity of the global economy fell by 2.3% in 2014, more than double the average rate of reduction over the last decade.[5] Over 75% of global emissions are covered by economy-wide emission reduction targets. Framework legislation to address emission reduction is in place in 76 countries.[6]
- The United States has committed to reduce emissions by 26-28% from 2005 levels by 2025; China has announced it intends for its CO_2 emissions to peak around 2030, and to make "best efforts" for this to happen earlier. Both have 2020 commitments which are comparable to those of the EU in terms of emissions intensity.[7]
- Renewables accounted for nearly half of all new power generation capacity in 2014. Pledges will require further very significant global investments in low-carbon technologies. For example, China's commitment will require them to deploy an additional 800-1,000 GW of low-carbon electricity generation capacity by 2030. In comparison, the UK's entire current generation capacity is around 90 GW.
- An international fund – the Green Climate Fund - has been established to support low-emission and climate resilient investments in developing countries.

These actions have occurred as part of global climate negotiations through the United Nations Framework Convention on Climate Change (UNFCCC). Parties to this process have agreed that emissions should be reduced so as to hold the increase in global temperature rise below 2°C above pre-industrial levels.

4 *Foresight International Dimensions of Climate Change* (2011) Final Project Report. The Government Office for Science
5 World Energy Outlook, Special Report on Energy and Climate Change, IEA, 2015.
6 *The 2015 Global Climate Legislation Study*, 2015.
7 See Figure 2.9 in CCC (2013) *The Fourth Carbon Budget Review – part 1. Assessment of climate risk and the international response.* Together, the USA , China and EU are responsible for 55% of global CO_2 emissions.

Emerging data suggest that 2014 was the first year in the last four decades, outside financial crisis, that global energy-related emissions did not rise.[8]

In the UK, greenhouse gas emissions have fallen over the past seven years, partly due to the economic downturn and partly as a result of investments in low-carbon technologies and improvements in energy efficiency. In 2014, preliminary figures indicate greenhouse gas emissions fell by over 8% while the economy grew by about 2.8% and manufacturing grew by about 3.0%. However, the underlying rate of emission reduction is less than these headline numbers. In 2014, a substantial part of the fall in emissions reflects the temporary effect of lower energy demand due to high winter temperatures.

The Committee's previous Progress Reports have documented the extent to which emission reductions arise from deliberate government and private actions, or as a consequence of other factors. The economic downturn played an important role in reducing emissions over the first carbon budget period. We are on track to meet the second carbon budget (2013-2017) but there is an acknowledged gap to the emission reductions required to meet the fourth carbon budget (2023-2027). **Action is needed in this Parliament to ensure the pace of emissions reduction accelerates whilst supporting economic growth.**

Further, proportionate, action is needed…globally…

If the 2°C limit is to be met then global efforts to cut emissions need to increase rapidly. Actions expected to be agreed at the international meeting (COP21) in Paris later this year will be an important step in this process:

- An objective of the Paris meeting is to secure an agreement binding nations together into an effective global effort to reduce emissions, consistent with the 2°C limit.
- It is likely that a gap will remain between pledges made in advance of the meeting and actions necessary to meet the 2°C limit cost-effectively.
- The Paris meeting may not plug that gap. A successful agreement should keep the climate objective within reach. The agreement should look to allow for the continued ratcheting up of ambition and transparent reporting of efforts.

…and in the UK

The UK, under the Climate Change Act, has a legal commitment to reduce emissions by at least 80% from 1990 levels by 2050. It is a target designed to be in line with actions required across the world to preserve a 50% likelihood of staying below the global 2°C target. It is achievable based on technologies that are known today, or whose development is foreseeable, while growing the economy each year. The Government must also produce a National Adaptation Programme that responds to the risks from ongoing climate change.

The role of the Committee on Climate Change, under the Act, is to advise Parliament on the best path to the 80% reduction target and whether measures to adapt to ongoing changes are appropriate. The emission reduction path is then legislated as UK carbon budgets, stepping stones in the form of declining 5-year caps on emissions. In providing this advice, the Committee is required to take a wide range of factors into account – scientific knowledge; technology; economic and fiscal circumstances; social circumstances, particularly fuel poverty; energy policy, including energy security; different conditions across the countries of the UK; European and international circumstances. The framework, therefore, requires a wide range of considerations to be balanced.

8 World Energy Outlook, Special Report on Energy and Climate Change, IEA, 2015.

The response to climate change will combine emissions reduction to avoid the worst of the future climate risks ("mitigation") and preparing for the changes in climate already taking place ("adaptation"). Both are needed to insure against the risks from climate change.

The appropriate timing of action is a key consideration. The UK's legislated carbon budgets imply steady progress towards the 2050 target, providing a framework for effective sequencing of actions. This is likely to be the lowest cost way for the UK to contribute to tackling climate change:

- The steady progress required by the budgets is feasible based on technologies available today, without relying on over-optimistic assumptions about what can be achieved in later years.
- Actions in early budget periods can help develop emerging options to reduce emissions. As uncertainties over costs and barriers are resolved, this will enable more effective decisions in later budget periods.
- Steady action avoids locking-in high carbon infrastructure which will still be on the system in 2050.
- The global climate responds to cumulative emissions of carbon dioxide, meaning it is the total amount emitted over all years that drives climate change. Therefore, where there are low cost opportunities to reduce emissions, these should be taken, even in early years.

Action to prepare the country for the changing climate is also needed. Continued emissions mean that some further changes to the climate are inevitable. However, adaptation should be a complement to mitigation, not a substitute. There are limits to how much adaptation is technically and economically feasible.

Where actions in response to climate change impose costs, the Committee considers the balance with other objectives and what steps might be taken to reduce or offset those costs. For example, we consider the extent to which the impacts on consumer bills are proportionate and can be offset through energy efficiency measures. Where costs are imposed on industry, we consider whether compensation is needed to avoid competitiveness risks and possible carbon leakage, which would damage the UK economy without global emissions benefits.

Our overall recommendations take these costs into account, as well as the benefits from reducing the risks from climate change and associated co-benefits (e.g. to health from improved air quality, to innovation). We consider a range of other factors including the impacts on the security of electricity supply to households and business, as well as the impacts on the public finances.

Targeted and coordinated actions to adapt to climate change and reduce emissions are needed. In many areas, action that supports both emissions reduction and adaptation will be more efficient than considering each issue in isolation. This includes decisions about:

- Investment in infrastructure, including decisions to build or expand electricity, water, transport and other networks.
- Changes in how the land is used, for example between housing, industry, farming, forestry and the natural environment.
- How villages, towns and cities are built, including to make sure that buildings are energy efficient: retaining heat on cold days and avoiding overheating on hot days.

Decisions in the new Parliament will largely determine how much progress is made to 2030 and beyond.

Taking mitigation and adaptation together, this assessment leads to five main recommendations for action this Parliament:

1. **Electricity: Ensure the power sector can invest with a 10-year lead time.** As soon as possible, set the Government's carbon objective for the power sector in the 2020s and extend funding under the Levy Control Framework to match project timelines (e.g. to 2025 with rolling annual updates).
2. **Buildings: Develop plans and policies that deliver low carbon heat and energy efficiency, whilst also addressing the increasing risks of heat stress and flooding.**
    a. Develop an action plan to address the significant shortfall in low-carbon heat in the 2020s, also ensuring a better integration with energy efficiency and fuel poverty. Commit to the Renewable Heat Incentive to 2020, or until a suitable replacement is found.
    b. Set out the future of the Energy Company Obligation beyond 2017, ensuring it delivers energy efficiency while also meeting fuel poverty targets.
    c. Implement the zero carbon homes standard without further weakening, ensuring investment in low-carbon heat.
    d. Introduce a standard to prevent new homes overheating, and promote passive cooling in existing buildings.
    e. Develop a strategy to address the increasing number of homes in areas of high flood risk, with the 'Flood Re' subsidised flood insurance scheme playing a central role.
3. **Transport: Maintain support for the up-front costs of electric vehicles** while they remain more expensive than conventional alternatives and push for stretching 2030 EU CO_2 targets for new cars and vans.
4. **Infrastructure: Make decisions that help reduce emissions and improve the resilience of infrastructure networks and services during periods of extreme weather.** A range of infrastructure decisions to be made this Parliament could have significant impacts. Foremost amongst these is the need for carbon capture and storage (CCS). Others include requirements for infrastructure support for heat networks and electric vehicles. Decisions taken now need to avoid 'lock-in' to high carbon pathways and vulnerability to climate change risks.
5. **Land and water management: Preserve and enhance the country's natural capital**, in order to sustain agriculture productivity in a changing climate, maximise carbon sequestration, and safeguard the economic and amenity benefits the natural environment provides.
    a. Announce firm measures to preserve the fertility and organic content of important agricultural soils to achieve the stated goal for all soils to be sustainably managed by 2030.
    b. Accelerate efforts to restore England's priority natural assets and counter long-term declines in the ecological condition of the farmed countryside.
    c. Review the effectiveness of agri-environment schemes in controlling damaging practices on internationally-protected peatland sites.

We have also developed a series of more detailed recommendations for specific government departments and others to consider. They are set out in the tables in the Annex and considered more fully in the two reports published alongside this summary.

2. Latest progress

This report sets out our independent evaluation of progress on mitigation and adaptation. Our evaluation is based on the requirements set out in the Climate Change Act, in particular:

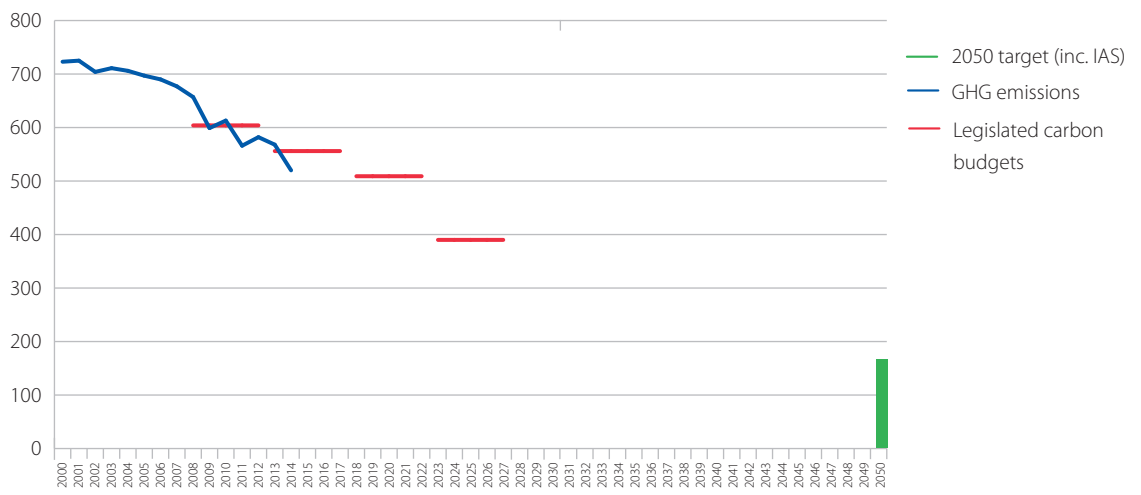
- progress made to meet the existing carbon budgets and the 2050 target to reduce greenhouse gas emissions, what further progress is needed and whether future budgets and the 2050 target are likely to be met (section 36, Climate Change Act)
- progress made towards implementing the objectives, proposals and policies set out in the programme for adaptation to climate change (section 59, Climate Change Act).

Our assessment acknowledges areas of progress – in some areas this has been at the level required. But overall, progress is fragmented and gaps remain.

2.1 Progress in reducing emissions

Provisional emissions statistics for 2014 indicate that UK domestic greenhouse gas emissions were 520 $MtCO_2e$ – an 8% decrease compared with 2013. Emissions are now 36% below 1990 levels. They are within the annual average level of the second carbon budget (2013-17), (Figure 1).

Figure 1: UK GHG emissions against legislated budgets and 2050 target ($MtCO_2e$)



Source: DECC Provisional UK greenhouse gas emissions national statistics 2014, CCC calculations

The large drop in emissions in 2014 is welcome, particularly given it occurred in a year with strong economic growth. However, it cannot be taken as a sign that the UK has shifted permanently to a lower emissions path. The large reduction across the economy was driven by falls in emissions from buildings, industry and power generation, many of which reflect one-off changes and uncertain factors, rather than replicable, ongoing trends (Figure 2):

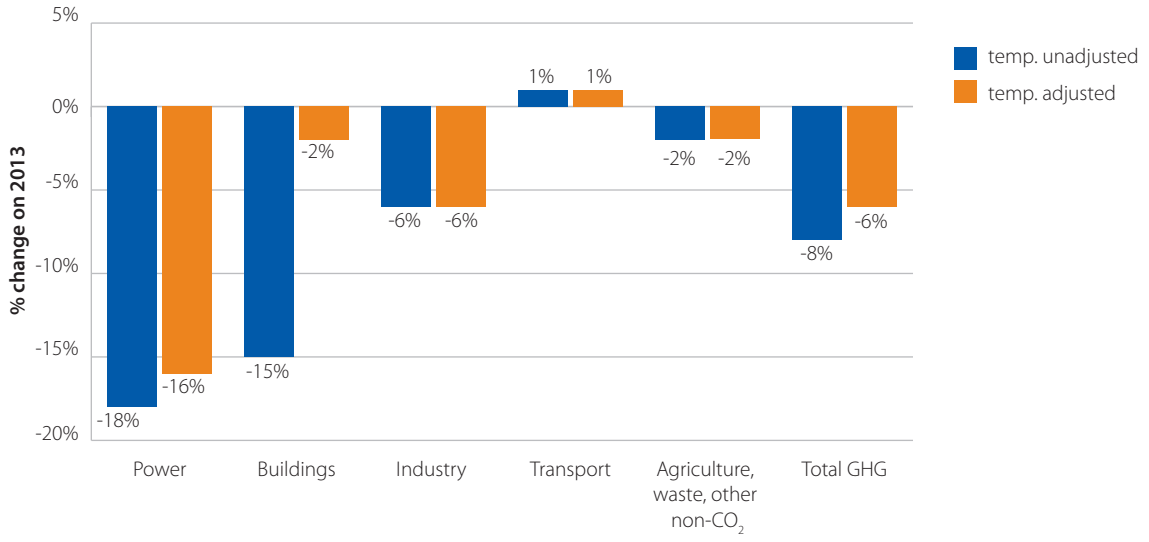
- The mild winter months in 2014 depressed demand for heating, leading to a 15% reduction in emissions from buildings. We estimate that without the higher average winter temperatures, buildings emissions would have fallen only slightly.[9]

9 Our approach to adjusting for temperature is set out in Technical Annex 1 – Overview.

- CO_2 emissions from industry decreased 6%, with limited information available about the causes of this change. Preliminary estimates of industry emissions have also been subject to significant revision in previous years.
- Power sector CO_2 emissions decreased 18%. Over half of this reduction was due to reduced coal burn and increased imports. However, in the long term almost all generation will need to be provided from low-carbon sources, which only accounted for a 4% reduction in power emissions.
- CO_2 emissions from transport showed minimal change. Emissions estimates for agriculture, waste and other non-CO_2 are not yet available for 2014.

Without the impact of higher temperatures in 2014, therefore, there is limited evidence of progress reducing emissions outside the power sector.

Figure 2: Change in UK domestic GHG emissions between 2013 and 2014



Source: DECC Provisional UK greenhouse gas emissions national statistics 2014, DECC Energy trends 2014, CCC calculations

Progress adopting low-carbon technologies and practices

As well as emissions, we monitor the uptake of low-carbon technologies and behaviours required to reduce emissions.

The carbon budgets were set to reflect our best estimate, based on detailed bottom-up analysis, of the most cost-effective path to the statutory 2050 target. Monitoring progress against the actions required on that cost-effective path provides an indication of whether the UK is likely to meet the carbon budgets and the 2050 target at lowest cost.

As in the headline emissions, in 2014 there were some areas of good underlying progress, but this is not universal:

- There has been good progress in deployment of renewable electricity generating capacity (wind, solar and biomass), installation of efficient boilers and some recovery – following a previous large fall - in loft and cavity wall insulation, improvement in new car and van efficiency, diversion of biodegradable waste from landfill, and deployment of low-carbon heat in industry.
- There has been limited progress in other areas, for example deployment of low-carbon heat in buildings, take-up of the most efficient domestic appliances and schemes to reduce travel demand.

- Evidence remains limited or of poor quality in some areas, especially agriculture, industry and commercial buildings.

Overall, this picture demonstrates that emissions reductions are possible and can be delivered through a variety of means. There has been success with EU regulation (new vehicles), UK regulation (boilers), taxation (waste) and public subsidy (renewable power). Extending this success will require that the right mix of instruments is used to overcome specific barriers to action.

Progress implementing low-carbon policies

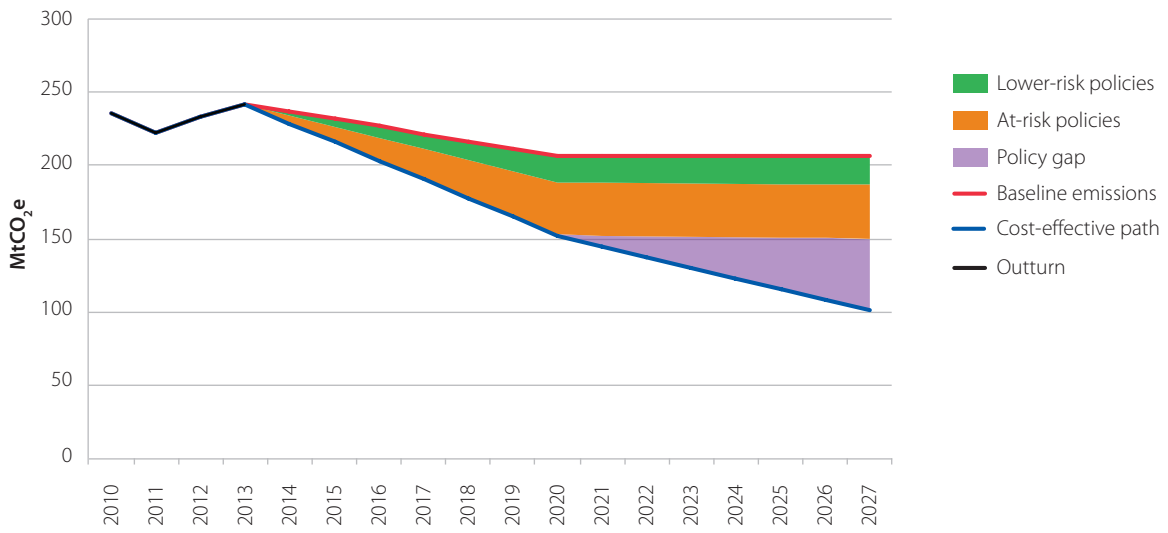
The final level at which we monitor progress is in the development and implementation of policies to drive the transition to a low-carbon economy.

Policies targeting emission reduction exist across the main sources of emissions:

- **Power:** the EU Emissions Trading System (EU ETS) and UK Carbon Price Support expose electricity generators to a carbon price. The Energy Act 2013 introduced long-term contracts providing a secure return for low-carbon generators.
- **Buildings:** building regulations require minimum standards of energy efficiency in new buildings. The Green Deal and Energy Company Obligation target retrofit improvement in the energy efficiency of homes. The EU Ecodesign Directive sets minimum energy performance standards for appliances. Public and commercial buildings face a carbon price through the CRC Energy Efficiency Scheme. Low-carbon heat is incentivised through the Renewable Heat Incentive. Devolved governments are increasingly developing policies appropriate to their circumstances.
- **Transport:** EU regulations require that the average efficiency of new cars and vans increases to 2020. Government grants are available to reduce the upfront cost of new electric vehicles, and various demand-side measures are being adopted at UK and devolved levels.
- **Industry:** the EU ETS also applies to energy-intensive industries. Voluntary Climate Change Agreements offer discounts on the Climate Change Levy if companies meet energy efficiency targets. The Energy Savings Opportunity Scheme requires large companies to regularly carry out energy assessments.
- **Agriculture:** the agriculture sector has a voluntary scheme to increase take-up of low-carbon practices and technologies, with devolved governments developing bespoke schemes in their areas.
- **Waste and F-gases:** the UK landfill tax, supported by various complementary schemes, often taken by devolved governments, creates incentives to divert waste from landfill, as required by the EU Landfill Directive. EU regulations require that F-gas use is phased down.

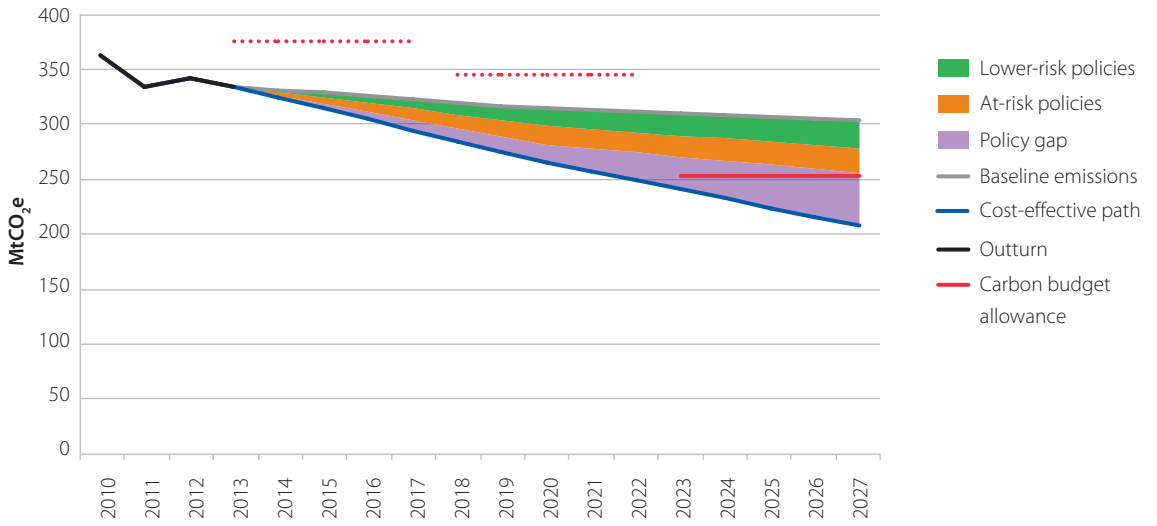
Overall, however, the policy landscape is complex and in places inconsistent. Our assessment of existing policies is that some of these are at risk of failing to deliver, either due to design and delivery problems, or because they are currently unfunded. Even if these policies delivered in full, there would be a policy gap to achievement of the fourth carbon budget (2023-27) and the cost-effective path to the 2050 target. This reflects that commitments to some policies are due to end and that policies have not yet been developed in other areas (Figures 3 and 4).

Figure 3: Assessment of current and planned policies against future targets (traded sector)



Source: DECC (2014): Updated energy projections; CCC calculations

Figure 4: Assessment of current and planned policies against future targets (non-traded sector)



Source: DECC (2014): Updated energy projections; CCC calculations

A number of changes are needed in order to close this gap and keep on track to future carbon budgets. **There are three priority issues to address:**

- **Low-carbon investment:** Many low-carbon policies and funding streams have no certainty beyond the next few years. That prevents efficient investment in low-carbon technologies and their supply chains which often have long lead-times and payback periods and in many cases are not yet economic without government intervention. To enable those investments, the Government will need to extend existing policy approaches and conditional funding commitments into the 2020s. Specific examples covered in this report include funding for low-carbon electricity, the approach to low-carbon heat and energy efficiency in buildings, and emissions regulations for vehicles.

- **Developing future options and innovation:** Many of the technologies that could contribute to meeting the 2050 target are still developing in terms of their cost and performance, the ability of suppliers and financiers to deliver them and the willingness of consumers to adopt them. Public support in these areas should be targeted to areas that the market will not or cannot provide, including some elements of R&D and infrastructure spending. To support private innovation, Government must ensure that there is a clear future market for low-carbon products through credible policy commitments that "price in" a rising external cost of carbon. There is scope for substantial benefits for UK industry which is well placed to compete in many areas of green innovation. Specific examples include offshore wind, carbon capture and storage (CCS), low-carbon heat, electric vehicles and many earlier-stage technologies still needing research, development and demonstration.
- **Low-carbon choices:** How lifestyles – which have changed considerably over the past 35 years – continue to change and the decisions people make in response to new products will increasingly determine whether we continue to reduce emissions. Government has a role to address barriers to change through effective policy design and evaluation to build the evidence base for "what works". Specific examples include setting incentives and information provision to increase take-up for new products such as electric and low-emission vehicles, home insulation measures, and heat pumps, and behavioural choices such as travel behaviour and food consumption.

2.2 Adapting to climate change

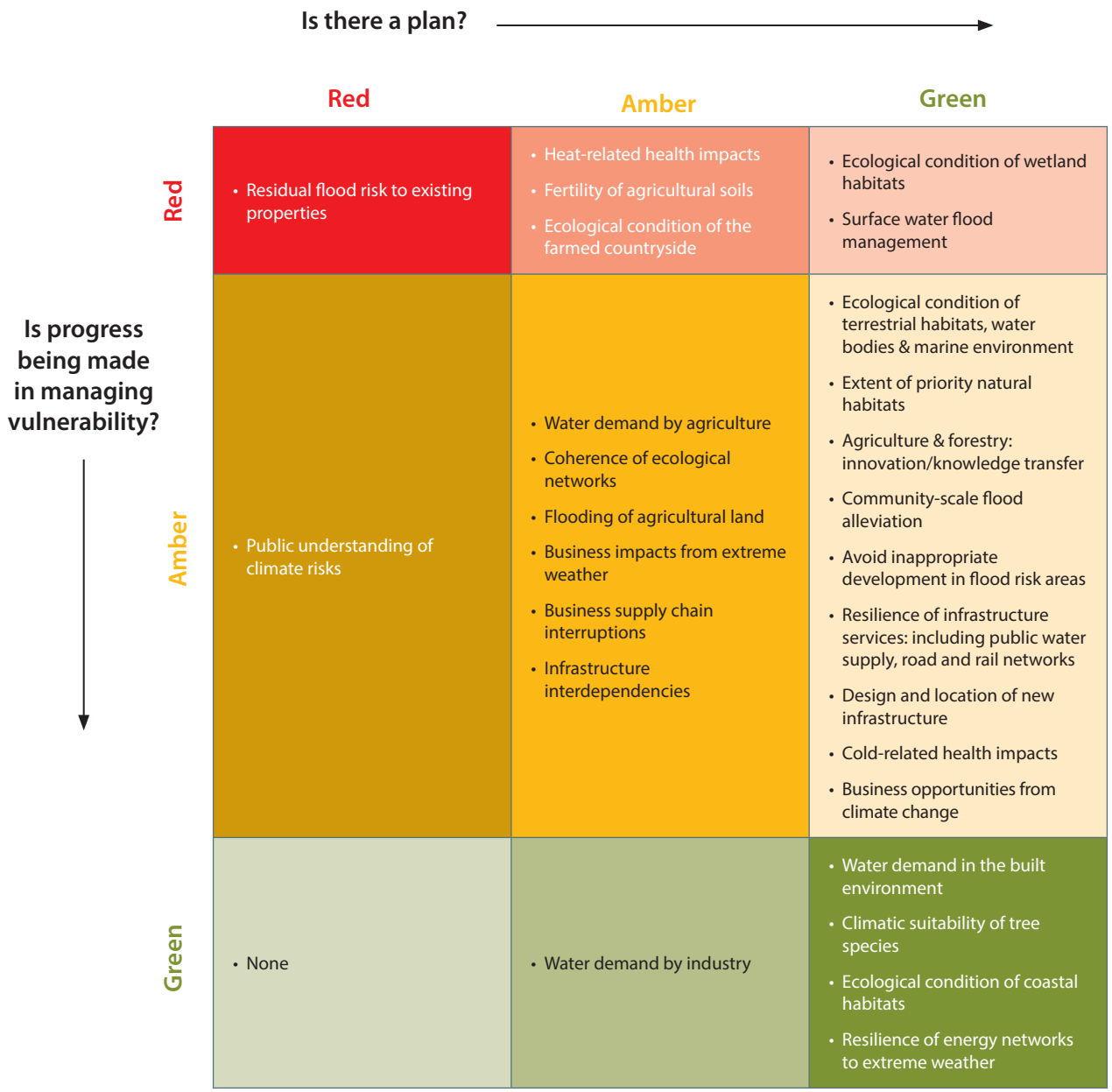
The Government published the first National Adaptation Programme (NAP) in 2013 to address the risks and opportunities highlighted by the first Climate Change Risk Assessment (CCRA), published the previous year. The NAP provides a useful summary of the action being taken to prepare the country for climate change. The significant stakeholder engagement that took place to co-create the programme's objectives and actions helped elevate its status, gain buy-in, and make clear who was responsible for delivery of its component parts.

To build on this first step, the programme now needs a clearer sense of priorities to make sure that the most important issues are being tackled. The next NAP (to be published in 2018) will allow the Government to be more specific about its priorities and set measurable objectives.

Exhibit 2 summarises the ASC's detailed assessment of the National Adaptation Programme. The exhibit highlights specific areas where the evidence suggests vulnerability to climate change risks is increasing, and where it is reducing. The exhibit also highlights areas where current plans and policies do not, or only partially, take the risks of climate change in to account.

Looking across the range of adaptation priorities considered in the ASC's report, there are four key areas of climate change risk where progress has been made but further steps are necessary: water scarcity; flood risks; heat stress in the built environment; and impacts on natural assets and agriculture.

Exhibit 2: Adaptation priorities - are plans in place, and is progress being made?



Source: ASC assessment of policies and plans, and progress in managing vulnerability, in each of the areas identified as an adaptation priority.
Notes: Adaptation priorities have been categorised according to the following criteria:
- Red: plans and policies, or progress in addressing vulnerabilities, are lacking.
- Amber: adaptation priority has been partially addressed in policies and plans, some evidence of progress in some areas.
- Green: plans and policies are in place, indicators of vulnerability are falling.

See Chapter 1 of the adaptation progress report for the full set of criteria used to form the ASC's assessment of progress.

Water scarcity

There has been some reduction in the demand for water, reducing the pressure on already scarce water resources in some parts of England. More people have stronger incentives to use water efficiently, as a result of increasing metering of household water use and the Environment Agency's review of abstraction licences in water-stressed areas. However, upwards pressure on demand will continue due to population growth. Structural reform of the water licencing regime is necessary, to promote the right combination of price and regulatory signals during dry periods. Climate change will also necessitate further strategic investments by water companies.

Water resources management plans require water companies to manage the risk of water shortages, taking climate change and population growth in to account. The economic regulator, Ofwat, has approved further investments by water companies over the next five years in the security of water supplies. Changes have also been made to the system of water company penalties and incentives to safeguard drinking water supplies and the treatment of waste water during times of flooding and drought. Almost half of all households now have their use of water measured with a meter. Consumption per person amongst this group is falling. Building regulations are setting high standards for water efficiency in new homes and developers often exceed these.

However, significant decisions in terms of new water storage, treatment and supply infrastructure will need to be taken. These must fully account for climate change. Reforming the water abstraction licencing regime also remains an urgent priority. This is necessary to ensure water is allocated efficiently between different industries and sectors whilst safeguarding the natural environment. The Government is due to announce its plans for abstraction reform early in this Parliament. There remains significant scope to manage water in a more efficient and integrated way in the urban and rural environments at the catchment scale.

Flood risk

An increased risk of flooding, including from rivers and the sea, and surface water flooding, was the largest risk identified in the CCRA. The Government invested £2.55 billion to manage flood and coastal erosion risks in England over the last four-year spending period (April 2011 to March 2015). As a result, around 180,000 households now benefit from new or refurbished defences, exceeding the 145,000 target. Investment in flood and coastal defence assets will need to steadily increase in the future to counter the impacts of climate change. Concerted efforts will also be needed by local authorities and partner organisations to improve the management of catchments, the coast, and urban areas in ways that alleviate the potential for flooding.

Even in the best case scenario, with sustained increases in spending at optimal levels over many years, 45,000 more homes and other properties are expected to fall in to the highest flood risk category by mid-century (i.e. at a 1-in-30 annual chance of flooding or greater). Planning policy is ensuring that three-quarters of new development in the floodplain is located in low risk areas. However, each year 1,500 new homes are built in areas of high flood risk and 3,100 homes per year in areas of medium flood risk (at a 1-in-100 annual chance of flooding or greater). New development will add to future flood protection costs and result in flood events causing more damage.

Plans to subsidise flood insurance represent poor value for public money unless, as part of the 'Flood Re' scheme, high risk households are given the information they need to make informed choices and prompted to take action to prevent flood damage. More needs to be done by local authorities to manage the risk of surface water flooding from heavy rainfall, including by requiring the use of sustainable drainage systems (SuDS) and enforcing controls on the use of impermeable surfacing. Local flood risk management strategies have yet to be finalised by most local authorities despite this being a legal requirement for the last five years.

Heat stress

Impacts on health from higher temperatures are likely to increase in the future due to climate change combined with a growing, ageing population. The risk of a severe heatwave is recognised in the National Risk Register. The Heatwave Plan for England provides guidance to health and social care organisations on protecting vulnerable people. However, action is needed to begin to adapt the built

environment, so that homes and other buildings can be comfortable and safe in higher temperatures. Recent losses in urban greenspace should also be reversed.

The number of heat-related deaths is projected to increase, from 2,000 per year currently to 7,000 per year by the 2050s, due to increasing mean temperatures and changes in the population. Around 20% of homes may already be overheating, even in relatively cool summers. Combined approaches to improving the energy efficiency of buildings whilst also avoiding overheating are needed, including incentives to encourage passive cooling (e.g. sun shades and improved ventilation). A standard or regulation is needed to avoid the risk of excessive internal temperatures in new homes. Around 7% of the area of urban greenspace in England, important to counter the urban heat island effect, has been lost since 2001. Although the trend in losses has slowed, it has not yet stopped. The Government should adopt a goal to increase urban greenspace and work with local authorities to achieve it.

There is low awareness amongst the general public about how the risks from heat are changing. The majority of people in a recent survey were unaware that the number of hot summer days in the UK has increased, nor that hot weather and heatwaves are likely to increase with climate change. The next iteration of the NAP should contain specific actions to increase public awareness of the risks of climate change, with lead responsibility for increasing awareness assigned to a single department.

Impacts on natural capital and agriculture

Some individual aspects of the natural environment are improving. Where this is the case, it will reduce the impacts of climate change on habitats and biodiversity. However, key indicators of environmental quality continue to move in the wrong direction, putting at risk vital ecosystem goods and services such as clean air, clean water, and carbon storage. Harmful land management practices persist, particularly on sensitive peat habitats in the uplands. Some of England's most productive agricultural land is at risk of becoming unprofitable within a generation due to soil erosion and the loss of organic carbon. Without further action, farmers may not benefit from the opportunities of longer growing seasons, and the natural environment will be severely harmed by climate change.

Climate change will add to existing pressures on vulnerable natural systems. These include air and water pollution, habitat loss and fragmentation, and intensive land-use practices. Of particular concern is the ecological condition of the farmed countryside, where key indicators of biodiversity are in long-term decline. Wetland habitats, including the majority of upland areas with carbon-rich peat soils, are in poor condition. The damaging practice of burning peat to increase grouse yields continues, including on internationally-protected sites. The Government has set ambitious targets to improve the ecological condition of important habitats and halt the decline in England's biodiversity. However it is far from certain that these goals will be met.

Agricultural soils are being degraded by intensive farming practices in some areas, with deep ploughing, short rotation periods and exposed ground leading to soil erosion from wind and heavy rain. Although soil erosion risk may be decreasing, the rate of loss is not sustainable as soil can take a hundred years or more to form. Water shortages and drier soil conditions that are likely with climate change puts at risk the profitability of farming in areas like the East Anglian Fens. This has the potential to reduce the productivity of UK farming, leading to an increased reliance on imported food at a time of growing demand worldwide. The Government recognises the issue and there is an ambition for all soils to be used sustainably by 2030. The evidence gathering phase of the soils strategy will draw to a close in 2016 and needs to be followed by an urgent plan of action.

3. Next steps

Decisions taken in this Parliament are vital to how the UK responds to climate change. These are decisions that will determine delivery of important mitigation and adaptation goals for the remainder of this decade, whilst setting the direction in both areas for the 2020s. Clarity on that direction needs to be set soon.

We have carefully considered how to achieve the UK's objectives for reducing emissions and preparing for climate change cost-effectively, achieving best value-for-money and considering specific impacts on particularly vulnerable individuals, households and businesses. This report, and the accompanying detailed reports, set out the actions that the Committee believes necessary in light of these considerations.

We have designed the recommended actions to be specific and measurable. We will monitor them closely. In relation to mitigation, in our 2016 Progress Report, we will review progress against each recommendation. The ASC's next report on the progress being made by the National Adaptation Programme will be in June 2017.

The Government is required to respond to our report by 15 October 2015. Aside from responding to our recommendations, it will need to develop plans to make up for the shortfall between current projected emissions and the legislated fourth carbon budget (2023-27).

We will continue to monitor progress and the Government's response.

Later in 2015, the Committee will provide its advice on the level of the fifth carbon budget (2028-2032). This will be informed by detailed, bottom-up analysis of what is achievable over that period and the costs and benefits, in line with our statutory duties. The Government will have until June 2016 to pass legislation on the fifth carbon budget.

In the summer of 2016, the Adaptation Sub-Committee will publish its advice to the Government on the next Climate Change Risk Assessment. This will take the form of an evidence report, summarising the latest scientific evidence on the likely consequences for the UK arising from the changing climate. The Government will respond to this and present its report on the Climate Change Risk Assessment to Parliament in early 2017.

Annex A: Recommendations

Table A.1: Progress towards meeting carbon budgets (mitigation, central Government)			
#	Recommendation	Owner	Deadline
Power			
1	Ensure the power sector can invest with a 10-year lead time: as soon as possible, set the Government's carbon objective for the power sector in the 2020s and extend funding under the Levy Control Framework to match project timelines (e.g. to 2025 with rolling annual updates)	DECC with HMT	Ahead of 2016 Progress Report
2	Continue with auctions under Electricity Market Reform, maintaining momentum by adhering to the proposed timings and working with industry to learn lessons from the first auctions	DECC	Next low-carbon auction by end-2015
3	Set out approach to commercialise CCS through the planned clusters: including a strategic approach to transport and storage infrastructure, completing the two proposed projects and contracting for at least two further 'capture' projects this Parliament	DECC	Ahead of 2017 Progress Report
4	Support offshore wind until subsidies can be removed in the 2020s: set out intention to contract 1-2 GW per year and wider innovation support provided costs fall with view to removing subsidies in the 2020s	DECC	Ahead of 2016 Progress Report
5	Be transparent over the cost implications of technology choices: including the cost of alternatives if low-cost options are constrained, system integration costs and the full carbon cost of fossil-fired generation	DECC	Ongoing, CCC to review in 2016 Progress Report
Buildings			
6	Develop an action plan to address the significant shortfall in low-carbon heat: short term this should commit to extend the Renewable Heat Incentive to 2020, or until a suitable replacement is found; long term it should link support for low-carbon heat with energy efficiency, support for heat networks and wider decisions about infrastructure for heat.	DECC	Ahead of 2016 Progress Report
7	Energy efficiency: set out the future of the Energy Company Obligation beyond 2017, ensuring it delivers energy efficiency while also meeting fuel poverty targets	DECC and DAs	Ahead of 2017 Progress Report
8	Implement commitments on Zero Carbon Homes for 2016: implement zero carbon standards without further weakening and ensure incentives are in place to encourage low-carbon heat sources.	DCLG	Ahead of 2016 Progress Report
9	Simplify policies for commercial energy efficiency: simplify and rationalise wide range of existing policies for commercial energy efficiency to strengthen incentives	DECC	Ahead of 2016 Progress Report
Industry			
10	Develop joint work with industry into action plans: publish plans setting out specific actions and clear milestones to move abatement efforts forward along the paths developed with industry in the "Roadmaps"	DECC	Ahead of 2016 Progress Report
11	Complete roll-out of "Roadmaps" to other industrial sectors: taking account of lessons learned, roll-out roadmaps to industrial sectors not covered in first wave	DECC	Ahead of 2017 Progress Report

Table A.1: Progress towards meeting carbon budgets (mitigation, central Government)			
#	Recommendation	Owner	Deadline
12	Join-up industrial CCS with power sector projects: set an approach to commercialisation of industrial CCS alongside the approach adopted for the power sector, including ensuring industry can link into planned infrastructure.	BIS with DECC	Ahead of 2017 Progress Report
13	Evaluate effectiveness of compensation to at-risk industries for low-carbon policies: independent evaluation of industries that are at-risk and effectiveness of the compensation framework	BIS	Ahead of 2017 Progress Report
Transport			
14	Provide motor industry with greater certainty to 2030: push for clear, stretching 2030 EU targets for new cars and vans that take account of the need for ultra-low emission vehicles and use realistic testing procedures.	DfT	Ahead of 2018 Progress Report
15	Tackle barriers to EV uptake: maintain support for upfront costs while they remain more expensive than conventional vehicles; provide a national network of charge points and roll-out local incentives such as access to parking.	DfT with Local Authorities	Ahead of 2017 Progress Report
16	Ensure the tax regime keeps pace with technological change: align existing fiscal levers (e.g. Vehicle Excise Duty) to ongoing improvements in new vehicle CO_2, including a greater differentiation between rates for high and low emission vehicles.	DfT with HMT	Ahead of 2017 Progress Report
17	Extend successful emissions-reduction schemes for freight operations: larger freight operators have pioneered schemes to reduce fuel costs and emissions that should be rolled out across the industry, including small operators.	DfT with BIS and industry	Ahead of 2016 Progress Report
18	Ensure lessons from schemes to reduce travel demand are applied: sustainable travel schemes should be properly evaluated and extended if they provide cost-effective emissions reductions.	DfT	Ahead of 2017 Progress Report
19	Publish an effective policy framework for aviation emissions: plan for UK 2050 emissions at 2005 levels (implying around a 60% increase in demand) and push for strong international and EU policies	DfT	Ahead of 2016 Progress Report
Agriculture and Land-Use			
20	Deliver the Smart inventory to current timeline: the Smart inventory is essential for effective measurement of emissions from agriculture and should be delivered in 2016, without further delays.	Defra	Ahead of 2016 Progress Report
21	Strengthen the current voluntary approach to reduce agricultural emissions: farming industry to develop robust indicators to properly evaluate the GHG Action Plan. Government to consider stronger measures as part of its 2016 review if these cannot assess the effectiveness of the existing scheme.	Defra	Ahead of 2016 Progress Report
22	Co-ordinate effort to reduce emissions from agriculture and forestry: ensure measures being implemented across the four nations are feasible, cost-effective and consistent with UK carbon budgets.	DECC with Devolved Administrations	Ahead of 2016 Progress Report
Waste and Non-CO_2			
23	Scotland, England, Wales and Northern Ireland to set out approaches to increase methane capture rates: as a devolved matter, each nation should set out specific actions and clear milestones	Defra and DAs	Ahead of 2017 Progress Report

Table A.1: Progress towards meeting carbon budgets (mitigation, central Government)			
#	Recommendation	Owner	Deadline
24	Reduce biodegradable waste to landfill: each nation should set out specific actions and clear milestones – including England – to further reduce biodegradable waste to landfill.	Defra and DAs	Ahead of 2017 Progress Report
25	Find opportunities to exceed regulatory minimums on F-gas abatement: including clearly assessing and addressing barriers where evidence suggests cost-effective abatement above minimum standards	Defra	Ahead of 2016 Progress Report

Some of the recommendations in the table above are for the devolved governments. We have indicated where that is the case. In addition, this report makes further specific recommendations to those governments. They are summarised in the table on the next page. They reflect areas where the governments of Scotland, Wales or Northern Ireland currently have powers and where there are important gaps in policy. In some areas (such as heat) there is further potential for all the governments to act and we repeat the recommendation for each government. In other areas, specific local circumstances suggest a recommendation that is different from one government to the next. We will continue to update the owner of each of our recommendations in light of ongoing devolution discussions.

The Committee produces a stand-alone Progress Report for the Scottish Government based on more detailed and extensive analysis of the progress in Scotland against its own climate targets. That report was published in March 2015. There are no new recommendations in this report. Below we repeat some specific recommendations from that report.

Table A.2: Progress towards meeting carbon budgets (mitigation, devolved administrations)			
#	Recommendation	Owner	Deadline
Scotland			
26	Consider further action to facilitate heat networks: for example, obliging local authorities to connect to existing local networks and requiring consideration of network heat in new developments.	Scottish Government	Ahead of 2017 Scottish Progress Report
27	Evaluate current energy efficiency schemes: focus particularly on area-based schemes to better understand the most effective way to implement supplier obligations once they become devolved	Scottish Government	Ahead of 2017 Scottish Progress Report
28	Improve evidence on agricultural abatement: to include what has worked under "Farming for a Better Climate" and whether its measures have been taken-up beyond the focus farms	Scottish Government	Ahead of 2016 Scottish Progress Report
Wales			
29	Develop a heat strategy: build on UK evidence and approach to develop clear heat strategy for Wales including a renewable heat target	Welsh Government	2017
30	Prepare for higher ambition required of industry: plan ways to reduce industry emissions, including consideration of voluntary partnership agreements with industry and encouraging innovative solutions	Welsh Government	2018
31	Address non-financial barriers for electric vehicles: including further measures which could be implemented such as parking, use of priority lanes, raising awareness and public procurement	Welsh Government	2016
32	Meet tree planting targets: consider whether further measures are needed to ensure tree planting targets are met, and develop approach jointly with stakeholders and other DAs	Welsh Government	2016
Northern ireland			
33	Consider further action to facilitate heat networks: for example, obliging local authorities to connect to existing local networks and requiring consideration of network heat in new developments	N.I. Executive	2017
34	Improve monitoring of agricultural emissions: following Defra's delivery of the Smart inventory, put in place local monitoring and process for acting on its findings	N.I. Executive	2017
35	Address non-financial barriers for electric vehicles: including further measures which could be implemented such as parking, use of priority lanes, raising awareness and public procurement	N.I. Executive	2016

Table A.3 provides a summary of the 36 recommendations made in the Adaptation Sub-Committee's first Progress Report on the National Adaptation Programme. Please see the ASC's Progress Report for the full text of each recommendation.

Table A.3: Progress in preparing for climate change (adaptation)				
#	Adaptation priority	Recommendation	Owner	Deadline
1	N/A	The **second National Adaptation Programme should:** • Set clear priorities for adaptation • Ensure objectives are specific, outcome-focused, and measurable • Focus on the core set of policies and actions that will have the biggest impact • Build on the breadth of local community and business engagement from the first NAP • Introduce effective monitoring and evaluation	Defra	Next NAP in 2018
Built environment				
2	Residual flood risk to existing properties	Defra should **take steps to address the increasing number of homes expected to be at high flood risk** in the coming decades, publishing a strategy within a year. Full use should be made of the opportunities presented by the Flood Re subsidised insurance scheme to encourage property-level flood alleviation.	Defra	Summer 2016
3	Surface water flood management	Defra should, first, **amend the Water Industries Act 1991 to remove the automatic right to connect new development to public sewers** and, second, publish an action plan within one year of this report to improve local flood risk management arrangements.	Defra	Summer 2016
4	Surface water flood management	DLCG should, first, **make water companies statutory consultees on all planning applications that have implications for the public sewer network** and, second, put in place a process for monitoring and evaluating the effectiveness of planning policy in delivering an uptake of SuDS in new development.	DCLG	Early 2017
5	Surface water flood management	Water companies should **report to Ofwat at the end of the current Asset Management Plan period in 2020 on the area each company has retrofitted with above-ground SuDS and/or permeable paving** in order to deliver the industry-wide commitment of a 33% reduction in sewer flooding incidents.	Ofwat	2020
6	Avoid inappropriate new development in flood risk areas	DCLG should publish **an assessment quantifying the impact of new development on long-term flood risk**. The evidence from this assessment should be used to inform subsequent Environment Agency Long Term Investment Scenarios.	DCLG	Early 2017
7	Residual flood risk to existing properties	**Flood Re's transition plan should set out clear proposals for promoting flood risk alleviation** amongst high risk households.	Flood Re Ltd	Autumn 2015

Table A.3: Progress in preparing for climate change (adaptation)				
#	Adaptation priority	Recommendation	Owner	Deadline
8	Water demand in the built environment	Ofwat, the Environment Agency and water companies should work together to ensure the next round of long-term water resources management plans in 2019 includes **ambitious commitments to manage demand for water.**	Ofwat	2019
Infrastructure				
9	Design and location of new infrastructure	DCLG should **develop an approach to assess whether systemic risk is increasing or reducing** as a result of individual decisions on the location of new national infrastructure assets. This should inform a decision on whether there is a need for an overarching National Policy Statement to guide decisions on the design and location of new assets.	DCLG	Early 2017
10	Resilience of infrastructure services	Cabinet Office should work with all infrastructure sectors as part of the next round of sector resilience plans in 2015 to **develop consistent incident reporting and indicators of resilience to allow improvements to be measured over time**. The results should be presented by operators as part of their reports under the third round of ARP. Reporting as part of the third round of ARP should be made mandatory.	Cabinet Office	Summer 2016
11	Resilience of infrastructure services	Cabinet Office should **confirm that the services provided by all critical national infrastructure are now resilient to a 1-in-200 year flood event**. The Cabinet Office should agree sector resilience standards that are in the national interest and see that they are implemented. This process should inform the 2016 round of sector resilience planning.	Cabinet Office	End of 2016
12	Infrastructure interdependencies	**Information on asset and network resilience should be shared** between operators of interdependent assets, and with local resilience forums. The Cabinet Office should facilitate the piloting of secure information sharing arrangements within a year of this report, as a pre-cursor to a possible legal duty to co-operate and share such information, introduced in this Parliament.	Cabinet Office	Summer 2016
13	Infrastructure interdependencies	The UK Regulators Network should ensure that **proportionate and cost-effective approaches to improving resilience and reducing climate risk are in place for the economically-regulated sectors**.	UK Regulators Network	Early 2017
Healthy and resilient communities				
14	Public understanding of climate risks	The next NAP should contain a **specific set of actions that aim to increase public awareness of climate change risks**. Defra should agree overall responsibility with a single government department or organisation to take the lead.	Defra	Next NAP in 2018
15	Heat-related health impacts	DCLG should **evaluate the latest evidence and subsequently introduce a new required standard or regulation on overheating for new homes**.	DCLG	Early 2017

Table A.3: Progress in preparing for climate change (adaptation)				
#	Adaptation priority	Recommendation	Owner	Deadline
16	Heat-related health impacts	The Department of Health, in partnership with DCLG, should **identify incentives for the uptake of passive cooling in existing homes**, hospitals and care homes, publish its results and include new measures in the next NAP due in 2018.	DoH/DCLG	Early 2017
17	Heat-related health impacts	DCLG should work with local authorities to **adopt and deliver a goal of reversing the decline in urban greenspace** and publish an implementation strategy by the time of the ASC's next report in 2017.	DCLG	Early 2017
18	Capability of the emergency planning system	Cabinet Office should undertake a quantitative **assessment of the existing, and required, capability of the emergency planning system to handle extreme weather events**, and publish a summary in time for the ASC's next report in 2017.	Cabinet Office	Early 2017
19	Capability of the emergency planning system	DCLG should work with Local Resilience Forums to **instigate a system that quantitatively assesses local capabilities to respond to extreme weather events**, including on aspects of recovery as well as response , with the results to be made available in time for the ASC's next report in 2017.	DCLG	Early 2017
20	Capacity of people and communities to recover from flooding	Local authorities should routinely **collect and publish data on aspects of flood recovery, including how long householders are out of their homes**. DCLG should review the capacity of local authorities to support people physically and mentally in the aftermath of a flood, and publish its findings before the ASC's next report in 2017.	DCLG	Early 2017
Agriculture and forestry				
21	Water demand by agriculture	Defra should **bring forward its planned review of water efficiency measures on farms** from 2018 in line with the initial plans presented in the National Adaptation Programme.	Defra	Summer 2016
22	Flooding of agricultural land	Defra, in collaboration with the Environment Agency and others, should **pilot integrated approaches to managing the risk of flooding to agricultural land**. This should be completed in time to inform wider dissemination of the lessons as part of the next NAP report in 2018.	Defra	Next NAP in 2018
23	Fertility of agricultural soils	Defra should **take action to deliver its policy aspiration for all soils to be sustainably managed by 2030**, publishing a comprehensive action plan within a year of this report.	Defra	Summer 2016
24	Prevalence of new and existing pests and diseases	Defra should use the information contained within the UK Plant Health Risk Register to **publish aggregate metrics that enable the overall risk from pests and diseases to be monitored over time**.	Defra	Early 2017
25	Innovation and knowledge transfer	Defra should **publish an initial evaluation of the impact of the Agri-Tech Strategy** in time to inform the next NAP in 2018.	Defra	Next NAP in 2018

Table A.3: Progress in preparing for climate change (adaptation)				
#	Adaptation priority	Recommendation	Owner	Deadline
Natural Environment				
26	Ecological condition of priority habitats	Defra and Natural England should continue to take action to deliver all the outcomes in the **England Biodiversity 2020 strategy,** publishing an action plan within a year of this report. The report should clarify what 'favourable ecological condition' means in the context of climate change.	Defra	Summer 2016
27	Ecological condition of wetland habitats	Natural England, in partnership with the Upland Stakeholder Forum, should take action to deliver the widespread **restoration of upland peat habitats** which includes a programme for reviewing existing consents for burning on protected sites and an assessment of whether agri-environment schemes are funding damaging land management practices.	Natural England	Summer 2016
28	Ecological condition of rivers, lakes and estuaries	The Environment Agency should publish the steps it will take to **ensure full delivery of the Restoring Sustainable Abstraction programme by 2020**. Defra should press ahead with **reforms to the abstraction regime early in this Parliament.**	EA / Defra	Summer 2016
29	Ecological condition of the farmed countryside	Natural England should establish within a year of this report a process to **monitor the extent to which the Countryside Stewardship scheme will help** to deliver coherent ecological networks, and more broadly reduce the vulnerability of farmland wildlife to environmental pressures, including climate change.	Natural England	Summer 2016
30	Extent of priority habitats	The Environment Agency should publish within a year of this report a portfolio of habitat creation projects that it will deliver to **ensure that there is no net loss of coastal habitat by 2025**, and publish a progress report on implementation to date to inform the ASC's next statutory report in 2017.	EA	Early 2017
Business				
31	Business impacts from extreme weather	The Environment Agency should **evaluate the impact of the main adaptation tools and guidance it has published**, including the Climate Ready support service, in time for the ASC's next Progress Report in 2017.	EA	Early 2017
32	Business impacts from extreme weather	Defra should **evaluate the 'repair and renew' grant scheme** and develop new policies in time for the next NAP due in 2018, to encourage businesses in high risk areas to improve their resilience to flooding.	Defra	Next NAP in 2018
33	Supply chain interruptions	BIS should assess the case for regulatory and non-regulatory measures to **encourage all listed companies to report on their exposure to risks from climate change**, and the actions being taken to manage those risks.	BIS	Next NAP in 2018

Table A.3: Progress in preparing for climate change (adaptation)				
#	Adaptation priority	Recommendation	Owner	Deadline
34	Supply chain interruptions	The Bank of England should undertake research to **better understand the potential systemic risks from climate change to the finance sector**, building on the forthcoming report under the Adaptation Reporting Power by the Prudential Regulatory Authority. The research should be completed in time to inform the next NAP, due in 2018. The third round of ARP reporting should be extended to cover the finance sector.	Bank of England	Next NAP in 2018
35	Water demand by industry	Defra should develop options in time for the next NAP to **encourage industry to improve water efficiency particularly in water-stressed areas**.	Defra	Next NAP in 2018
Local Government				
36	All	Defra and DCLG should **introduce a cost-effective and proportionate way of consistently assessing local authority progress with planning for and managing climate change risks**.	Defra / DCLG	Early 2017

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