Climate Change Committee
10 South Colonnade,
Canary Wharf, London
E14 4PU
theccc.org.uk

Emma Hardy MP
Seacole Building
2 Marsham Street
London
SW1P 4DF

Dear Minister Hardy,

Thank you for seeking my Committee's advice on objectives for adapting to a world where climate change is increasingly driving extreme weather events. It is clear we are not yet adapted for the changes in weather and climate that we are living with today, let alone those that are expected over coming decades.

We strongly welcome your commitment to strengthening adaptation objectives; indeed, we believe it to be essential and urgent. These objectives must cover critical areas of our lives, both social and economic, have clearly measurable and time-bound targets, articulate a clear role for Government, and come with explicit delivery accountability for Government departments. Objectives should be set relative to a baseline of today's level of resilience so that progress towards them can be clearly tracked.

A well-adapted UK should deliver a future where:

- Impacts on people's health and wellbeing from climate change are minimised.
- The UK's food security is preserved and key goals for environmental improvement and support for nature are delivered, despite a changing climate.
- Key infrastructure systems function at least as well as they do today, and in many cases better, in the face of changing weather.
- Cities, towns, and villages are not disrupted by extreme weather more frequently than today and, where possible, disruption is reduced.
- Key public services maintain their current levels of service despite climate change, and some vital services, such as health and social care, continue to operate normally during periods of extreme weather.
- Economic growth is climate-resilient and access to key business and financial services, such as insurance, is maintained.

Across these areas it is the most vulnerable people and places that will be most impacted by climate change. A well-adapted UK is one that understands when and where adaptation can be targeted to those most at risk.

The level of ambition within adaptation objectives is for Government to decide. We will provide further analysis of the trade-offs involved in our Well-Adapted UK report, which we will publish in May 2026.

You asked for specific advice on a timeframe and minimum climate scenarios for setting adaptation objectives. Our advice is that adaptation objectives should be set to be achieved by 2050 at the latest. They should, at a minimum, prepare the country for the weather extremes that will be experienced if global warming levels reach 2°C above preindustrial levels by 2050.

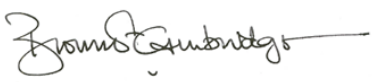
This advice is informed by our assessment of the latest science on future climate change in the UK and globally. Unfortunately, we have to advise that the UK should be prepared for climate change beyond the long-term temperature goal of the Paris Agreement. We continue to believe that the long-term temperature goal is achievable, but prudent risk management needs to consider a wider range of possible worse outcomes.

Planning for global warming levels reaching 2°C above preindustrial levels by 2050 should be a minimum level. Faster rates of warming between now and 2050 remain possible, and additional warming beyond 2050 is currently expected. Significant progress on the cost of low-carbon technologies has reduced the central expectations of future warming in the second half of the century. However, the climate system is complex: extreme outcomes remain possible, for example from a higher than anticipated climate response to greenhouse gas emissions. At the high end of possibilities, reaching 4°C above preindustrial levels by the end-of-century cannot yet be ruled out and should be considered as part of effective adaptation planning.

A framework of clear long-term objectives should be set out in the next National Adaptation Programme (NAP). These longer-term adaptation objectives need to be driven through a set of interim milestones, with targets every five years. The objectives should be set out together with the first set of interim milestones for the 2030s, clear accountabilities for departments, and a plan to deliver them. The relevance and adequacy of adaptation objectives should be reviewed regularly: the five-yearly assessment of the latest evidence of impacts required under the Climate Change Act would allow for that review. As noted in our recent adaptation progress report, governments have repeatedly failed on their ambitions to make the UK resilient to climate change. We welcome your commitment to an ambitious and impactful fourth NAP. This will have to be materially different to previous NAPs if it is to have value.

The people of this country are already experiencing the impacts of a changing climate, and we owe it to them to prepare, and to help them prepare, for what we know is ahead. It is important that the Government and bodies like ours continue to use scientific, factual analysis as the basis for our respective decision making and advice. We stand ready to help in any way we can as you develop this new framework for climate adaptation in the UK.

Yours sincerely,



Baroness Brown of Cambridge DBE FREng FRS FMedSci
Chair, Adaptation Committee

Annex

Time horizon

Further climate change is inevitable. This is because it will take several decades, at least, to reduce global greenhouse gas emissions to Net Zero and global temperatures will continue to rise until close to that point. Even under the most ambitious scenarios for global emissions reductions, climate change is expected to continue until at least around 2050.

- The most ambitious set of scenarios (consistent with keeping peak warming to close to 1.5°C above preindustrial levels with low or no overshoot) considered by the most recent Intergovernmental Panel on Climate Change (IPCC) Assessment Report sees global warming peak around 2045.[1]

- These scenarios would require significantly faster global emissions reductions than expected under current near-term commitments to the Paris Agreement.

- Even when global temperature is stabilised the sea levels globally and around the UK are expected to continue to rise for tens to hundreds of years. This ongoing change would have to continue to be adapted to.

Less ambitious global emissions trajectories, including those consistent with current expectations of future global emissions, see warming continue beyond 2050 into the second half of the century.[2] Continued warming beyond 2050 will make delivering a well-adapted UK increasingly challenging on an ongoing basis.

Adaptation objectives set to be achieved by 2050 at the latest would be a useful horizon for setting out an adaptation policy response in the UK.

- Without more ambitious action, dangerous climate impacts across society will be experienced by 2050. Around half of risks and opportunities in the Third Climate Change Risk Assessment are assessed to be 'high' by the 2050s.[3] These risks are those that would be expected to bring hundreds of million pounds of damages, lead to hundreds of deaths or have major impacts on habitats and species loss.

- 2050 is sufficiently far in the future (25 years) to support ambitious objectives delivered through action over long timescales. This is necessary for some adaptations which require long lead-times, for example, reservoir construction.

Timeframes for objectives later than 2050 would be so far into the future that it becomes challenging to constrain the levels of warming that might be expected (which depend strongly on future global emissions) or how socio-economic development might change the functioning of key systems. This limits that ability to set clear and robust objectives for adaptation to drive action today. They would also likely be sufficiently far away that they struggle to motivate effective action today.

Minimum climate scenario

Adaptation objectives should consider credible pathways for future global climate change and the associated changes in the UK's weather and climate extremes. A central estimate of future global climate change is that the world is currently heading towards global warming levels reaching beyond 1.5°C above pre-industrial levels in the 2030s and reaching around 2°C above preindustrial levels in the 2050s.

- This is consistent with a continuation of the current rate of global warming of around 0.25°C per decade.[4]

- It is consistent with climate outcomes based on up-to-date estimates of current global emissions reduction policy and median climate response (Figure 1 – left hand side).

Continued warming would be expected after the 2050s based on the current trajectory with estimates suggesting that warming could continue to rise to around 2.5–3°C above preindustrial by 2100.

Higher rates of future warming than this central estimate are possible. This could come from both higher than anticipated climate response to greenhouse gas emissions or from a global scale relaxation of emissions reduction ambition.

- A higher climate response could see global warming reaching around 2.5°C above preindustrial by the 2050s and reaching around 3.5°C above preindustrial levels by 2100 (Figure 1 – right hand side). An approximately 2°C level of global warming could be reached as early as the 2030s.

- Under both a high-end climate response and an emissions trajectory at the upper end of current policy estimates warming in excess of 4°C by 2100 is still possible.

These more impactful climate scenarios should be considered when adaptation plans are made to identify adaptation actions which would build resilience to a range of future climates. Adapting to these scenarios will be much more challenging and costly.

Increased global emissions reduction ambition would lower the expected level of global warming in the 2050s and sufficiently rapid reductions could keep central expectations of warming in the 2050s to 1.5–2°C above preindustrial levels. However, while this remains possible, pathways of expected global emissions are not yet consistent with those required to keep warming to this level.

UK weather extremes at 2°C global warming above preindustrial levels

A global warming level of 2°C above preindustrial levels will result in significant changes in the UK's weather and climate. More impactful, more frequent, and increasingly unprecedented extremes will be seen. It is resilience to these extremes that needs to be supported through strong adaptation objectives.

- **Heatwaves:** heatwaves will become more frequent and widespread at 2°C global warming. Averaged across England, the chance of an officially defined heatwave occurring doubles from a 40% chance each year in the 1981 to 2010 climate, to close to an 80% chance each year.[5]

- **Drought:** hot dry summers are expected to become more frequent. Averaged across England, the time spent under drought conditions due to low rainfall is expected to double at 2°C global warming compared to the 1981 to 2010 climate.[6]

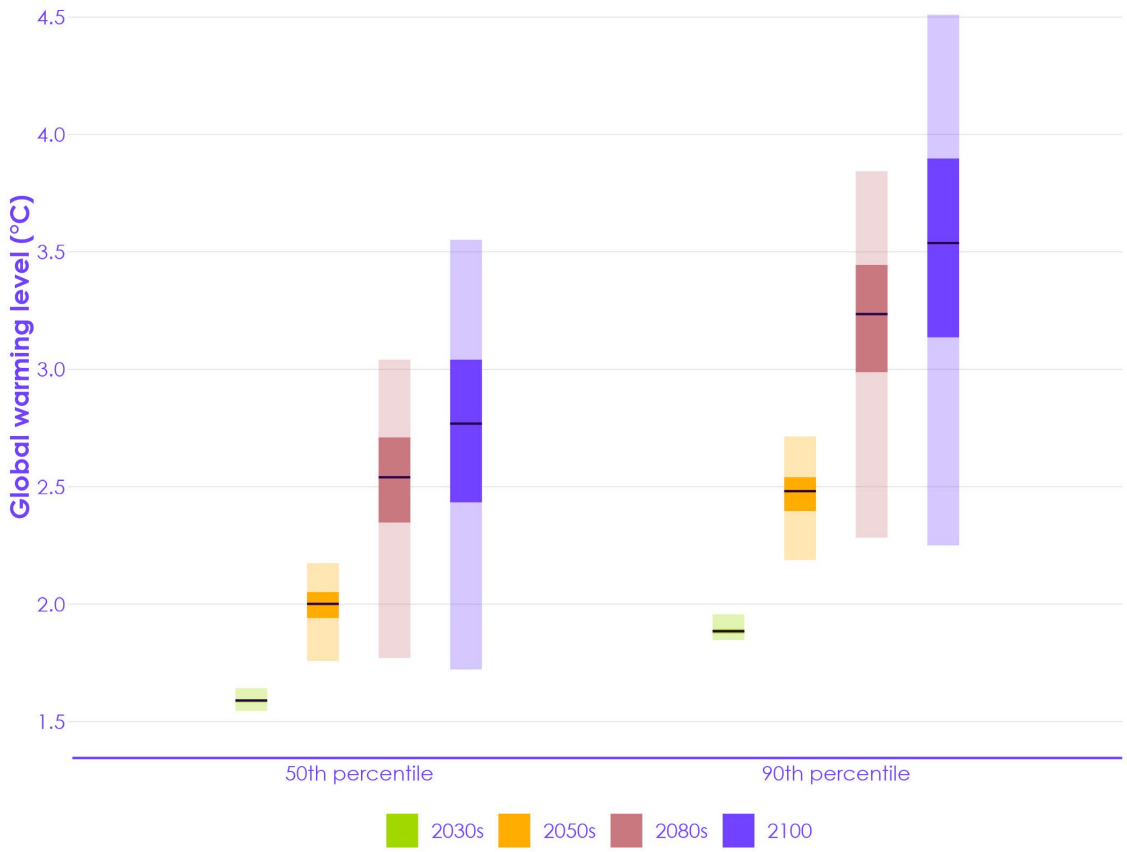
- **Flooding:** at 2°C global warming, peak rainfall averaged across the UK is expected to increase by up to 10–15% for the wettest days.[7] Peak river flows will increase by up to 40% for some UK river catchments.[8] Sea level rise will continue and accelerate with 15–25 cm of additional sea level rise expected by 2050 for UK coastal cities.[9]

- **Fire weather:** future projections show a doubling of days (compared to the 1981 to 2010 average) with conditions highly favourable for wildfires over at least 5% of England and Wales at 2°C global warming. They also show a close to trebling of days in the peak wildfire month of July from three days per year on average in a 1981 to 2010 climate to approximately eight days per year for the UK as whole.[10] Wildfire season will become longer, extending into autumn.

- **Storms:** future changes in UK storms due to global warming remain uncertain at 2°C global warming. However, there is evidence for increased combined impacts from wet and windy conditions generated by UK storms under global climate change. For example, estimates for approximately 4°C global warming suggests potential for a two to four times increase in the likelihood of extreme events with both high wind and river flow in the future.[11,12]

As further understanding of the climate and future weather extremes develops over time, adaptation objectives should be regularly reviewed (as part of the five-yearly process in the Climate Change Act) to ensure they keep pace with our increasing understanding of the expected effects of climate change.

Figure 1 Projections of global average warming under current policy scenarios for global greenhouse gas emissions



Description: A range of global warming levels remain possible based on current global plans to reduce emissions. Warming is expected to be around 2°C above pre-industrial levels in the 2050s and between 2.5°C to 3°C by the end of the century. Global warming reaching as high as 4°C above pre-industrial by the end of the century cannot be ruled out.
Source: Climate Change Committee (CCC) (2025) *Progress in adapting to climate change: 2025 report to Parliament*; Rogelj, J. et al. (2023) *Credibility gap in net-zero climate targets leaves world at high risk.*
Notes: Current policies here is based on scenarios estimated to be consistent with current global policy ambition (based on policies in implementation) out to 2030 – and extrapolated thereafter. Delivery of currently pledged Nationally Determined Contributions (NDCs) and longer-term Net Zero targets are not assumed. The darker colouring (central in each bar) marks the interquartile range and median across emissions scenarios, with the paler colouring indicating the maximum and minimum from the scenario range. Global warming levels are expressed relative to 1850 to 1900.

References

[1] Riahi, K. et al (2022) *Mitigation pathways compatible with long-term goals. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge University Press. https://doi.org/10.1017/9781009157926.005.

[2] Riahi, K. et al (2022) *Mitigation pathways compatible with long-term goals. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge University Press. https://doi.org/10.1017/9781009157926.005.

[3] Climate Change Committee (2021) *Independent Assessment of UK Climate Risk.* https://www.theccc.org.uk/publication/independent-assessment-of-uk-climate-risk/.

[4] Forster, P. et al (2025) *Indicators of Global Climate Change 2024: annual update of key indicators of the state of the climate system and human influence*. Earth System Science Data. https://doi.org/10.5194/essd-16-2625-2024.

[5] Arnell, N. et al. (2021) *Indicators of climate risk in the UK at different levels of warming.* Environmental Research Communications. https://iopscience.iop.org/article/10.1088/2515-7620/ac24c0.

[6] Arnell, N. et al. (2021) *Indicators of climate risk in the UK at different levels of warming*. Environmental Research Communications. https://iopscience.iop.org/article/10.1088/2515-7620/ac24c0.

[7] Kendon, E.J. et al (2023) *Variability conceals emerging trend in 100yr projections of UK local hourly rainfall extremes.* Nature Communications. https://www.nature.com/articles/s41467-023-36499-9.

[8] Kay, A.L. et al. (2021) *Climate change impacts on peak river flows: Combining national-scale hydrological modelling and probabilistic projections.* Climate Risk Management. https://www.sciencedirect.com/science/article/pii/S221209632030053X.

[9] Sayers, P. et al (2020) *Future flood risk – Main Report.* https://www.ukclimaterisk.org/wp-content/uploads/2020/07/Future-Flooding-Main-Report-Sayers-1.pdf.

[10] Perry, M.C. et al. (2022) *Past and future trends in fire weather for the UK*. Natural Hazards and Earth System Sciences. https://nhess.copernicus.org/articles/22/559/2022/.

[11] Bloomfield, H.C. et al. (2023) *Co-occurring wintertime flooding and extreme wind over Europe, from daily to seasonal timescales.* Weather and Climate Extremes. https://www.sciencedirect.com/science/article/pii/S2212094723000038.

[12] Hillier, J.K. et al. (2025) *Increasingly seasonal jet stream raises risk of co-occurring flooding and extreme wind in Great Britain.* International Journal of Climatology. https://rmets.onlinelibrary.wiley.com/doi/10.1002/joc.8763.