VISION DERBYSHIRE

INTRODUCTION: BACKGROUND TO CLIMATE CHANGE SCIENCE AND EVIDENCE

"It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.
Many changes due to past and future greenhouse gas emissions are irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level."

Intergovernmental Panel on Climate Change, Sixth Assessment Report
9 August 2021

1. The Intergovernmental Panel on Climate Change (IPCC) published its 6th Assessment Report on 9 August 2021 and an Impacts, Adaptation and Vulnerability Report in March 2022. It contains a damning assessment of the current state of action on climate change and states that strong, rapid and sustained reductions in greenhouse gas emissions along with limiting cumulative carbon dioxide (CO_2) emissions, reaching at least net zero by 2050, are required to keep climate change to between 1.5°C and 2.0°C this century. The report concludes that there is now a small window of opportunity when significant action by society and governments can reduce the worst effects of climate change to within our ability to adapt.

2. Climate science is not new, the impacts of atmospheric CO_2 concentrations were first identified by Fourier in 1820s[1] and linked to climate by Tyndall in 1850s[2]. It was not until the second half of the 20th century that the scale of human influences on CO_2 levels was recognised, and the term 'Greenhouse' applied to the effect on climate, and to the gases responsible, principally carbon dioxide, methane, nitrous oxide and fluorinated gases. As concentrations of these gases increase, the world warms, the sea levels rise, and the atmosphere becomes more turbulent and able to hold more moisture. In the UK this will mean warmer, wetter winters with less snowfall and fewer frosts. Summers will be hotter and generally dryer but the potential for extreme, intense rainfall, droughts, heatwaves, flooding and storms will all increase.

3. Carbon dioxide concentrations have risen from a pre-industrial 280 parts per million (ppm) in the 1750s, to 300ppm in the 1950s, and over 400 ppm in 2018. The 2021 provisional figure released by the US National Oceanographic and Atmospheric Administration is 421 ppm which is comparable with the 410 ppm in 2020 cited by the Intergovernmental Panel on Climate Change.[3] Without action, at the current rate of change this could reach 900 ppm by the end of the century.[4] The impacts of rising greenhouse gas concentrations are clear, globally, the 10 warmest years on record have all occurred since 2005.[5] The global average temperature has risen at an unprecedented rate, by between 1.25°C and 1.5°C since 1880 and every year since 1976 has been hotter than the long-term average. Global temperatures are rising by at least 0.3°C per decade.[6] Arctic summer ice coverage

[1] General remarks on the temperature of the globe. J Fourier, 1824
[2] Proceedings of the Royal Institution of Great Britain. J Tyndall, 1859
[3] Climate Change 2021, The Physical Science Basis, Summary for Policy Makers. Intergovernmental Panel on Climate Change, 9 August 2021
[4] United States National Oceanographic and Atmospheric Administration, Climate Change: Atmospheric Carbon Dioxide. 2020
[5] Met Office Observations, 2018
[6] Met Office 2018

has decreased by an average of 2.6% per decade since 1979, and global sea level has risen by 17 cm in the 20th century. In the UK, the ten warmest years on record have occurred since 2002, rainfall has increased by 5% and sunshine by 7%.[7] It is clear that the earth is warming rapidly, rainfall patterns are changing, there are droughts, wildfires[8], and unprecedented flooding, while water shortages and rising sea levels bring the threat of flood, geo-political instability and mass migration.

4. Around the world, 39% of the population live within 100 kilometres of the coast and are at risk of flooding if sea levels continue to rise. 600 million of these people live in a 'low-level coastal zone', and 200 million on a coastal flood plain at risk of displacement due to climate induced sea level rise.[9] Large parts of the East and Southeast England are included in this, and in Wales, Gwynedd Council is considering the future of the village of Fairbourne which is threatened by rising sea levels and surface water flooding. It is possible that Fairbourne will become the first settlement in the UK abandoned due to climate change.[10]

5. As much as 90% of the greenhouse warming is absorbed by the oceans causing sea level rise due to thermal expansion and the melting of polar ice. The oceans release heat to the atmosphere more slowly than land, therefore, even if emissions are stopped now, the oceans and existing atmospheric greenhouse gases will continue to cause atmospheric warming for many decades. The level of climate change we experience therefore depends on how quickly we cut emissions now. Even if we stop all emissions

[7] Met Office Observations, 2018
[8] E.g. West Coast USA, Australia, Siberia, UK, Turkey and Israel.
[9] Effects of Climate Change. Met Office, August 2021
[10] Shoreline Management Plan. Gwynedd Council, May 2013

today, we will not prevent some changes due to the inertia that exists in our atmosphere. However, the sooner we cut emissions, the smaller these changes will be, and the greater our ability to adapt.[11]

6. While human populations can to some extent adapt to changes in climate, the ecosystems on which we all depend will find this more difficult. Warmer and more acidic oceans, due to the absorption of CO_2, are impacting on marine life, for example coral bleaching has been widely reported while some fish species are moving to cooler waters in higher latitudes. Habitat is closely linked to climate, as climate changes so this will cause changes to habitats, species distribution, biodiversity loss and extinctions. Agricultural patterns will also be changed. While some areas will be able to grow a wider variety of crops, others will be taken out of production altogether due to rising temperatures, water shortages, changes to rainfall patterns and inundation by the rising sea levels. Climate change can also accelerate the introduction and spread of invasive species. It is these global changes in climate and ecosystems that are contributing to the sharp decline in biodiversity, and it is this link between climate and biodiversity that leads to the inclusion of biodiversity measures in this document and indeed, the governments' introduction of a Biodiversity Net Gain requirement and metric. There is little to be gained from including policies for the protection of biodiversity in a Development Plan if climate change is allowed to accelerate, significantly changing the climatic conditions on which our biodiversity depends.

7. The UK Governments' Department for Business, Energy and Industrial Strategy (BEIS) has stated that "reducing emissions now will keep the scale and rate of change within our ability to adapt. It makes good economic sense to take action now to drastically cut greenhouse gas emissions. If we delay acting on emissions, it will only mean more radical intervention in the future at greater

[11] Effects of Climate Change. Met Office August 2021

cost, and larger impacts on society. Taking action now can also help to achieve long-term, sustainable economic growth from a low-carbon economy."[12]

8. Following the signing of the Kyoto Protocol in 1997 UK government introduced the Climate Change Act 2008, setting a legally binding target to reduce greenhouse gas emissions to 80% compared to 1990 levels by 2050[13]. In response to increasing evidence of the impacts of climate change, the 2008 Act was amended in 2019[14] to introduce a new target to achieve net zero emissions by 2050. In addition, the Planning and Compulsory Purchase Act 2004[15] includes a requirement for Local Development Documents (taken as a whole) to include policies designed so that development and the use of land contribute to the mitigation of, and adaptation to, climate change. This has been reiterated in the government's National Planning Policy Framework, most recently amended in July 2021 and in the Environment Agency's 3rd Adaptation Report[16] published in October 2021. The EA report highlights the urgency for, and the scale of, response required to deliver the degree of adaptation needed given the changes in climate that are already inevitable due to existing GHG concentrations.

9. The planning system is only able to direct the form and location of new development within the limits of regulation and with regard to national policy. There are few mechanisms for the planning system to address the issues of emissions from existing

[12] Department for Business, Energy and Industrial Strategy, UK Government 25 July 2019
[13] Climate Change Act 2008
[14] Climate Change Act 2008 (2050 amendment) Order 2019
[15] Planning and Compulsory Purchase Act 2004 Section 19(1A)(added by Planning Act 2008)
[16] Living better with a changing climate, report to Ministers under the Climate Change Act. Third Adaptation Report, Environment Agency, October 2021

development, therefore, it is increasingly important that all new development should be as 'low carbon' as possible if the worst effects of climate change are to be avoided. Similarly, the landscape of energy generation is changing, and will need to continue to change. De-carbonising the grid will require a switch from fossil fuel energy generation to renewables. The nature of renewable forms of generation lends itself to a less centralised system and a change in the associated visual impacts. Large coal, oil and gas fired power stations, with their own, but now accepted impacts on the landscape, are being replaced by wind turbines and solar arrays supported by on-site generation such as PV and heat pumps. The planning system will have to negotiate this change and seek to enable the decarbonisation of the grid while managing the visual changes in our urban and rural landscapes.

10. To emphasise the scale of the change required it is important to note that renewables account for around 43% of the UK electricity generation, de-carbonising the grid will therefore require more than a doubling of our renewables supply. However, this accounts only for electricity supply. If transport, gas and oil for domestic, commercial and industrial purposes are included, renewables account for only 17% of the UK energy consumption, the remainder being fossil fuels.

11. The IPCC has concluded in its 6th Assessment Report[17] that "unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5ºC or even 2ºC will be beyond reach." UK Government Ministers have described the potential outcome of inaction as 'climate change catastrophe'. It is therefore more important than ever that climate change becomes the foremost consideration in the development process. We must achieve the goal of net zero emissions by 2050, with significant cuts now if the carbon budgets needed to keep to 1.5ºC or 2.0ºC are not to be exceeded. The UNEP

[17]AR6 Climate Change 2021: The Physical Science Basis. Intergovernmental Panel on Climate Change, 2021.

Emissions Gap Report 2022 is unambiguous in its conclusions stating that "…the international community is falling far short of the Paris goals, with no credible pathway to 1.5ºC. Only urgent system-wide transformation can avoid climate disaster."[18] The science has never been clearer; action must be significant and rapid if we are to avoid the worst effects of global climate change. With every challenge comes opportunity, the transformation of our economy and society will bring economic opportunities in the energy supply, construction and energy efficiency industries. Transformation will require new supply chains, new skills and new jobs while energy efficiency and low carbon living has the potential to create healthy, attractive and safe places to live and work.

12. The issue for consideration is then what action can be taken through the planning system here in Derbyshire to contribute to the required GHG reductions nationally while adapting to the impacts of climate change and building resilience? This guide and assessment tool therefore aim to assist in the preparation of future Local Plans as well as in Development Management decision making, ensuring that as far as possible, future development in Derbyshire takes full account of the need to mitigate and adapt to the impacts of climate change, rapidly moving to a resilient, net zero emissions society, supporting green jobs and a healthier environment. The guide does not have a statutory basis, but it should be used as an evidence base resource, as a guide to the issues that may be considered in relation to climate change and planning.

[18] United Nations Environment Programme Emissions Gap Report – Closing the Window, October 2022.