

FAQ 1.1 | What is climate change mitigation?

Climate change mitigation refers to actions or activities that limit emissions of greenhouse gases (GHGs) from entering the atmosphere and/or reduce their levels in the atmosphere. Mitigation includes reducing the GHGs emitted from energy production and use (e.g., that reduces use of fossil fuels), and land use, and methods to mitigate warming, for example, by carbon sinks which remove emissions from the atmosphere through land-use or other (including artificial) mechanisms (Sections 12.3 and 14.4.5; see AR6 WGI for physical science, and WGIII Chapter 7 for AFOLU mitigation).

The ultimate goal of mitigation is to preserve a biosphere which can sustain human civilisation and the complex of ecosystem services which surround and support it. This means reducing anthropogenic GHG emissions towards net zero to limit the warming, with global goals agreed in the Paris Agreement. Effective mitigation strategies require an understanding of mechanisms that underpin release of emissions, and the technical, policy and societal options for influencing these.

FAQ 1.2 | Which greenhouse gases (GHGs) are relevant to which sectors?

Anthropogenic GHGs such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases (e.g., hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride) are released from various sources. CO₂ makes the largest contribution to global GHG emissions, but some have extremely long atmospheric lifetimes extending to tens of thousands of years, such as F-gases (Chapter 2).

Different combinations of gases are emitted from different activities. The largest source of CO₂ is combustion of fossil fuels in energy conversion systems like boilers in electric power plants, engines in aircraft and automobiles, and in cooking and heating within homes and businesses (approximately 64% of emissions, Figure SPM.2). Fossil fuels are also a major source of methane (CH₄), the second biggest contributor to global warming. While most GHGs come from fossil fuel combustion, about one quarter comes from land-related activities like agriculture (mainly CH₄ and N₂O) and deforestation (mainly CO₂), with additional emissions from industrial processes (mainly CO₂, N₂O and F-gases), and municipal waste and wastewater (mainly CH₄) (Chapter 2). In addition to these emissions, black carbon – an aerosol that is, for example, emitted during incomplete combustion of fossil fuels – contributes to warming of the Earth's atmosphere, whilst some other short-lived pollutants temporarily cool the surface (IPCC AR6 WGI Section 6.5.4.3).

FAQ 1.3 | What is the difference between 'net zero emissions' and 'carbon neutrality'?

Annex I (Glossary) states that 'carbon neutrality and net zero CO₂ emissions are overlapping concepts' which 'can be applied at the global or sub-global scales (e.g., regional, national and sub-national)'. At the global scale the terms are equivalent. At sub-global scales, net zero CO₂ typically applies to emissions under direct control or territorial responsibility of the entity reporting them (e.g., a country, district or sector); while carbon neutrality is also applied to firms, commodities and activities (e.g., a service or an event) and generally includes emissions and removals beyond the entity's direct control or territorial responsibility, termed 'Scope 3' or 'value chain emissions' (Bhatia et al. 2011).

This means the emissions and removals that should be included are wider for 'neutrality' than for net zero goals, but also that offset mechanisms could be employed to help achieve neutrality through abatement beyond what is possible under the direct control of the entity. Rules and environmental integrity criteria are intended to ensure additionality and avoid double counting of offsets consistent with 'neutrality' claims (see 'carbon neutrality' and 'offset' in Glossary, for detail and a list of criteria).

While the term 'carbon' neutrality in this report is defined as referring specifically to CO₂ neutrality, use of this term in practice can be ambiguous, as some users apply it to neutrality of all GHG emissions. GHG neutrality means an entity's gross emissions of all GHG must be balanced by the removal of an equivalent amount of CO₂ from the atmosphere. This requires the selection of a suitable metric that aggregates emissions from non-CO₂ gases, such as the commonly used GWP100 metric (for a discussion of GHG metrics, see AR6 WGI Box 1.3 and Cross-Chapter Box 2 in Chapter 2 of this report).