

Net zero by 2050

The UK government has set a target of reducing greenhouse gas (GHG) emissions to net zero by 2050. Net zero implies that an amount of GHGs must be removed from the atmosphere by natural (such as forests, oceans and peatlands) and artificial methods such as carbon capture and storage (CCUS) that is equal to, or greater than, the emissions produced (for example by burning fossil fuels). We will only be able to remove a very small amount of GHGs from the atmosphere so need to reduce emissions that are produced as much as possible.

The target of net zero by 2050 is needed to

limit global warming to **+1.5°C** compared to pre-industrial levels. But even if this limit is met, there will still be negative impacts on the climate that we should prepare for.

A deadline of 2050 might seem like a long time away

but, in reality, it is not long at all to achieve what is needed. In December 2020, the government announced a plan to **reduce GHG emissions by at least 68%** (compared to 1990 levels) by 2030 – this will help us to stay on track to reach net zero before 2050.

Reducing our GHG emissions is necessary but won't be easy. Modern economies are reliant on burning fossil fuels for energy and on manufacturing processes that release GHGs directly.

Net zero is used as a target rather than aiming to eliminate all emissions

because there are some products (like steel, glass and cement) that are very difficult to manufacture without emitting GHGs ...

...however, it is possible to capture and immobilise concentrated CO₂ produced by a process through **Carbon Capture Usage and Storage (CCUS)**...

... but CCUS alone is **not able to capture all** the CO₂ that we currently produce.

CO₂ is the main GHG emitted by human activities,

although it also exists naturally in the atmosphere. The problem is that human activities have released **so much extra CO₂** (and other GHGs) that the natural balance has been disrupted.

Net zero requires huge changes

to infrastructure systems (such as energy and transport) and also to the built environment. The legal requirement to decarbonise by 2050 means that **we must transform (renew, upgrade, install and secure) entire parts of the UK's national infrastructure** over a relatively short timeframe – nothing like this has ever been done before ...

The planet can no longer absorb and store the carbon that we are emitting and so it is warming rapidly and dangerously.

How are emissions measured?

CO₂ is actually only one of several important GHGs (others include fluorinated gases, nitrogen oxides and methane). Total GHG emissions are usually shown in units of CO_{2e}, which means the global warming potential of a GHG is measured and converted into a CO₂ equivalent.



... but this transformation also has the potential to bring many social and economic benefits

in terms of health, quality of our built environment, biodiversity, air quality, resilience to extreme weather events, and more.

What's not in net zero?

For the UK's net-zero target, emissions from international shipping and aviation are excluded because it's not easy to decide whether the importer or exporter is responsible. Also, the UK is not legally responsible for the embodied/embedded emissions caused by producing the goods and materials we import from abroad.

The net-zero target isn't perfect. It would reward us for closing domestic manufacturing in favour of importing goods from elsewhere. Net zero GHG emissions is just one aspect of climate change; other environmental issues such as biodiversity loss, ocean acidification and pollution also need to be considered. **A holistic approach is needed for a more equitable and sustainable future.**