

Malvern Panalytical Glossary of Net Zero

What is Net Zero?

Net Zero is a state where we add no incremental greenhouse gases to the atmosphere. This means achieving a balance between carbon emissions and carbon sinks through a combination of emissions reduction in our business activities and carbon sequestration¹.

Attaining Net Zero requires that we decrease our emissions output to as close to zero as possible, consistent with a 1.5°C warming scenario, and then balancing any remaining emissions via removal/sequestration of an equal quantity of carbon from the atmosphere.

What are Greenhouse Gas Emissions?

Before we get to greenhouse gases, we need to cover the greenhouse effect. This is when heat and energy from the sun get trapped in the Earth's atmosphere. Some of this is a natural process, but gases created by human activity are trapping more heat in the atmosphere, raising the temperature and causing global warming or climate change. These gases are therefore known as 'greenhouse gases' (GHG).

There are seven greenhouse gases that contribute directly to climate change:

- carbon dioxide (CO₂)
- methane (CH₄)
- nitrous oxide (N₂O)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulphur hexafluoride (SF₆)
- nitrogen trifluoride (NF₃)

Total greenhouse gas emissions are the sum of emissions of these various gases.

What is a carbon sink?

Carbon sinks are reservoirs (natural or artificial) that absorb carbon circulating in the biosphere. By helping to reduce the amount of atmospheric CO₂, carbon sinks influence the climate by slowing global warming. Natural carbon sinks include oceans, soil and flora (forests, peat bogs, grasslands), while artificial carbon sinks refer to technologies that actively extract carbon from the atmosphere.

Carbon dioxide equivalent

(CO₂e/ CO₂eq)

Carbon dioxide makes up the majority of our GHG, which is why so much research is focused on carbon emissions and/or reducing them.

Sometimes you may see greenhouse gases expressed as CO₂e, particularly when discussing carbon footprints. This is because a single item or activity can generate multiple GHG, but to keep things simple they are grouped together as a 'carbon dioxide equivalent' (the amount of carbon dioxide that would have the same climate-change impact), or CO₂e.

The universal unit of measurement to indicate the global warming potential (GWP) of each Greenhouse Gas Emission (GHG), expressed in terms of the GWP of one unit of carbon dioxide. It is

¹ Sequestration is trapping a chemical in the atmosphere or environment and then placing it in isolation in an artificial or natural container.

used to evaluate the climate impact of releasing (or avoiding releasing) different greenhouse gases on a common basis.

Most typically, the CO₂-equivalent is obtained by multiplying the emission of a GHG by its GWP for a 100-year time horizon. For a mix of GHGs, it is obtained by summing the CO₂-equivalent of each gas.

What is carbon neutralization?

Neutralization offsets are activities that 'remove' carbon emissions from the atmosphere. By investing in or developing neutralization projects, we will be taking measures to counterbalance or remove and permanently store the impact of unabated emissions.

What is a 1.5°C warming scenario?

A scenario of emissions of greenhouse gases and other climate forces that provides an approximately one-in-two to two-in-three chance, given current knowledge of the climate response, of global warming either remaining below 1.5°C or returning to 1.5°C by around 2100 following an overshoot. This is the long-term temperature goal included in the Paris Agreement which establishes 1.5°C as the warming limit in the long term. The purpose of the goal is to 'reduce the risks and impacts of climate change' as assessed in the science of the time, not to achieve a mere objective in terms of a temperature number.

What does our Net Zero Ambition cover?

Our ambition covers our Scope 1, 2 and 3 emissions.

Scope 1 emissions

Our direct greenhouse gas emissions resulting from our fuel combustion, vehicles and fugitive emissions.

Scope 2 emissions

Our indirect greenhouse gas emissions which result from the procurement of electricity, steam, heating, or cooling from a third party.

Scope 3 emissions

The indirect greenhouse gas emissions which occur in our value chain, not included in Scope 2 emissions, related to the emissions from our supply chain ('upstream') and our customers ('downstream').