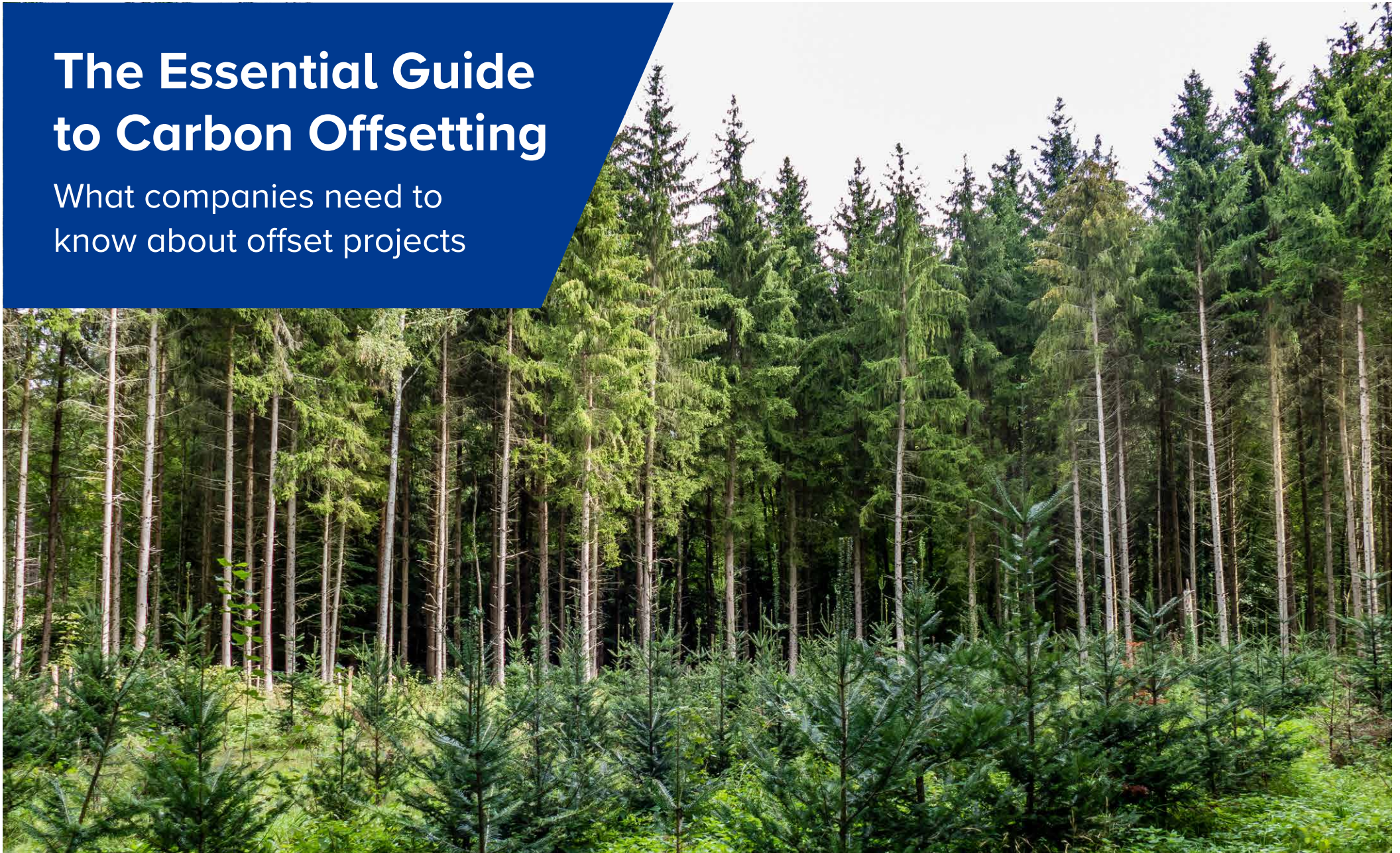


# The Essential Guide to Carbon Offsetting

What companies need to  
know about offset projects





## Reducing emissions is a key component to tackle climate change

There is no doubt that reducing greenhouse gas emissions is the most crucial component in tackling climate change and keeping global warming under 1.5 °C. For this reason, the global economy needs to undergo rapid and deep decarbonisation. Businesses of all sizes and industries around the world are called upon to reduce emissions within their operations and value chains. At the same time, companies need to be investing in climate mitigation to address climate change and help the global community to reduce its [carbon footprint](#). This is where carbon offsetting comes in.

This mechanism is both an immediate way for businesses and organisations to take responsibility for their unabated emissions now and to contribute to achieving the United Nations' Sustainable Development Goals.

This eBook sheds light on carbon offsetting, carbon offset projects, and the current standards and quality criteria of the voluntary carbon market.





People are increasingly aware of the urgency to join forces in the challenging battle against climate change by taking climate action.



Halving emissions in only a few years from now will not be possible without the participation of all industries and businesses. This is a fact.

Even though civic engagement around the world has significantly increased and more countries have declared their commitment to drastically reduce greenhouse gas (GHG) emissions in order to limit global warming to 1.5 °C by 2050 as enshrined by the [Paris Agreement](#), there is still much to do.

The [IPCC](#) report made it clear in early 2022: To reach the goal of net zero emissions by 2050, we need to reduce GHG emissions by 7.6% every year from 2021 until they are halved by 2030. State and citizen engagement is important to increase awareness of the urgency of tackling climate change and setting policies that enable climate action.

However, achieving this target is not that simple and requires both short-term and long-term strategies as well as the large-scale deployment of different measures: carbon offsetting is one of them.

Learn about the concept of carbon offsetting and what role it plays in a company's transition towards net zero emissions, the different technologies used in carbon offset projects, and the standards of the Voluntary Carbon Market.





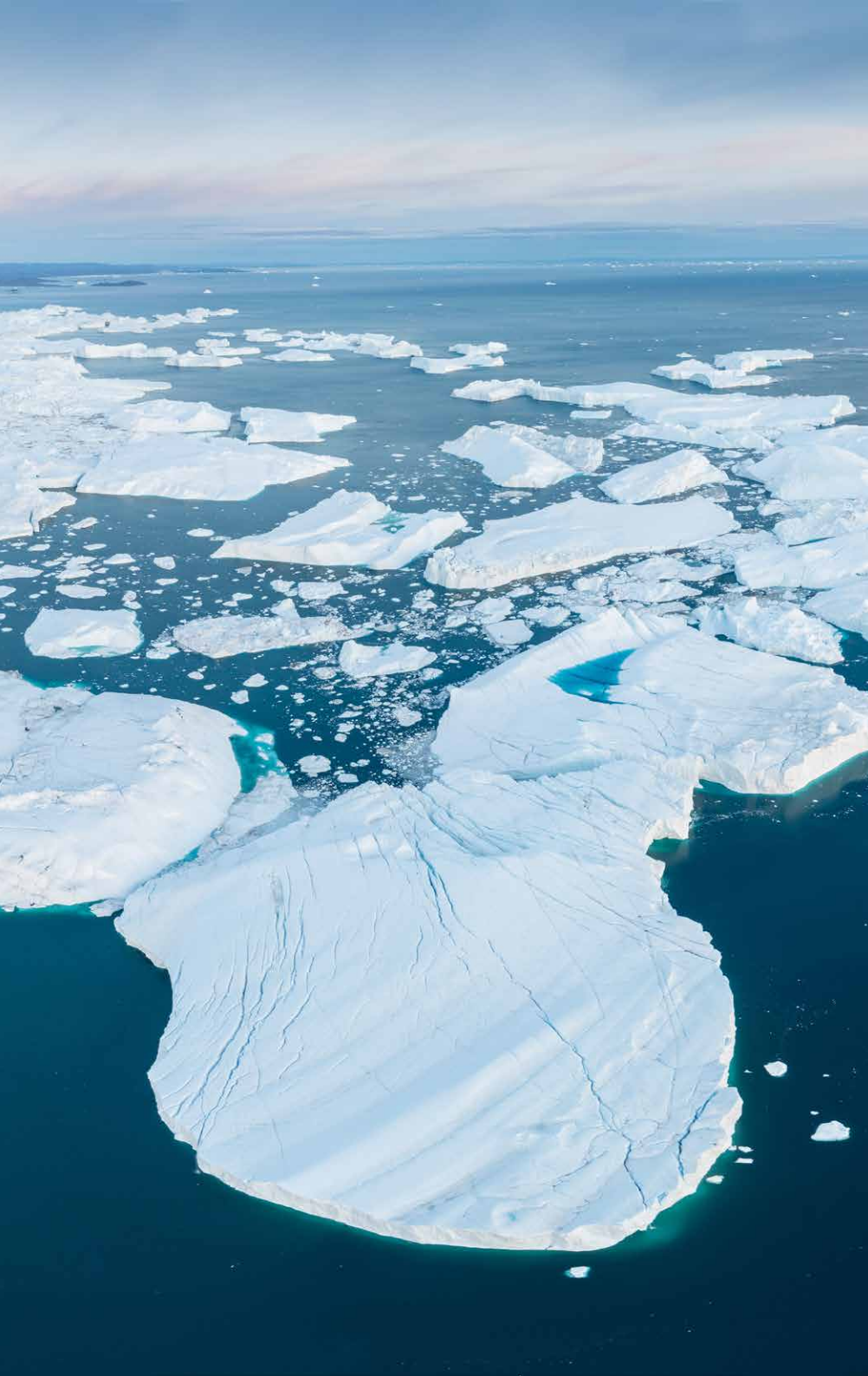
## Carbon offsetting allows immediate climate action

You may have heard about “carbon offsets” and assume that they involve reducing CO<sub>2</sub> emissions, but there’s a lot more to it than that. Let’s start with a clear explanation of what carbon offsetting really means.

The [UNFCCC](#) describes carbon offsetting as an action that allows companies and individuals “to compensate for the emissions they cannot avoid, by supporting worthy projects that reduce emissions somewhere else.” In other words, carbon offsetting is climate action that organisations take voluntarily to reduce, remove, or prevent the release of CO<sub>2</sub> and other GHG emissions.

Carbon offsetting allows companies to compensate for their hard-to-abate greenhouse gas emissions, which means the emissions that remain after reduction efforts, to balance out their carbon footprints. This is achieved by funding carbon offset projects around the world that reduce, remove, or prevent the release of GHGs into the atmosphere.

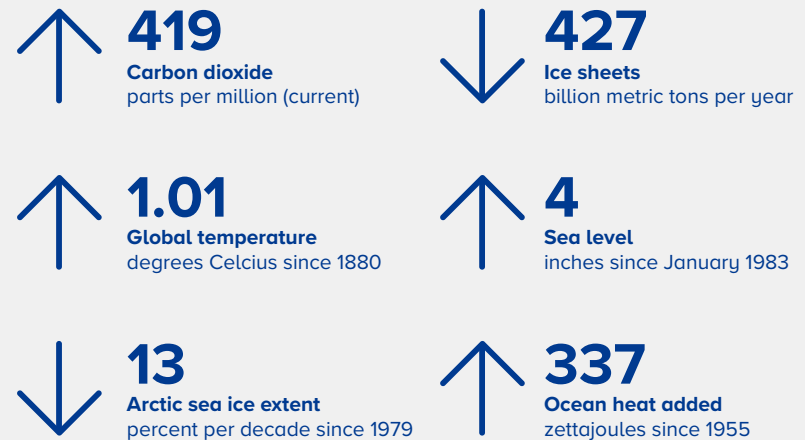




## Why is carbon offsetting so important?

Human activities, like transportation, agriculture, and electricity generation, are responsible for most of the GHGs in the atmosphere over [the last 150 years](#), causing global warming and driving climate change. A [report](#) from the World Meteorological Organization predicted that the planet could reach 1.5 °C above pre-industrial levels by 2025, in only three years' time. Going beyond that threshold means significantly increasing the impacts of climate change, like extreme weather conditions and rising sea levels. Moreover, according to [recent research](#) led by the University of Leeds, the current rates of warming will put Earth at risk of crossing several climate tipping points, which could lead to [irreversible shifts](#) and change the world forever, such as the disappearance of permafrost peatlands in Europe and Western Siberia.

### The effects of rising global warming on Earth according to NASA



Source: according to [NASA](#)

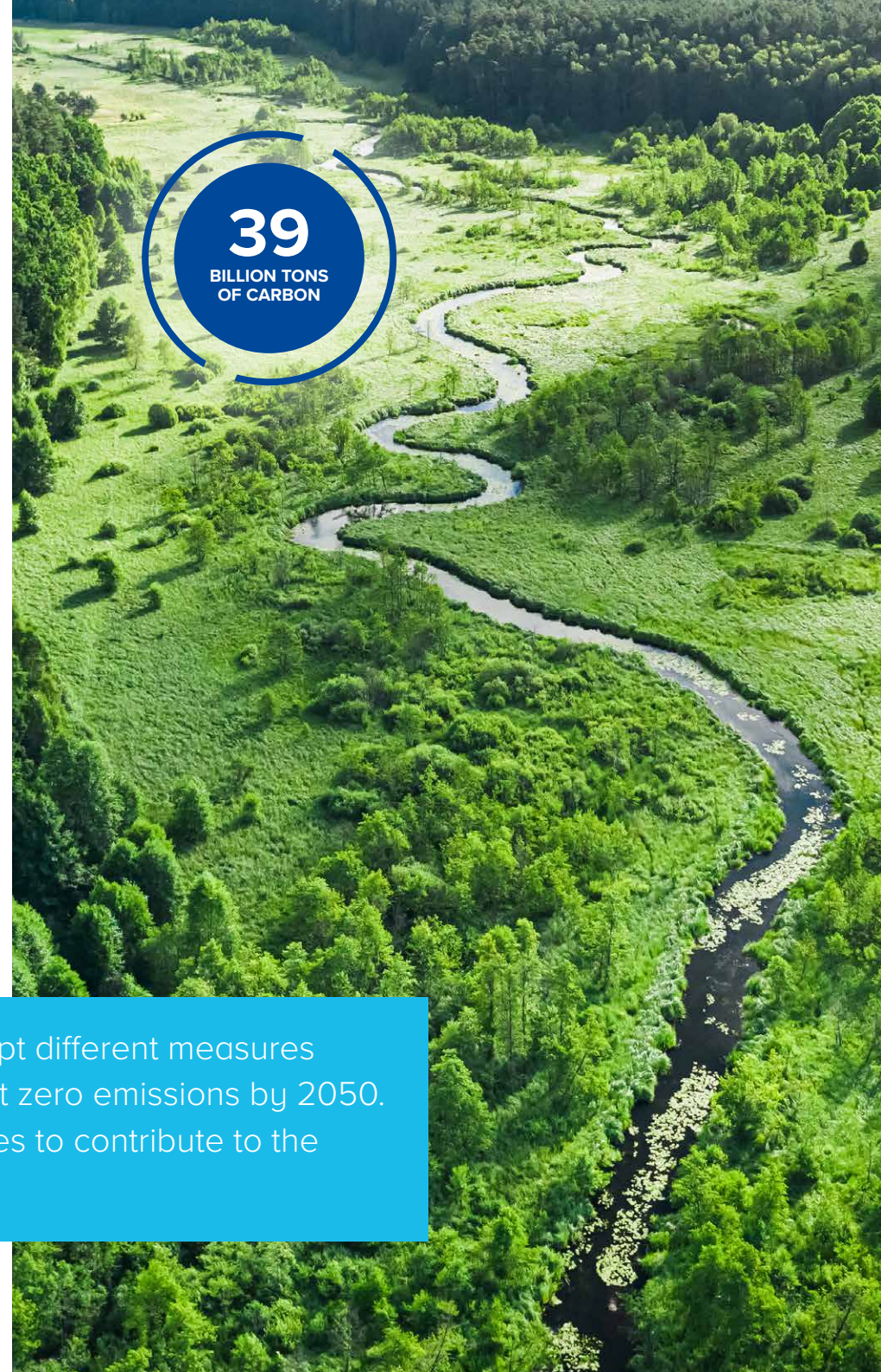


According to [Columbia University](#), a tipping point is “the point at which small changes become significant enough to cause a larger, more critical change that can be abrupt, irreversible, and lead to cascading effects”. The permafrost peatlands store up to [39 billion tons of carbon](#), which is the equivalent of twice that stored across all European forests. As the global temperature rises, this permafrost is at increasing risk of thawing and potentially releasing carbon stored for millennia as well as methane, an even more potent GHG than carbon dioxide. This in turn will lead to increased [global warming](#) and could potentially accelerate climate change.

The answer is clear: To prevent climate change, companies need to drastically reduce greenhouse gas emissions, halving them by 2030. In the longer term, 90% to 95% of emissions should be eliminated before 2050, according to the [Science Based Targets initiative \(SBTi\)](#).

During their transition towards [net zero](#) emissions, companies should “take action to mitigate emissions beyond their value chains” by investing in climate mitigation projects outside of the value chain (i.e. carbon offsetting). Examples include “high-quality, jurisdictional REDD+ credits or investing in direct air capture (DAC) and geologic storage”.

That is why the international community has agreed to adopt different measures with global impacts, to pave the way for the transition to net zero emissions by 2050. One of these measures that allow, among others, businesses to contribute to the [overall mitigation effort](#) is carbon offsetting.





## Responsible offsetting must follow the mitigation hierarchy

The need to drastically reduce and cut carbon emissions is unequivocal. According to the [SBTi's](#) net zero standard, companies should focus on rapid and deep emissions cuts first, not instead of, offsetting. This means, that companies should follow the [“mitigation hierarchy”](#), committing as a first order priority to reduce their value chain emissions before investing to mitigate emissions outside their value chains.

Once this option is exhausted, companies should “go further by making investments outside their science-based targets to help mitigate climate change elsewhere”. This is where carbon offsetting comes in.

Carbon offsetting can play “a critical role in accelerating the transition to net zero emissions at the global level”, as stated by the SBTi. In this context, the [UNFCCC](#) declared carbon offsetting as part of three steps that companies should follow: [measuring](#) their corporate carbon footprint, reducing as much as they can, and offsetting what emissions they cannot avoid.

However, a report from the [Royal Society](#) and Royal Academy of Engineering stated that only reducing GHG emissions, even drastically, will not be enough to reach the net zero goal by 2050. The same report affirmed the necessity of nature-based removals and technological solutions such as direct air capture and carbon storage as an integral part of any climate action strategy on the road to net zero.







Therefore, to counteract the unabated emissions, we will need to enhance and add to GHG sinks around the globe. These are natural storage systems that absorb and remove GHGs from the atmosphere, such as plants, the soil, and the ocean.

For a better understanding of the role of sinks and why they are crucial to tackling the climate crisis, it is useful to explain the carbon cycle.

The [carbon cycle](#), which is vital to life on Earth and even a part of the air we breathe, consists of sources and sinks. The sources emit carbon into the atmosphere. The sinks, such as forests, absorb carbon from the atmosphere and serve as natural storage systems. In the past, the carbon cycle was delicately balanced in the atmosphere. But with the beginning of industrialisation, human activities like burning fossil fuels have rapidly increased the amount of CO<sub>2</sub> in the atmosphere. The level is already higher than at any time in the last [3.6 million years](#). Once humans started burning coal, gas and oil, the carbon that was stored in these fuels for millions of years was suddenly released in a very short period, while at the same time, carbon sinks are visibly continuously shrinking and weakening.

Therefore, to restore this delicate carbon cycle, we need rapid and dramatic decreases in GHG emissions. At the same time, we need to look for ways to activate the removal of those emissions from the atmosphere.

According to the SBTi, most industries will only be able to reach net zero through neutralisation (i.e. investing in carbon removal offset projects). That's why we need to invest in carbon removals today to increase the supply and drive innovation in the space. This is where carbon offset projects come in. So, what is a carbon offset project?



## Carbon offset projects – giving back to nature and communities

As a company, when you buy a carbon credit, you are buying a guaranteed and verified environmental outcome. The idea is that by purchasing ex-post credits, in other words credits where the CO<sub>2</sub> reduction, avoidance, or removal has already occurred, you can make substantiated and credible claims about your own historic emissions. All offsetting standards have insurance buffers to cover for any chances of reversal, and all projects go through rigorous due diligence and regular auditing.

Carbon offset projects can be broadly classified into three types, based on the function of their environmental contribution to achieve the net zero target:

- Projects that reduce GHG emissions through energy efficiency measures (such as clean [cooking](#) stoves, and clean [drinking](#) water) or through the use of renewable energy sources like [wind](#) or [solar](#) energy.
- Projects that avoid emissions like forest protection, also called REDD+ projects.
- Projects that remove and capture released GHGs directly from the atmosphere through nature-based solutions such as [afforestation](#), reforestation, and revegetation (ARR), and soil organic carbon, or technology-based solutions such as direct air capture and carbon storage (DACCS).

Clean cookstoves



Solar energy







Carbon offset projects can also have other co-benefits not only for the environment but also for communities, such as better access to health and education, people's well-being, and their social and economic prosperity. Moreover, carbon offsetting also contributes to the United Nation's 17 Sustainable Development Goals (SDGs) like no poverty, zero hunger, good health, and clean water and sanitation.





# Offsetting projects drive technology transfer and sustainable development

**Most carbon offset projects are located in the global south and emerging economies. Why? There are three main reasons for this:**

**Firstly**, the principle of carbon offsetting is based on the fact that no matter where GHGs are emitted or avoided, they have the same impact on the climate. Therefore, GHG emissions caused in northern Europe, for example, can be reduced or compensated for through carbon offset projects in southern Asia or western Africa.

**Secondly**, in addition to reducing or preventing GHG emissions, carbon offset projects in the global south and emerging economies can contribute to the sustainable development of the hosting countries. This can occur, for example, by improving health or creating new jobs or education opportunities for the local community. Moreover, carbon offset projects might facilitate the transfer of green technology to help the hosting country to tackle climate change. Offset projects are also a way to help those least responsible for historical GHG emissions to benefit from some of the solutions. Nevertheless, nature-based projects in Western Europe or USA are still important as these areas need to preserve and restore their natural sinks too.

**Thirdly**, the [Kyoto Protocol](#), which is considered as the originator of the offsetting mechanism, stated that climate change is a problem affecting the whole planet, and reducing GHGs anywhere contributes to overall climate change mitigation. Furthermore, it mandated that industrialised countries reduce their GHG emissions compared to 1990 levels because it was these countries that were responsible for the majority of the GHG emissions and for most of today's climate change impacts.

To help countries to meet their emissions reduction targets, the Kyoto Protocol established, among other strategies, the [Clean Development Mechanism \(CDM\)](#).

This mechanism allowed countries with emission reduction commitments under the Kyoto Protocol to implement emission reduction projects in developing countries. In other words, an industrialised country was permitted to offset its GHG emissions through the financing of carbon offset projects in developing countries that were not mandated to do so. This is where the initial principle of carbon offsetting originates from.

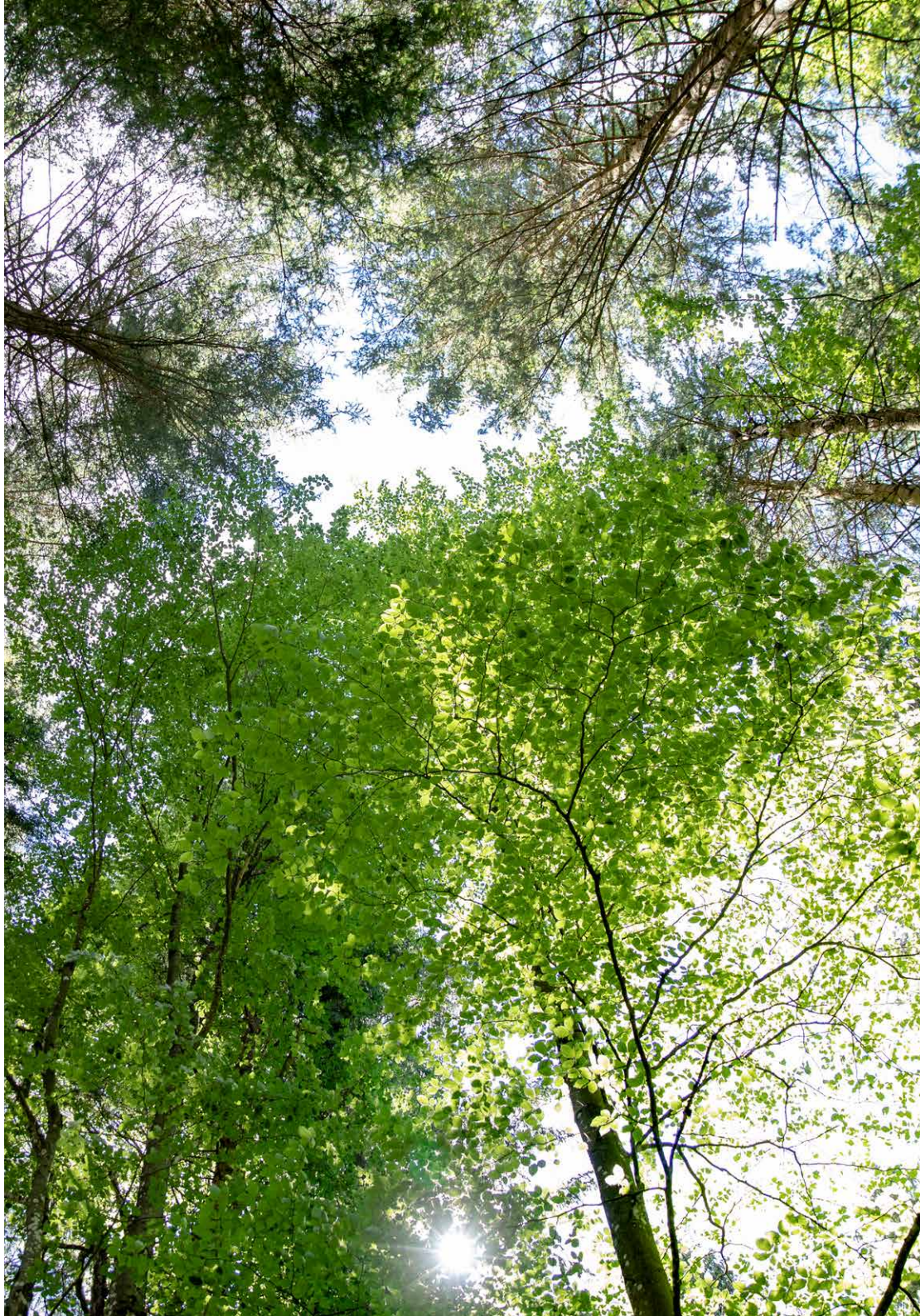
With the [Paris Agreement](#) of 2015, the successor of the Kyoto Protocol, the international community agreed that climate change is a [shared problem](#) that can be only tackled through global cooperation. Furthermore, it was reaffirmed that developed countries should provide financial, technical, and capacity-building support to countries that are more vulnerable to the impacts of climate change.



## How does voluntary carbon offsetting work?

Carbon offsetting is quantified in tonnes, also called metric tons, of carbon dioxide equivalents (CO<sub>2</sub>e). Once the carbon saving has been verified, a project issues carbon credits each corresponding to 1 tonne of carbon dioxide. As a reference, one carbon credit is equivalent to 1 tonne of CO<sub>2</sub> not emitted or an equivalent amount of other GHGs removed, reduced, or prevented by a carbon offsetting project. The issuance is recorded on a public registry managed by an independent standard body such as [Verra](#) or the [Gold Standard](#). For a company to make an offsetting claim, they would need to purchase the carbon credit, and then retire it on the registry. This avoids double counting and ensures that no one else can make a claim with the same carbon credit. This is a very important requirement that will be explained later in this eBook.

Two types of carbon credits are the most common. Verified Emissions Reductions (VER) are exchanged within the voluntary market, while Certified Emissions Reductions (CER) are carbon credits that were created within the compliance market but can also be purchased voluntarily. This leads us to explain how carbon credits are traded.







## Understanding the Voluntary Carbon Market

The purchase and sale of carbon credits are conducted through carbon markets. There are two types of carbon offset markets: voluntary and compliance.

As our focus here is on voluntary offsetting, compliance offsetting is not explored further in this eBook. Companies, organisations, or even individuals are participants in the [Voluntary Carbon Market \(VCM\)](#), which functions in parallel with compliance markets. So, what is the VCM?

Generally, the VCM is a decentralised market that facilitates trade between buyers and sellers of carbon credits from GHG emissions reduction, removal, and avoidance.

As the name suggests, the VCM is driven by voluntary, private initiatives and not regulated by governments. In other words, while governments were wrestling with ways to address the impact of climate change, private parties, who were concerned about the increase of GHG emissions and wanted to take climate action into their own hands, took initiative and established the VCM.

In this market, companies and organisations can buy and sell carbon credits voluntarily, not because they are obliged to comply with legal obligations.

However, there are no global regulations that define how carbon credits purchased on the VCM align with science-based decarbonisation targets.

But various organisations have built on existing standards and guidelines from compliance markets to ensure the quality of voluntary offsets and increase their transparency and credibility.



# Why do high standards in voluntary markets matter?

Even though voluntary offsetting is based on a self-imposed commitment to contribute to climate action, carbon offset projects must be stringently validated, registered, and regularly verified by third-party auditors according to strict and [internationally recognised standards](#), like the [Gold Standard](#), the [Verified Carbon Standard \(VCS\)](#), or [Plan Vivo](#).

Carbon credits issued under one standard and retired in the registry of that standard cannot be transferred or used again by another standard. For example, a carbon credit issued under the VCS is stored in the VCS registry. Once it is sold, it is then retired in the VCS registry and cannot be moved to the registry operated by another standard.

The Clean Development Mechanism (CDM), established under the Kyoto Protocol as the first major offsetting scheme, set three basic criteria to evaluate carbon offsets: additionality, permanence, and verification. Other standards now comply with the same criteria. Later, a fourth criterion was added to exclude double counting.

**Therefore, to ensure that carbon offset projects satisfy internationally recognised quality standards, they must abide by at least the following four characteristics:**

## **1. Exclusion of double counting**

It must be ensured that the GHG emissions saved through the carbon offset project are accounted for only once. [Double counting](#) occurs when GHG emissions reductions generated by a carbon offsetting project are claimed more than once by the same or different buyers. Therefore, double counting is avoided through the issuance and retirement of carbon credits in only one registry, as previously explained.

## **2. Additionality**

This criterion applies to two key aspects: financial and environmental additionality. Financial additionality means that the carbon offset project can only be realised through additional funding and would not happen without the revenues generated through the carbon credit sales. On the other hand, environmental additionality means that the carbon offset project must lead to lower levels of GHG emissions compared to the baseline scenario (in which the project does not exist).

## **3. Permanence**

This means that the GHG emissions reductions or savings must be permanent or at least take place over an extended period, providing long-term benefits for the climate even after the crediting period of a carbon offset project is finished.

## **4. Regular verification by independent third parties**

This is a very crucial criterion to ensure that the internationally recognised standard requirements are met. Carbon offset projects must be constantly monitored by the project developer and regularly verified by independent third parties such as TÜV Nord, [SCS Global](#) or [Aenor](#). These Validation and Verification Bodies (VVBs) check the compliance of the project with the respective methodology and verify the actual amount of GHG emissions removed or avoided retrospectively.





## Beyond carbon reduction, projects improve the lives of local communities

As previously mentioned, standards such as the Gold Standard or the VCS are designed to provide interested companies and consumers with “greater [transparency and confidence](#) in the credibility and integrity of certified offsets”. Additionally, certified projects are regularly audited and verified by independent, third-party VVBs.

On top of this, additional standards such as the Climate, Community, and Biodiversity ([CCB](#)) and [the SocialCarbon Standard](#) provide transparency that the certified carbon offset projects provide co-benefits to the environment and local communities.

While the main focus of carbon offset projects is to reduce, prevent, or remove GHG emissions from the atmosphere and restore the delicate balance of the carbon cycle, many also aim to provide social, economic, and other environmental co-benefits for local communities and contribute to achieving the UN's SDGs.

Social and economic co-benefits include the [fight against poverty](#) and hunger, [creating jobs](#), better [education and health](#), improving the supply of clean [drinking water](#), free [cooking stoves](#), and the dissemination of clean and affordable [solar](#), [biomass](#), [wind](#), and [hydroelectric](#) energy.

Environmental benefits include protecting [biodiversity](#), [maintaining habitats](#) for native animal and plant species, improving local air and [water quality](#), and clearing [plastic waste](#) from the ocean.



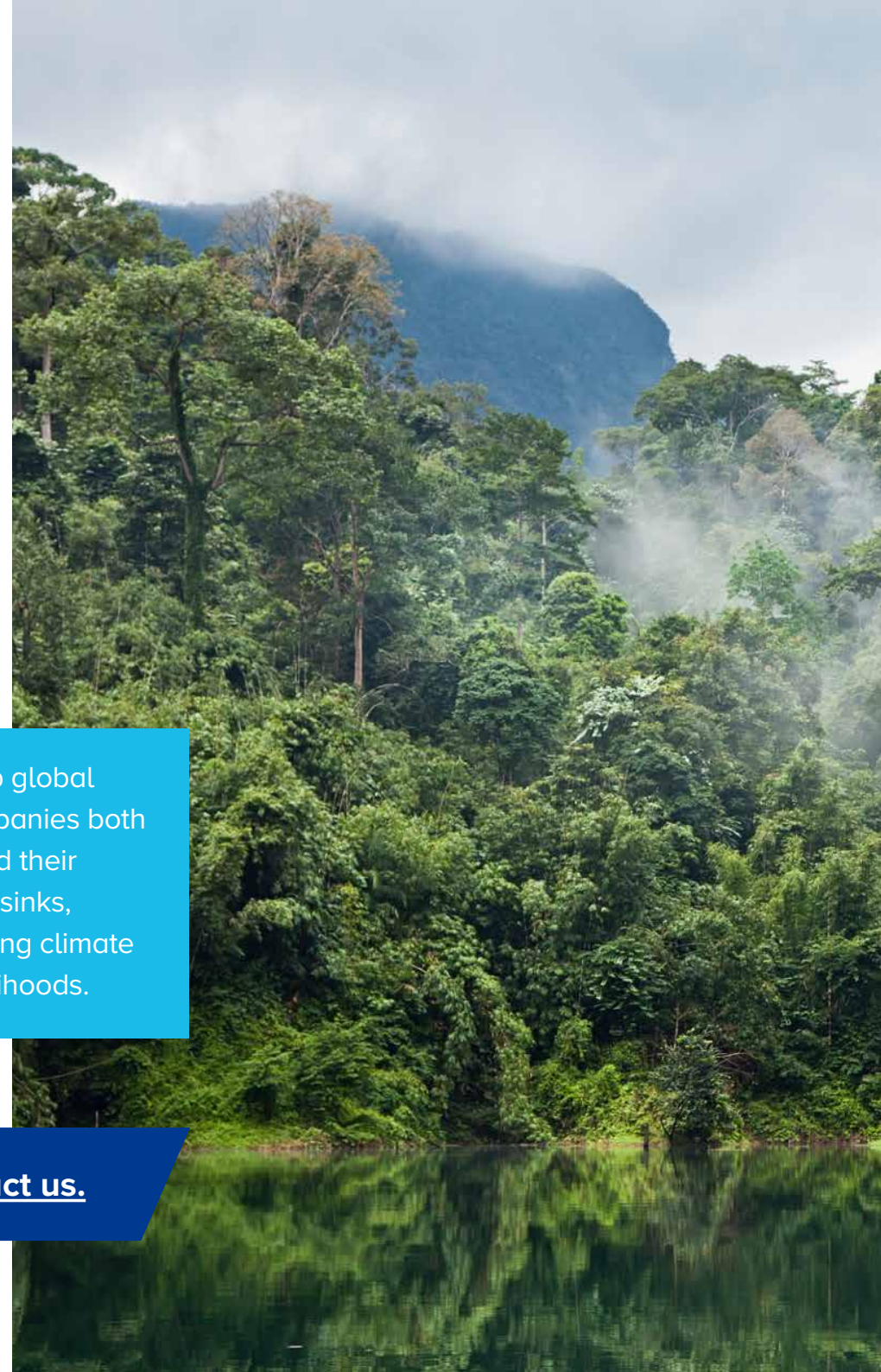
## Carbon offsetting: Contributing to global climate goals

Primarily intended to reduce, remove, or prevent GHG emissions from being released into the atmosphere, carbon offset projects have significant benefits not only for the environment but also for societies.

They foster the protection and restoration of natural ecosystems, help to meet the Paris Agreement goals, and contribute to sustainable development and reducing poverty in countries in the global south, as stated by the [UNFCCC](#). To achieve these aims, carbon offset projects must meet defined criteria set by internationally recognised standards, namely the exclusion of double counting, additionality, permanence, and being independently verified. Furthermore, carbon offset projects should provide additional social and economic benefits to the sustainable development of the hosting countries and local communities.

Certainly, rapid and deep GHG [emissions reduction](#) is crucial to keep global warming under 1.5 °C. However, carbon offsetting represents for companies both an immediate climate action and a crucial long-term measure beyond their value chains to neutralise any unabated emissions, enhance carbon sinks, and restore the natural world. It is also an important source of financing climate action and helps communities around the world to improve their livelihoods.

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