

Carbon Neutralization & Nature-Based Solutions

Amazon's Approach to Neutralizing Remaining Emissions on the Path to Zero

Amazon is achieving our commitment to The Climate Pledge through two complementary actions:

carbon elimination and, for remaining carbon impact that cannot be eliminated, **carbon neutralization**.

First and foremost, we are innovating and investing to eliminate emissions within the value chain of our businesses.

Second, we are driving meaningful and necessary actions outside of our value chain, through nature-based and technological solutions, to enable a credible carbon market for companies that will need to neutralize remaining emissions. As stated in The Climate Pledge, these solutions must be additional, quantifiable, real, permanent, and socially-beneficial. This document describes Amazon's science-based approach to carbon neutralization.



Introduction

Scientists reporting through the Intergovernmental Panel on Climate Change (IPCC) tell us that we have a limited window to make unprecedented headway in order to limit global warming to 1.5 degrees Celsius by 2050. No one company or organization can do this on its own and everyone must do their part. To drive collective, cross-sector action on the climate crisis, and signal the urgent need for new solutions, Amazon co-founded The Climate Pledge with Global Optimism in 2019. The Climate Pledge is a commitment to be net-zero carbon by 2040—ten years ahead of the Paris Agreement.

To meet this commitment, we are investing in innovations and solutions to decarbonize our business over the next two decades. In 2019, we ordered 100,000 custom electric delivery vehicles, the largest order ever of such vehicles. In 2020, we became the world’s largest corporate purchaser of renewable energy as part of our path to powering our operations with 100% renewable energy by 2025—five years ahead of the original target of 2030. We also launched a \$2 billion dedicated investment program in 2020 to invest in companies whose products and solutions facilitate the transition to a low-carbon economy. We are committed to using science-based targets to guide our efforts to decarbonize our business and ensure we reduce our carbon emissions in line with the latest climate science.

The Science of Carbon Neutralization

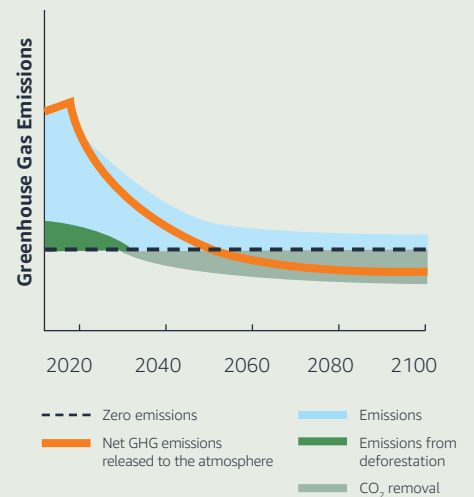
Climate science is also telling us that we need to go beyond decarbonizing our own business. The scientific body that developed the foundation of the Paris Agreement—the Intergovernmental Panel on Climate Change (IPCC)—has declared that the world needs to reach net-zero carbon emissions by mid-century in order to avoid the worst impacts of climate change. At the same time, the IPCC has made clear that, even in global scenarios consistent with stabilizing temperature rise to 1.5 degrees, significant carbon emissions from several sectors of the economy will not be fully abated by 2050 (Figure 1).¹ In other words, even with aggressive decarbonization efforts, companies will need to step outside of their own value chains to net out some portion of emissions to reach zero by mid-century.

We believe that Amazon—and other companies—can drastically reduce our own emissions while also investing outside of our value chain in ways that significantly contribute to the collective goal of achieving the Paris Agreement goals by mid-century. By doing both, we can increase our positive impact to mitigate the effects of global climate change. To do this right, we believe it will take principled leadership, innovation, open collaboration, and a new level of accountability for businesses, governments, and partners who participate in this work.

Our Science-Driven Approach

Amazon is taking a new approach towards reaching net-zero, one that emphasizes the integrity of net-zero claims as well as the quality of the actions and investments to make those claims. Of course, Amazon is not the only business working toward net-zero carbon and grappling with these issues. We share our approach to carbon neutralization publicly so that our stakeholders can hold us accountable to our actions. We also aim to inspire others to join our efforts toward a highly credible and sustainable approach and to jointly continue to review the science as it evolves.

Figure 1: IPCC Greenhouse Gas Emission Mitigation Illustrative Pathway



Source: Simplified representation from IPCC Special Report on Global Warming of 1.5C.

¹IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

Bridge to a Decarbonized Future

Amazon continues to make significant investments in low-carbon technologies and other innovations to eliminate the emissions from our own business activities across our value chain, and we will use a science-based target² to ensure those efforts are transparent, measurable, and in line with the Paris Agreement. But even companies that reduce emissions at science-based rates will still emit carbon on their way to zero. Amazon will continue to prioritize carbon elimination, and while we develop and scale decarbonization technologies and materials over the next decades, we will also support climate mitigating actions outside of our value chain.

Amazon's Priorities Outside Our Value Chain

Our carbon neutralization approach focuses on three actions outside of our value chain that climate science tells us can deliver needed mitigation impact and have a significant unmet need for investment: (1) reducing deforestation to near-zero, especially in tropical regions; (2) scaling up the removal of carbon from the atmosphere with nature-based solutions such as reforestation and agroforestry; and (3) scaling up carbon removal technologies, such as direct air carbon capture and storage. While Amazon is currently prioritizing nature-based solutions, to address technological carbon removal in the future, Amazon's Climate Pledge Fund is scoping investments in businesses with promising technologies. Read more about The Climate Pledge Fund investments [here](#).

Nature-Based Solutions

We believe that nature-based solutions such as conservation, restoration, and improved land management actions play a necessary and complementary role alongside eliminating carbon from business activities. These solutions increase carbon storage or reduce greenhouse gas emissions in forests, wetlands, grasslands, farmland, and marine environments. They also provide additional benefits to preserve the natural world, such as conserving wildlife habitats, protecting biodiversity, improving water quality, and reducing flood risk. All of these benefits can enhance well-being in communities around the world.

Amazon is focused on driving large-scale transformations in nature that are critical for achieving the Paris Agreement goals. Our focus on reducing deforestation recognizes that a continuation of current rates of deforestation over the next decade would put the Paris Agreement targets out of reach no matter what companies do in their own operations. That's why our investment to combat deforestation will be significant, but also transitional. As we work with others to successfully reverse rates of deforestation, we will transition toward large-scale removal of carbon from the atmosphere. And, since building capacity for nature-based carbon removal at scale will take concerted investment over many years, Amazon is starting now.³

Reducing Deforestation

Our first priority area—driving deforestation to near-zero in the next decade—is critical for hitting the Paris Agreement goals and staving off the most catastrophic effects of climate change.¹ Significant investment is urgently needed to help communities set a course for sustainable economic development that protects the forest, particularly in tropical forest regions.

We believe ending deforestation requires effective government policy that protects forests and provides for sustainable livelihoods—not just in select plots of forest but across entire landscapes within a government's jurisdiction. Amazon's participation in the [Lowering Emissions by Accelerating Forest finance \(LEAF\) Coalition](#) is an example of this approach. It will establish purchase agreements with national and sub-national governments for verified reductions in deforestation emissions

²A science-based target defines the decarbonization progress a company must make to keep pace with science-based pathways established by the IPCC for the global economy to achieve the long-term temperature goals of the Paris Agreement.

³A truly "additional" emission reduction has the same neutralizing effect on the atmosphere as a carbon removal. However, over time as the rest of the world acts, the availability of truly additional emission reductions will decline and the carbon market will need to shift to carbon removal. Our phased approach and planned transition from emission reductions to carbon removal aligns with the [Oxford Principles](#) for Net Zero Aligned Carbon Offsetting.

across entire countries or large states. LEAF is backed by the governments of the United States, United Kingdom, and Norway, as well as a growing number of climate-leading corporations, and has support from the United Nations Environment Programme and other environmental and social non-profit organizations. We believe the LEAF Coalition has the potential to be truly transformational in the effort to conserve the world's tropical forests.

Priorities for reduced deforestation investments

- **Jurisdictional scale.** We will finance real reductions in deforestation and forest degradation emissions across entire landscapes where forest protection is underpinned by effective and enduring government policy. We will also seek to support project-based efforts in locations with outsized benefits for local people and biodiversity, especially where those projects are nested in a jurisdictional-scale program.
- **Equity, inclusion, and rights.** We will take care to ensure the jurisdictions we partner with provide for full and effective participation by stakeholders, especially indigenous peoples and local communities, and respect for their rights.
- **Financially sustainable.** To provide for the durability of reductions in deforestation, we will prioritize investments in jurisdictions that effectively reinvest proceeds in sustainable and inclusive economic development conducive to forest protection.
- **High-ambition.** We will seek to support proposals that are consistent with a trajectory to zero-deforestation by 2030, recognizing that this is the decade to halt deforestation.

Scaling Up Nature-Based Carbon Removal

Science-based pathways to global net-zero emissions under the Paris Agreement will require removing billions of tons of CO₂ from the atmosphere each year over the coming decades.¹ Carbon removal can be achieved with natural and technological means, but the institutional, technical, and financial capacity to execute these kinds of projects today is extremely limited. Scaling up carbon removal by mid-century will require immediate and sustained investments in a wide range of innovative approaches that need long lead times to produce large-scale and lasting results.

Nature-based carbon removal has enormous potential to help close the gap identified by the IPCC (Figure 1). Globally, hundreds of millions of hectares that were once forested and remain ecologically suitable for trees and woody shrubs are currently used as open pasture. By reforesting or reintegrating trees in regenerative agroforestry systems on just a portion of this land, we could remove billions of tons of CO₂ from the atmosphere. Our nature-based carbon removal actions center on building systems, tools, scientific knowledge, and scalable business models for reforestation and regenerative agroforestry.⁶ Over time, we will look to expand our focus to include other forms of nature-based carbon removal, such as restoring mangrove forests and marine ecosystems.

Amazon will make direct investments in reforestation and agroforestry project development, as well as purchase carbon credits from nature-based carbon removal projects and landscape-scale initiatives that meet our priorities. As we generate learnings and innovations from our own investments, we will share our results openly so that others can replicate our efforts. Amazon is prioritizing carbon removal investments that meet five basic priorities.

⁶Agroforestry systems integrate trees and crops on the same land in ways that increase carbon removal and storage and provide other ecological benefits.

Priorities for nature-based carbon removal investments

- **Small landholders.** To yield a more just and equitable result, our investments should support restoration efforts by small landholders and local communities.
- **Equity, inclusion, and rights.** Initiatives must have strong processes in place to provide for transparent and inclusive consultation and partnerships with local communities and respect for their rights.
- **Financially sustainable.** Reforestation and agroforestry systems should be deployed in ways that significantly and sustainably boost local livelihoods by sustainably enhancing the productivity and profitability of agriculture and forestry, especially for smallholders.
- **Ecological benefit.** Initiatives must satisfy environmental safeguards and promote native species and other ecologically beneficial practices to landholders.
- **Scalability.** We will prioritize investments in initiatives capable of operating at landscape-scale, removing at least one million tons of CO₂ per year across tens of thousands of landholders.

High-Quality Carbon Credits

To quantify, validate, and transparently account for our carbon neutralization investments, we will acquire carbon credits—a tradable asset that represents a climate mitigation outcome, either reductions in emissions to the atmosphere or the removal of CO₂ from the atmosphere. A credit is measured in metric tons of CO₂ or the equivalent “warming potential” of another greenhouse gas, such as methane. The mitigation outcomes underlying carbon credits occur outside of an organization’s value chain, and they are used to compensate for emissions produced within an organization’s value chain until those emissions can be eliminated.

Carbon credits are a way to standardize, quantify, and verify the measurement of actions that mitigate climate change. This standardization makes carbon credits tradable, enabling the use of market-based mechanisms to drive investment in climate mitigation. Companies need a way to support nature-based and other carbon neutralization projects that are valuable and meaningful. However, without a standardized way to measure and verify a projects’ impact, a company cannot make a credible claim about their impact on the climate.

Carbon credits have been around for decades as a means to zero out emissions. They have earned their fair share of controversy and a tarnished reputation in part because they have been used in some cases as a way to avoid the hard work of decarbonization. Moreover, there is skepticism, in many cases well-founded, about the quality of carbon credits on the market today and whether some actually produce the climate mitigation outcomes they claim to represent. And in some cases, investments by the carbon market have not properly prioritized local stakeholder engagement and equitable results.

What makes a carbon credit high quality?

A carbon credit is high quality if it is additional, quantifiable, real, permanent, and socially-beneficial. A credit must result in a durable and conservatively estimated emission reduction or carbon removal that would not otherwise occur. Credits lack quality if they overestimate their underlying mitigation outcomes—for example, if the credits make errors in measurement, lack proper accounting of the full net effects of a mitigation action, make tenuous assumptions about what would have occurred in the absence of that action or without the prospect of generating carbon credits, or fail to account for the likelihood of reversal of the mitigation outcome. High-quality credits also reflect care in ensuring positive social and local environmental results.

Opportunities to Improve Carbon Credit Quality

Across all of our investments in carbon neutralization, Amazon aims to increase the quality and supply of high-integrity carbon credits. We are seeking to catalyze a sea change in the environmental integrity of the voluntary carbon market by taking a principled and innovative approach in our carbon credit investments, sending a clear demand signal to the market for high-quality credits; while helping and encouraging other companies to join us.

Improvements in Carbon Crediting for Reduced Deforestation

Jurisdictional-scale programs and project-based efforts nested within those programs have a built-in advantage on carbon credit quality compared to standalone forest protection projects because they account for all net changes in forests across entire landscapes and can credit against conservative historical baselines instead of needing to make assumptions about what would have happened in a particular forest in the absence of an intervention. The LEAF Coalition will further ensure quality by using the rigorous ART TREES standard, which conservatively estimates reductions in deforestation emissions against a simple historical baseline, and then regularly ratchets down the baseline following short crediting periods. This feature aligns with Amazon's view that our actions to reduce deforestation should provide significant but transitional support—it has the effect of allowing private-sector carbon credit buyers to finance the transition to lower deforestation rates, and then transfer responsibility to governments to maintain those reduced deforestation rates as a matter of national contributions under the Paris Agreement.

Amazon is also exploring technological solutions to improve the accuracy of jurisdictional-scale measurement and monitoring of deforestation and forest degradation emissions. And we are looking at safeguards Amazon could add to purchase agreements to ensure that jurisdictional plans are inclusive and supportive of local and vulnerable communities, and to ensure we are supporting jurisdictions that are acting ambitiously toward the goals of the Paris Agreement.

Improvements in Carbon Crediting for Nature-based Carbon Removal

Reforestation and agroforestry projects can generate high-quality carbon credits, and Amazon is working to advance carbon credit quality relative to common practice.

- **Measurement.** Amazon's projects will draw on scientifically rigorous field measurements to validate the biomass growth and carbon storage rates used to quantify carbon credits. Instead of using coarse default values, which do not reflect significant variation on the ground, we will generate field measurement data where it does not already exist.
- **Additionality.** We will focus on smallholder agriculture, and exclude industrial-scale projects that would likely occur without additional funding. We will also use satellite data to understand trends in the broader landscape, estimate baseline reforestation and agroforestry adoption rates, and re-evaluate those baselines throughout project implementation to ensure we are properly accounting for external changes on the landscape that may affect practices by smallholder farmers.
- **Avoid leakage.** Leakage is when an undesired action is displaced to another location. Our investments will focus on projects that increase agricultural productivity in-place to avoid simply displacing unsustainable farming activities to other areas. These dynamics will need to be monitored on an ongoing basis so that any adjustments to carbon credit quantification can draw on real evidence rather than assumptions.
- **Permanence.** Our projects will be regularly and comprehensively monitored (e.g., by satellite) to enable immediate detection and compensation for any carbon losses. If a project suffers a loss of carbon, for example due to fire or illegal logging, that lost carbon must be replaced from other high-integrity projects to ensure the effective permanence of the carbon removal claimed by the project.