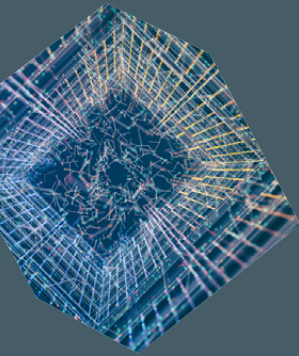


How-to guide for voluntary carbon credit portfolio design



World Business
Council
for Sustainable
Development



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Glossary, acronyms and abbreviations

Glossary

abatement

Measures that companies take to prevent, reduce or eliminate sources of greenhouse gas (GHG) emissions in their value chain. Examples include reducing energy use, switching to renewable energy and reducing chemical fertilizer use.

beyond value chain mitigation

Mitigation action or investments that fall outside a company's value chain, including activities that avoid or reduce GHG emissions or remove and store GHGs from the atmosphere.

carbon credit

A tradable unit issued by a carbon crediting program/standard that represents a verified reduction or removal of GHGs from the atmosphere equivalent to one metric ton of CO₂-equivalent. Carbon credits are uniquely serialized, issued, tracked and canceled or retired by means of an electronic registry.

carbon dioxide removal (CDR)

Anthropogenic activities that remove CO₂ from the atmosphere and durably store it in geological, terrestrial or ocean reservoirs or products.

historical emissions

The estimated emissions, inclusive of all scopes, of a firm since its founding.

insetting

A strategy used to describe climate mitigation projects or programs wholly contained within the scope 3 value chain boundary of a company or projects partially within its scope 3 supply chain boundary (spanning its supply chain and other companies' supply chains).

natural climate solutions (NCS)

Nature-based solutions (NbS) that address climate change.

nature-based solutions (NbS)

Actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits.¹

net-zero emissions

Emissions achieved when anthropogenic GHG emissions in the atmosphere balance globally with anthropogenic removals over a specified period. Companies set net-zero emissions targets to achieve net-zero emissions.

neutralization

Measures companies take to remove carbon from the atmosphere and permanently store it to counterbalance the impact of emissions that remain unabated at and after the Science Based Targets initiative (SBTi)-aligned net-zero emissions target date. Companies can implement carbon removals within or beyond the value chain to neutralize residual emissions.

remaining emissions

Emissions that remain in a given year as a company progresses towards the delivery of its near- and long-term targets.

residual emissions

Emissions that are not possible to completely eliminate despite implementing all available mitigation measures contemplated in pathways that limit warming to 1.5°C with no or limited overshoot. In the context of science-based targets, residual emissions refer to the company's scope 1, scope 2 and scope 3 emissions that remain once it has achieved its long-term emissions reduction target.

technology-based solutions (TbS)

Actions that deploy technology to reduce or avoid emissions or to remove carbon.

Acronyms and abbreviations

ARR

Afforestation, Reforestation and Revegetation

BECCS

Bioenergy with Carbon Capture and Storage

CCP

Core Carbon Principles

CCS

Carbon Capture and Storage

CDR

Carbon Dioxide Removal

CO₂

Carbon dioxide

CO₂e

Carbon dioxide equivalent

DACC

Direct air carbon capture

DACCS

Direct air carbon capture and storage

ETS

Emissions Trading Scheme

GHG

Greenhouse Gas

Gt

Gigaton

ICVCM

Integrity Council for the Voluntary Carbon Market

IPCC

Intergovernmental Panel on Climate Change

NbS

Nature-based Solutions

NCS

Natural Climate Solutions

REDD+

Reducing emissions from deforestation and forest degradation, plus the sustainable management of forests

SBTi

Science Based Targets initiative

SDG

Sustainable Development Goal

TbS

Technology-based Solutions

VCM

Voluntary Carbon Market

VCMI

Voluntary Carbon Markets Integrity Initiative

WBCSD

World Business Council for Sustainable Development

Executive Summary



01.

01. Executive summary

If we are to restrict global warming to no more than 1.5°C (2.7°F), as outlined by the Paris Agreement, emissions must be reduced by 45% by 2030, and countries and corporations must pledge to reach net zero by 2050. To achieve global targets for carbon sequestration and mitigation, companies should, first and foremost, rapidly and deeply reduce their greenhouse gas (GHG) emissions across scopes 1, 2 and 3.

To successfully meet global climate action goals, companies should also commit to extensive, ongoing investment in carbon offset solutions and technologies: The World Resources Institute has estimated that the private sector will need to annually allocate USD \$2.2 trillion² to achieve 2030 benchmarks.

As companies seek to determine how and where best to invest funds in support of their decarbonization agendas, they should look first at the voluntary carbon market (VCM). The procurable, high-integrity, voluntary carbon credits of the VCM offer vetted, high-return opportunities to channel critical financing to carbon reduction activities — leading to positive environmental impacts far beyond a business' value chains.

Further, these credits offer an essential complement to companies' efforts to abate scope 1, 2 and 3 emissions, both during the transition period and as tools to address remaining emissions or to achieve net zero state.

Navigating the VCM

Its merits aside, the VCM can feel daunting to navigate, and deciding to participate in the VCM to offset carbon emissions is just the first step. Companies must then consider other critical steps to VCM navigation, including selecting best fits from an array of available credit types, such as avoidance and/or removal credits and nature-based and/or technology-based credits.

All this must occur alongside a crash course in the complex web of policies and standards — think Beyond Value Chain Mitigation (BVCM), Voluntary Carbon Markets Integrity (VCMI) Initiative claims tiers, Science Based Targets initiative (SBTi) guidelines and more — that oversee VCM operations.

Even choosing the types and amounts of VCM credits to procure requires layers of considerations, each weighing a company's long-term environmental goals and market projections against potential short-term reputational or operational expenses and risks.

By adopting a portfolio approach to the VCM, companies can pursue their climate leadership goals, while mitigating the risks inherent in the new technologies driving decarbonization. A portfolio approach helps companies make timely and informed decarbonization decisions regarding the optimal types and quantities of credits to procure today, while ensuring they achieve appropriate footholds in emerging or nascent technology-based removals that will continue to scale as the VCM grows to meet global climate goals.

The Merits of a VCM Portfolio

A portfolio approach to the VCM allows companies to meet a broad range of corporate and operational objectives through the procurement of high-integrity credits selected across a range of solution types, geographies and developers/partners.

Specifically, VCM portfolios not only address companies' immediate and long-term carbon mitigation and removal needs, they also support corporate efforts to manage costs, secure future supplies, maximize co-benefits and mitigate operational risks.

Portfolios also allow companies to adeptly address diverse stakeholder expectations while preserving use case optionality in the form of credits for voluntary claims or for compliance markets.

Carefully developed VCM portfolios allow companies to blend the benefits of nature-based solutions (NbS), also known as natural climate solutions (NCS), and technology-based solutions (TbS). Moreover, diversified VCM portfolios enable companies to:

- 1 **Manage cost allocation:** Allocating funds to nascent and high-cost TbS removal types helps build the market for future high volumes while investing in immediate mitigation through NCS.
- 2 **Secure TbS supply:** Including a proportion of TbS removals early and increasing them over time will help companies secure the carbon removals required to meet their 2050 net zero goals.
- 3 **Maximize and diversifying co-benefits:** Balancing investments with different co-benefits maximizes companies' return on investment. For example, NCS projects generate numerous positive co-benefits including biodiversity and habitat protection and soil, air and water quality enhancements. TbS projects, meanwhile, may positively impact industrial development and livelihood improvements.
- 4 **Identify business opportunities:** Engaging in investments and partnerships to develop new technologies for carbon credits can open new business opportunities.
- 5 **Mitigate risks:** Diversifying across various projects, project types, developers and geographies mitigates project- and technology-specific risks, including reversal, technology failure, project developer management challenges or delivery issues.
- 6 **Enhance reputation:** Companies can enhance their reputational stance by showing commitment to climate outcomes through balanced carbon credit procurement in alignment with stated company values and sustainability objectives.

Prioritizing a Balanced Portfolio

VCM portfolios enable businesses to build a balanced carbon credit strategy — one that leverages the power of both nature and technology. Investing in both existing NCS credit opportunities and emerging TbS technologies will be crucial as companies progress towards their net zero targets.

In fact, the two types of credits vitally complement one another, each extending the other's reach. Natural climate solutions (NCS) can provide over 30% of the cost-effective carbon dioxide (CO₂) mitigation needed through 2030.^{3,4} Meanwhile, technology-based solutions focused on CO₂ removal technologies will open the door to more permanent solutions certain to be critical if corporations are to achieve long-term neutralization of residual carbon emissions.

By leveraging a balanced portfolio approach to carbon credit procurement, businesses can effectively contribute to global climate goals in a two-tiered way. First, their procured NCS credits support immediate decarbonization efforts through ground-level efforts to aid reforestation or to prevent further deforestation, for example. Meanwhile, companies' staged procurement of TbS removal credits support more long-term or permanent carbon mitigation solutions, while simultaneously promoting a marketplace for further development of these nascent technologies.

Blended portfolios send clear signals to the marketplace that carbon sequestration and removal efforts are valued and in-demand. They enable early-stage TbS projects to scale and increase their bankability by supporting innovation and R&D to drive down removal credits' future market costs — a critical step for companies' long-term net zero goals.

Using This Guide

This guide is meant to help businesses navigate VCM objectives while balancing key considerations, such as credit types, costs and project risks.

Creating a VCM portfolio unfolds in two stages, which are described in detail in this report:

- First, companies must confirm the role of carbon credits in their environmental objectives. Then, they must determine the optimal volume of credits to procure and the requirements/preferences for certain carbon credit solution types. Well-planned, high-level portfolios will likely include both NCS reduction or removal credits and TbS credits aimed at reducing or avoiding emissions or removing carbon.
- Second, companies should work to build a detailed, implementation-ready carbon credit portfolio. This step includes assessing the trade-offs of various project types by measuring the certainty of the carbon impact, Sustainable Development Goal (SDG) contributions, costs and feasibility. These considerations require in-depth, careful analyses on issues including, for example, the likely impacts of NCS removal credits focused on afforestation, reforestation and revegetation (ARR) and the ideal project locations for procurement approach.

It is our hope that the approach and frameworks outlined in this guide will help accelerate companies' investment in voluntary carbon credits. We believe the VCM is an accessible and instrumental tool poised to play a critical role in helping companies achieve their mid-century net zero targets.

WBCSD plays a pivotal role in advancing the understanding of how companies can take action beyond their value chains through instruments like voluntary carbon credits. This contribution includes publishing reports like "[The Case for Beyond Value Chain Actions](#)", which introduces the beyond-value-chain actions concept and outlines the reasons companies should engage in these actions and investments. Additionally, we provide guidance on carbon removals through "[Removing Carbon Responsibly: A Guide for Business on Carbon Removal Adoption](#)" and NCS through the "[Buyer's Guide to Natural Climate Solutions Carbon Credits](#)". Furthermore, we actively lead the [Natural Climate Solutions Alliance](#) to foster the growth of NCS markets. Despite these developments, however, much work remains for all key actors to accelerate the progress of carbon credit procurement.

The role of voluntary carbon credits *in reaching global net-zero emissions*



02.

02. The role of voluntary carbon credits in reaching global net-zero emissions

in reaching global net-zero emissions

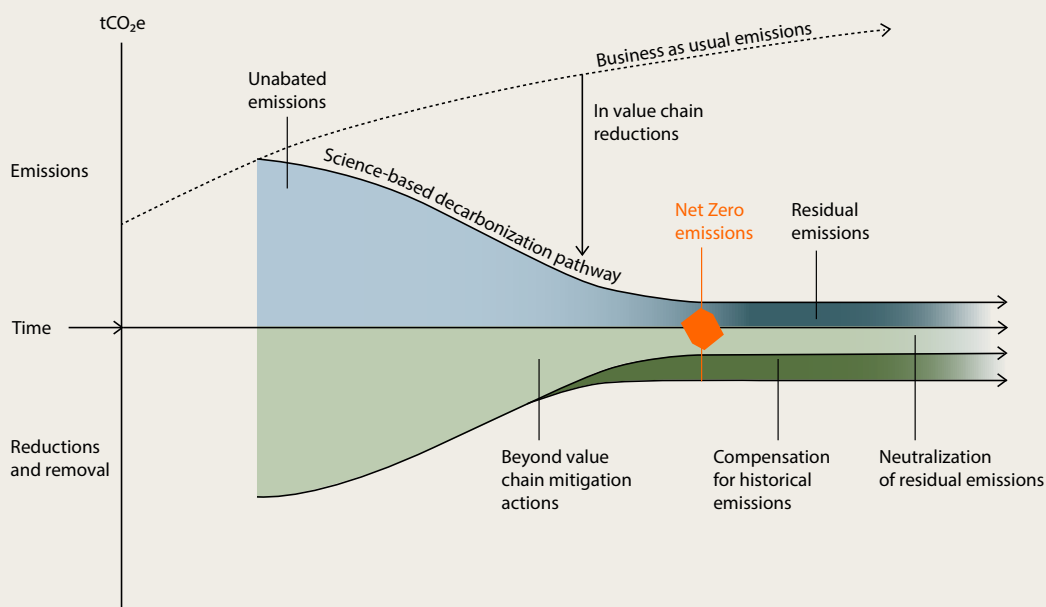
High-integrity voluntary carbon credits play an important role in channeling finance to activities that lead to the reduction of emissions or the removal of greenhouse gases (GHGs) beyond the value chains of businesses. They are a valuable complement to a business' efforts to abate scope 1, 2 and 3 emissions, both during the transition period as a way to address remaining emissions and when the net-zero state is reached to neutralize residual emissions (Figure 1).

Businesses that decide to use voluntary carbon credits in the transition to net-zero emissions

face the key decision of what "type" of credits to purchase (Figure 2). The "type" is defined by the mitigation activity, which can be:

- An activity that reduces anthropogenic emissions of a GHG. The mitigation activity could be nature-based or technology-based.
- An activity that enhances removals by sinks relative to GHG emissions or removals in the activity's baseline scenario. The mitigation activity could be nature-based or technology-based.

Figure 1: The use of voluntary carbon credits in the transition and at net-zero emissions



Source: WBCSD, ERM and World Economic Forum (2022). Natural Climate Solutions and the Voluntary Carbon Market

So, although all carbon credits represent the same mitigation outcome of 1 metric ton of carbon dioxide equivalent (CO₂e), a **reduction credit** represents 1 metric ton of CO₂e avoided or reduced through mitigation activities, while a **removal credit** represents 1 metric ton of CO₂e removed from the atmosphere and durably stored through a mitigation activity.

Emissions reductions generated by technology-based solutions (TbS) include renewable energy projects, energy efficiency or GHG capture from industrial emissions. They are also associated with natural climate solutions (NCS) that prevent

forest degradation and deforestation and improve agriculture and forest management. Carbon dioxide removals (CDR) are associated with technologies like direct air carbon capture (DACC), bioenergy with carbon capture and storage (BECCS) and enhanced weathering. NCS that remove carbon include restoring degraded forests and natural habitats or improving land management.

Figure 2: Solution types generating carbon credits

	Solution type	Project type
Definition	Carbon reduction and removal are two types of carbon mitigation solutions comprising mainly nature-based or technology-based solutions	Under each solution type, different mitigation options are categorized into key overarching project types through which carbon is reduced or removed
Example	Carbon removal: Nature-based solutions (NbS)	Afforestation, reforestation and revegetation (ARR) Improved rangeland management Improved forest management Blue carbon Soil carbon
	Carbon removal: Tech-based solutions (TbS)	Enhanced weathering Biochar BECCS DACCs
	Carbon reduction: Nature-based solutions (NbS)	Reducing emissions from deforestation and forest degradation (REDD+)
	Carbon reduction: Tech-based solutions (TbS)	Renewable and bioenergy Energy efficiency

These two solution types include many project types, or methods, to reduce emissions and remove carbon from the atmosphere, from energy efficiency to renewable energy, electric vehicles, mini-grids, Reducing Emissions from Deforestation and Forest Degradation, plus the sustainable management of forests (REDD+) methods, carbon capture and storage (CCS), and many more. The Integrity Council for the Voluntary Carbon Market (ICVCM) has identified 35 categories.⁵

Recognizing and embracing the difference between reductions and removals and between NCS and TbS solutions is central for a successful transition to global net-zero emission because:

- **There is no net-zero without nature.** There is clearly no viable path to reaching a global temperature increase of only 1.5°C without the massive deployment of NCS as they can provide over 30% of the cost-effective carbon dioxide (CO₂) mitigation needed through 2030.⁶ Overall, land-based activities need to move from emitting 12.5 gigatons (Gt) of GHG each year, to become net-zero emissions by 2030, a 5 Gt sink by 2040 and a 10 Gt sink by 2050.⁷
- **Net-zero is not possible without the permanent removal of CO₂ from the atmosphere.** Estimates show that the capacity to remove carbon from the atmosphere with low reversal risk needs to be increased, with an estimated 6 to 10 Gt in annual removal capacity needed by 2050 for most Paris-aligned net-zero pathways.⁸

To dramatically scale the capacity for carbon removals with the low(est) risk of reversal, it is essential to channel as much finance into the process as possible.⁹ To complement removals generated by NCS, there is a nascent yet high potential market for TbS removals, new technological innovations that remove and store carbon.

A portfolio of voluntary carbon credits that includes NCS reduction and removal credits today, combined with the staged procurement of more permanent TbS removal credits, supports both the conditions outlined. While taking action today through NCS credits, this approach promotes the allocation of funds for TbS contracts and purchasing in order to help build the market by sending clear demand signals. This will enable early-stage projects to scale, increase bankability and catalyze the necessary innovation and research and development to drive down the future market costs of TbS removal credits that will be needed at the net-zero state.



A portfolio approach to procuring voluntary carbon credits



03.

03. A portfolio approach to procuring voluntary carbon credits

A portfolio approach for the use of voluntary carbon credits will help meet corporate ambitions and contribute to the need to invest in the protection, improved management and restoration of nature for climate change mitigation and the need to scale the potential for carbon removals with the low(est) risk of reversal. A portfolio approach seeks to balance typical company objectives – managing costs, maximizing business opportunities and co-benefits, minimizing trade-offs, increasing market knowledge, mitigating project-specific risk, preserving use case optionality (such as use credits for voluntary claims or for compliance markets), addressing diverse stakeholder expectations and the trade-offs specific to the use of voluntary carbon credits – through the procurement of high-integrity credits from different solution types, geographies and developers/partners.

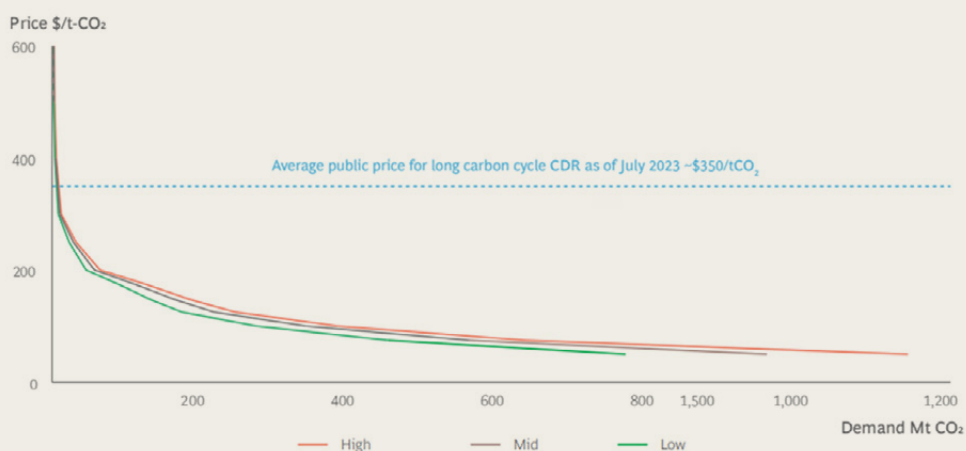
1 Manage costs of achieving a net-zero emissions portfolio

During the transition to net-zero emissions companies will design a voluntary carbon market (VCM) portfolio with a unique allocation to various credit types and with a wide range in costs. For example, TbS reduction credits are typically the lowest cost option (below USD \$5 per metric ton), whereas TbS removal credits have a wide range of costs and can exceed USD \$1,000 per metric ton.

Companies need to manage these costs while maximizing the desired impacts (climate, innovation, biodiversity, equity, etc.) of their high-integrity VCM portfolio. At the same time, as companies design a VCM portfolio aligned with their pathway to a net-zero target date, a shift over time to removals only – and increasingly to the lowest risk of reversal TbS removals – is necessary. As such, companies should allocate some funds to these nascent and high-cost TbS removal types to help build the market for when high volumes are needed. The scope for cost and market price reductions from these TbS removal credits is significant. As an example, the end-to-end cost of DACC today can vary between USD \$600 and USD \$1,000 per metric ton. To ease the wider adoption of DACC, this cost needs to fall to below USD \$200 per metric ton, driven by technical innovations, infrastructure development and access to low-cost, low-carbon energy.

The average price for TbS removals with low reversal risks is USD \$350 per metric ton. Companies' ability to contribute to the reduction of this market price by early investment would in turn unlock significant additional demand from the wider market (Figure 3).¹⁰

Figure 3: Price of carbon credits¹¹ and market size¹²



Source: Mistry, K. et al. (2023). [Climate Needs and Market Demand Drive Future for Durable CDR](#). BCG

2

Achieve security of supply of removals for neutralization

A company's VCM portfolio allocation strategy will adjust over time and will need to consist exclusively of removal credits at net-zero emissions. Companies' portfolios that include a proportion of TbS removals early in the process and increase the proportion over time will help them develop the relationships and contracts needed to secure access to the removals they need by mid-century. Predictions show the supplies on the market will be significantly constrained. Therefore, a lack of access to the removals companies need for net-zero emissions is a significant business risk that they can mitigate through this portfolio approach. A portfolio approach that promotes the allocation of funds today (for contracts and purchasing) will therefore help build the market by sending clear demand signals that enable these early-stage projects to scale due to increased bankability. They will also catalyze the necessary innovation and research and development to drive down the future market costs of TbS removal credits.

3

Maximize and diversify co-benefits

Companies have multiple sustainability targets (such as decarbonization, addressing natural resource use and biodiversity loss impacts, addressing inequality and contributing to the Sustainable Development Goals (SDGs)). VCM credits can address some or all targets. For example, NCS projects generate numerous positive co-benefits from biodiversity protection, livelihood improvements and soil, air and water quality enhancements. Likewise, in addition to the generally greater levels of measurability and permanence, TbS projects may have positive impacts on industrial development and livelihood improvements. Organizations often quantify such co-benefits as SDG impacts, which may increase the price per credit.

4

Identify business opportunities

Companies may find that business opportunities emerge from investments and partnerships to develop new technologies that generate carbon credits. For example, engineering and oil and gas businesses that are already investing in capabilities and solutions regarding CCS identify new business opportunities through related carbon removal technologies, such as BECCS.

5

Mitigate project- and technology-specific risk

Despite rigorous due diligence and measurement, reporting and verification frameworks, risks remain (such as reversal, negative externality, technology failure, project developer management challenges, delivery issues) for any individual carbon project and emerging CDR technologies. Sourcing from only one project or even only one project type could be risky due to several associated project-specific risks, for example with the use of a specific methodology or technology.¹⁴ A portfolio approach mitigates this risk as companies buy from various projects, project types, developers and geographies.

6

Advance the company's reputation

A company enhances its reputation by communicating its dedication to achieving the primary climate outcomes of reduced or removed carbon from the atmosphere while highlighting how its carbon credit procurement aligns with company brand values and larger sustainable objectives. For example, an agricultural company may prioritize NCS credits, both reduction and removal, especially if such credits can quantify positive biodiversity benefits and livelihood improvements for smallholders and local communities. Likewise, an innovative technology company may prioritize investments into TbS removal credits, illustrating a willingness to be at the vanguard of decarbonization.

The interplay between reductions and removals and NCS and TbS solutions is central to the Oxford Principles for Net Zero Aligned Carbon Offsetting.¹⁵ NCS removal credits should reach ~40% of the VCM, by volume, by 2030, up from ~10% today. By 2040, removals (both NCS and TbS) should then comprise ~80% of the VCM and, by 2050, TbS removals should account for essentially all new credits generated. For this market trend forecast to materialize, it is urgent to deploy greater investment into TbS removals. As of today, only 0.5% of companies with a Science Based Targets initiative (SBTi) target have made any purchases of TbS carbon removal credits and existing standards have verified and issued very few TbS removal credits so far.¹⁶

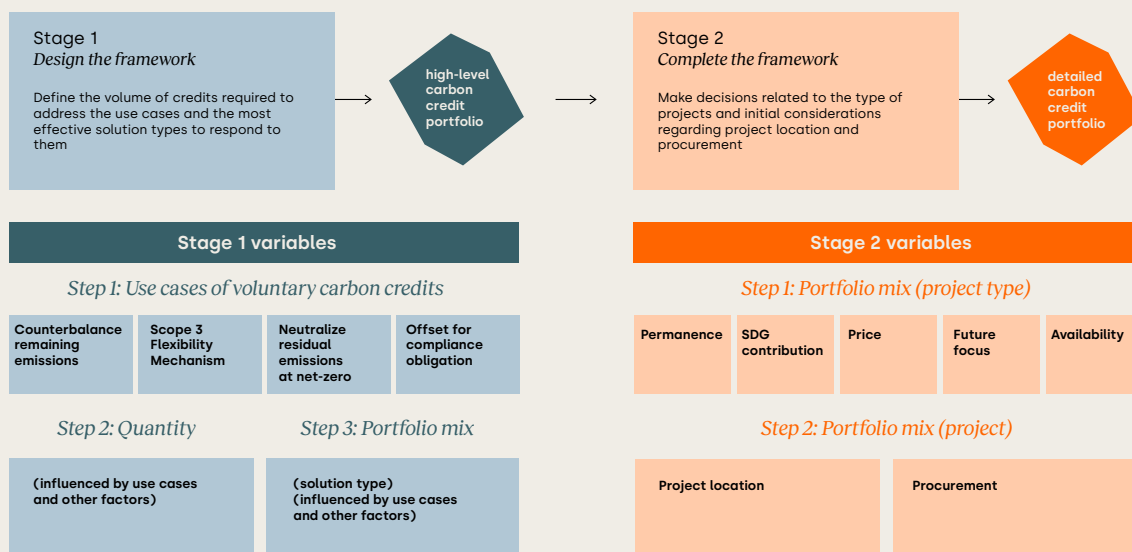
Going forward, removal credits will be in position for significant growth due to the need “to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse

gases in the second half of this century” called for by the Paris Agreement,¹⁷ which the SBTi Corporate Net-Zero Standard has embraced, recognizing only removals for use in neutralizing residual emissions in the net-zero state.¹⁸

A two-stage approach to designing a portfolio

The designing of a portfolio of voluntary carbon credits is a two-stage approach (Figure 4). In Stage 1, the business will generate a framework based on its specific use cases and define the volume of credits required to address the use cases and the most effective solution types to respond to them. In Stage 2, it will use this framework to make more granular decisions, completing the framework with decisions related to the type of projects and initial considerations regarding project location and procurement.

Figure 4: Portfolio design approach



Stage 1. Design the framework

Step 1. Define your use cases for voluntary carbon credits

The first step to take in the design of an effective portfolio is to identify the use cases for purchasing and retiring voluntary carbon credits. This may both quantify the amount of credits required and define the solution types and specific crediting schemes required.

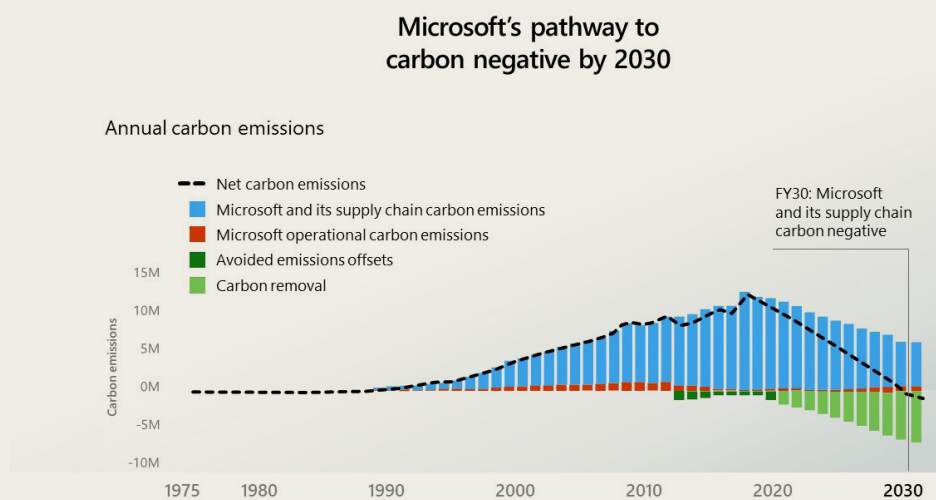
Voluntary carbon credits can support several use cases for businesses:

- **A. Counterbalance remaining emissions.** Companies on track with their near-term targets, while prioritizing emissions reductions within the value chain, may purchase voluntary carbon credits to counterbalance their remaining emissions annually during the transition phase. The quantity of credits purchased could open the possibility of making a Carbon Integrity Claim supported by the Voluntary Carbon Markets Integrity Initiative (VCMI).¹⁹
- **B. Neutralize residual emissions at net-zero.** Businesses reaching net-zero status that cannot further reduce their carbon emissions should permanently remove an equivalent amount of carbon to residual emissions.²⁰ In addition to in-value chain removal activities, businesses can use removal carbon credits to neutralize residual emissions.

- **C. Temporarily close the gap in achieving scope 3 reduction targets.** A company could make limited use of high-quality carbon credits to close the gap between its estimated scope 3 GHG emissions reduction target level and its current scope 3 emissions in a given year, as long as it has already taken other steps to reduce current emissions.²¹ The VCMI is exploring this use case as part of the Scope 3 Flexibility Claim testing phase (launched in November 2023 for testing in Q4 2024)²² as is SBTi as part of the planned consultation on the Corporate Net-Zero Standard²³ (Q4 2024).
- **D. Fulfill compliance requirements.** In limited situations, compliance markets accept voluntary carbon credits. Certain emissions trading schemes (ETS) allow businesses to purchase voluntary carbon credits to fulfill part of their compliance obligations. They often set the allowance cap low to limit voluntary carbon credit use.

Businesses may consider further action beyond counterbalancing remaining emissions and neutralizing residual emissions by compensating their historical emissions during the transition phase and at the net-zero state. For example, Microsoft has clearly positioned itself as a climate leader – by committing to being carbon negative by 2030 and then going further to address all its historical emissions by 2050 (Figure 5).

Figure 5: Microsoft addresses historical emissions



Source: Smith, B. (2020). [Microsoft will be carbon negative by 2030.](#)

Deciding the volume of credits when compensating for historical emissions involves certain factors:

- 1 The company should consider it as an addition to the counterbalancing of remaining emissions or to neutralization; it should not be a use case for the company to pursue separately as stakeholders may view it as greenwashing.
- 2 The company should clearly communicate the boundary of emissions covered by compensating for historical emissions, such as all scope 1 and 2 emissions since company incorporation, and the rationale for addressing historical emissions.

For example, Microsoft's historical emissions target "will remove from the environment all the carbon the company has emitted either directly or by electrical consumption since it was founded in 1975".²⁴

Important to note is that: (1) Microsoft uses the term "remove", suggesting it will only use carbon removal credits for its historical emissions target; (2) the historical emissions target addresses scope 1 and 2 emissions only; and (3) the company expressed the rationale for the target in a post as "those of us who can afford to move faster and go further should do so".²⁵

Step 2. Define the volume of carbon credits needed

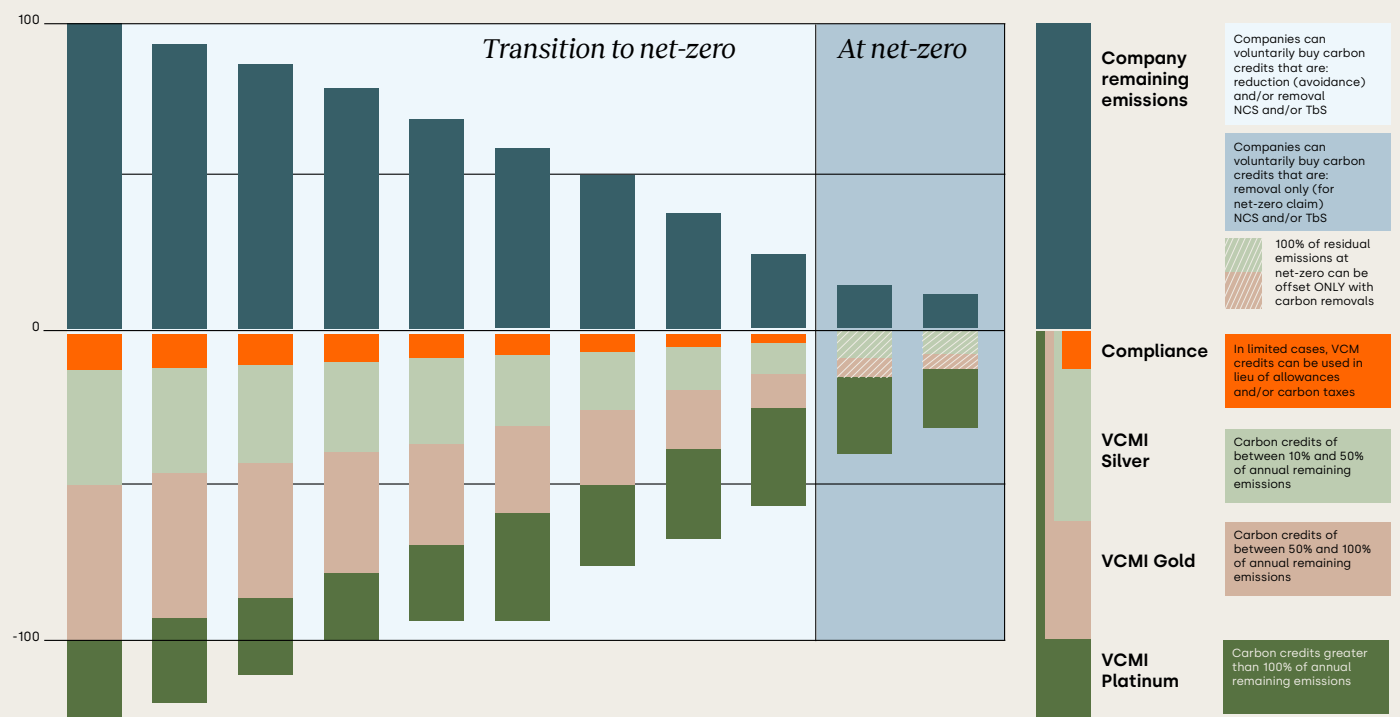
The selection of the use cases for voluntary carbon credits will influence the total volume of credits necessary on a yearly basis to fulfill the objectives of the selected use cases. After identifying the potential combination of use cases for businesses in transition or at net-zero emissions, businesses can consider the following factors to determine the quantity of voluntary carbon credits for their identified use cases.

A. Counterbalance remaining emissions

As companies meet or progress towards the delivery of their near-term emissions targets, they should quantify the emissions that remain in the given year and then multiply by the percentage to be counterbalanced (Figure 6).

For example, a company with 2 million metric tons of remaining emissions in 2023 that wishes to counterbalance 20% of its total remaining emissions would allocate a budget sufficient to procure 400,000 metric tons of credits. Some companies may wish to counterbalance 100% or more of their remaining emissions and even begin to address their historical emissions.

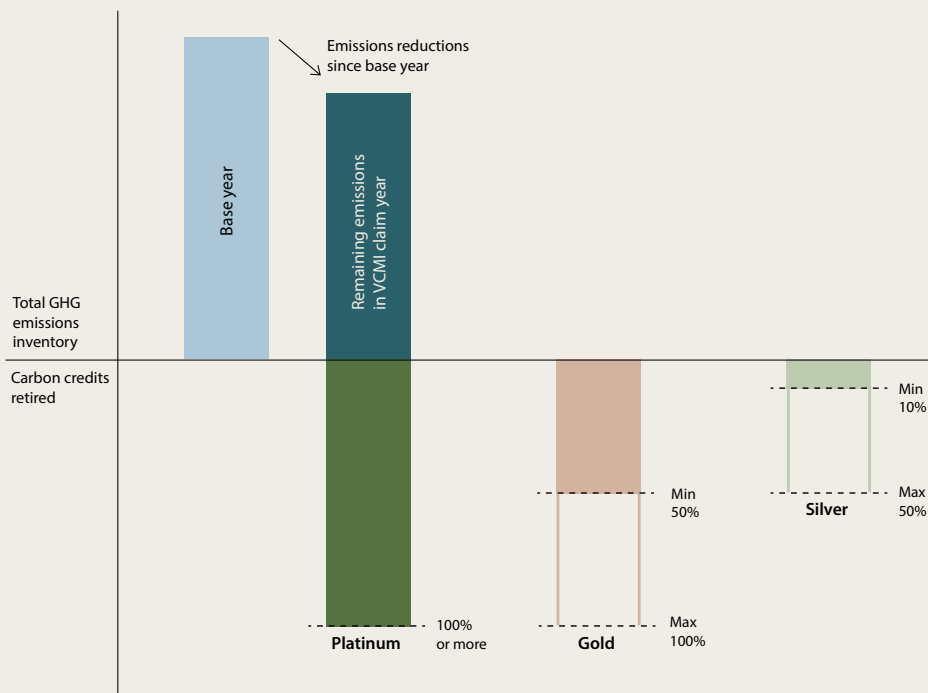
Figure 6: Roles of carbon credits in distinct phases throughout the net-zero journey



Companies should consider various factors when deciding on how much to counterbalance through credits:

- **Climate ambition.** What is your company's market positioning, branding and values? Is there a decision to align with a certain VCMI carbon claim tier? Is the company preparing for neutralization? The decision to make a claim associated with the purchase and retirement of voluntary carbon credits will influence the volume of credits needed. The recommendation is therefore that the business develop a clear view of whether to make a VCMI claim and which claim tier to consider (Figure 7 and Appendix).
- **Hard to abate emissions.** Does your company operate in a hard-to-abate sector in which economically feasible alternatives are slow to materialize (such as sustainable aviation fuel) and therefore a moderate percentage of counterbalancing is more sensible/economical?
- **New business and investment opportunities.** Does your company foresee business opportunities in emerging low-carbon technologies or solutions that may emerge from investments in carbon credits?
- **Budget consideration.** Given your company's profit margins and intangible brand value, what is an appropriate budget for counterbalancing the company's unabated emissions through carbon credits? Will the company link this budget to an internal carbon price?²⁶

Figure 7: Microsoft addresses historical emissions



The VCMI has defined three claims that companies and other non-state actors can make. All three represent action above and beyond companies' internal decarbonization efforts. These claims are appropriate for companies that are taking action now to accelerate global net-zero emissions by going above and beyond science-aligned emissions cuts through the additional use of high-quality carbon credits and that are either making progress to meet their near-term emissions reduction targets during interim years or have already met their targets.

- **Carbon Integrity Silver** requires the purchase and retirement of high-quality carbon credits in an amount equal to or greater than 10% and less than 50% of a company's remaining emissions once it has shown progress on its near-term emissions reduction targets.
- **Carbon Integrity Gold** requires the purchase and retirement of high-quality carbon credits in an amount equal to or greater than 50% and less than 100% of a company's remaining emissions once it has shown progress on its near-term emissions reduction targets.
- **Carbon Integrity Platinum** requires the purchase and retirement of high-quality carbon credits in an amount equal to or greater than 100% of a company's remaining emissions once it has shown progress on its near-term emissions reduction targets.

Source: Voluntary Carbon Markets Integrity Initiative (VCMI) (2023). [Claims Code of Practice: Building integrity in voluntary carbon markets](#)

B. Temporarily close the gap in achieving scope 3 reduction targets

The VCM's Scope 3 Flexibility Claim— launched as a beta version in November 2023 – would support this use case. The new claim would recognize the companies that use high-integrity carbon credits to close the gap between their estimated scope 3 GHG emissions reduction target and their current scope 3 emissions in a given year. Preliminary guardrails to the use of this claim have been defined and are being further refined, including a determination of the maximum percentage of credits allowed.²⁸

The current (2024) version of the Corporate Net-Zero Standard does not allow the use of voluntary carbon credits. However, in Q3 2024, SBTi will share the role that Environmental Attribute Certificates may be able to play in climate mitigation as part of the process of revising its Net-Zero Standard.

C. Neutralize net-zero emissions

Only a minority of companies have already reached their net-zero emissions target and will need to neutralize the residual emissions. Those that have not yet reached the net-zero emissions target should start planning neutralization needs. These companies should forecast their neutralization needs based on the expected residual emissions across all scopes at net-zero emissions and assume the need for total neutralization of the residual emissions. SBTi requires achieving neutralization using only permanent carbon removals, though these can be from a combination of in-value chain removals and carbon removal credits. The amount of carbon credits required will be based on the amount of residual emissions left after netting in-value chain removals against the emission scopes.

To prepare for neutralization, companies need to start increasing the proportion of TbS removals in their portfolios, in line with the Oxford Principles for Net Zero Aligned Carbon Offsetting. Deciding on the quantities and trajectory up to net-zero can be a challenge. [CDR.fyi](#) has introduced a tool that can help companies model tailored scenarios that detail how they can incorporate CDR into their portfolios in a way that is consistent with the global need to scale CDR.

While this can provide a useful overview on an average basis, it does not take into account the differences between sectors and the capacity to pay that may alter company-specific trajectories.

D. Fulfill compliance requirements

Companies face exposure to compliance markets for carbon emissions where a limited number of voluntary carbon credits are allowed. Regardless of whether a company is in transition or already at net-zero emissions, it may still be able to use some voluntary carbon credits against a compliance market obligation. Typically, the allowance for voluntary carbon credits is minimal (5-10% of total allowances or tax). Nonetheless, for some companies with high exposure to such compliance markets, the economic benefit of using voluntary carbon credits may be material and warrants procurement planning. Businesses may procure carbon credits to fulfill certain parts of their compliance obligation, which is part of the offset cap regulated by each scheme. A word of caution: voluntary carbon credit fungibility with compliance markets is a fast-moving space and requires ongoing assessment.

Step 3. Match the use cases with the best solution type(s)

Each use case has implications on portfolio mix. The first decision to make is which type of solution is best for the selected use case.

Examples of how the different solution types match the different use cases:

- **Counterbalance remaining emissions.** Companies can apply both reduction and removal credits for this use case. They may wish to especially focus on nature-based projects aiming to protect natural ecosystems with meaningful SDG contributions, such as REDD+ projects. While removal credits are generally more costly and less available, this only underscores the rationale for leading companies to allocate a portion of credits to removals, signaling durable demand and helping scale the removal market.
- **Neutralize net-zero emissions.** Only a removal can neutralize an emission. According to the science behind net-zero emissions, to achieve permanent climate stabilization, only removals with permanence equivalent to geological timescales will be able to fully neutralize emissions.³⁰ The extent to which companies will be able to achieve this is not clear, however. As such, SBTi has yet to establish a standard to support the definition of permanence, thereby specifying which type of removal will be permitted for neutralization. It is likely, however, that TbS removals with a low reversal risk will play a central role and should be a broad objective.
- **Temporarily close the gap in achieving scope 3 reduction targets.** Both reduction and removal credits could apply for this use case. The recommendations for counterbalancing remaining emissions would also apply here given the temporary nature of this use case.
- **Offset for compliance obligation.** If a company is operating under a compliance mechanism that allows a set percentage of VCM credits, it must review the requirements of each compliance mechanism as the solution types and specific carbon credit methodologies accepted will vary.
- **Address historical emissions.** No standard defines what type of credits would be best suited. The budget available will likely play an important deciding factor as the volume and the associated cost needed might define the choice. If removals are the priority, NCS removal might be the best way to secure large volumes of credits.

Other factors will influence the decision regarding the type of solutions to include in the portfolio.

- **Budget consideration.** NCS reduction credits typically cost less than NCS removal. NCS removals, however, come at a much lower cost than TbS removal credits. Businesses facing budget limitations can opt to integrate a higher amount of reduction credits.
- **Emission source and emission intensity.** Company emission sources and emission intensity may also influence the decision regarding solution types. For example, businesses with emissions from food and beverage practices may prioritize NCS credits because these are generated by the same emission source and deliver more nature and social co-benefits. Businesses with hard-to-abate emissions from fossil fuels may invest in reduction credits for immediate impact and economic efficiency but they will also invest in TbS removal credits for future scaling purposes and their relevance with supply chains.
- **Dependency on natural capital.** Businesses with a high dependency on natural capital may prioritize NCS as they typically come with more nature and social core benefits. For example, companies with an agriculture-based value chain might consider purchasing NCS credits associated with avoided deforestation (REDD+) or agroforestry (afforestation, reforestation and revegetation – ARR) mitigation activities.

The output of this first stage is a portfolio framework companies can use for annual decisions on what project types and projects to purchase and retire.

Businesses can cost the **portfolio framework** using the price range for TbS removal, NCS reduction and NCS removal and generate a preliminary cost estimation to support internal decision-making on investment and resource requirements. It is crucial to note that high quality is a prerequisite for carbon credit procurement and businesses should not sacrifice the quality of carbon credits for lower cost.

By the end of this process, businesses will have key outputs on the quantity of carbon credits needed and the solution type – the portfolio mix and cost to seek for management-level alignment.

Stage 2. Complete the portfolio framework

Companies can use the portfolio framework both to plan long term how voluntary carbon credits can complement their transition to net-zero emissions and to make annual decisions on what project types and projects to purchase from and retire. In Stage 2, businesses assess additional key variables within each solution type to select project types.

Solution types refer to the combination of reduction/removal and NCS/TbS while project types refer to the mitigation action under each solution. For each project type (such as REDD+), different carbon crediting programs issue multiple methodologies (Figure 8). Project verification takes place according to a methodology available through the corresponding registry. Once businesses step into carbon credit procurement, they encounter the project lists. This is not in this document's scope of discussion.

As companies further refine their portfolio by selecting appropriate project types, three overarching drivers guide the project type decisions: (1) the overall climate ambition of the firm; (2) relevancy to the business and alignment with other sustainability targets; and (3) the portfolio budget (Figure 9).

Once the company has agreed on the portfolio framework and defined the budget limits, it is time to select the portfolio mix by first choosing the project types for the selected solution type. Only then is the business ready for the selection of the specific projects, which should take place through a careful procurement process (Figure 10).

In general, the portfolio framework has a longer shelf life than the selection of project type and project mix, although the recommendation is to establish long-term commitments at the project level.

Figure 8: The taxonomy of carbon credit types applied in this document

	Solution type	Project type	Project list
Definition	Carbon reduction and removal are two types of carbon mitigation solutions comprising mainly nature-based or technology-based solutions	Under each solution type, different mitigation options are categorized into key overarching project types through which carbon is reduced or removed	Projects refer to the detailed project list businesses will be offered when making the purchase; projects can vary by geographic location, registry, etc.
Example	Carbon removal: Nature-based solutions (NbS)	Afforestation, reforestation and revegetation (ARR) Improved rangeland management Improved forest management Blue carbon Soil carbon	Afforestation project 1 Afforestation project 2 Afforestation project 3
	Carbon removal: Tech-based solutions (TbS)	Enhanced weathering Biochar BECCS DACCS	
	Carbon reduction: Nature-based solutions (NbS)	Reducing emissions from deforestation and forest degradation (REDD+)	
	Carbon reduction: Tech-based solutions (TbS)	Renewable and bioenergy Energy efficiency	

Figure 9: Three drivers to consider in designing a portfolio

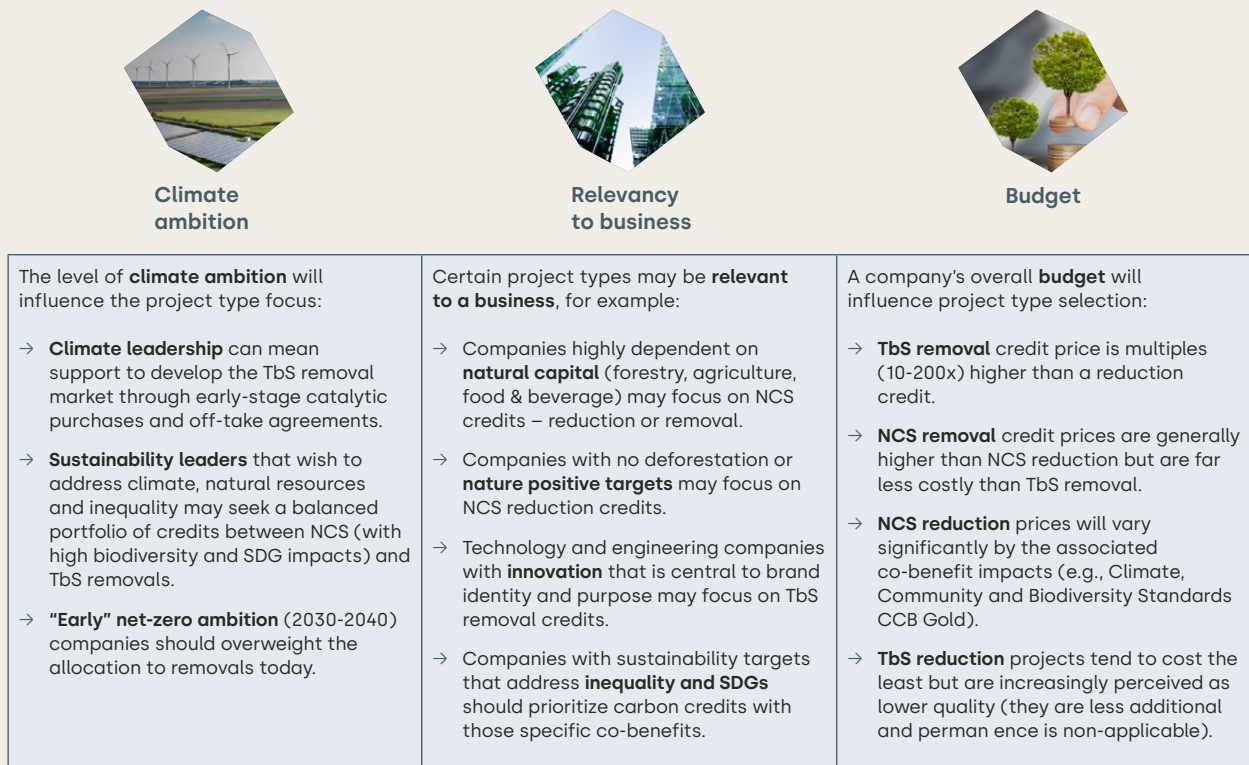
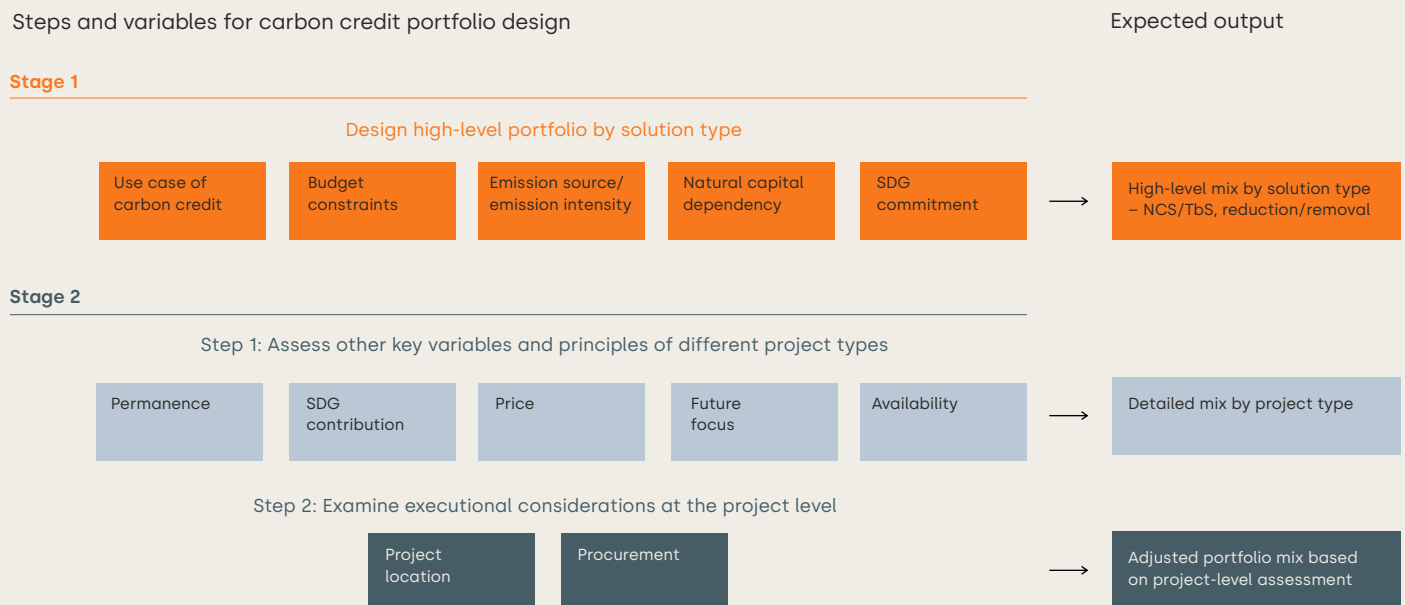


Figure 10: Comprehensive steps to detail the carbon credit portfolio mix



Step 1. Select project types within each solution type

As the business considers both the outcome and feasibility, it should evaluate various project types at a minimum on five variables. It must conduct the comparative assessment between different project types for each solution type selected, as reduction/removal and NCS and TbS projects exhibit distinct characteristics that are not directly comparable to one another (Box 1).

Variables to consider include:

- **Permanence** of the carbon mitigation outcome. This permanence refers to the longevity of the mitigation outcome associated with the carbon credit. Permanence applies both to reduction and removal activities but is more central to the selection of removals, especially when the use case is neutralization. If companies are using removal credits to counterbalance their remaining emissions, then the permanence required by ICVCM's Core Carbon Principles (CCP) (40 years) will be sufficient. However, if companies are using removal credits to neutralize their residual emissions at net-zero emissions, then longer permanence will likely become the standard, as the essence of neutralization is about balancing carbon flows within the geosphere (Figure 11).
 - **SDG contribution.** This refers to the additional positive impact that different project types are likely to generate beyond their climate mitigation outcomes (emissions reductions and carbon removal). The choice of project type of businesses committed to the delivery of other SDGs may vary depending on the specific sustainability development objectives they prioritize (Figure 12). For example, they may opt for forestry projects because they come with biodiversity conservation and employment/livelihood improvement (Figure 13). They may also choose direct air carbon capture and storage (DACCS) as part of their TbS removal credits share because they stimulate the development of industry, innovation and infrastructure.
 - **Price of the credits.** Businesses need to weigh the affordability of certain credit types today (reduction) against the collective obligation to invest into more costly and nascent removal project types (for instance TbS) to help stimulate market supply (Figure 14).
 - **Future focus.** This focus refers to the alignment with the gradual shift favoring NCS and TbS removal credits. Figure 15 illustrates the trend towards carbon removals; companies will want to ensure that purchases of carbon credits align with this overall trend.
- **Availability** in the market for each project type for inclusion in the portfolio. It is possible to assess current or near-term availability through spot market transactions; it is also possible to create them through the deployment of long-term off-take agreements, which project developers can use to enhance the bankability for additional project finance and increase required credits (this is currently the only way to procure large volumes of TbS). This means that orders placed today will be ready for delivery only in a few years.
 - **Vintage.** In relation to carbon credits, vintage is the year in which the emissions reduction or removal took place. Companies might consider retiring carbon credits with vintages matching the same timeframe as their emissions. This can also be a relevant element in the price of the carbon credits, as older vintage carbon credits have lower prices on average.
 - **Conservation hierarchy.** While developing a portfolio of carbon credits, companies should consider the conservation hierarchy, which prioritizes the protection of standing forests and habitats (that generate reduction credits), before making investments into restoration and reforestation (that generate removal credits). Central to the protection of standing forests is the REDD+ framework. Today, project-level interventions generate most REDD+ credits; however, the shift continues towards jurisdictional baselines and jurisdictional-level implementation in general. The advice to businesses is to consider adopting Jurisdictional REDD+ once it becomes more readily available in the market.
 - **Significance of permanence for neutralization.** Permanence is fundamental to the concept of neutralization as neutralization is about achieving and maintaining the "net" in net-zero emissions (meaning satisfying the geospheric carbon balance). [Removing carbon responsibly: A guide for business on carbon removal adoption](#) explains why it is important for geologically permanent removals to neutralize fossil emissions and cautions companies about actively claiming neutralization/elimination of a fossil emission with a removal credit not of geological permanence.

It is worth noting that land-based emissions and removals are subject to a separate set of rules under the SBTi Forest, Land and Agriculture pathway,³¹ in which the removals play a fundamentally different role.

Also, some of the variables to consider (permanence, SDG contribution, price, future focus and availability) differ by each of the main solution types (Figure 16).

Box 1: Project types evaluations against the five variables

NCS reduction

- **Permanence:** NCS reduction projects theoretically can meet the minimum thresholds of high-integrity credits, though unique reversal risks (such as from wildfires and land-use conversion) characterize these projects.
- **SDG contribution:** NCS reduction projects positively and significantly contribute to SDGs – most notably biodiversity protection, ecosystem services (air, water, soil purification), climate adaptation and enhanced livelihoods.
- **Price:** The price of NCS reduction credits is higher than TbS reduction and lower than NCS removals. Given the prevalence of SDG contributions from these projects, variations in pricing are frequent considering the different standards to meet.
- **Future focus:** NCS reduction projects are widely accepted today but the forecast is that these projects will be less viable as net-zero emissions approach and companies prioritize removals (Figure 14).
- **Availability:** NCS reduction projects are widely available and in a current surplus. However, this is not the case for Jurisdictional REDD+ projects.

NCS removal

- **Permanence:** NCS removal projects can meet the minimum thresholds of high-integrity credits, though unique reversal risks (such as from wildfires and land-use conversion) characterize these projects.
- **SDG contribution:** NCS removal projects positively and significantly contribute to SDGs – like NCS reduction projects – enhanced livelihoods are potentially greater than NCS reduction projects given the greater employment needs for nursery, planting and management.
- **Price:** The price of NCS removal projects is higher today than NCS reduction, but forecasts suggest prices for NCS removal credits will be the affordable removal option for most companies. These projects also have variations in pricing (such as Climate, Community and Biodiversity Standards) linked to sustainable development contributions.
- **Future focus:** Alignment of NCS removal credits with the future need for the “neutralization” of residual emissions at net-zero emissions still lacks a definition.

- **Availability:** NCS removal projects are the only removals available at scale, having been verified by third parties and issued by carbon crediting programs. The volume is below projected demand, but they remain the best option today for removals for companies to use towards net-zero emissions neutralization claims.

TbS removal

- **Permanence:** TbS removal projects well exceed minimum thresholds as set by the ICVCM and have low reversal risks. Biochar is the least permanent of the TbS removal projects as it ranges between 100 and 1,000 years. DACCS, BECCS and weathering have consensus estimates all greater than 1,000 years of carbon storage.
- **SDG contribution:** TbS removal projects have a more mixed picture regarding these contributions. While the positive impacts regarding industry innovation and generating demand for high added value are significant, some considerable negative impacts are possible, such as the BECCS requirement for land, the demand for sustainable biomass that could go to other applications and the fact that DACCS processes use considerable energy to operate. [Removing carbon responsibly: A guide for business on carbon removal adoption](#) provides additional guidance on the trade-offs to consider as part of a removals strategy.
- **Price:** TbS removal projects are the most expensive of all solution types, ranging between USD \$100 and >USD \$600/metric ton. Some leading companies have committed to long-term off-take agreements to signal demand and accelerate technology learning and cost curves, ultimately lowering the price of these credits.
- **Future focus:** TbS removal projects are the most aligned with the future of the VCM as companies buy them for the “neutralization” of residual emissions at net-zero emissions.
- **Availability:** TbS removal projects require long-term off-take agreements (which are all effectively future off-takes) from buyers in order to obtain financing to scale up developments.

Figure 11: Recommendation for investing in credits with higher permanence for both neutralization preparation and neutralization purpose³²

		Intended carbon storage duration	Reversal risk	Challenges against permanence
TbS reduction	Renewable and bioenergy	Not applicable, as emissions are not stored by natural sinks or technologies		
	Energy efficiency			
NCS reduction	Ecosystem protection	Decades to centuries	Relatively high	Insect infestations, logging damage, extreme weather conditions, 2 fires
NCS removal	Forestry			
	Agriculture			~100 years
	Marine/coastal	Rising sea level, coastal ecosystem erosion, contamination		
TbS removal	Biochar	100-1,000 years	Relatively low	Improper storage, decomposition, land degradation
	Weathering	>1,000 years		Leaks, geological instability, cost competitiveness, public acceptance, absence of regulations
	BECCS			
	DACCS			

Definitions

- According to IPCC, **permanence is the longevity of carbon pool and the stability of its stocks**, given the management and disturbance environment in which it occurs
- **The benchmark for long permanence** is generally considered **100 years**, but certain regulations may require a longer timeframe (e.g. **1000 years**)
- "Permanence" and "durability" are often used interchangeably

Key principles to consider

Start investing now for neutralization at net-zero:

- Business must start investing in removal credits with higher permanence and lower reversal risks to neutralize residual emissions at net zero

Beware of the trade-offs of their maturity:

- While some TbS removal credit outperforms in permanence, businesses should be aware of its tech immaturity

Follow regulatory definition and requirements

Please refer to the sources below for up-to-date information:

- SBTi is working to define the definition of permanence in the neutralization criteria within its [Corporate Net-Zero Standard](#).
- **Removing carbon responsibly: A guide for business on carbon removal adoption** helps businesses understand the permanence variances between voluntary carbon credits and introduces the approaches to managing permanence equivalence when considering neutralizing residual emissions (such as horizontal stacking, vertical stacking, like-for-like neutralization).

Source: Intergovernmental Panel on Climate Change (IPCC), California Legislation Information, WBCSD, literature research, Bain analysis

Figure 12: SDG contribution potentials

Solution type	Project type	1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS
TbS reduction	Renewable and bioenergy																	
	Energy efficiency																	
NCS reduction	Ecosystem protection																	
NCS removal	Forestry																	
	Agriculture																	
	Marine/coastal																	
TbS removal	Biochar																	
	Weathering																	
	BECCS																	
	DACCS																	

Impact: Moderate High

Figure 13: SDG contribution project type example, REDD+³³

Solution type	Project type	1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS
NCS reduction	Ecosystem protection																	

Impact: Moderate High

- **#1 No Poverty:** A focus on forests as a source of income for rural populations can reduce poverty.
- **#2 Zero Hunger:** Forests are a direct source of food but also support the productivity of agro-ecosystems.
- **#5 Gender Equality:** In many countries, a disproportionate number of women are leaders of community forest groups.
- **#8 Decent Work and Economic Growth:** Revitalizing forest industries can provide work and contribute to economic growth.
- **#10 Reduced Inequalities:** Many rural communities are marginalized; empowering them through REDD+ can reduce inequality.
- **#12 Responsible Consumption and Production:** Making commodity supply chains more sustainable reduces the pressure on forests.
- **#13 Climate Action:** REDD+ is central to climate action, but forests also are vital for adaptation to climate change.
- **#15 Life on Land:** Forests are home to a large proportion of terrestrial biodiversity.
- **#16 Peace, Justice and Strong Institutions:** The underlying causes of threats to forests are often the same as those leading to conflict, including weak institutions.
- **#17 Partnerships for the Goals:** As forests are a global resource, action on forests requires global partnerships.

Figure 14: Price variation of project types according to the nature of different solutions, including technology maturity, additional benefits, etc.³⁴

		Cost range (USD \$/tCO ₂)	Cost trend	Reason
TbS reduction	Renewable and bioenergy	~0-45	↓ *Cookstoves will increase	→ Cost decline because of technology advancements and economies of scale → Uncertain for bioenergy due to biomass cost
	Energy efficiency	~5-10		
NCS reduction	Ecosystem protection	~10-20	↑	→ Scarcity of natural resources due to growing population and demand for food
NCS removal	Forestry	~0-240	↑	
	Agriculture	~0-100	↓	→ Potential technological advancement to increase the efficiency
	Marine/coastal	~10-75	↑	→ Scarcity of natural resources
TbS removal	Biochar	<200 (low temp) >300 (high temp)	↓	→ High costs at small scale; will likely decrease with more advanced technology and biomass feedstock availability
	Weathering	<100 possible	↓	→ Technological advancement, economies of scale and learning benefits
	BECCS	~15-344	↓	
	DACCS	~300-600, up to 1,800	↓	

Definitions

- The cost of carbon credit projects is influenced by several factors, including capital and operational investment, registries, vintage, and location.
- The price of carbon credits is not only influenced by the cost, but also by demand, supply and non-carbon revenue. This how-to-guide primarily focuses on cost discussions and does not delve into the other factors. Refer to market reports for up-to-date information on carbon credit prices.

Key principles to consider

Align with budget plan

- Depending on the planned budget, businesses can opt for various project types to fulfill their climate ambition and the defined roles of carbon credits.

Balance investment for now and the future:

- TbS removal involves higher costs and has lower technical maturity but its permanence is superior, commanding greater investment today to realize future scale.
- NCS removal offers more cost-effective options because of its higher commercial maturity, which is an advantageous choice for businesses looking for immediate impact and scale.

Quality comes first:

- The selection of more affordable credits should not be made at the expense of compromising quality.

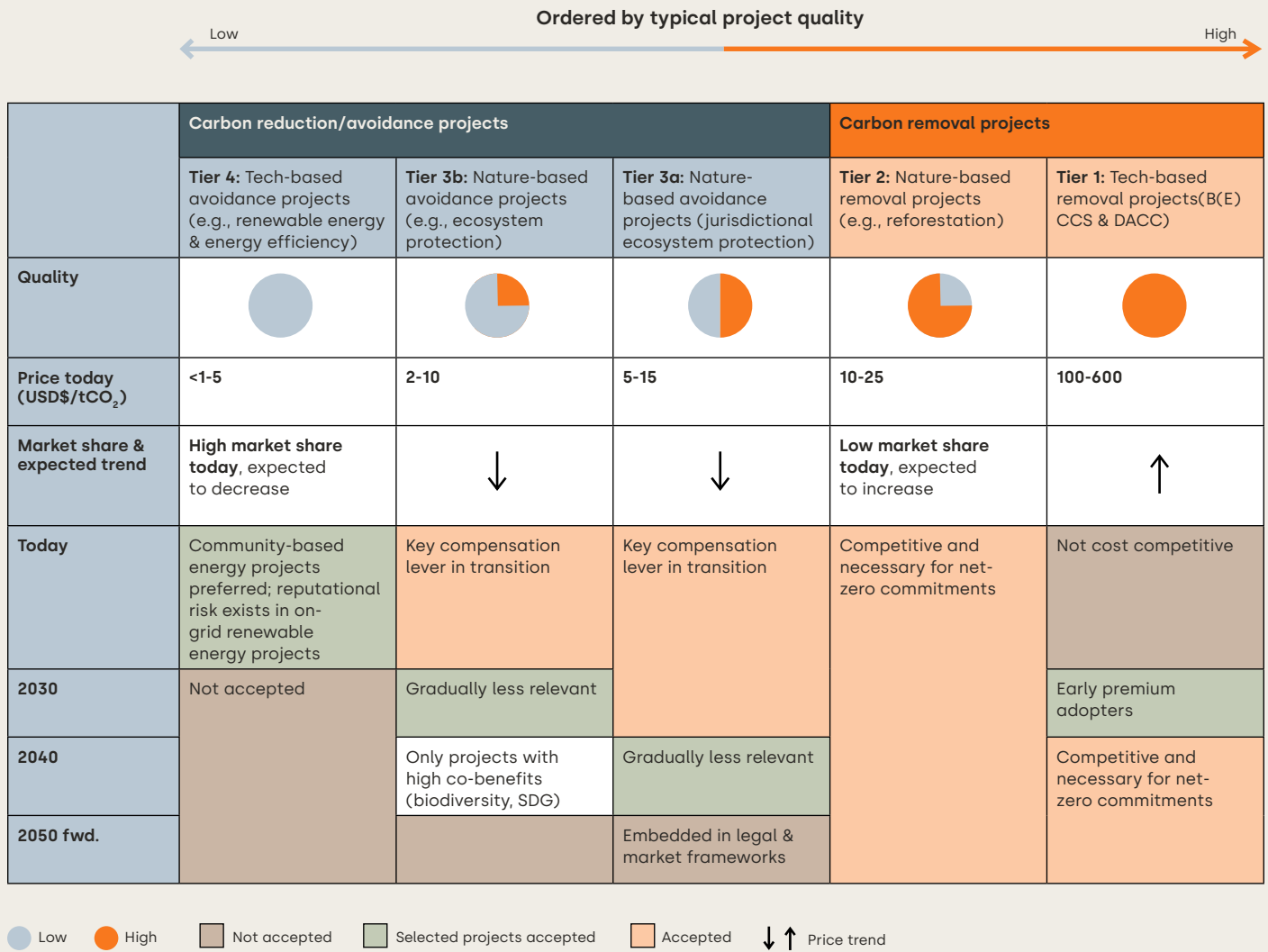
Please refer to the sources below for up-to-date information:

- Trove Research on [The role of "reduction" and "removal" projects in the voluntary carbon market – an economic analysis](#).
- Intergovernmental Panel on Climate Change (IPCC) [Sixth Assessment Report](#).

To ease the comparison of various project types, businesses must assess and balance the importance of the five variables from Stage 2, Step 1. Businesses should be able to balance the trade-offs between the advantages and disadvantages associated with each project type. Presented below for reference are the pivotal trade-offs inherent to each project type.

Source: WBCSD, Trove Research, Intergovernmental Panel on Climate Change (IPCC), expert interview

Figure 15: Future focus – a gradual market shift towards carbon removals³⁵



Source: SBTi, literature research, Microsoft

Figure 16: Summary of the assessment on key variables of different project types³⁶

Solution type	Project type	Permanence	SDG contribution	Price (USD\$ per ton)	Future focus	Availability
TbS reduction	Renewable and bioenergy	N/A	Affordable and clean energy creation with industry and infrastructure development	~0-45	Low	Very high
	Energy efficiency			~5-10	Low	High
NCS reduction	Ecosystem protection	Decades to centuries	Life on land, clean water and sanitation	~10-20	Low-Med	Very high
NCS removal	Forestry	Decades to centuries, high reversal risk	Reforestation: Improved biodiversity, enhanced employment; Afforestation: avoidance of soil erosion	~0-240	High	Low-Med
	Agriculture		Improved soil quality, resilience and agricultural productivity	~0-100	High	Med
	Marine/coastal	~100 years	Increased productivity of fisheries, improved biodiversity; climate adaptation	~10-75	High	Low-Med
TbS removal	Biochar	>100 years, low reversal risk	Improved crop yields and reduced non-CO ₂ emissions	<200 (low temp) or >300 (high)	Very high	Low
	Weathering	>1,000 years, low reversal risk	Enhanced plant growth, reduced erosion, enhanced soil carbon	<100 possible	Very high	Very low
	BECCS		Reduction of air pollutants, fuel security, optimal use of residues	~15-344	Very high	Very low
	DACCS		Development of high-skilled industry and local infrastructure	~300-600, up to 1,800	Very high	Very low

Advance scoring: Strongly Slightly Less

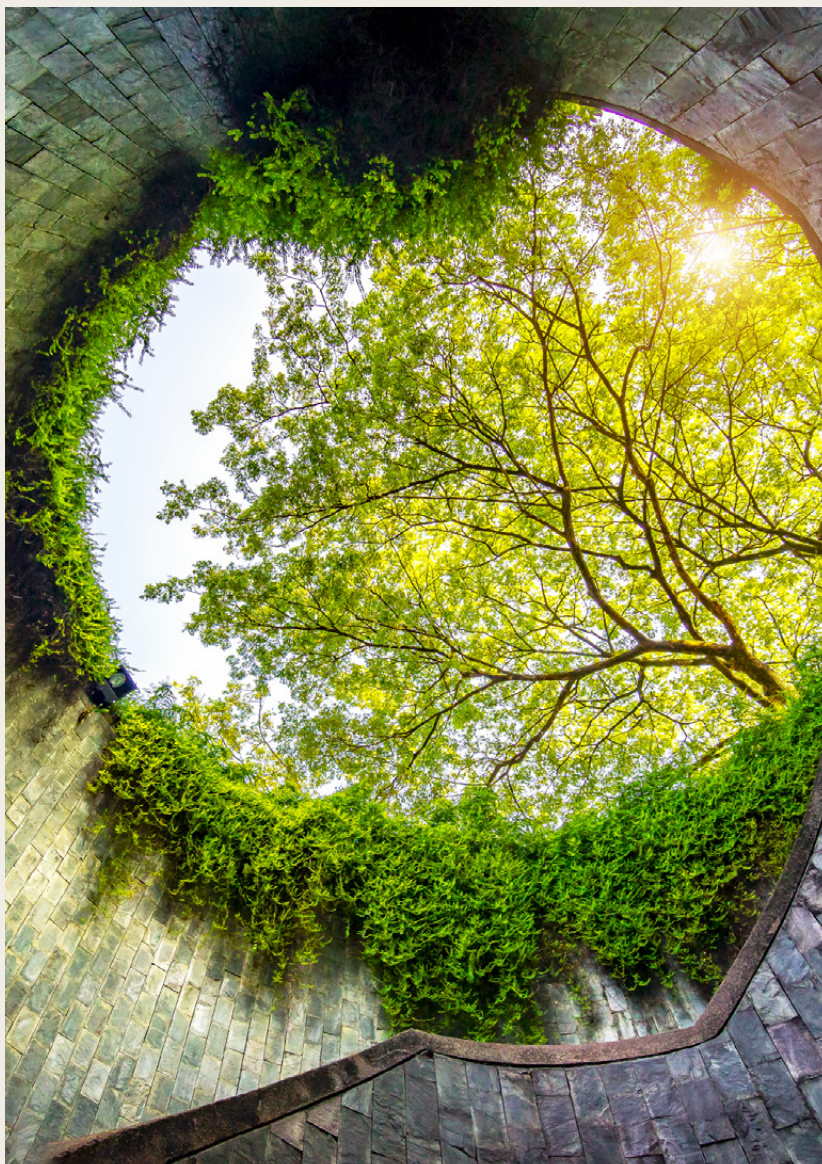
Step 2. Adjust the portfolio by evaluating executional considerations on the project level

The final step in designing the portfolio is to identify specific features, such as geographic coverage, registry and quality ranking, before moving to the procurement of credits from specific projects. These elements do not necessarily link to specific project types.

Project location

Project location refers to the physical sites or geographical areas where companies implement emissions reduction/removal projects. Project location involves two key considerations.

1. Consider geographical proximity to business operation, while avoiding overconcentration on a single area. Businesses might prioritize carbon credit projects from geographical areas where the company conducts its primary business operations while simultaneously avoiding a high concentration of projects within a single country or region.
2. Strive to strike a balance between delivering tangible carbon impact and supporting climate justice. Carbon credits have a direct impact on emissions reduction/removal and side impacts on the protection of marginalized populations. For example, a project location criterium/policy for the portfolio design may seek to allocate a higher percentage of the budget to credits from the Global South (especially least developed countries) to ensure support to those communities most likely to suffer disproportionately from the effects of environmental and societal changes.



Availability of high-integrity credits

Once the company has designed the portfolio, it is time to move to the procurement of credits. Selecting carbon credits of high integrity, backed by a rigorous due diligence process, is of utmost importance for businesses.

Businesses should procure carbon credits issued by carbon crediting programs that meet [ICVCM's Carbon Credit Principles](#) or equivalent, once available (Box 2).

The procurement process generally follows eight steps (Figure 17). Their description and illustrations appear in "[A Buyer's Guide to Natural Climate Solutions Carbon Credits](#)".

Box 2: High-integrity voluntary carbon credits

High-integrity voluntary carbon credits

According to the ICVCM, a high-quality credit needs to adhere to the [ICVCM's Core Carbon Principles \(CCP\)](#). The 10 CCP establish a global benchmark for high integrity and are similar to standards set by financial regulators. They set rules relating to a product – carbon credits – and to the carbon-crediting programs that issue them.

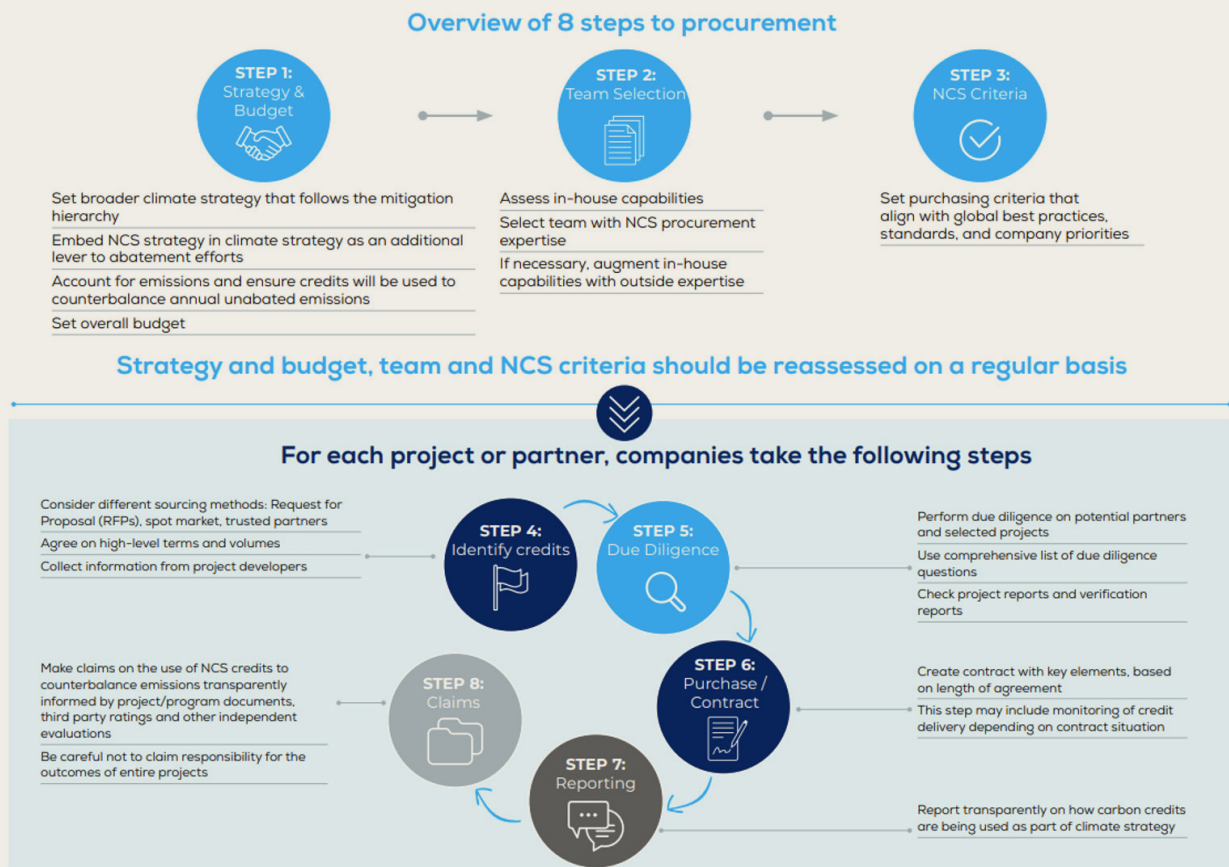
A high-integrity CCP-labeled carbon credit will deliver genuine, quantified climate impact and sustainable development benefits that support Indigenous Peoples and local communities.

- Programs must ensure that carbon credits make a genuine impact on emissions. This includes ensuring that they fund reductions or removals that are additional (meaning they would not have occurred without the incentive created by carbon credit revenues). They must be permanent, measured robustly and conservatively, and verified by independent experts.
- Programs must ensure that high-integrity credits come from projects with robust social and environmental safeguards that also deliver positive sustainable development impacts. This includes ensuring that projects assess and mitigate risks to Indigenous Peoples and local communities, secure their free, prior and informed consent and are transparent about how they share benefits.
- Programs must meet high standards of governance to ensure the overall quality of carbon credits. This includes providing comprehensive and transparent information on projects issuing credits so people can understand their impact on emissions, society and the environment.
- It is also essential that programs support the transition to net-zero emissions and do not lock in fossil fuel emissions or technologies.
- Optional CCP attributes will enable programs to highlight additional features that may be of interest to buyers.
- Climate finance raised through CCP-labeled carbon credits will support the SDGs because they require all new projects to make a positive contribution to sustainable development and adopt robust measures to protect people and the environment.
- High-integrity CCP-labeled credits will make it easier to channel climate finance to countries in the Global South, helping them achieve their national climate goals. They will make it easier to identify good projects that reduce and remove emissions, from actions protecting and restoring forests to scaling innovative clean technologies that are hard to commercialize.

These eight steps will help businesses procure high-quality carbon credits and are critical to ensuring high quality and avoiding the reputational risks associated with purchasing low-quality carbon credits. Projects or programs generate

high-integrity carbon credits when they address the permanence, additionality, leakage, double-counting, robust quantification and verification of the climate mitigation activities implemented.

Figure 17: The 8 steps to procurement



Source: Natural Climate Solutions Alliance (2023). [A Buyer's Guide to Natural Climate Solutions Carbon Credits](#)

Conclusion



04.

04. Conclusion

The Intergovernmental Panel on Climate Change (IPCC) has recommended efforts to limit global warming to 1.5°C (2.7°F) in order to reduce the threat of irreversible climate damage. To meet this goal, many countries and companies have pledged to reach net-zero carbon emissions by the early 2050s. However, this threshold can only be achieved if greenhouse gas (GHG) emissions peak before 2025 and decrease roughly 45% by 2030 from 2010 levels.³⁷

Companies' rapid and steep reduction of GHG emissions across scopes 1, 2 and 3 are critically important to reducing the effects of climate change. So too are their use of high-integrity voluntary carbon credits.

As an increasingly in-demand carbon mitigation solution, voluntary carbon credits channel much-needed financial support to a host of vetted activities and technologies aimed at CO₂ reduction or GHG removal. Available via the voluntary carbon market (VCM), these credits carry the potential for positive environmental impacts far beyond a company's immediate value chain and beyond, even, mere carbon sequestration.

Its potential benefits notwithstanding, the VCM can be admittedly perplexing to navigate, and companies must consider numerous challenges to entry, including, on a basic level, what types and amounts of credits to procure.

This guide was developed to help break down some of the confusion surrounding the VCM and to provide actionable steps companies can take to build their own, best-fit carbon credit portfolios.

As this guide has shown, companies who opt for a balanced, blended VCM portfolio — one that includes both nature- and technology-based credits — will be best poised to meet their net zero goals in the coming decades. Natural climate solutions (NCS) can provide over 30% of the cost-effective carbon dioxide (CO₂) mitigation needed through 2030,^{3,4} while CO₂ removal technologies offer more permanent solutions sure to be critical for neutralizing residual emissions.

The urgency of climate change demands that all possible forms of credits be employed. The most effective VCM portfolios will be the ones that skillfully blend a mix of credit types, including reduction or removal credits and nature- or technology-based credits.

In short, a well-executed portfolio approach to voluntary carbon credits acknowledges the importance of all solution types:

- **NCS solutions:** Nature has a critical role to play in climate mitigation and adaptation. Environmental carbon mitigation programs have the dual-pronged benefit of reducing emissions and protecting irreplaceable natural habitats and forests.
- **TbS solutions:** Technology-based removals are essential for achieving permanent carbon removal, which is needed for a successful transition to net-zero emissions. Securing immediate financing for these technologies is critical for their development and scalability.

Finally, and not insignificantly, VCM portfolios help companies achieve their carbon mitigation goals while managing potential risks associated with the use of voluntary carbon credits. A diversified portfolio benefits businesses by maximizing positive impacts, simplifying decision making and mitigating risks. These portfolios not only address immediate and long-term mitigation and removal needs but also help businesses control costs, maximize business opportunities and address diverse stakeholder expectations.

The words of former IPCC Chair Hoesung Lee highlight this pivotal moment for humanity: *"We are at a crossroads. The decisions we make now can secure a livable future. We have the tools and know-how needed to limit warming."*

Urgent action is paramount. We hope this guide will empower businesses to create impactful carbon credit portfolios that advance climate action and accelerate investment in nature conservation and the development of new and innovative carbon removal technologies.

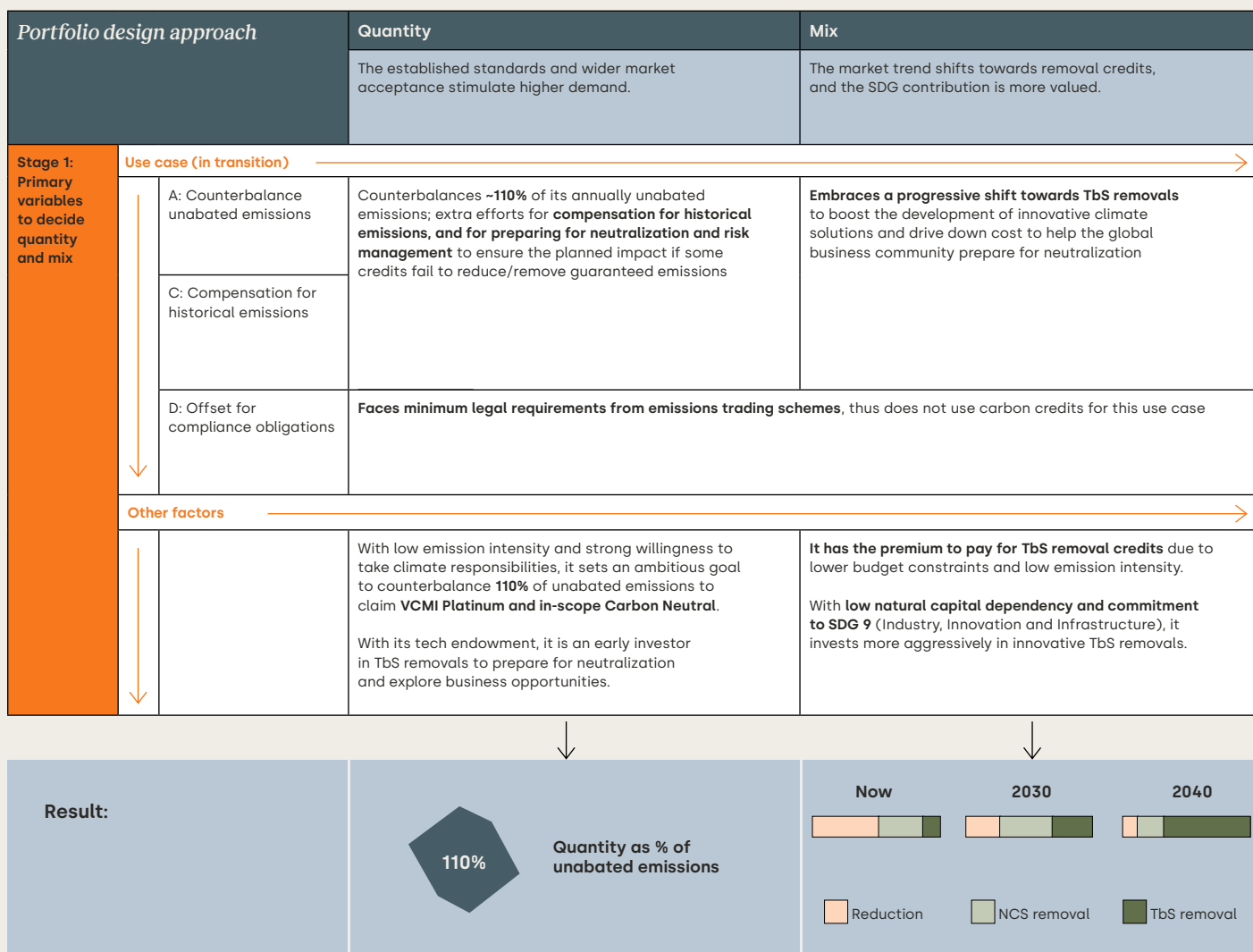
Appendix: Illustrative examples

Three examples highlight how different companies in diverse sectors can use the same portfolio approach process yet get a different portfolio allocation of credits associated with different (VCMI) integrity claims.

Tech Co. driving a technological breakthrough

Tech Co. decides to claim VCMI Platinum by purchasing and retiring carbon credits for 110% of its unabated emissions annually. Regarding the solution type, Tech Co. has chosen to purchase an increasing share of TbS removal credits in view of the company's high profitability and low emission intensity, and its core capabilities and purpose of technology innovation.

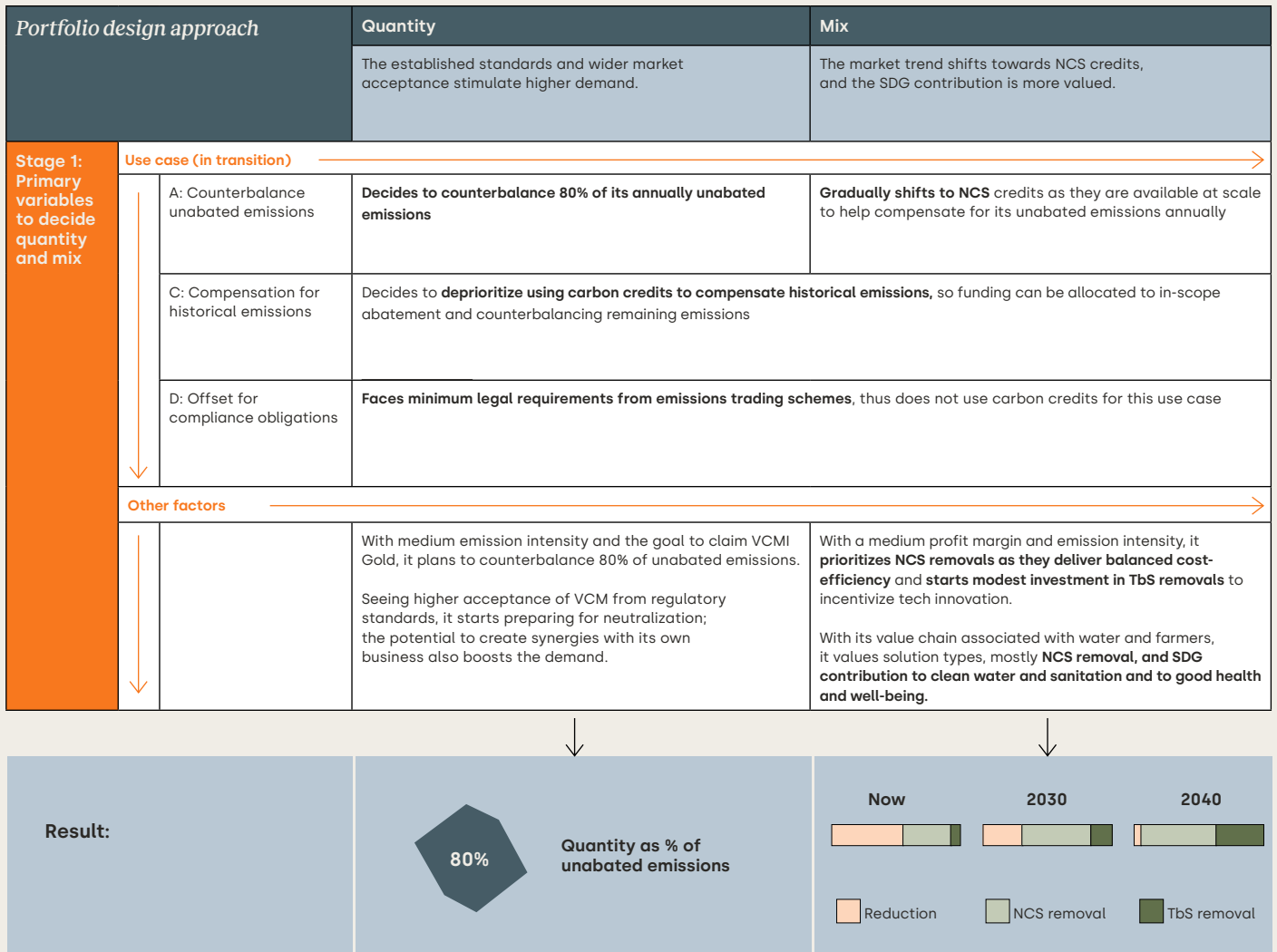
Figure A: Portfolio design process and simulated results for 2030 – Tech Co.



Consumer Product Co. building a balanced portfolio

Consumer Product Co. decides to claim VCM Gold by purchasing and retiring carbon credits as 80% of its unabated emissions annually. Regarding the solution type, Consumer Product Co. has chosen to purchase an increasing share of NCS removal credits with biodiversity and livelihood co-benefits in view of the company's high dependency on natural resources and smallholders.

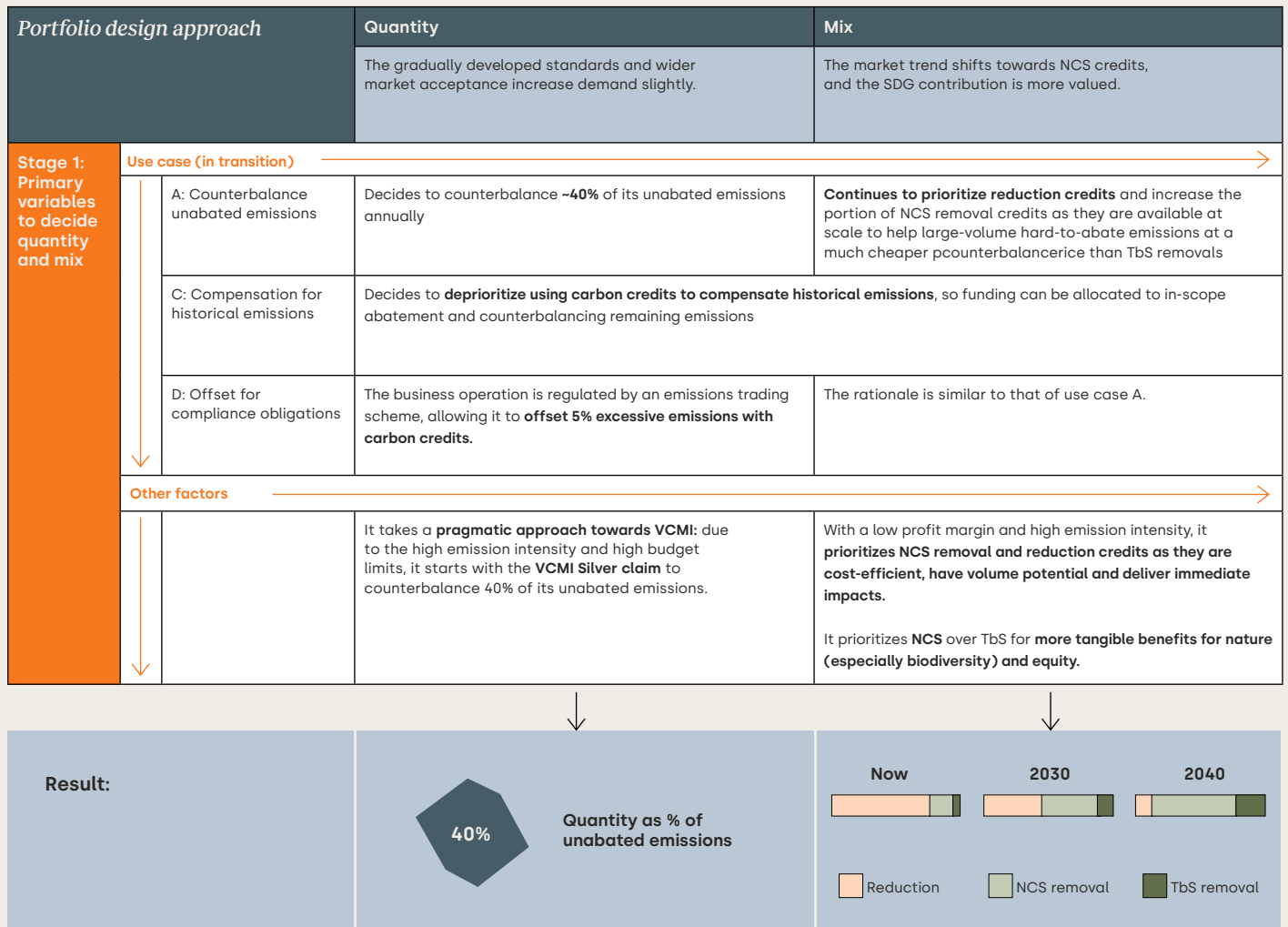
Figure B: Portfolio design process and simulated results for 2030 – Consumer Product Co.



Industrial Co. focusing on economic feasibility

Industrial Co. decides to claim VCM Silver by adopting carbon credits as 40% of its unabated emissions annually. Regarding the solution type, Industrial Co. has chosen to purchase a portfolio weighted towards reduction credits while steadily increasing its purchase of NCS removal credits rather than more nascent and costlier TbS removal credits. Industrial Co.'s portfolio design decision is defined by its low profitability, high emission intensity and volume and high dependency on natural resources.

Figure C: Portfolio design process and simulated results for 2030 – Industrial Co.



Resources

Policy and standards on voluntary carbon markets

- The International Carbon Action Partnership's [ETS Map](#) provides up-to-date information on emissions trading schemes (ETS) around the world – including systems in force, under development and under consideration.
- The Science Based Targets initiative (SBTi) [Above and Beyond: An SBTi Report on the Design and Implementation of Beyond Value Chain Mitigation \(BVCM\)](#) provides guidance on BVCM actions for which carbon credits are a crucial tool.
- The Integrity Council for the Voluntary Carbon Market (ICVCM) [Core Carbon Principles, Assessment Framework and Procedure](#) sets new threshold standards for high-quality and high-integrity carbon credits (released in January 2024).
- The Voluntary Carbon Markets Integrity Initiative (VCMI) [Claims Code of Practice](#) provides a rulebook on the credible use of high-quality carbon credits and associated climate claims that will accelerate climate action.

- The University of [Oxford's Oxford Principles for Net Zero Aligned Carbon Offsetting](#) depicts a global carbon credit portfolio in alignment with climate science and companies' general net-zero pathways.
- The World Bank's annual [State and Trends of Carbon Pricing](#) traces the development of carbon pricing schemes from year to year.

Quantification of demand for voluntary carbon credits

- **VCMI claim tiers:** The [VCMI Claims Code of Practice](#) provides businesses with a rulebook on the credible use of high-quality carbon credits and associated climate claims.
- **Compliance obligations:** The International Carbon Action Partnership's [ETS Map](#) provides up-to-date information on ETS around the world – including systems in force, under development and under consideration.



Endnotes

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- 11 Note: Some hybrid solutions consist of both nature-based and technology-based approaches. Also, some project types under carbon removal may use a carbon reduction methodology. Under TbS reductions, this how-to guide excludes the discussion on CCS at industrial facilities and fossil fuel power plants for two reasons: (1) it only captures limited market share of voluntary carbon credits and is mostly leveraged in mandatory carbon markets; and (2) only certain sectors (such as oil and gas) are particularly relevant to this approach.
- 12 Source: Market size data is from Trove Research, triangulated by multiple experts in VCM.
- 13 Note that reduction credits may still be purchased at or past the net-zero emissions target date but such purchases shall be for "contribution claims" only and not "compensation" towards a company's residual emissions.
- 14 The diversification of TbS removal credit purchases is especially important as such an approach increases the chances of successfully scaling the carbon removal market by allowing multiple technological options to develop.
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