

Advancing Corporate Climate Action

Practical Net-Zero Guide for Business



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Introduction



Why is net-zero an essential strategy for business?

The August 2021 report from the UN’s climate science body, the Intergovernmental Panel on Climate Change (IPCC)¹ confirms in unequivocal terms what we have been coming to understand for many years: the growing physical risks from climate change are caused by human action, the outlook is alarming, but although short, there is still time for effective action. UN Secretary-General António Guterres called the IPCC report a “code red for humanity”.

In response to this mounting scientific evidence, economically damaging fires and floods and growing public concern, many governments around the world have announced target dates for achieving net-zero greenhouse gas (GHG) emissions.

At a September 2020 UN General Assembly, China’s President Xi announced that China aimed to achieve carbon neutrality before 2060. The following November, Hong Kong’s Chief Executive Carrie Lam declared in her policy address that HKSAR will strive to achieve carbon neutrality before 2050.

Along with China, Japan, South Korea, the EU and several other nations, together representing more than 70% of global emissions, have now announced net-zero target dates. Their message is clear: the task is urgent and the work starts now.

To reinforce government policy towards net-zero targets, G7 finance ministers have agreed to mandate climate-related financial reporting in line with the recommendations of the Taskforce on Climate-related Financial Disclosures (TCFD).² Monetary Authorities and market regulators around the world, including the Hong Kong Monetary Authority and the Hong Kong Securities and Futures Commission are moving to embed TCFD reporting standards within their rules and regulations.

In simple terms, a net-zero target means a country or company is pledging to reduce carbon emissions³ to as close to zero as possible and then using carbon removal or sequestration technologies to net out the remainder of their emissions. In order to keep global warming within safe limits – recognised by the mainstream scientific community to be 1.5°C compared to pre-industrial era, the net-zero target must be reached by no later than 2050.

¹ Refer to [IPCC AR6 Climate Change 2021: The Physical Science Basis](#).

² More details can be found on [TCFD official website](#).

³ Unless specified, for the purposes of this Guide, the term “carbon emissions” is used interchangeably with “greenhouse gas emissions” or “GHG emissions”, encompassing all seven types of greenhouse gas listed in GHG Protocol: carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF₆); and nitrogen trifluoride (NF₃).

Governments do not expect to achieve their net-zero goals through their own efforts alone. They expect business, finance, and individual citizens to play their part in reducing emissions. Governments stepping up climate action will introduce a range of regulations, fiscal measures, and other programmes to achieve this. These will contain both incentives to do better and penalties for those not doing enough.

This Net-Zero Guide is designed to help companies respond to the changing landscape, understand their carbon emissions, and avoid the risk of failing to adjust to international, national and local climate action.

Many countries are now clear about the year by which their economies will become carbon neutral. They are also setting interim targets, most commonly for 2030, to shape a realistic pathway towards eventual net-zero emissions. Businesses will need to respond to both near-term and long-term targets.

The concept of net-zero emissions takes account of the possibility of removing GHGs from the atmosphere through natural means such as tree planting, or through technological methods related to carbon capture, use and storage. Although reducing GHGs from within a company's value chain will remain the priority, beyond value chain mitigation (BVCM) measures outside a company's value chain will be useful in helping the society to achieve the overall goals, and neutralisation via carbon removal can be planned for at a level that balances any small amounts of residual emissions⁴, thereby adding up to net-zero emissions.

What is this Guide?

This is a practical implementation guide⁵ (the “Guide”) aims to facilitate companies to develop a net-zero pathway in line with national targets and global commitments. It is designed to help companies be aware of the choices available, and seek the right balances on the path to net-zero emissions, also considering the alignment with local and international goals, as well as any applicable local regulations.

The Guide adopts a practical approach, taking companies through the steps that are necessary for them to understand their GHG emissions in terms of:

- where they are now;
- where they want to get to; and
- how to get there.

The Guide aims to help a business understand what government plans will require and assist in setting a pathway that aligns to government plans. This is made real with an action plan involving long-term goals and near-term targets.

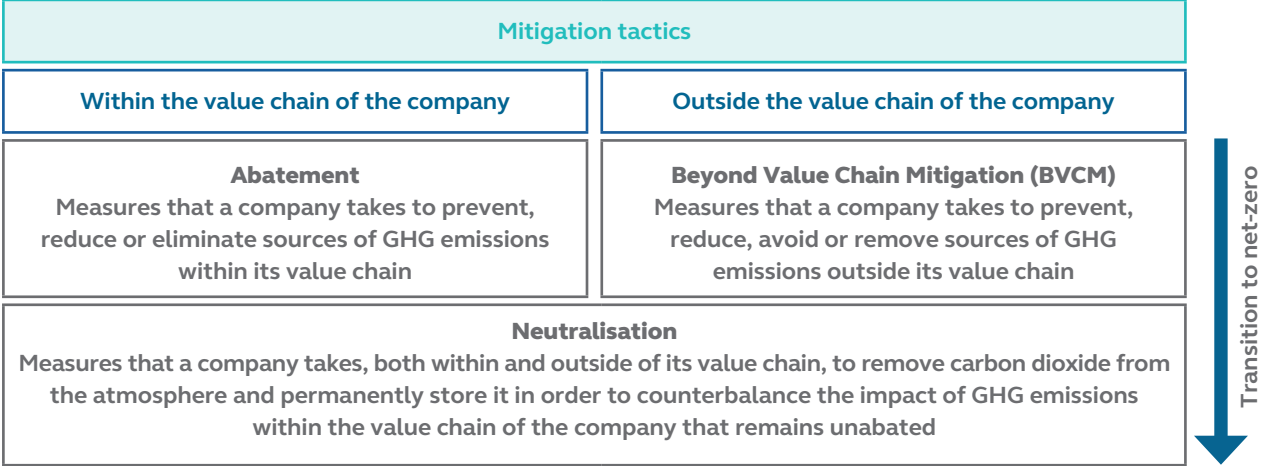
It is important to note that multiple efforts are being made by various parties to set up corporate frameworks and develop new standards for net-zero. However, in order to encourage early action this Guide does not aim for perfection or full consistency with all global standards under development. Instead, it takes a practical approach to encourage early action, recognising that some of the carbon reduction targets, neutralisation and BVCM measures will need to be improved as climate science and global practices evolve over time.

When considering to adopt this Guide, companies should also review local laws and regulations in relation to disclosures and target setting.

⁴ Residual emissions refers to GHG emissions that remain unabated by the time net-zero is reached in scenarios that limit warming to 1.5°C with low or no overshoot.

⁵ Carbon Care Asia Limited was engaged to prepare this Guide, including the research and development of methodologies for target setting, abatement measures, and net-zero strategies.

Figure 1. Taxonomy of climate change mitigation tactics⁶



Source: SBTi Corporate Net-Zero Standard Version 1.0, SBTi

This Guide will seek to mitigate the many challenges currently faced by most companies in creating a net-zero strategy:

- the vast array of materials related to net-zero are difficult to comprehend for companies with no dedicated carbon expert or sustainability professionals;
- many companies are not ready or are unable to devote sufficient resources to fully grasp the concepts and complexities behind the net-zero debate; and

- the many choices required to be made in the formulation of an optimal net-zero pathway demand a lot of decision-making power that many companies do not possess in their daily operations.

In view of the above, this Guide is focused on setting out the most essential steps in the form of a how-to guide.

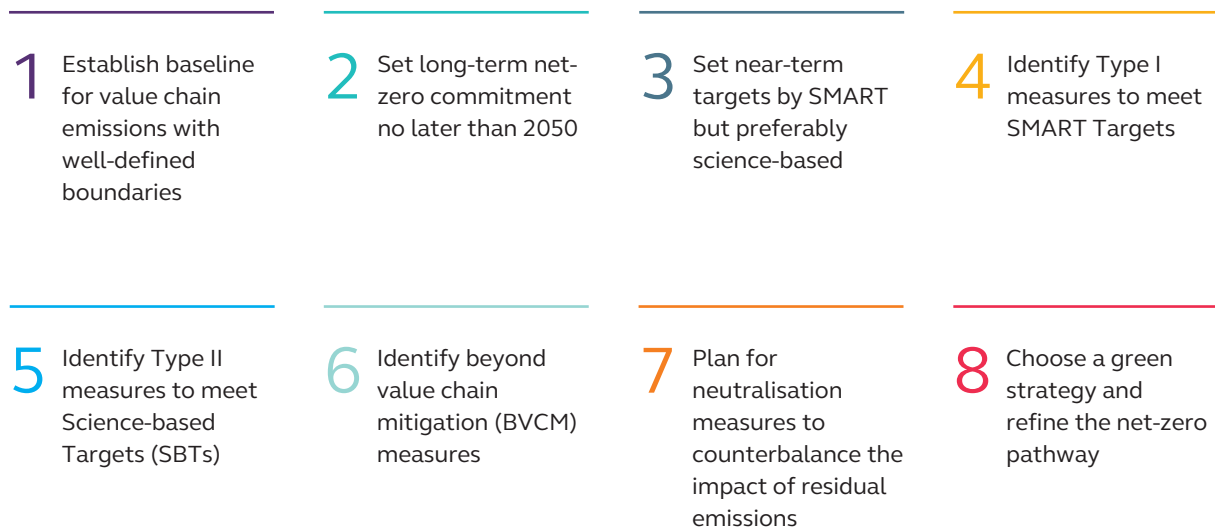
⁶ This Guide adopts the same taxonomy of climate mitigation and outcomes as Science Based Targets Initiative (SBTi). More details can be found in [SBTi Corporate Net-Zero Standard Version 1.0](#) and [Beyond Value Chain Mitigation FAQ Version 1.0](#).

How to use this Guide?

This Guide is organised into five chapters which reflect the work process of a typical company taking action to develop a net-zero pathway. Users of this Guide are advised to follow the order of the chapters and the steps set out in each chapter since this could be helpful in building up corporate buy-in, information gathering, data analysis and decision-making. The footnotes in each chapter contain more references for further details.

Almost every company with a successful sustainability programme points to the importance of support from the highest levels of the company. Support from top management and the Board is crucial for a company's journey to net-zero; a good starting point could be setting up a sub-committee or assign a board member responsible for sustainability strategy. Top management must also indicate the importance of taking bold actions along the net-zero pathway and communicate this internally and externally.

Figure 2. Overview of the work process of a typical company taking actions to develop a net-zero pathway





Establishing a Baseline for Future Planning

Establishing a Baseline for Future Planning

What can be achieved in this chapter?

This chapter provides an overview of the first step in developing a net-zero pathway. The starting point in any net-zero journey for a business is to understand where it is at present. Step one involves conducting an inventory of greenhouse gas (GHG) emissions using standardised methods.

Below topics are covered in this chapter:

- the resources needed for GHG accounting;
- the essential steps in establishing a baseline for GHG emissions;
- the early decisions that are required to make which may have lasting impact on a net-zero journey; and
- the common pitfalls as well as low-hanging fruit.

What resources are needed?

A baseline setting out current or recent GHG emissions at corporate level is a clear starting point for a GHG management strategy. This allows the company to have a meaningful and consistent reference point against which to plan and assess the performance towards net-zero.

Since credible emission measurements must conform to national standards and international protocols, in-house expertise on GHG accounting is needed. It is important to organise a dedicated team with these primary responsibilities:

- conducting research and planning the project;
- overseeing the project progress and addressing problems as they arise;
- gaining internal buy-in, from both top management to front-line operation staff;
- assigning data collection responsibilities; and
- calculating and analysing results.

To ensure a smooth process, sufficient support to staff involved in the data collection process is needed, which is often the most time consuming and challenging phase.

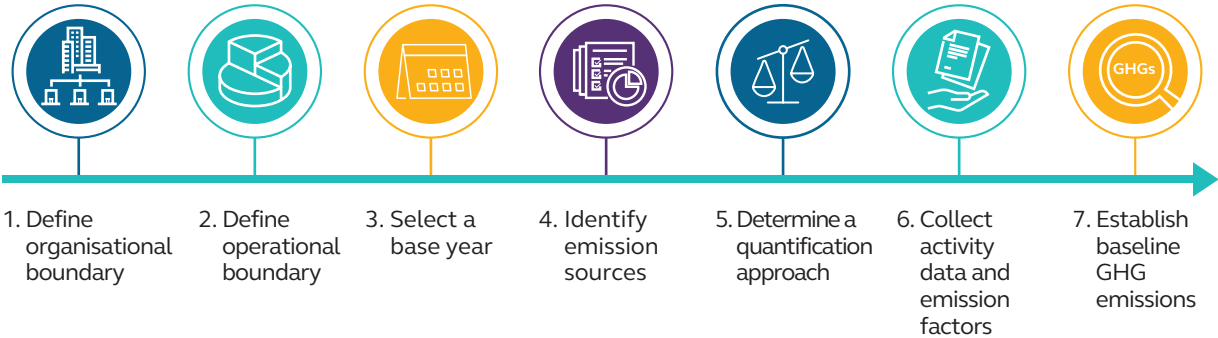
Using external support may be considered if a company does not have the necessary resources or skills internally. However, it is essential to have a dedicated executive or small team with the authority and responsibility to coordinate the in-house process in tandem with external consultants.

What steps should be taken?

Seven steps in establishing a baseline

When establishing baseline GHG emissions, it is recommended to follow seven key steps outlined in Figure 3. Some steps may require multiple rounds of iteration to ensure a fair representation of baseline GHG emissions.

Figure 3. Overview of recommended baseline GHG emissions establishment methodology



Step 1. Define organisational boundary

A company must choose one of two distinct consolidation approaches for reporting on GHG emissions – the equity share approach or the control approach.⁷

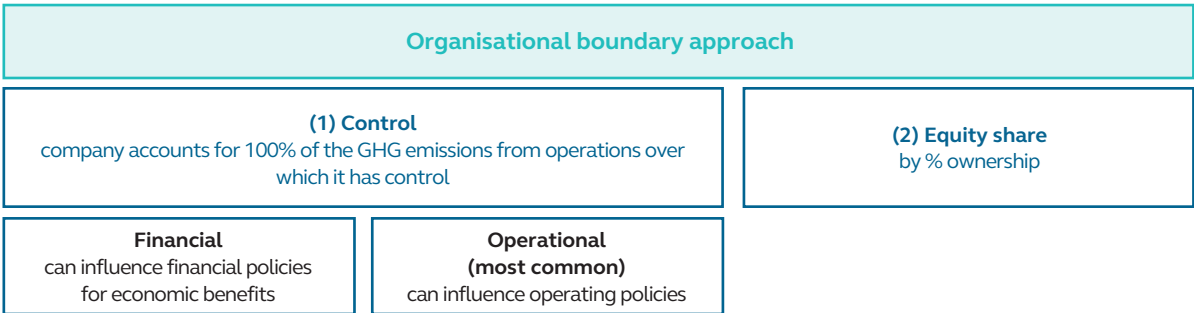
If the equity share approach is chosen, GHG emissions from operations should be accounted according to the share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation.

If the control approach is chosen, 100% of the GHG emissions should be accounted from operations

over which the company has control. Control can be defined in either financial or operational terms. For companies with complex business structures such as layers of subsidiaries or joint-venture operations, this is a delicate decision since GHG management in the future should be considered in addition to the present process of GHG data collection.

For the purpose of performance tracking, the control approaches seem to be more appropriate since managers can only be held accountable for activities under their control. However, for the purpose of risk assessment, companies might incur liabilities for GHG emissions produced by joint operations in which they have an equity interest, but over which they do not have financial control.

Figure 4. Overview of GHG Protocol organisational boundary approach



Source: GHG Protocol A Corporate Accounting and Reporting Standard (Revised edition), WBCSD & WRI

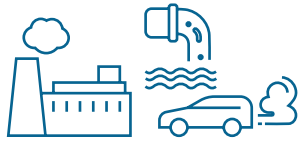
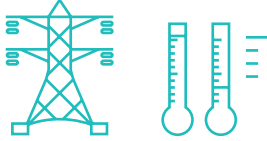

⁷ See Chapter 3 of GHG Protocol : A Corporate Accounting and Reporting Standard (Revised edition) for more explanation on each approach.

Step 2. Define operational boundary

Determining operational boundaries refers to decisions on the types of emissions connected to the company’s activities that can be included in GHG accounting (see Table 1). To achieve a credible

net-zero target, all Scope 1, 2 and 3 emissions must be assessed. Some local standards are not as comprehensive, particularly with regard to Scope 3 emissions. Setting a Science-based Target (SBT) (see p.21 of this Guide) will require a screening for all material Scope 3 categories.⁸

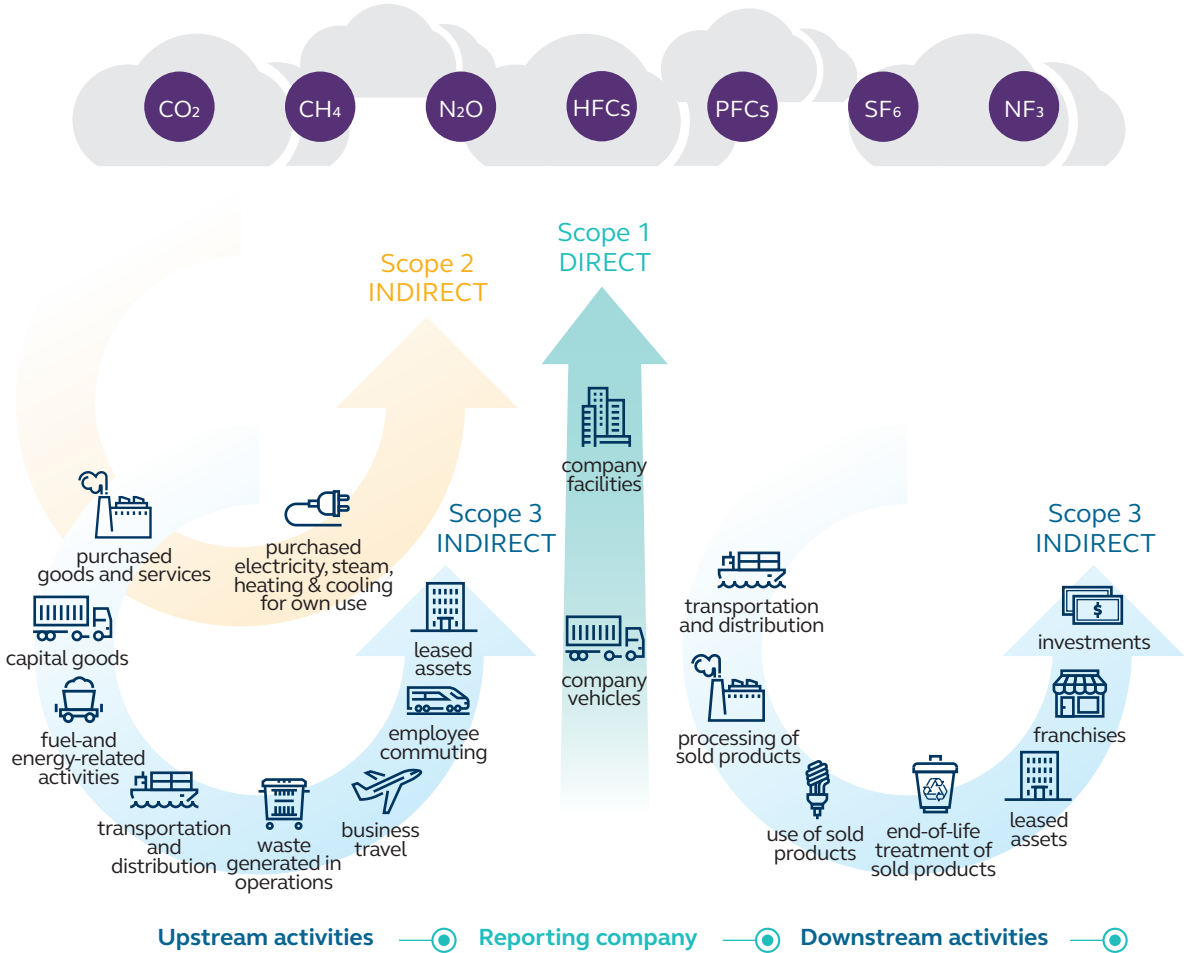
Table 1. Reporting company’s GHG footprint

Scope 1 Direct emissions or removals from sources	Scope 2 Indirect emissions from energy	Scope 3 Indirect emissions from company’s upstream/ downstream activities
		
<ul style="list-style-type: none"> • Combustion of fuels in stationary sources (e.g. boilers, furnaces, turbines) • Combustion of fuels in mobile sources (e.g. trucks, cars, ships) • Physical/ Chemical processing (e.g. cement, aluminium) • Fugitive emissions (e.g. refrigerants, fire extinguishers) 	<ul style="list-style-type: none"> • Electricity purchased from power companies • Heat and/ or cooling purchased 	<p>Common sources include:</p> <ul style="list-style-type: none"> • Purchased goods and services and capital goods • Fuel- and energy-related activities (excluded from Scope 1 and 2) • Upstream/ Downstream transportation/ distribution • Waste generated in operations • Business travel

Source: GHG Protocol A Corporate Accounting and Reporting Standard (Revised edition), WBCSD & WRI

⁸ Refer to Table 5.4 and 6.1 of [GHG Protocol : Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard](#) for description and boundaries of Scope 3 categories, and criteria for identifying material Scope 3 categories respectively.

Figure 5. Overview of GHG Protocol scopes and emissions across the value chain



Source: GHG Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard, WBCSD & WRI

Example 1. Setting organisational and operational boundaries

Organisational and operational boundaries

Organisation X is a parent company that has full ownership and financial control of operations A and B, but only a 30% non-operational interest and no financial control in operation C.

Setting organisational boundary: X would decide whether to account for GHG emissions by equity share or financial control. If the choice is equity share, X would include A and B, as well as 30% of C’s emissions. If the approach chosen is financial control, X would count only A and B’s emissions as relevant and subject to consolidation. Once this has been decided, the organisational boundary is defined.

Setting operational boundary: Once the organisational boundary is set, X then needs to decide, on the basis of its business goals, whether to account only for Scope 1 and Scope 2, or whether to include material Scope 3 categories for its operations. If the equity approach is selected, X would account for the GHG emissions of operations A, B and C in the chosen scopes, i.e., apply the corporate policy in drawing up their operational boundaries.

Step 3. Select a base year

A base year must be selected in order to have a meaningful and consistent way to track GHG emissions over time. Significant business disruptions such as a global pandemic may affect a company's emissions. Unless there are good reasons related to data availability or business variations, the most recent year with verifiable emissions data should be chosen for the required scopes.

In general, the selected base year should reflect the company's typical profile to avoid using a base year that could result into an unambitious target setting. However, if emissions fluctuate wildly year to year, an average over a series of recent years may be used.

Example 2. Sample targets with a target base year

Sample targets with a target base year

Target with a single year base year: Company [•] commits to reduce absolute Scope 1 and 2 GHG emissions by [•]% by 202[•] from 201[•].

Target with a multi-year average base year: Real Estate Company [•] commits to reduce Scope 3 GHG emissions from capital goods by [•]% per square meter by 202[•] from a 201[•]-1[•] base period.

Step 4. Identify emission sources

A company should identify which activities within the defined boundary (as confirmed in Step 1 and 2) release GHG emissions and categorise them into the three groups listed in Table 1.

Since Scope 3 refers to all emissions in the value chain, to simplify the analysis a two-stage procedure is recommended. Firstly, conduct a screening to

identify material emission sources from 15 categories based on spend data.⁹ Secondly, collect GHG data from only the material emission sources, which are different from industry to industry.^{10,11}

As an illustration, the following table highlights the material Scope 3 categories commonly found in five sectors as examples. However, each company should undertake its own screening process to confirm which Scope 3 emission sources are most material.

9 GHG Protocol and Quantis developed the [Scope 3 Evaluator](#), a free, web-based Scope 3 screening tool allowing companies to estimate emissions for all 15 Scope 3 categories using spend data.

10 Refer to [GHG Protocol : Technical Guidance for Calculating Scope 3 Emissions](#) for practical guidance (e.g., methodology, data sources and worked examples) on measuring Scope 3 emissions.

11 Financial institutions can refer to the [PCAF Global GHG Accounting and Reporting Standard for the Financial Industry](#) to quantify Scope 3 category 15 financed emissions.

Table 2. Material Scope 3 categories of five sample sectors¹²

S/N	Scope 3 Category	Textile and Clothing	Financials	Information Technology	Properties	Transport
		- Apparel - Footwear - Jewellery & Timepieces - Textiles & Fabrics - Other Accessories	- Banks - Insurance - Other Financials	- IT Hardware - Semiconductors - Software & Services	- Property Development - Property Investment	- Automobiles - Commercial Vehicles & Trucks - Industrial Transportation
1	Purchased goods and services	•	•	•	•	
2	Capital goods			•	•	
3	Fuel- and energy-related activities	•	•		•	•
4	Upstream transportation and distribution	•			•	•
5	Waste generated in operations		•	•		
6	Business travel					•
7	Employee commuting		•			•
8	Upstream leased assets					
9	Downstream transportation and distribution	•				•
10	Processing of sold products			•		
11	Use of sold products	•			•	•
12	End-of-life treatment of sold products				•	
13	Downstream leased assets				•	
14	Franchise					
15	Investment		•			

Sources:
 Guide to Scope 3 Reporting in Commercial Real Estate, UKGBC
 Transport Science-based Target Setting Guidance, SBTi
 Value Change in the Value Chain: Best practices in Scope 3 greenhouse gas management, SBTi

12 The five sample sectors are classified according to the Hang Seng Industry Classification System.

Step 5. Determine a quantification approach

Calculating GHG emissions by multiplying activity data with a corresponding emission factor is the most common approach to quantify GHG emissions. “Activity data” is a level of activity that results in GHG emissions while an “emission factor” is a factor that converts activity data into GHG emissions data.

In other words, the emissions factor will be used to calculate how much GHG has been emitted for each unit of any type of activity, such as electricity consumption, kilometres flown in an aircraft or heating/ cooling per square meter of building space.

Formula 1. GHG emissions calculation formula using activity data and emission factors

Activity Data	x	Emission Factor	=	GHG emissions
1,500 kWh (Electricity Consumption)	x	0.37 kg CO ₂ e/kWh (Emission Factor)	=	555 kgCO ₂ e ¹³

Step 6. Collect activity data and emission factors

Collecting activity data

This is an important but often laborious step that may involve many operational staff in a company. It is also the key to data integrity. All activity data should be documented and traceable, such as procurement records, electricity bills, etc. Training should be organised for staff concerned so that they would not misinterpret or misreport data.

Choosing emission factors

Emission factors can be obtained from government publications, regional and national statistics, databases and other sources. Some emission factors may not be available locally. In general, emission factors from different sources based on this hierarchy: 1. local or regional; 2. national publications; and 3. international and global databases.

Step 7. Establish baseline GHG emissions

After gathering the activity data and emission factors needed, a GHG emissions baseline can be calculated using Formula 1 above and the GHG emissions inventory results can be summarised into the sample output table below (see Table 3).

13 The “e” in kgCO₂e stands for kg CO₂ “equivalents”. If the activity generates emissions from other GHGs (e.g. methane, nitrous oxides), it should be multiplied by the global warming potential (GWP). Refer to [EPA Understanding Global Warming Potential](#) for more information on GWP.

Table 3. Sample GHG Emissions Inventory

GHG Emissions Inventory											
Total emissions (tonne CO ₂ e)											
	The Group	Organisation			Per building/ office						
		Hong Kong	Mainland China	Overseas	Sub 1	Sub 2	Sub 3	Sub 4	Sub 5	Sub 6	Sub 7
Total emissions (tonne CO₂e)	-	-	-	-	-	-	-	-	-	-	-
Scope 1											
Direct emissions from source owned/ controlled by company	-	-	-	-	-	-	-	-	-	-	-
Fuels (stationary combustion), e.g. genset, cooking equipment	-	-	-	-	-	-	-	-	-	-	-
Fuels (mobile combustion), e.g. company-owned transport fleet	-	-	-	-	-	-	-	-	-	-	-
Fugitive emissions due to refrigerant	-	-	-	-	-	-	-	-	-	-	-
Fugitive emissions due to fire extinguishing agent	-	-	-	-	-	-	-	-	-	-	-
Scope 2											
Indirect emissions from the generation of purchased energy	-	-	-	-	-	-	-	-	-	-	-
Purchased electricity	-	-	-	-	-	-	-	-	-	-	-
Purchased heat	-	-	-	-	-	-	-	-	-	-	-
Purchased steam	-	-	-	-	-	-	-	-	-	-	-
Purchased cooling	-	-	-	-	-	-	-	-	-	-	-
Scope 3											
Indirect emissions from the generation of supply chain	-	-	-	-	-	-	-	-	-	-	-
Purchased goods and services	-	-	-	-	-	-	-	-	-	-	-
Waste generation in operations	-	-	-	-	-	-	-	-	-	-	-
Business travel	-	-	-	-	-	-	-	-	-	-	-
Downstream leased asset	-	-	-	-	-	-	-	-	-	-	-
Investment	-	-	-	-	-	-	-	-	-	-	-

What pitfalls should be avoided?

Since both the GHG management process and future target setting all rely on accurate measurement, ensuring data integrity is one of the key tasks for the company. For companies with inexperienced

coordinators or front-line staff, errors may occur at any stage of the process, from boundary setting to data collection, aggregation, interpretation and analysis. Below are some of the more common pitfalls that warrant special attention:

Table 4. Pitfalls and corresponding preventive or mitigation measures

Pitfalls	Preventive or mitigation measures
Baseline changed without valid reasons	Pre-set a “significance threshold”, e.g. 10% of total emissions, that provides the context and basis for any recalculations of the base year emissions. The following are valid reasons for recalculation ¹⁴ : <ul style="list-style-type: none"> • structural changes in the company; • changes or improvements to the calculation methodology; or • discovery of significant errors or cumulative errors.
Certain areas or certain sources of emissions omitted	Difficulty in collecting data is not a valid reason to omit certain areas unless the omitted emissions are not more than 5% of Scope 1 and 2 emissions and material Scope 3 emissions combined. ¹⁵
Certain GHGs omitted from inventory	Check emissions in all operations to ensure that all seven GHGs ¹⁶ are included in data collection and their footprints are expressed carbon dioxide equivalent.
Data quality in doubt and not ready for verification or assurance	Implement an inventory quality management system that includes precise and standardised methodologies, robust data gathering process and built-in analytics for comparison and alert. Involve in-house teams for internal audit or corporate governance. Seek external support for data integrity services or verification. ¹⁷
Incomplete organisational boundary	It may be challenging to collect data from overseas operations so a company may wish to focus on collecting data from its local operations initially. However, the company is recommended to make best efforts to collect data from overseas operations to give a full picture of its operations as early as practicable. A narrative explaining the boundaries and describing the process used to identify which entities or operations are included is recommended. If there is a change in the scope, the company should explain the difference and reason for the change, too.
Misinterpretation of data definition at points of collection or aggregation	Provide training sessions to relevant staff at management and operational levels. Data generation and reporting systems are only as reliable as the people who operate them.

14 Refer to Chapter 5 of *GHG Protocol : A Corporate Accounting and Reporting Standard (Revised edition)* for detailed explanation.

15 Scope 3 emissions shall be included while over 40% of overall Scope 1, 2 and 3 GHG emissions, which is one of the SBTi criteria for setting SBTs. This will be further explained in p.21 of this Guide.

16 The seven GHGs include carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF₆); and nitrogen trifluoride (NF₃).

17 See Chapter 10 of *GHG Protocol : A Corporate Accounting and Reporting Standard (Revised edition)* for more guidance on selecting a verifier and verification preparation.



Target Setting in Alignment with National and International Goals

Target Setting in Alignment with National and International Goals

What can be achieved in this chapter?

To achieve net-zero, a company will need to make commitments and set targets that are in line with national and international goals.

Below topics are covered in this chapter:

- international commitments and national goals in carbon reduction, in particular for China and Hong Kong;
- considerations for setting a long-term commitment; and
- methodologies available to setting near-term targets.

How to determine long-term commitments?

As a company prepares for its net-zero commitment, it should take note of the policy commitments made at three different levels – international, national and city level, as well as the scientific consensus that underlies these targets. The way that these commitments are made often involves different terminology and different base years, and hence care should be taken to avoid confusion.

The most authoritative definition of net-zero, and the most widely accepted by the scientific community, comes from the Intergovernmental Panel on Climate Change (IPCC), the UN scientific body that informs the Paris Agreement. The IPCC defines net-zero as that point when human-caused emissions of greenhouse gases (GHGs) to the atmosphere are balanced by removals over a specified period. The Paris Agreement, to which China is a signatory, is clear on the need to achieve this balance by the second half of this century. Recent studies suggest that in order to have a reasonable chance of holding temperature rises to 1.5°C, this state must be reached by 2050.¹⁸

In an address to the UN General Assembly on 22 September 2020, China's President Xi announced that China would peak GHG emissions before 2030 and achieve carbon neutrality before 2060.¹⁹ In November 2020, Hong Kong's Chief Executive Carrie Lam announced that the city would strive to achieve carbon neutrality before 2050.²⁰



18 Refer to IPCC Special Report on Global Warming of 1.5°C.

19 See *Bolstering Confidence and Jointly Overcoming Difficulties To Build a Better World*.

20 See Chief Executive's 2020 Policy Address.

Box 1. Guiding principles for a corporate net-zero strategy

Guiding principles of a corporate net-zero strategy

Three guiding principles have been proposed by the Science Based Targets Initiative (SBTi) in the formulation of corporate net-zero strategies consistent with global goals²¹:

Guiding principle 1

Reaching net-zero emissions for a company involves achieving a state in which its value chain results in no net accumulation of carbon dioxide in the atmosphere and in no net-impact from other GHG emissions.

Guiding principle 2

In accordance with the best available science, the Paris Agreement and the UN Sustainable Development Goals (SDGs), companies should transition towards net-zero in line with mitigation pathways that are consistent with limiting warming to 1.5°C with no or limited overshoot.

Guiding principle 3

The mitigation strategy followed by the company should inform long-term strategies and investments that mitigate exposure to climate-related transition risks, ensuring that the business model of the company will continue to be viable in a net-zero economy.

In order to fulfil global, national and city-level goals, companies should reach net-zero GHG emissions by no later than 2050. Even if a level of abatement of about 90% of all GHG emissions by 2050 can be achieved, there is still a 33% probability of global warming beyond 1.5°C compared to pre-industrial levels.

To avoid reputational risks, it is prudent for a company to set a net-zero commitment for 2050 or earlier. If a company decides to be more ambitious and adopts a target year earlier than 2050, it should still maintain its best effort in reducing absolute emissions during the transition period.

21 More details can be found in [SBTi Foundations for Science-based Net-zero Target Setting in the Corporate Sector](#).

How to set near-term targets?

In the latest IPCC assessment²², humanity has about a 50% chance of staying below the 1.5°C threshold if carbon dioxide emissions from 2020 onwards remain below 500 billion tons. At the current rate of emissions, that carbon budget would be used up in about 13 years.

A long-term commitment for net-zero would not be credible unless it is supported by robust, specific strategies and ambitious near-term targets, commonly set in a 5 to 10-year time frame. Companies should therefore strive to set near-term targets that are consistent with the global decarbonisation pathway needed to stay within the 1.5°C threshold – an effort that is the premise of “Science-based Targets” (SBTs).

Box 2. Definition of SBT

What is a Science-based Target?

A GHG emission reduction target is defined as science-based if it is in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement - with the level of decarbonisation required to limit global temperature increase to 1.5°C above pre-industrial level.²³

Considering the challenges faced by many companies in deep decarbonisation, a set of “SMART Targets” may be adopted as a transitional step, before setting SBTs for the company. Typically, SMART Targets

should not go beyond a time frame of 5 years. Beyond this, a company should aim to adopt SBTs so that its emission trajectory will converge with the 1.5°C decarbonisation pathway as early as possible.

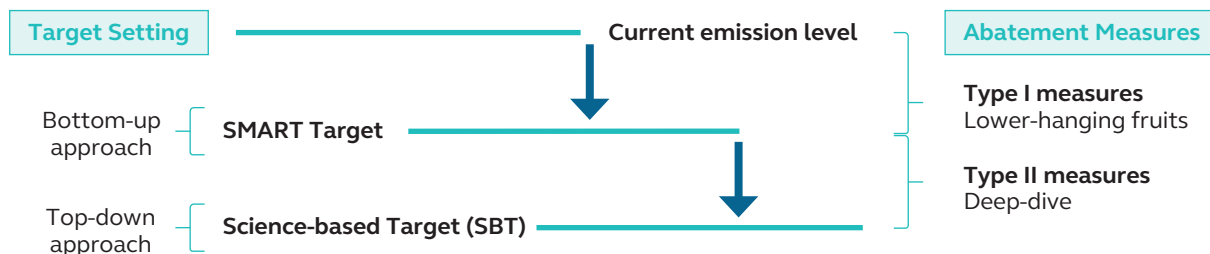
Table 5. Stepwise approach to target setting

Step	Considerations
1. Scope of targets	<ul style="list-style-type: none"> Define what emissions are covered in the base year inventory (refer to p.6 - 14 of this Guide for more details). At minimum, operational (Scope 1 and 2) emissions should be covered. Scope 3 screening can then be conducted to identify material upstream and downstream emissions. Companies should note that Scope 3 emissions typically make up the majority of a company’s emissions.
2. Identify appropriate target level	<ul style="list-style-type: none"> Top-down approach: follow the target reduction pathways required to reach 1.5°C and net-zero as described in the SBTs. Bottom-up approach: set SMART Targets by identifying all carbon reduction measures the company is ready to take.
3. Target output	<ul style="list-style-type: none"> To achieve net-zero, a company must set targets based on absolute emissions: an absolute reduction in GHG emissions. However, for the purpose of in-house monitoring and management, intensity targets may also be set as follows: <ul style="list-style-type: none"> Physical intensity: a reduction target in emissions relative to a specific business metric, such as production output of the company. Economic intensity: an intensity reduction of tCO₂e/\$ value added.
4. Time frame of targets	<ul style="list-style-type: none"> Near-term targets between 5 to 10 years. Companies setting near-term targets not aligned to a 1.5°C pathway will be expected to decarbonise more aggressively in the future to ensure their mitigation strategy aligns with a 2050 net-zero goal. A company should aim to set ambitious near-term targets so that it would be easier to reach net-zero by 2050.

²² Refer to IPCC AR6 Climate Change 2021: The Physical Science Basis.

²³ Although earlier versions of SBT allows the choice for a “well below 2°C” pathway, the latest standards being developed by SBTi is shifting its focus to “1.5°C pathway”.

Figure 6. Target setting approach and abatement measures²⁴



The top-down approach implies that the ambition level of target is determined independent of the company’s GHG reduction potential and action planning. On the other hand, bottom-up targets are selected after analysing the GHG reduction potential of the value chain and identifying all practical actions.

overall target reduction pathways required to reach long-term net-zero commitment. These two sets of targets may not align with each other. For most companies, SMART Targets may fall short of SBTs, which means that companies will need to undertake more drastic gap-closing measures in later years in order to reach net-zero on or before 2050.

Setting SMART Targets

Setting SMART Targets follows a bottom-up approach while setting SBTs is a top-down approach guided by

A company should undertake a stakeholder engagement process and determine GHG reduction target(s) after considering the following five aspects:

Specific – What specifically do you want to achieve?

Targets should lead to absolute GHG reduction, although intensity targets may be set for management purposes.

Measurable – How will you know when you have achieved the target?

Targets should indicate the desired level of reduction your company aims to achieve, expressed as an absolute number or a percentage reduction.

Attainable – Is it something you have control over and can actually achieve?

All practical reduction measures should be examined in your internal operations and value chain, so as to reach as high a level of ambition as possible.

Relevant – How applicable is the target to your business and does it align with existing strategies?

Targets should have the same organisational coverage as your company’s GHG inventory. They should at least cover operational (Scope 1 and 2) emissions and preferably selected value chain (Scope 3) emissions.

Time bound – By when do you want to achieve your goal?

Targets should include a base year and target year. Multi-year targets ranging from annual targets to 10-year targets are useful for progress tracking.

24 Type I and Type II measures will be further explained in p.26 - 29 of this Guide.

Example 3. Sample disclosure of a SMART Target

Sample disclosure of a SMART Target

Below is an example of a near-term SMART GHG reduction target from a banking and financial services company:

“We have established a Group-wide 32% absolute carbon emissions (Scopes 1 and 2) reduction target by 2030 based on a 2019 baseline. Our new target builds on our previous annual electricity consumption reduction target of 1.1% in our two main office buildings in Hong Kong. At the turn of 2020, the emissions of both buildings accounted for 22% of our Group’s total emissions from our own operations.”

- **Specific** – It specifically states the outcome to reduce 32% absolute carbon emissions at a group level.
- **Measurable** – Emissions reduction can be tracked and analysed as a percentage change.
- **Attainable** – The company has control over the electricity consumption of the office buildings which accounted a significant part of the total operational (Scope 1 and 2) GHG emissions.
- **Relevant** – The target covers operational (Scope 1 and 2) GHG emissions.
- **Time bound** – The company aims to achieve the target by 2030.



Setting Science-based Targets

A SBT refers to any target that is developed based on a methodology aligning to the Paris Agreement. There are various scientific methodologies currently available, such as the absolute contraction approach or sectoral decarbonisation approach, and other sector-specific approach.

A widely recognised validation body for SBTs is the Science Based Target initiative (SBTi), which defines and promotes best practices in emissions reductions and net-zero targets in line with climate science. Company targets set against their methodologies need to be presented to SBTi for official validation.

Box 3. Key criteria of near-term SBTs by SBTi

Key criteria of near-term SBTs²⁵:

- **Scope:**
 - The target(s) must cover at least 95% of company-wide Scope 1 and Scope 2 emissions, as defined by the GHG Protocol Corporate Standard.
 - If a company's relevant Scope 3 emissions are 40% or more of total Scope 1, 2, and 3 emissions, a Scope 3 target is also required.
 - Scope 3 target(s) must collectively cover at least 2/3 of total Scope 3 emissions considering the minimum boundary of each category in conformance with the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.
 - The most recent completed GHG inventory must not be earlier than two years prior to the year of submission.
- **Level of ambition:**
 - Emissions reductions should be aligned to a 1.5°C pathway.²⁶
 - Intensity targets for Scope 1 and Scope 2 emissions are only eligible when they lead to absolute emission reduction targets in line with climate scenarios for keeping global warming to 1.5°C or when they are modelled using an approved sector pathway applicable to companies' business activities.²⁷
- **Time frame:**
 - Targets must cover 5 to 10 years from the date the target is submitted to the SBTi for an official validation.²⁶
- **Caution:**
 - The use of offsets must not be counted as emissions reduction toward the progress of companies' SBTs.
 - Avoided emissions do not count towards a SBT.
 - Targets that have already been achieved by the date they are submitted to the SBTi are not acceptable as SBTi assesses only forward-looking ambition.

25 This is the general SBTi criteria for setting a SBT, please refer to the list of sector-specific guidance on [SBTi official website](#) for sector-specific methods and requirements.

26 Although earlier versions of SBT allows the choice for a "well below 2°C" pathway and targets from 5 to 15 years, the latest standards developed by SBTi is shifting its focus to "1.5°C pathway" and near-term SBTs from 5 to 10 years. SBTi has also developed criteria and methods for setting long-term SBTs. See [SBTi Corporate Net-Zero Standard Criteria Version 1.0](#). The SBTi has released [SBTi Criteria and Recommendations Version 5.0](#) in October 2021, and this will come into force from 15 July 2022.

27 Companies can consider setting targets to actively source renewable electricity at a rate that is consistent with the 1.5°C pathway as an alternative to Scope 2 emission reduction targets. Companies can also consider setting near-term Scope 3 supplier and/or customer engagement targets in addition to emissions reduction targets.

Example 4. Sample disclosure of SBTs following SBTi criteria

Sample disclosure of SBTs following SBTi criteria

Below is an example of near-term SBTs from a logistics service provider in China:

“We have committed to reduce absolute Scope 1, 2 and 3 GHG emissions 50% by 2030 from a 2019 base year. We commit that 50% of our suppliers by spend covering all upstream categories, will have Science-based Targets by 2025. Our company is also committed to increase annual sourcing of renewable electricity to 100% by 2030.”

The operational (Scope 1 and 2) emissions reduction level and the renewable energy procurement target (Scope 2) are consistent with a 1.5°C pathway. The company also set supplier engagement target for relevant value chain (Scope 3) emissions.

Table 6. Key differences of SMART Targets and SBTs in near and long-term

Target type	Near-term	Long-term
SMART Targets	<ul style="list-style-type: none"> • Enable a company to engage stakeholders quickly and identify practical actions • Having succeeded with low-hanging fruit, company management and staff can be inspired to take deep decarbonisation actions 	<ul style="list-style-type: none"> • Reduction trajectory is likely to fall short of what is needed to align with the 1.5°C pathway • Require aggressive GHG reductions in later years and such delay may increase the economic costs associated with deep decarbonisation²⁸
SBTs	<ul style="list-style-type: none"> • Allow a company to demonstrate high ambition level in near-term actions, thus strengthening the company’s reputation • Ensure that the company is well prepared for policy and regulatory changes, hence lowering transitional risks • Require careful planning and resources to gather and analyse available data, in particular value chain data required for Scope 3 screening and measurement 	<ul style="list-style-type: none"> • Enable a company to capture business opportunities in the transition to net-zero • Reduce reputational and transitional risks when social values shift and carbon prices go up • May require more radical adjustments in business models and investment directions

28 Refer to Annual Review of Environment and Resources: The economics of 1.5 °C climate change for details.

What pitfalls should be avoided?

Table 7. Pitfalls and corresponding preventive or mitigation measures

Pitfalls	Preventive or mitigation measures
Insufficient information disclosure	Key data such as base year, target year, boundary, ambition level and progress should be disclosed publicly to preserve credibility.
Company only provides long-term targets with no or ambiguous near-term targets	Credible near-term targets and action plans that are aligned to achieving long-term net-zero targets should be set. Be aware that steeper and more ambitious reduction goals now will make it easier to transit to net-zero in future decades.
Failing to account for Scope 3 emissions in mid-term to long-term	For some companies, the Scope 3 emissions may constitute less than the 40% requirement by SBTi initially. However, Scope 3 emissions will become relatively more important as Scope 1 and 2 emissions are reduced over time. Hence, a company is advised to conduct a comprehensive Scope 3 screening at the early stage of the target setting process and conduct regular review during the transition period.
Lack of internal resources or support for target setting	<p>Target setting requires a company-wide effort, which is best driven by the board or top management. Consider hiring people with the right skills or training in-house staff with external help. A campaign for cultural change may be necessary.</p> <p>Stakeholder support and good quality data are essential for target setting. In view of this, investing more effort in stakeholder engagement such as data collection training, data integrity checks and capacity building will deliver significant benefit to the entire process.</p>
Lack of support from suppliers to reduce GHG emissions	For supply chain emissions, mapping Scope 3 emissions will provide valuable insights for further engagement with suppliers on reducing supply chain emissions. Developing a supply chain engagement strategy and a low-carbon procurement policy is also encouraged. ²⁹
Treating target setting as a one-off exercise	Regardless of the approach chosen, companies should monitor progress towards the targets and review the strategies regularly. Companies using the SMART target approach should aim to increase the level of ambition within 5 years and ultimately adopt a SBT.

²⁹ Refer to Chapter 5 of *SBTi Value Change in the Value Chain : Best practices in Scope 3 greenhouse gas management* for additional guidance.



Identifying Reduction Potential and Gap-Closing Measures

Identifying Reduction Potential and Gap-Closing Measures

What can be achieved in this chapter?

To achieve net-zero, best effort must be made to reduce emissions to as close to zero as possible.

Below topics are covered in this chapter:

- how to identify low-hanging fruit for emissions reduction;
- how to evaluate strategic options for deep decarbonisation;
- how to advocate for positive policy measures; and
- how to avoid potential pitfalls in the implementation process.

What steps should be taken?

Target setting must be accompanied by corresponding abatement measures – actions that prevent, reduce or eliminate greenhouse gas (GHG) emissions – that can be reasonably expected to meet the targets. Since SMART Targets are dependent on the company’s assessment of its own reduction potential, target setting and action planning is an iterative process. SBTs are not, however, dependent on a company’s particular conditions. The responsibility falls on the company to identify adequate gap-closing measures to meet a SBT regardless of its baseline emissions.

For ease of planning, different types of abatement measures may be classified as follows:

Table 8. Types of abatement measures

Type of action	Functions	Identification process	Examples
Type I measures	Low-hanging fruit that can reduce emissions from the baseline to meet SMART targets	Engage stakeholders in a planning process to identify practical actions available to reduce operational and value chain emissions	<ul style="list-style-type: none"> • Select energy efficient office space with green certifications • Incorporate low-carbon criteria in procurement specifications
Type II measures	Deep-dive actions that can close the gap between a SMART target and a SBT	Evaluate strategic options across entire value chain – from technology, supply chain, business model to investment/divestment	<ul style="list-style-type: none"> • Transform company car fleet to electric/ zero-emissions vehicles • Divest investments from fossil fuel companies
Policy conditions	Government or sectoral policies that help companies reduce emissions by improving emission factors for their activities	Advocate governments and industrial bodies to adopt bold policies that will deliver cross-cutting benefits to all companies	<ul style="list-style-type: none"> • Join business chambers to call for higher local renewable targets • Make representation to International Maritime Organization (IMO) to raise global targets on low-carbon fuels in marine shipping industry

Type I measures

A company will need to identify all practical actions that it is ready to take to reduce Scope 1 and 2 operational emissions, as well as selected Scope 3 emissions in the value chain. This process will be most effective if it is taken up as a company-wide process from senior management to front-line staff.

An iterative process with five steps illustrated below may help planning actions required to meet the SMART Targets:

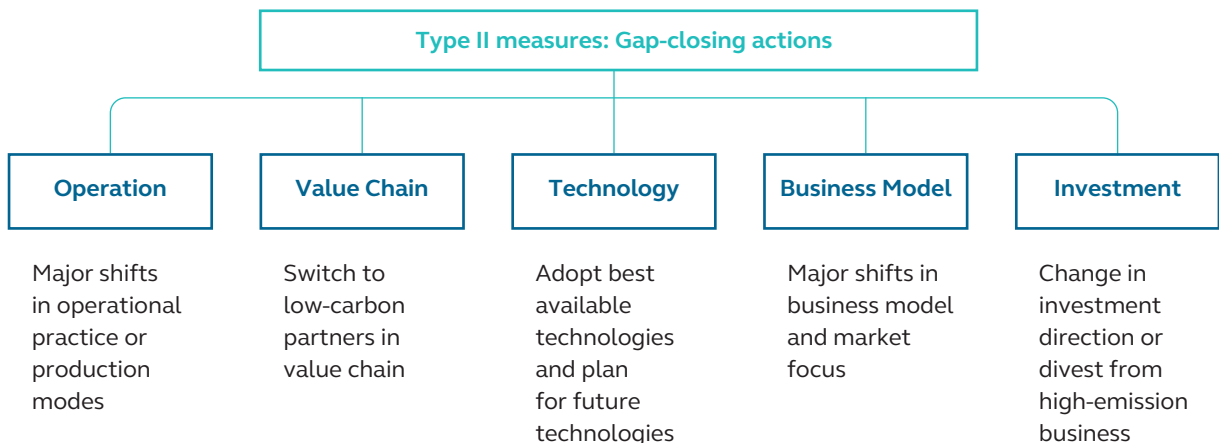
Figure 7. Identification process for Type I measures



Type II measures

More actions may be needed to meet SBTs and align with the 1.5°C pathway in addition to the Type I measures. This requires a deep dive process to explore strategic options that go beyond reduction opportunities in daily operations.

Figure 8. Strategic options for Type II measures



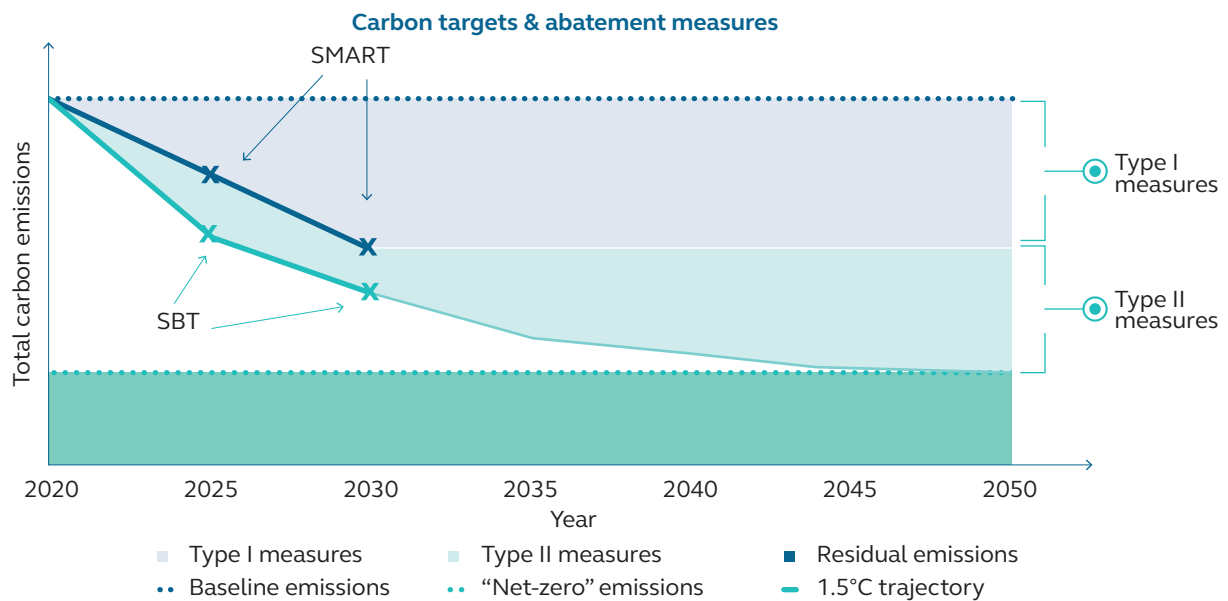
Each of the options identified should be evaluated against its mitigation potential and business impacts. They should be thoroughly studied by the management and discussed at board level. To facilitate the evaluation process, the following common criteria may be considered:

Table 9. Internal and external criteria for evaluation of Type II measures

Internal criteria	External criteria
Staff expertise	Impact on emissions reduction
Technical feasibility	Industry practice
Resource availability	Customer expectations
Cost-benefit ratio	Regulatory trends

After the evaluation, quantifying and consolidating the emissions reduction potential of the most desired Type II measures will allow the company to assess how and when it can meet its SBTs.

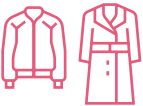




Figure 9. Carbon targets and abatement measures



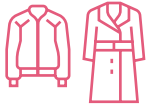
As an illustration, some common abatement measures in five sample sectors are listed below. This is by no means exhaustive and more innovative measures are encouraged. A measure deemed by one company as a change in daily operational practices may be viewed

as a measure requiring strategic change in business model for another. Abatement measures can only be classified into Type I and II measures by taking company-specific circumstances (e.g. size, industry, target levels) into consideration.

Table 10. Common abatement measures in five sample sectors³⁰

 Textile & Clothing	 Financials	 Information Technology	 Properties	 Transport
Scope 1				
<ul style="list-style-type: none"> Use energy efficient technologies (e.g. smart meters) in retail facilities 	<ul style="list-style-type: none"> Select energy efficient office space with verifiable green building certifications 	<ul style="list-style-type: none"> Centralise data centres and facilities to optimise operations Substitute high global warming potential (GWP) fabrication gases Upgrade manufacturing equipment to more efficient versions 	<ul style="list-style-type: none"> Switch to low-carbon refrigerants Transform company car fleet and construction vehicles from conventional fossil fuel vehicles to electric/zero-emissions vehicles 	<ul style="list-style-type: none"> Invest in low-carbon fuels (e.g. biofuel, liquid hydrogen, green ammonia) Transit from conventional fossil fuel vehicles to electric/zero-emissions vehicles <p>Companies that manufacture vehicle parts:</p> <ul style="list-style-type: none"> Design energy efficient parts
Scope 2				
<ul style="list-style-type: none"> Apply low carbon assessment criteria for selecting office space and retail stores Purchase green power through direct power purchase agreements if available 	<ul style="list-style-type: none"> Increase virtualisation in data centres to reduce electricity use Invest in local renewables and secure green energy 	<ul style="list-style-type: none"> Decommission legacy networks Design and construct new manufacturing facilities according to recognised green building standard (e.g. LEED certification) Purchase green power through direct power purchase agreements for all facilities and data centres if available 	<ul style="list-style-type: none"> Energy efficient innovation (e.g. install variable speed drive condensing water pumps, and replace air-cooled chillers with high-efficiency oil-free magnetic bearing chillers) Install rooftop PV panels and micro-wind farms 	<ul style="list-style-type: none"> Switch to 100% renewable energy for operations (i.e. manufacturing plants, facilities)

³⁰ Reduction measures listed in the table are referenced from the public disclosure of listed companies, *EDF Pathways to Net Zero: A Guide for Business*, and *HKGBC Green Tenancy Driver*.



Textile & Clothing



Financials



Information Technology



Properties



Transport

Scope 3

- Apply green logistics and optimise routes to reduce distance covered during supply and delivery
- Apply sustainability criteria in product design
- Incorporate low-carbon criteria in procurement specifications and provide suppliers training
- Raise ambition for recycled materials in packaging
- Switch to electric/zero-emission vehicles for outsourced fleets

- Encourage clients to shift from conventional debt instruments to ESG-linked loans/bonds with decarbonisation targets
- Help clients build capacity to set SBTs and formulate action plans
- Reduce exposure to fossil fuel portfolio
- Require clients to disclose comprehensive carbon inventory and targets

- Innovate business models to decarbonise end-user device electricity consumption
- Implement circular economy, using recycled metals, raw materials, and plastics for product design

Downstream leased assets:

- Implement food waste recycling program for F&B tenants
- Develop green lease partnership programs for tenants to incentivise energy efficiency
- Provide electric vehicle charging facilities in shopping mall carparks

Construction sites:

- Replace diesel generators with battery storage units to reduce fossil fuel consumption in construction projects
- Incorporate low-carbon specifications in tender documents and prioritise the procurement and use of local construction materials
- Switch from conventional to pre-fabrication construction to minimise energy use and waste

Companies that own/control vehicles and vehicle manufacturers:

- Collaborate with policymakers, businesses, and NGOs to accelerate electric vehicle cost-parity and access to electric vehicle charging stations
- Partner with suppliers with proven low-carbon construction capabilities to build transport infrastructure
- Work with suppliers across the supply chain to develop technologies that support commercially viable operations of net-zero emissions vessels and vehicles

Companies that manufacture vehicle parts:

- Implement close loop recycling, using recycled metals, raw materials, and plastics for fabrication of new parts

Companies that subcontract/purchase transport services:

- Develop low-carbon transport agreement with transport service providers

Policy conditions

In addition to the direct actions a company may take in Type I Measures and Type II measures, certain policies taken or not taken by governments or industry bodies may have a significant impact on its future emissions profile.

For instance, since the carbon footprint in Scope 2 emissions is a multiple of the consumption of purchased electricity and the emission factor of the electricity grid that supplies the power, any variation in the latter will have direct impact on the future carbon footprint. If the utility companies generate more power from renewable energy, the carbon intensity for each kWh of power generated will decrease, and the company’s carbon footprint will decrease correspondingly. On the contrary, if the city grid becomes more addicted to coal or gas-fired power generation, the company’s carbon footprint could increase despite its efforts to reduce power consumption.

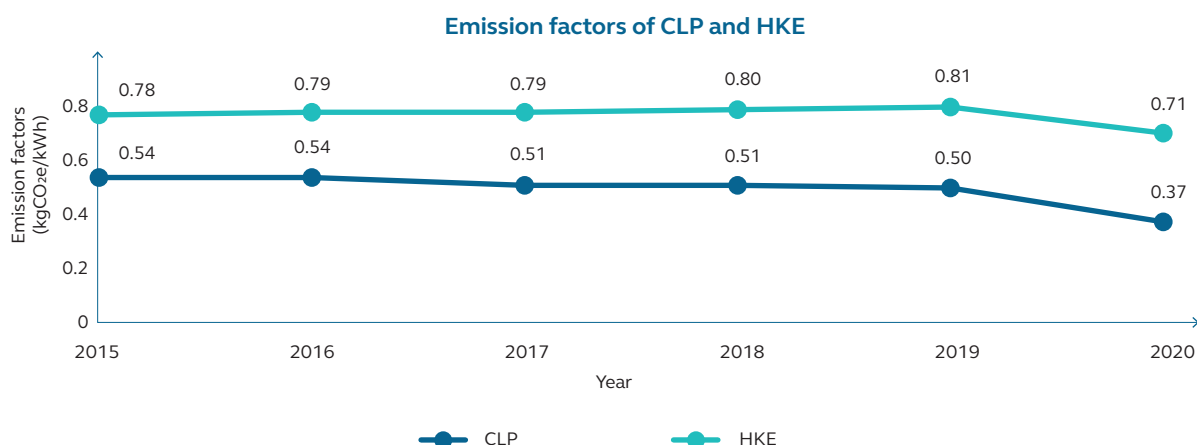
The same is true for Scope 3 emissions. If emission factors for the products or services in the value

chain increase or decrease, such as future changes in waste treatment, air travel or material production and processing, the carbon footprint will increase or decrease correspondingly.

In view of the above, one of the actions a company should take to reduce its carbon footprint is to advocate for cleaner forms of electricity generation in the cities and countries where it operates and demand industry bodies to adopt more stringent standards in decarbonisation.

As an illustration, the movement of emission factors in Hong Kong’s two power companies are highlighted below. In addition, HK Electric Investments has set a target to reduce carbon dioxide equivalent per unit of electricity sold to not higher than 0.6kg/kWh in 2023 from 0.93kg/kWh in 2005,³¹ while the CLP Group has pledged to reach net-zero GHG emissions across the value chain by 2050 at a group level.³² Their future trend will depend on how quickly they adopt cleaner fuel and renewable energy, which is subject to changes in government policies.

Figure 10. Historical emission factors of CLP and HKE



Sources:

CLP Sustainability Report, 2015-2020

HK Electric Investments Sustainability Report, 2015-2020

31 Refer to [HK Electric Investments 2020 Sustainability Report](#) for details of the target and the target progress.

32 Refer to [CLP’s Climate Vision 2050 \(2021 Edition\)](#) for more information on the Group’s net-zero GHG emissions commitment.

In China, the increased utilisation of renewable energy will likely reduce emission factors in future years although there has been a history of delay in the update of official national emission factors.

In support of the Paris Agreement, China has committed to peak its carbon dioxide emissions and to supply 25% of its energy demand using non-fossil sources by 2030.³³

Regarding Scope 3 emissions from business travel and logistics, if the aviation and marine transport sectors can be persuaded to adopt more ambitious carbon reduction targets, their emission factors will improve more quickly to the benefit of all companies using their services and seeking to reduce emissions.

What pitfalls should be avoided?

Table 11. Common pitfalls in the implementation of abatement measures and corresponding preventive or mitigation measures

Pitfalls	Issues related to abatement measures
Inadequate budget or resource allocation	There is clear evidence that delayed response to climate risks will often result in greater loss and higher cost of remedies during the transition period. For this reason, it is imperative to enable the board to grasp the economics of trade-offs by conducting comprehensive cost-benefit analyses, taking into account of the physical and transitional risks under different climate scenarios.
Inertia in company culture	Effective changes in operational practices require systemic shifts in company culture. Company-wide awareness campaigns and capacity building programmes are often cost-effective investments to get the best out of management and staff. Linking the remuneration of senior management and company performance to carbon reduction targets has also proven to be an effective tool in net-zero strategies.
Over-emphasis on operational changes	Strategic decisions in the choice of business models and new investments often have significant impacts on a carbon profile. The company’s board should consider not only incremental changes in current operations, but also a broad range of strategic options in light of market development, new products, green finance, technology shifts, customer preferences and policy trends.

33 Watch Leadership statement by H.E. Xi Jinping President of the People’s Republic of China at the Climate Ambition Summit 2020.



Neutralisation and Mitigation Beyond Value Chain

Neutralisation and Mitigation Beyond Value Chain

What can be achieved in this chapter?

Corporate net-zero emissions strategies usually consist of a combination of mitigation tactics which lead to different outcomes for companies, society and for the climate. Whilst a company should do its best in order to reduce emissions, to achieve net-zero it needs to employ neutralisation measures to fully counterbalance the impact of its residual emissions. During the transition period mitigation measures beyond a company's value chain are essential for accelerating the transformation into a low-carbon economy. These three tactics – abatement, neutralisation and beyond value chain mitigation (BVCM), are indispensable components of any robust net-zero strategy.

Below topics are covered in this chapter:

- understand the concept of neutralisation and BVCM;
- learn how to differentiate carbon credits in terms of project types and qualities;
- determine what to look for when making purchase decisions; and
- understand how and when to use neutralisation and BVCM at different stages of the net-zero journey.

Box 4. Definition of Neutralisation and BVCM

What is Neutralisation and BVCM?

“Neutralisation” refers to measures taken by a company, both within and outside of its value chain, to remove carbon dioxide from the atmosphere and permanently store to counterbalance the impact of GHG emissions within the value chain of the company that remain unabated. “Beyond value chain mitigation” (BVCM) refers to actions taken by a company to reduce, avoid or remove GHG emissions outside of its value chain in the transition to net-zero.

Reaching net-zero emissions requires neutralising a company's residual greenhouse gas (GHG) emissions with an equivalent amount of carbon removals. An effective neutralisation strategy involves removing carbon from the atmosphere and storing it for a long-enough period to fully neutralise the impact of any of the company's GHG emissions that continue to be released into the atmosphere.

Neutralisation and BVCM as mitigation tactics

After developing action plans for abatement (Type I and Type II measures) in the last chapter, a company should look at how to address the unabated emissions during the transition period and residual emissions in its journey to net-zero. This involves primarily two tactics: neutralisation and BVCM. These two approaches serve different purposes in a net-zero strategy. It is important to understand the different mitigation tactics that a company can use in its net-zero strategy. If the actions a company takes do not match the claims it makes, this may carry reputational risks.

While reaching a balance between emissions and removals is the end goal of a net-zero journey, corporate actions to reduce, avoid or remove emissions beyond a company's value chain can contribute to the global transition to net-zero.

Box 5. Definition of Carbon Neutral

What is Carbon Neutral?

According to the Intergovernmental Panel on Climate Change (IPCC), the term "carbon neutral" refers to a state when human-caused carbon dioxide emissions are balanced globally by carbon dioxide removals over a specified period. Nevertheless, the term is generally used to describe a specific state when the total GHG emissions arising from an entity, facility, product or event are offset by accredited carbon credits, which may involve either carbon avoidance or removal. It is common for companies to set a carbon neutrality target covering all of their direct operations (usually including Scope 1 and 2 emissions) and certain Scope 3 emissions for a specific facility, product, brand or event. A robust verification standard for carbon neutrality can be found in PAS2060.³⁴

This is not to be confused with the concept of "neutralisation" in the taxonomy for net-zero strategy, which only permits carbon removal credits to be used to counterbalance the impact of residual emissions when a company lays claim to "net-zero".

Avoided emissions is a relative metric estimated by comparing the climate impacts of a given product, activity, or service against the climate impacts of a reference product, activity, or service. Due to its relative nature, avoided emissions cannot be used to substitute carbon removals.

If a company lays claim to "achieving a net-zero target", it must neutralise the residual emissions within its value chain with an equivalent amount of permanent carbon dioxide removals. However, carbon avoidance credits play an important role to encourage more funds to be channelled into green projects, which are essential for the transition to a low-carbon economy. Many carbon avoidance and reduction projects, if structured well, can offer sustainability

co-benefits such as biodiversity enhancement, poverty alleviation or other community gains in pursuit of UN Sustainable Development Goals (SDGs).

Since carbon avoidance is of a transitional nature, more investments for carbon removals projects will be needed as we get closer to the net-zero target year. Hence companies are encouraged to contribute to early planning, research and development for nature-based and technology-based removal solutions.

When neutralisation or BVCM tactics are applied, the most common action is to purchase carbon credits but direct actions by financing or investing in carbon avoidance or removal projects may also be taken.

34 Refer to [BSI official website](#) for more details on the standard.

Table 12. Mitigation tactics

Mitigation tactic	Direct actions	Indirect actions	Typical projects
Neutralisation	<ul style="list-style-type: none"> • Develop and invest in carbon removal projects • Validate carbon credits in the financed projects via recognised standards • Use accredited carbon credits to counterbalance the impact of residual emissions to achieve net-zero 	<ul style="list-style-type: none"> • Purchase accredited carbon removal credits – either nature-based or technology-based • Provide debt funding to carbon removal projects • Retire carbon credits at recognised registries to avoid double counting 	<ul style="list-style-type: none"> • Nature-based solutions, e.g. afforestation, mangrove restoration • Technological solutions, e.g. direct air capture, enhanced mineralisation
BVCM	<ul style="list-style-type: none"> • Develop and invest in carbon avoidance, reduction or removal projects outside of company value chain • Validate carbon credits in the financed projects via recognised standards • Use accredited carbon credits to counterbalance the impact of unabated emissions during transition period 	<ul style="list-style-type: none"> • Purchase accredited carbon avoidance, reduction and removal credits from brokers or retailers • Provide debt funding to carbon avoidance and reduction projects • Retire carbon credits at recognised registries to avoid double counting 	<ul style="list-style-type: none"> • Avoided nature loss, e.g. prevention of forest degradation or deforestation • Technology-based avoidance, e.g. wind farms, solar farms, biomass, biogas digesters, hydropower • Nature-based solutions, e.g. afforestation, mangrove restoration • Technological solutions, e.g. direct air capture, enhanced mineralisation

Carbon credits: criteria and standards

Carbon credits help to fund projects that are able to reduce, avoid or remove emissions. There are many different types of carbon credits. To facilitate a purchase decision, companies may assess carbon credits against below qualities:

Table 13. Common qualities of a credible carbon credit³⁵

Criteria	Explanation
Real	Carbon offsets represent real emission reductions or removals that have already occurred (not projected to occur in the future).
Additional	Emission reductions or removals are in addition to what would have occurred otherwise (without the financial incentives provided by revenue generated by offset sales).
Based on realistic and credible baseline	Carbon credit should be issued against a defensible, conservative estimated emissions baseline that assumes a “business as usual” trajectory (i.e. emissions without the implementation of the emissions reduction, avoidance or removal project). Baseline should be recalculated on a regular, conservative time frame.
Measurable	Emission reductions or removals generated from the offset projects can be accurately quantified.
Verifiable	Emission reductions or removals are verified by an independent auditor against an established protocol or methodology.
Permanent	Carbon offset projects have established approaches to lower the risk of reversal and emissions are compensated in the event of non-permanence (e.g. through buffer pools).
Minimised leakage	Leakage happens when emission reductions occurring within the boundary of the project result in emission increases elsewhere. Carbon offset projects should demonstrate that any leakages are minimised and accounted for as a result of the project activity.
No double-counting	Emission reductions and removals should not be used more than once to achieve climate targets or goals. There should be no double issuance, double use, and double claiming with international mitigation targets. ³⁶
Co-benefits	Carbon offset projects may generate positive environmental and social benefits beyond avoiding, reducing or removing emissions. Examples include reducing air pollution, supporting poor communities, improving public health and well-being. These co-benefits are often good communication tools for stakeholders.
Do no net harm	Carbon offset projects have established approaches to identify related environmental and social risks and take actions to avoid significant harm and to mitigate associated harm.

³⁵ The criteria are developed referencing [WWF position and guidance on voluntary purchases of carbon credits](#), [What makes a high-quality carbon credit](#) and [Taskforce On Scaling Voluntary Carbon Markets \(TSVCM\) Phase 1 Report](#).

³⁶ Refer to [What makes a high-quality carbon credit](#) for more information on terminology.

Box 6. Definition of Carbon Credit

What is a Carbon Credit?

Carbon credits are transferable instruments certified by governments or independent certification bodies to represent the reduction, avoidance or removal of carbon dioxide equivalent. When a carbon credit is purchased by a company, it can be used to offset emissions within the company's operations and/or value chain. Once the carbon credit is purchased, it should be retired forever and cannot be used again. This concept of voluntary carbon credit is not to be confused with the emission reduction certificates used in emission trading systems, such as EU ETS, which are also known as carbon credits in certain mandatory markets.

How to access carbon credits?

Corporate buyers can have access to carbon credits mainly through one of the following ways:

Direct purchase from project developers

Getting involved in early stages of project development helps a company to better understand the offsets project and influence its outcome. This method is suitable for large companies who desire deeper or longer-term engagement with project developers, such as financing or investment, and are expecting to secure a large quantity of credits in the longer term.

Indirect purchase via third-parties, such as carbon brokers, retailers or open platforms

Purchasing via third-parties is the common channel for companies looking for a fast and convenient way to purchase carbon credits. Purchase can be made from carbon brokers (for larger transactions), retailers (for smaller transactions) who are members of international carbon exchanges, or open platforms³⁷ (for both larger and smaller transactions). This will allow the company to select from a range of carbon credits arising from projects that can maximise the co-benefits it desires most.

What credible standards should companies look for?

High-quality carbon credits must be verified against recognised standards and established methodologies. All credits issued from any of the major carbon standards will have undergone a robust verification process by an ISO accredited third-party verifier. The following table gives a broad overview of the major international standards for voluntary carbon credits. This is not an exhaustive list and there are certain national carbon credit standards which may meet quality criteria if the purpose of the company's offsetting is focused on a particular country or market.

37 Refer to [Projects – Gold Standard Marketplace](#) for available carbon credits from a variety of projects.

Table 14. Major international standards for voluntary carbon credits

Standard	Managed by	Key benefits
Verified Carbon Standard (VCS) ³⁸	Verra	<ul style="list-style-type: none"> ✓ Verified Carbon Units (VCUs) issued follow quality assurance principles³⁸ (i.e. are additional, real, measurable, conservative, permanent, independently verified, uniquely numbered and transparently listed).
Climate, Community and Biodiversity Standards (CCBS) ³⁹	Verra	<ul style="list-style-type: none"> ✓ Other than climate mitigation, the projects deliver co-benefits for communities and biodiversity. ✓ Includes nature-based carbon removal methodologies (e.g. mangrove afforestation, and peatland restoration³⁹)
Sustainable Development Verified Impact Standard (SD VSta) ⁴⁰	Verra	<ul style="list-style-type: none"> ✓ Delivers co-benefits aligned to SDGs (e.g. zero hunger, good health and well-being, gender equality)
Gold Standard (GS)	Environmental NGOs, including World Wide Fund for Nature (WWF) and International Union for Conservation of Nature (IUCN)	<ul style="list-style-type: none"> ✓ Verified Emissions Reductions (VERs) are real, additional, independently verified, unique and traceable ✓ Additional criteria include rigorous safeguards, stakeholder inclusivity, gender sensitivity, and avoidance of high-risk projects (e.g. large hydropower projects) ✓ Delivers co-benefits aligned to SDGs (all projects have at least three SDG impacts, including climate action) ✓ Includes nature-based carbon removal methodologies (e.g. reforestation⁴¹)

What pitfalls should be avoided?

Table 15. Pitfalls and corresponding preventive or mitigation measures

Pitfalls	Preventive or mitigation measures
Go soft on abatement measures and rely on purchasing carbon credits to achieve net-zero	Best efforts should be made to reduce emissions within operations and value chain before using carbon credits as additional measures in a net-zero strategy.
Purchasing carbon credits that are of dubious quality	A carbon offset policy should be established to provide a clear guideline in sourcing and procuring credible, high-quality carbon credits, and explain how to use the different types of avoidance, reduction and removal credits to counterbalance the impact of unabated emissions. Disclosing the project type, validation standards and retirement mechanism of the selected carbon credits in public reports is also essential to enhancing credibility.

38 Refer to Verra official website for more information on [VCS](#), [VCUs](#), and [VCS quality assurance principles](#).

39 Refer to Verra official website for more information on [CCBS](#) and nature-based carbon removal projects ([Zhanjiang Mangrove Afforestation Project](#), [Zhangye City Afforestation Project in Gansu Province](#), and [Katingan Peatland Restoration and Conservation Project](#)).

40 Refer to Verra official website for more information on [SD VSta](#).

41 Refer to Gold Standard official website for more information on nature-based carbon removal projects ([The Nicaforest High Impact Restoration Program](#) and [WithOneSeed Community Forest Programme](#)).



Choosing Net-Zero Strategies

Choosing Net-Zero Strategies

What can be achieved in this chapter?

There are multiple strategies available for achieving net-zero. These strategies will demand different levels of resources from the company and lead to different outcomes to society and the environment. Choosing an optimum net-zero pathway will not only ease the way for taking necessary actions in the company, but also protect the company against reputational risks in the transition journey and in its net-zero claims.

In this chapter robust net-zero strategies available for companies are illustrated. We will provide some examples on how these strategies are applied across the world.

Net-zero strategies

Whilst there is no universal formula for what constitutes the optimum strategy, the following three strategies are constructed in alignment with the guiding principles proposed by the Science-based Target Initiative (SBTi) as stipulated in p.17 of this Guide.

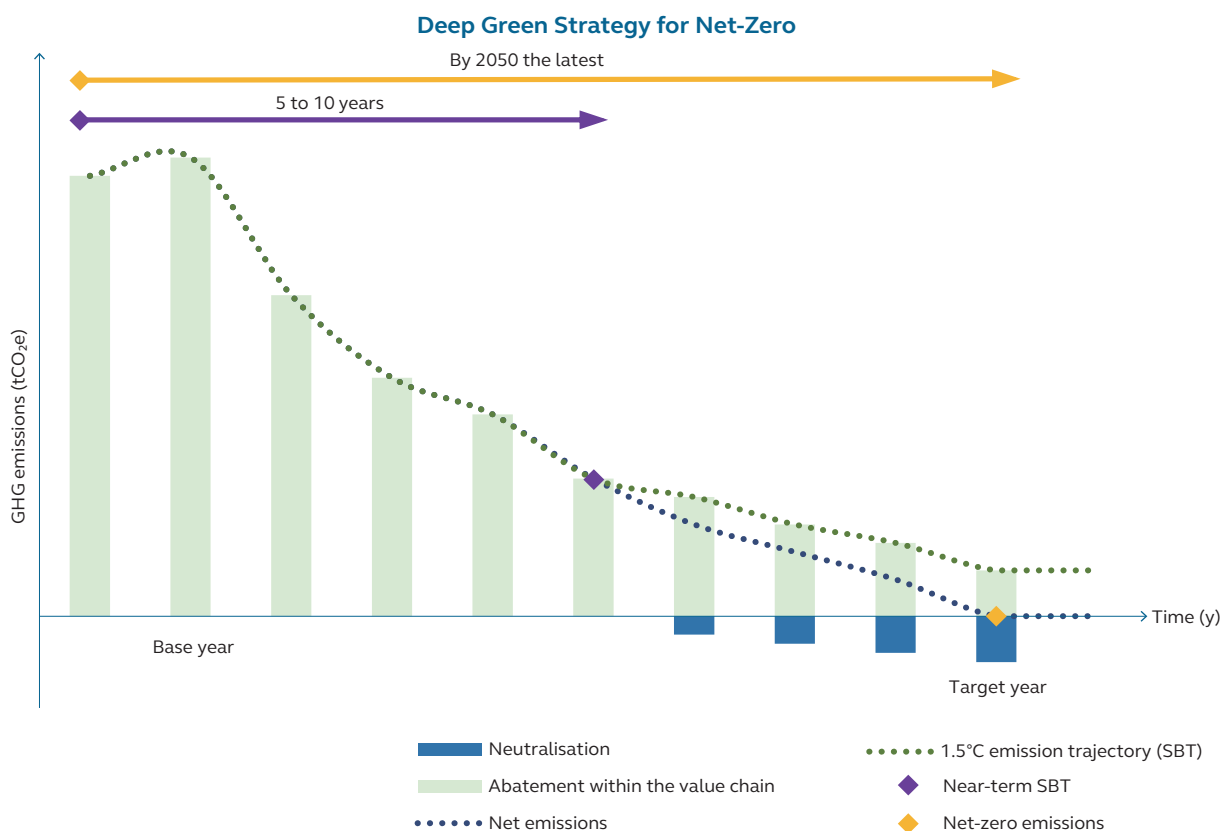
Deep Green Strategy: SBT + Neutralisation

Adopting a Science-based Target (SBT) means a company's gross emissions profile should be equivalent to the 1.5°C trajectory. It is contributing its fair share to the global carbon emissions budget during the transition period. When it approaches the net-zero target year, it should use neutralisation measures to fully counterbalance the impact of its residual emissions.

In order to build a solid foundation for future neutralisation measures, a company may consider one of the two following tactics:

- identify the availability of carbon removal credits and start some trial purchase. This can also help to neutralise a company's gross emissions early during the transition period; or
- identify carbon removal projects and provide finance via debt or investment. This will enable the company to secure future carbon removal credits and, on a broader level, accelerate technological developments and promote policy changes in favour of carbon removals.

Figure 11. Deep Green Strategy for Net-Zero



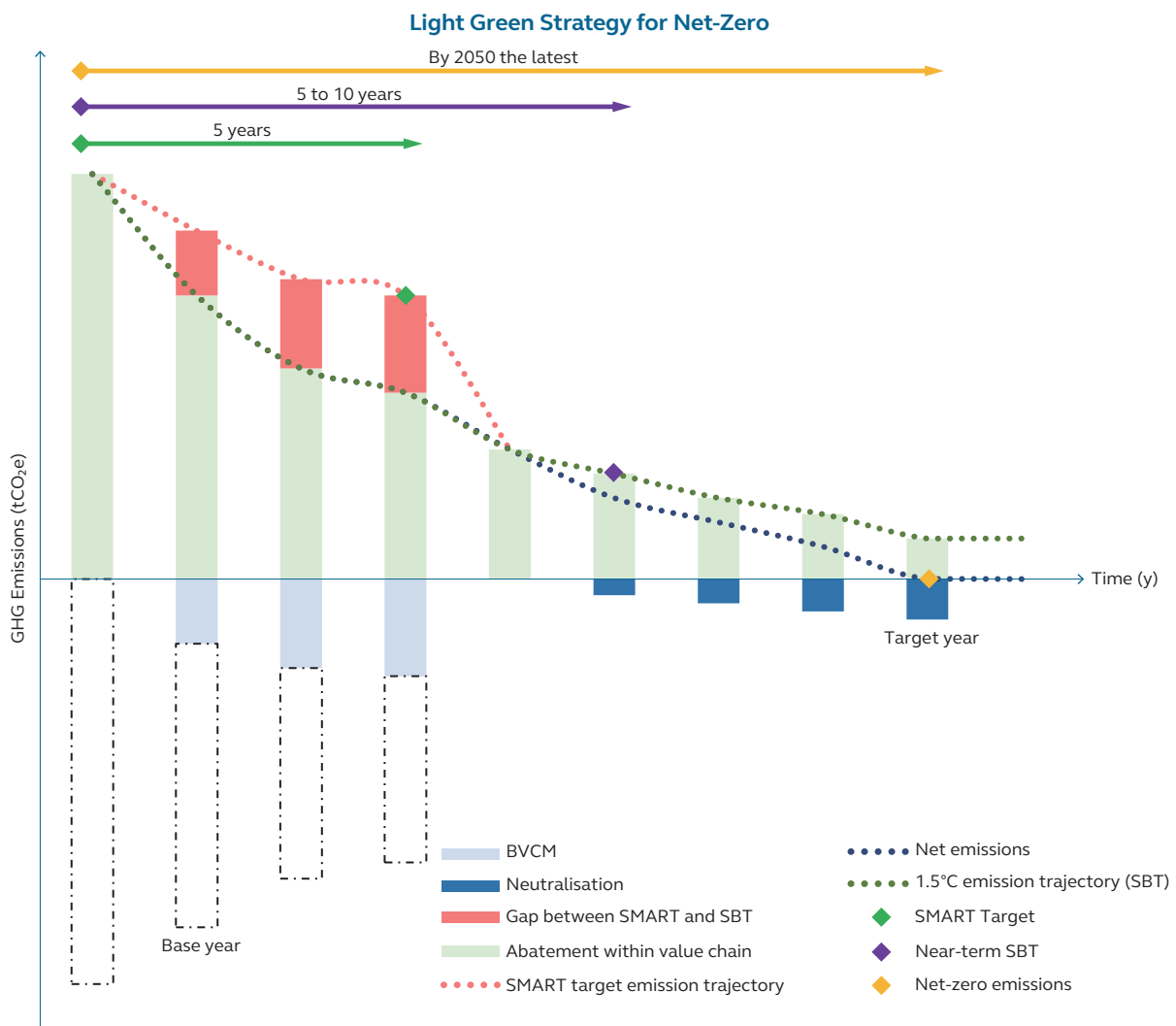
Light Green Strategy: SMART + BVCM

If a company are not yet ready to adopt a SBT, it may choose to set a SMART target in the near-term, typically within a 5-year time frame. Since the emissions reduction needed to achieve a SMART target is likely to fall short of what is required to achieve a SBT, the company is emitting more than its fair share of what is needed to keep global warming within 1.5°C during the transition period. In order to counterbalance the impact of this overshoot, the company should support emission avoidance, reduction and removal activities outside its value chain through beyond value chain mitigation (BVCM) measures, including the purchase of carbon credits or investment in carbon reduction, avoidance and removal projects.

Under the Light Green Strategy, the minimum amount of BVCM should equal to the annual gaps between SMART target and SBT estimated for the company. If the company has not assessed the appropriate SBT or if it wishes to take a prudent stance, it may counterbalance the impact of a bulk or whole of its annual emissions during the transition period.

As the company comes closer to the net-zero target year, BVCM measures should be replaced by neutralisation measures so that carbon removals can fully balance its residual emissions in the target year.

Figure 12. Light Green Strategy for Net-Zero



Positive Green Strategy: SBT + Neutralisation + BVCM

With this strategy, a company is not only contributing its fair share by reducing value chain emissions at a rate consistent with the 1.5°C trajectory, it will help accelerate society’s net-zero transition by counterbalancing the impact of all emissions during the entire transition period beyond its value chain.

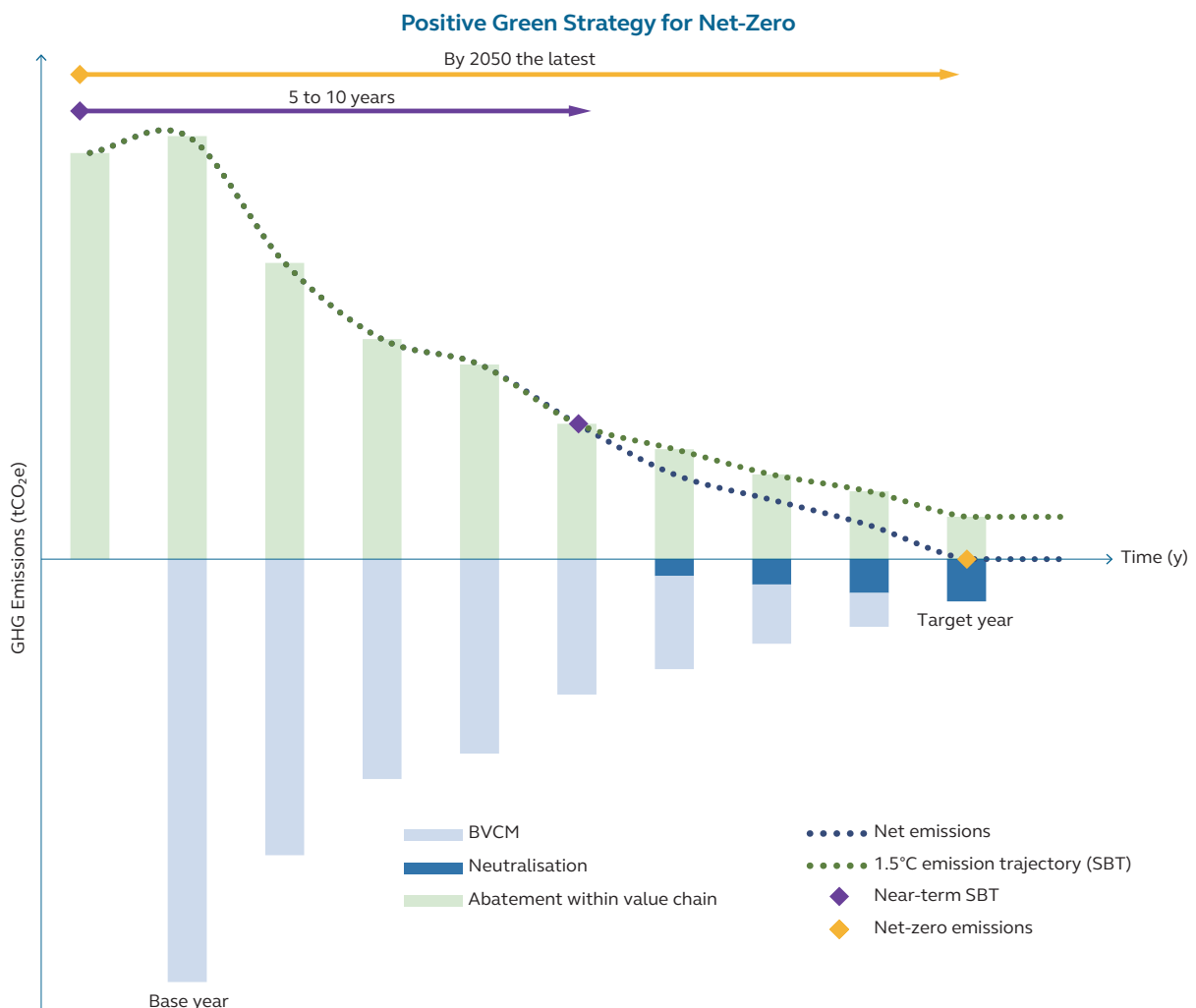
This will require a combination of three actions:

- set SBT and take abatement measures to meet the annual targets;
- take BVCM measures to fully counterbalance the impact of any unabated emissions on an annual basis, starting from the current year; and
- neutralise all residual emissions with carbon removal credits when getting closer to the net-zero target year.

In addition to abatement measures along the company’s value chain, it will need an active strategy to purchase carbon avoidance, reduction and removal credits, involving either credit purchase or direct project investment or both.

If a company successfully implements this strategy, it can lay claim to being “positive green” – contributing to global decarbonisation and acting as a climate steward by helping to close the climate finance gap or engaging constructively and responsibly in climate policy. However, mitigation for unabated emissions, or undertaking partial neutralisation in the transition period does not entitle a company to claim that net-zero has been reached early, unless all its residual emissions are balanced by carbon removals.

Figure 13. Positive Green Strategy for Net-Zero



Illustrative examples

Refining net-zero pathway is an ongoing initiative that requires regular reviews on inputs and outputs. In addition to the three strategies highlighted in the last section – deep green, light green and positive green approaches, we have prepared some illustrative examples below. They represent different shades of green strategies which are in general compliance with the guiding principles.

Example 5. Deep Green Net-Zero Strategy

A global commercial real estate services and investment management company

Strategy: Deep Green (SBT + Neutralisation)

The company plans to reduce Scope 1 and 2 emissions 68% by 2034 from a 2018 base year. Additionally, it has committed to reducing Scope 3 GHG emissions from the space managed by the company on behalf of its clients by 53% per square foot by 2034 from a 2018 base year. The targets are validated by the SBTi.

It aims to achieve net-zero emissions by 2040 across all areas of operation, including its clients and supply chain. As a signatory of The Climate Pledge, the company will:

- measure and report GHG emissions on a regular basis;
- implement decarbonisation strategies, including efficiency improvements, renewable energy, materials reductions, and other carbon emission elimination strategies; and
- take actions to neutralise any remaining emissions with additional, quantifiable, real, permanent, and socially beneficial offsets to achieve net-zero annual carbon emissions by 2040.

In addition, the company has signed the World Green Building Net Zero Carbon Building Commitment, pledging to only occupy offices which are net-zero carbon in operation by 2030. It is planning to publish its pathways to net-zero in late 2021, in the interest of transparency and driving advocacy.

Special features

To deliver the net-zero by 2040 commitment, the company has committed to fully abate 95% of its 2018 baseline GHG emissions, and any residual emissions needed to be neutralised will be limited to no more than 5% of that baseline. It seeks to minimise the purchase of carbon credits by driving the take up of renewable energy and improving the energy efficiency of its office portfolio as a priority.

Example 6. Light Green Net-Zero Strategy

A real estate company

Strategy: Light Green (SMART + BVCM)

A vertically integrated real estate company is transitioning from SMART targets to 1.5°C aligned SBTs. In addition, the company has been counterbalancing the impact of a portion of its unabated emissions during the transition.

The company has set SMART Targets to reduce Scope 1 and 2 GHG emissions by 2.5% and carbon emissions per transaction by 1% from a 2017 base year by 2021. At the same time, the company aims to align its abatement pathway with the 1.5°C trajectory and has therefore set SBTs through the SBTi. The company commits to:

- reduce absolute Scope 1 and 2 GHG emissions by 90% by 2030 from a 2017 base year;
- increase annual sourcing of renewable electricity from 0% in 2020 to 100% by 2030; and
- reduce Scope 3 GHG emissions from purchased goods and services and fuel-and energy-related activities by 12.5% by 2030 from a 2020 base year.

The company has also participated in the “Net Zero 2030/2050 Initiative” and has committed to achieve net-zero by 2030. It plans to achieve this using the following measures:

- allocate dedicated budget to improve energy efficiency of the headquarters building and branches;
- conduct internal and external stakeholder engagement to promote and raise awareness of environmental sustainability and green living; and
- allocate dedicated R&D budget to develop innovative green services and digital tools.

Special features

The company has implemented a branch carbon neutrality project and introduced PAS 2060 verification since 2018. It has used Gold Standard carbon credits from wind farms project to balance the impact of the GHG emissions arising from 17 out of 450 branches in 2021.

Example 7. Positive Green Net-Zero Strategy

A multinational technology company

Strategy: Positive Green (SBT + Neutralisation + BVCM)

An American multinational technology company plans to be carbon negative by 2030 by aggressively cutting their emissions in both operations and supply chain. This will be done via:

- shifting to 100% renewable energy by 2025;
- electrifying its global campus operations vehicle fleet by 2030;
- pursuing carbon-zero certifications for its campus modernisation projects; and
- expanding its internal carbon tax to include Scope 3 emissions and using the funds for sustainability improvements.

The company has set GHG reduction targets that are approved by the SBTi. It is committed to:

- continue annually source 100% renewable electricity through 2030;
- reduce Scope 3 GHG emissions intensity per unit of revenue by 30% by 2030 from a 2017 base year; and
- avoid growth in absolute Scope 3 emissions.

Special features

Recognising that relying on carbon avoidance offsets is insufficient in achieving net-zero, the company has also shifted their focus to carbon removal, and is launching a fund to accelerate the global development of carbon removal technologies.



Concluding remarks

The key to a successful net-zero strategy is to set tangible targets that can drive effective corporate action in abatement, neutralisation and BVCM. The sooner these targets are fully aligned with the 1.5°C pathway, the better a company is protected against reputational and transitional risks, and the more it is contributing to tackling the climate crisis. The Exchange will continue to provide more guidance to different industries in formulating and implementing net-zero strategies in line with international developments.

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