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Scope 3+ Emissions Reduction 2022

A New Methodology for Corporate Climate Actions Beyond Value Chains

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Disclaimer:

This methodology has been written in general terms and therefore cannot be relied on to cover specific situations. The application and the publication of reports based on it are the full responsibility of its users. Neither Alibaba, the Carbon Trust, CEC, nor other individuals who contributed to this methodology assume responsibility for any consequences or damages resulting directly or indirectly from its use and application.

In this methodology, terminology 'Scope 3+' has been developed by Alibaba to inspire more discussion and action beyond a company's value chain emissions. 'Scope 3+' is independent from Scope 1, 2, and 3. As such, it does not replace or substitute a company's efforts to reduce its Scope 1, 2 and 3 emissions. Similarly, reductions in 'Scope 3+' emissions cannot be used to offset Scope 1, 2 and 3 emissions. Moreover, this methodology does not replace any guidance from Greenhouse Gas Protocol.

All examples provided in this report are purely for illustrative purposes and a full analysis would need to be completed to assess the impact of these examples.

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Introduction

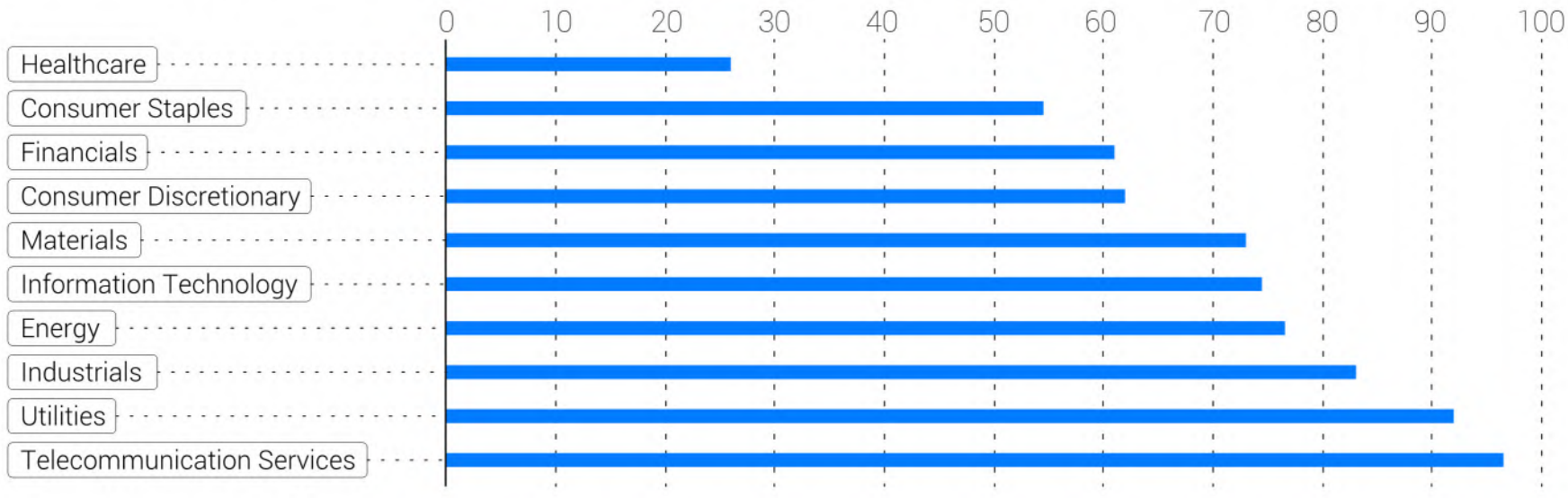
1.1 The global climate emergency and the role of businesses

The unprecedented climate crisis is calling for deep and rapid cuts in greenhouse gas (GHG) emissions aligned with the ambition set out in the 2015 Paris Climate Agreement to limit global warming to well below 2 ºC, preferably to 1.5ºC, above pre-industrial levels. While a recent rise in commitments from countries and businesses has brought some optimism, the Intergovernmental Panel on Climate Change (IPCC) warns that decarbonisation efforts must be accelerated. Otherwise, temperatures are likely to rise beyond 1.5ºC by 2040, resulting in higher frequencies of extreme weather events with irreversible impacts to the environment and humanity[1].

Businesses have a huge responsibility in accelerating the move towards a decarbonised future. Increasingly, organisations are recognising their role to play and have taken steps in their climate action journey. More than 3,200[2]companies have publicly submitted or committed their ambitions on operation and/or value chain emissions reduction to achieve Science-based Targets (SBTs). Some have even declared commitments to reaching Net Zero.

In recent years, businesses are also beginning to realise the need to not only cut emissions within their own value chain, but also influence emissions reduction of a wider range of stakeholders within the ecosystem[3]. It is changing the way businesses see themselves. They are no longer just a source of emissions, but providers of solutions to tackle the impact of climate change. Many businesses have created low carbon products and services that appeal to their climate-conscious stakeholders. According to a 2017 survey conducted by the Carbon Disclosure Project (CDP), 67% of 2,235 companies claimed that their low carbon products and services help[4].This sentiment rang true for a large percentage of companies across a range of sectors, but especially for those within the utilities and ICT sectors (see Figure 1).

Figure 1: Percentage of companies who believe they had positive GHG impacts[5]



One of the key drivers of this transformation is innovation. Innovation has led to new climate solutions and their deployment across various sectors. It has enabled industries and governments to press forward and progress their global climate actions in recent years. For example, making clean energy competitive and reducing its cost has only been made possible thanks to technological innovations in the energy system.

[1]The Guardian, Major climate changes inevitable and irreversible (9 August 2021)
[2]https://sciencebasedtargets.org/companies-taking-action (June 2022)
[3]All 'ecosystem' mentioned throughout this report refer to 'business ecosystem', which is defined as the collection of entities involved in the delivery of a specific production or service, including suppliers, distributors, customers, government agencies, etc. By this definition, the value chain of a company is contained in its ecosystem.
[4]CDP Climate Change Report 2017 (United Kingdom Edition)
[5]2014 CDP Climate Change Questionnaire (total of 1,793 companies surveyed). Chart reference: WRI "Estimating and reporting comparative emissions impacts of products". The sector breakdown from 2014 is the most recent publicly available data that we are able to find, and we believe that it is representative of the recent years.

These solutions have contributed hugely to the transition to a low carbon energy system. Further innovation efforts are called for to bring new technologies to market. This is especially true for clean technologies which are currently at the demonstration or prototype phase and collectively account for half the global reductions according to the International Energy Agency's (IEA) Net Zero pathway. [6] Besides developing disruptive technologies, companies can also deploy climate-related innovation by enhancing technology applications to assist major technologies for combating climate change to create wider impact or improve existing business models to approach new markets and customers.

Another driver is the trend towards long term value-creation through integrating the stakeholder economy[7]. Creating long term value requires companies to understand their role within the wider ecosystem, meeting not only the needs of shareholders, but also of stakeholders – in particular customers. As the impact and consequences of climate change have become more visible, customers' demands have shifted. The IEA recognised consumer behavioural change as one of the key drivers which can contribute to 8% of emissions reduction required to achieve net zero by 2050[8] .

Benefiting from their ability to connect a wide range of stakeholders, digital platforms are in a frontline position to shape the new business framework to address climate change. These platforms can leverage the economies of scale from their network effects and create a larger impact than linear business models[9]. Platform companies—particularly giants such as Google, Amazon, and Alibaba—have set up online structures that enable a wide range of human activities and radically change the way we work, socialise and make decisions. Platform companies create value by enabling direct interactions between two or more customer[10] groups and aggregating supply and demand side for products and services, etc. The multi-sided nature determines the extent of influence that platform companies are able to achieve, particularly in the face of the severe climate crisis. As the centre of interactions between the supply and demand side of the society, platform companies can help avoid or reduce emissions by promoting the consumption of lower carbon products or services across their network. Major platform companies have begun to involve their stakeholders in their sustainability and decarbonisation commitments as a way to address climate challenges.

But the current GHG accounting standard does not recognise the climate actions taken within a company's ecosystem, which fall outside of the full value chain emissions—as known as Scope 1, 2, and 3 emissions in the GHG Protocol Corporate Accounting and Reporting Standard. The concept of avoided emissions has received explicit attention across sectors. Over the years, there have been taxonomies, projects, and methodologies aiming to provide the basis for measurement of avoided emissions relating to low carbon products. However, new forms of business structuring and functioning from companies emerging in the past decade, in particular platform companies, offer additional opportunities to make positive GHG impacts beyond Scope 1, 2, and 3.

Therefore, Alibaba, jointly with China Environmental United Certification Center (CEC), published Scope 3+ Emissions Reduction: A New Methodology for Corporate Climate Actions Beyond Value Chains, with expert contributions from the Carbon Trust. This methodology report is to understand Alibaba's positive impact that has not been addressed by the GHG accounting frameworks and methodologies available. Additionally, this methodology hopes to inspire more companies to start emissions reduction discussions and take action beyond their value chain. Through a systematic view and approach to measure these impacts, companies can gain a fresh perspective in the new competitive landscape under climate change and unlock new commercial opportunities while achieving their climate ambitions.

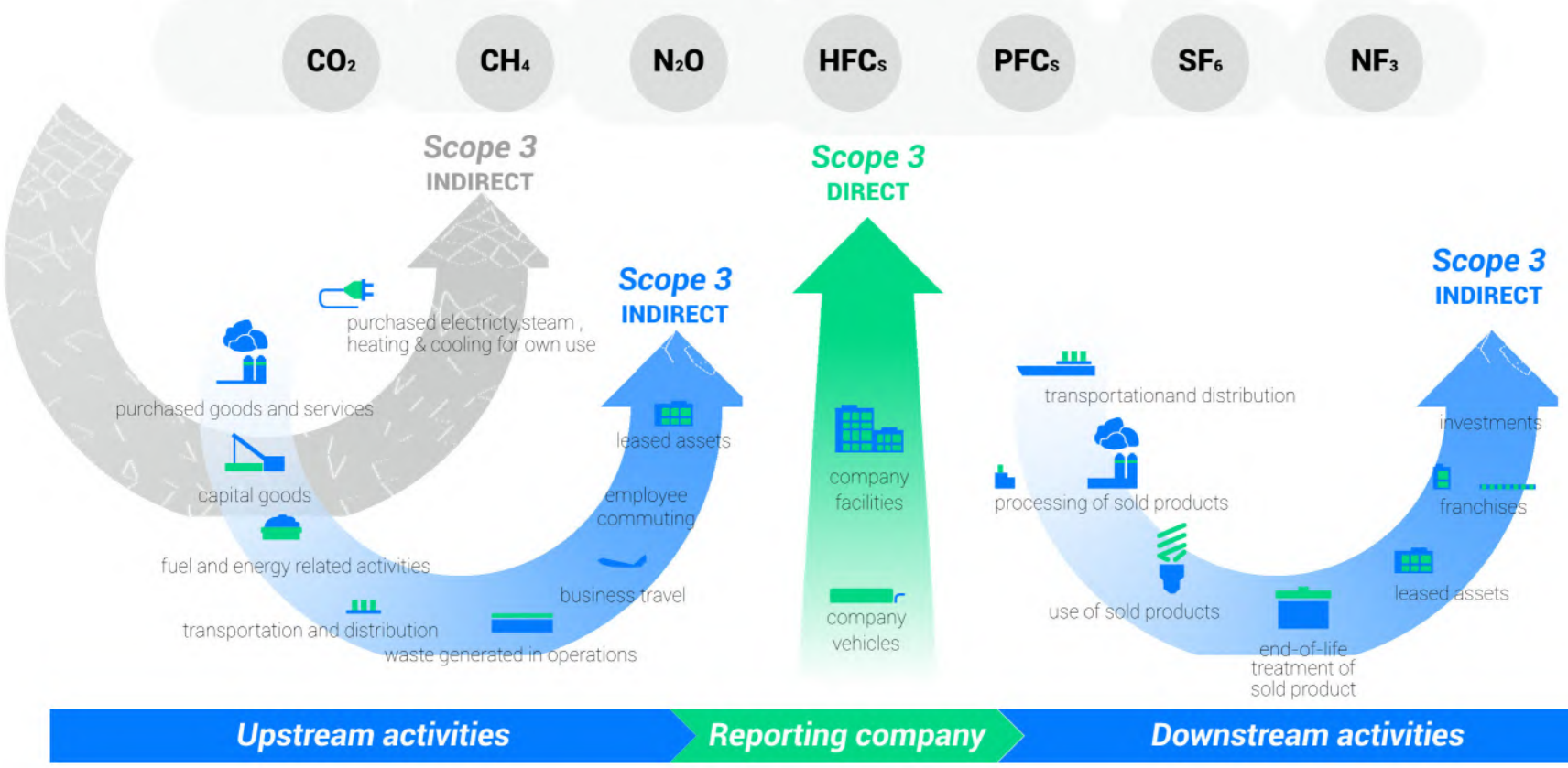
[6] IEA (2021). Net Zero by 2025 – A roadmap for the Global Energy Sector
[7]According to World Economic Forum, stakeholder economy refers to a system in which corporations are oriented to serve the long-term interests of all their stakeholders, as opposed to only shareholders. Among the key stakeholders are customers, suppliers, employees, shareholders, and local communities.
[8] In the IEA report, behavioural change refers to changes in the behaviour of individuals consuming energy-related goods and services and includes three main types: reducing excessive or wasteful energy use, transport mode switching, and materials efficiency gains.
[9]Innovationtactics. The Complete Guide to the Revolutionary Platform Business Model. https://innovationtactics.com/platform-business-model-complete-guide/#PBM-Strategy
[10]Andrei Hagiu (2013). Strategic Decisions for Multisided Platforms.

Types of greenhouse gas emissions

Identifying and measuring the sources of GHG emissions within the organisation and its value chain is the first step that companies can take in their climate action journey. By accounting for GHG emissions, companies will be able to establish a GHG inventory, identify emission hotspots and determine where to cut emissions.

The GHG Protocol is the most widely used international standard for measuring and managing GHG emissions. They can be classified into three emission categories: Scope 1, Scope 2, and Scope 3.

Figure 2: Overview of GHG Protocol scopes and emissions across the value chain



According to the GHG Protocol Corporate Accounting and Reporting Standard , Scope 1 emissions are direct GHG emissions that occur from sources that a company controls or owns. Scope 2 emissions, on the other hand, are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling.

Scope 3 emissions are not directly owned or controlled by the company. However, they can be found across the company's value chain and thereby have an indirect impact on the company's overall emissions. Scope 3 emissions are made up of all upstream activities, such as purchased goods, and downstream activities, such as product use. Scope 1, 2, and 3, collectively, form the emissions of a company's full value chain, which contains the reporting company itself, and its upstream and downstream activities.

Table 1: List of Scope 3 categories[12]

Upstream or downstream	*Scope 3 category*	
Upstream Scope 3 emissions	1. Purchased goods and services 2. Capital goods 3. Fuel- and energy-related activities (not included in Scope 1 or 2) 4. Upstream transportation and distribution	5. Waste generated in operations 6. Business travel 7. Employee commuting 8. Upstream leased assets
Downstream Scope 3 emissions	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. Franchises 15. Investments

[11] WBCSD, WRI. The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (revised edition)
[12]Same as 11

1.2 Definition of 'Scope 3+'

'Scope 3+'

Developed by Alibaba in its 2021 Carbon Neutrality Report, the concept of 'Scope 3+' in this methodology refers to **the emissions generated by a wider range of stakeholders within a company's ecosystem, that are outside of the company's current Scope 1, 2, and 3 emissions.**

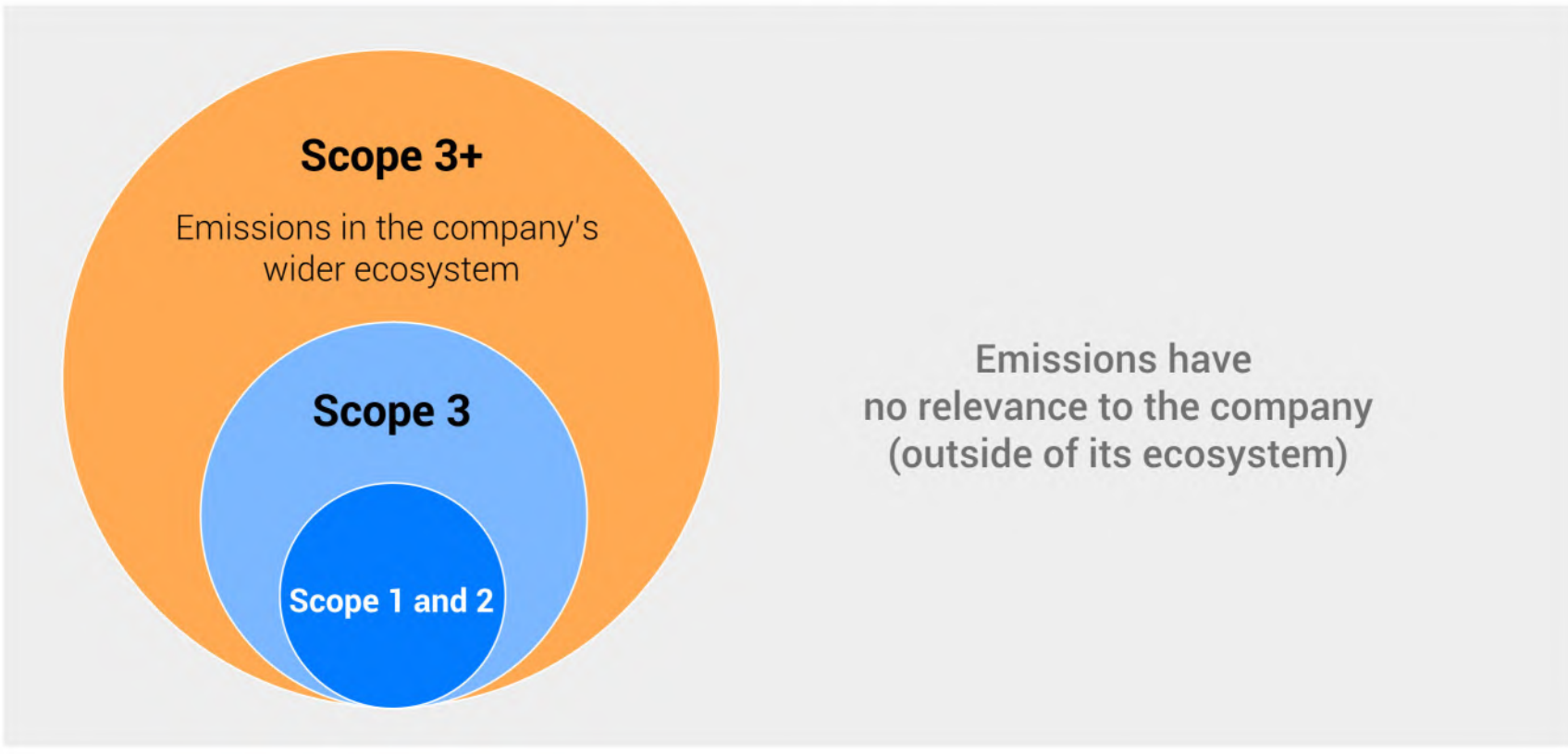
The introduction of 'Scope 3+' by Alibaba is an attempt to capture the climate impacts made by new forms of businesses that utilise their wider influence on the stakeholders within their ecosystems, empowering them to drive GHG emissions reductions beyond their value chain.

The concept emphasises two key characteristics:

- **'Scope 3+' emissions are related to the company's business and stakeholders (including users, suppliers, business partners, etc.) in the ecosystem**
- **'Scope 3+' emissions do not belong to the company's current Scope 1, 2, and 3 GHG emissions**

In this report, Scope 1, 2 and 3 will be referred to as a company's value chain emissions, while 'Scope 3+' will be referred to as emissions within a company's wider ecosystem not captured by the company's current Scope 1, 2, and 3.

Figure 3: Illustration of 'Scope 3+'



Two examples are given here to explain the difference between Scope 3 and 'Scope 3+'. It should be noted that 'Scope 3+' can be applied to a much wider range of sectors and companies than ones in the examples.

Table 2: Comparison between Scope 3 and 'Scope 3+'

Example 1:

Company type	*Business model*	*Product's LCA emissions belong to*
E-commerce platform	Independent sellers sell their own products on platform	Independent seller's Scope 3, and platform's 'Scope 3+'
Regular retailer	Retailer purchases products from suppliers for resale	Retailer's Scope 3

An e-commerce platform, for example, does not own the products and services it sells. As such, emissions from the products and services sold do not fall within the company's direct value chain, and therefore reductions from these products are also not captured within its Scope 3 inventory. Instead, these emissions fall within the company's wider ecosystem ('Scope 3+').

Example 2:

Company	*Emission source*	*For the real estate developer of the office building*	*For the manufacturer of the glass installed on the office building*
Office building glass manufacturer	Heating- and cooling-related emissions of an office building	Scope 3	'Scope 3+'

The heating and cooling needs can be influenced by the amount of light and thermal radiation to be let in the building. The more optimised the window insulation is, the less the energy is needed for indoor temperature control. Emissions from heating- and cooling-related emissions of an office building do not fall within the Scope 1, 2, and 3 inventory of the glass manufacturer, and can be influenced by the thermal performance of glasses installed (for example, installing high performance glass). Therefore, these emissions fall within the company's wider ecosystem ('Scope 3+').

'Scope 3+' emissions reduction

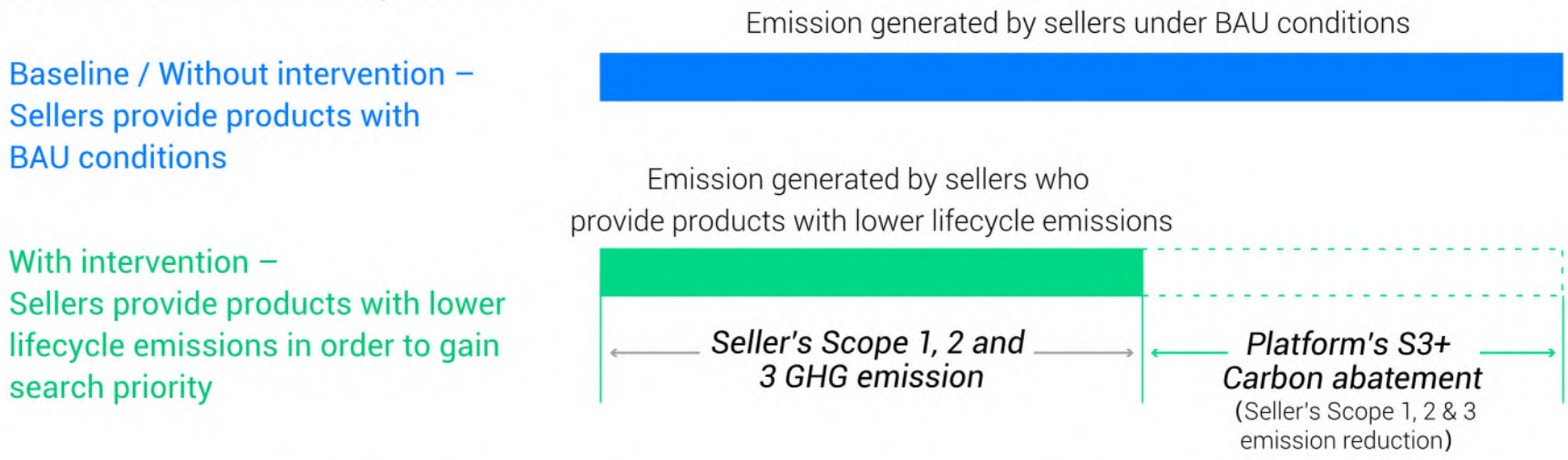
In relation to the definition of 'Scope 3+' outlined in this report, 'Scope 3+' emissions reduction is defined as the carbon abatement resulting from collaborative actions and solutions by the company and stakeholders within its ecosystem. These actions fall outside of the company's Scope 1, 2, and 3 emissions reduction.

'Scope 3+' emissions reduction includes the actual emissions 'reduced' by stakeholders' actions, as well as the emissions 'avoided' by stakeholders' use of lower carbon solutions.

The graphs below show two examples of 'Scope 3+' emissions reduction.

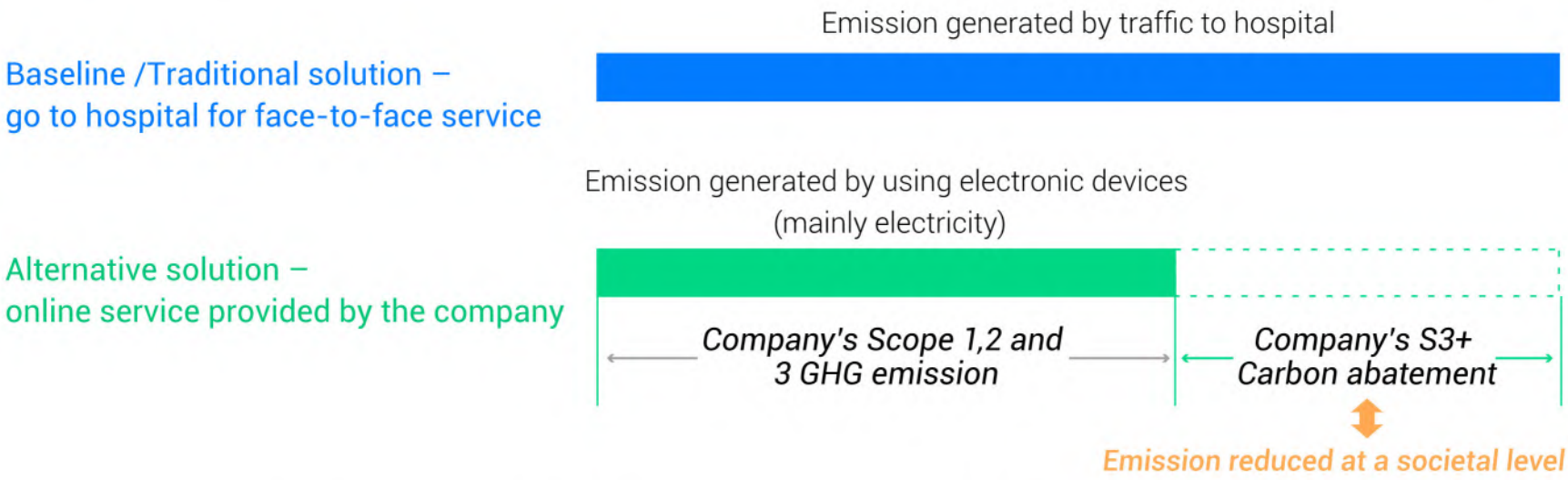
Figure 4: Examples of 'Scope 3+' emissions reduction

*Example: Scope 3+ emission reduction generated by platform company's seller engagement scheme for low-carbon products **



* Note: the scenario is simplified and the comparison only includes the major emissions

*Example: Scope 3+ emission reduction generated by online health diagnosis and prescription service **



* Note: the scenario is simplified and the comparison only includes the major emissions

In the scenario depicted in the second example, online health diagnosis and prescription service helps avoid the transportation-related emissions from the in-person hospital visit, hence the service provider enables 'avoided emissions' beyond its Scope 1, 2, and 3. Avoided emissions measure how much GHG emissions are avoided by using a certain product and/or service, and can capture the change in emissions from certain scenarios.

In addition to the concept of 'avoided emissions', Scope 3+ emission reductions also aim to capture emissions reduction driven by climate-conscious companies[13], such as an e-commerce platform's seller engagement scheme for low-carbon products in the first example. Such an engagement scheme offers search priority to encourage sellers to improve their products' sustainability performance, such as products that have lower lifecycle emissions or are certified as carbon neutral. With such scheme, the platform company helps to reduce emissions generated by sellers when sellers reduce the emissions on the products sold on the platform.

Disclaimer about the relationship between 'Scope 3+' and Scope 1, 2 and 3

◆ 'Scope 3+' is not a substitution for a company's efforts to reduce its Scope 1, 2, and 3 emissions.

[13] See more details on the difference between 'avoided emissions' and 'Scope 3+ emissions reduction' in Section 2.1

- Every company should prioritise its own organisational and value chain emissions before addressing 'Scope 3+' emissions
- 'Scope 3+' and Scope 1, 2, and 3 are independent of each other, therefore, emissions reduction within 'Scope 3+' cannot be used to offset Scope 1, 2 and 3 emissions.

Why 'Scope 3+' emissions reduction is important to corporates

There are multiple benefits for evaluating a company's 'Scope 3+' emissions reduction.

Firstly, it can help businesses generate more innovative and sustainable products and services. When assessing their 'Scope 3+' emissions reduction, companies are required to evaluate the use case of its solutions and understand how they interact with the wider range of stakeholders. Through this process, a company gains a fresh perspective of the impact of their solutions and will be able to question their effectiveness to find room for improvement. As businesses become increasingly co-related, incorporating 'Scope 3+' emissions reduction in a company's business plan becomes important. It motivates companies to leverage their influence over their ecosystems to mobilize actions and behavioural changes among consumers, merchants, and partners, resulting in a faster and smoother transition towards a Net Zero economy.

Secondly, reporting 'Scope 3+' emissions reduction could help enhance companies' reputations and user adherence. 'Scope 3+' emissions reduction stems from the influence of a company to help stakeholders adopt low carbon activities, which will have a positive impact and is widely encouraged across society. Through regular reporting of 'Scope 3+' impact, companies can showcase their efforts and potentials in tackling climate issues alongside reducing their operational and value chain emissions. This commitment to action will ultimately create a favourable brand image.

Lastly, introducing a 'Scope 3+' emissions reduction methodology can enhance corporate transparency and improve external communications with key stakeholders. 'Scope 3+' emissions reduction reporting can help investors understand how the company can succeed in the future low carbon economy and assess how the company's sustainability efforts aligns with their own ESG investment strategy. Similarly, information on 'Scope 3+' emissions reduction also helps the public sector understand the mechanisms and capabilities of distinctive solutions to create synergies in reducing emissions on the society level when making action plans for national, local, and sector climate targets. Through enhanced transparency from companies reporting on progress in climate mitigation, government agencies can make informed decisions. It will allow them to optimise their use of limited resources when designing policies that will help to achieve climate goals.

Scope of Greenhouse gases

Consistent with the GHG Protocol, all reference to 'Scope 3+' in this report covers the seven greenhouse gases from the Kyoto Protocol and its amendment, namely, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3). The emissions of each GHG will be converted to CO_2 equivalents (CO_2e) based on their global warming potentials. Please note that the terms 'carbon emissions' and 'GHG emissions' are used interchangeably throughout this report and both terms refer to the seven greenhouse gases mentioned.

1.3 Purpose of this report

This report provides a methodology for calculating 'Scope 3+' reductions. Its goal is to help businesses quantify the impact of emissions beyond their current Scope 1, 2 and 3, alongside the standard Scope 1, 2, and 3 accounting. The report outlines:

- Definitions for 'Scope 3+' and 'Scope 3+' emissions reduction, and explains their relationship with Scope 1, 2, and 3 emissions and avoided emissions respectively.
- Detailed accounting principles and methodology to calculate and report on 'Scope 3+' emissions reduction.
- A process to help companies integrate 'Scope 3+' emissions reduction within their businesses and climate strategies.

The report aims to raise awareness, inspire discussion and support companies across different sectors to take positive action and go beyond current emissions reductions in their operations and value chains, to reach wider stakeholders and to jointly build a decarbonised future.

1.3.1 Who can use this methodology

The 'Scope 3+' emissions reduction methodology can be used for various purposes:

Companies with existing and potential 'Scope 3+' emissions reduction can use this methodology to identify, measure and report on 'Scope 3+' emissions reduction. In addition, companies can use this methodology to set 'Scope 3+' emissions reduction targets which will help support their decision-making when developing new products and services. Government agencies can use this methodology to evaluate a company's potential through their 'Scope 3+' emissions reduction targets and fund those that can create the biggest decarbonisation impacts on the economy. Public Financial Institutions (PFIs) and Multilateral Development Banks (MDBs) can use this methodology to conduct climate assessments to ensure their investments align with the predefined climate strategy. Third-party organisations, such as ESG rating agencies, Non-Governmental Organisations (NGOs), and consulting agencies, can refer to this methodology to identify, monitor, and question claims on positive GHG effects from companies, which entail possible greenwashing.

1.3.2 How to use this methodology

This methodology will cover the principles of 'Scope 3+' emissions reduction, accounting methodology of 'Scope 3+' emissions reduction, followed by an introduction of generic steps for companies to address 'Scope 3+' emissions reduction. It does not offer sector specific guidance on how to use and adapt the principles and methodology. The reader will have to define and select the best parameters representative of their business to ensure efficacy of the calculation.

While this report is developed with the intention for wider usage, it is not sector specific and may be less relevant to some sectors. Companies in these sectors who are still interested in 'Scope 3+' accounting can take reference to data of other companies in similar sectors and adapt for their own calculations.

1.4 Key references in developing the report

The basic structure of this report and the explanation of some concepts are adapted from *The Avoided Emissions Framework (AEF)* by Mission Innovation[14].

We also referred to the following materials while developing this methodology:

- GSMA and the Carbon Trust (2019). The Enablement Effect
- WRI (2019). Estimating and Reporting the Comparative Emissions Impacts of Products
- AT&T (2021). AT&T Gigaton Goal Overview and Methodology
- GESI and the Carbon Trust (2015). GeSI Mobile Carbon Impact
- Walmart (2021). 2021 Project Gigaton Accounting Methodology
- ICCA & WBCSD Chemicals (2013). Addressing the Avoided Emissions Challenge
- Schroders & GIC (2021). A framework for Avoided Emissions Analysis
- ADEME (2016). Quantifying the Impact of an Emissions Reduction Action on GHGs V2
- Greenhouse Gas Protocol (2011). Corporate Value Chain (Scope 3) Accounting and Reporting Standard
- Luohan Academy (2022). Digital Circular Economy for Net Zero

[14] The Carbon Trust is the lead author of The Avoided Emission Framework

Definition

2.1 'Scope 3+' and relevant terms

The introduction of 'Scope 3+' and 'Scope 3+' emissions reduction within this report is an attempt to understand and measure how a company affects emissions in its ecosystem and the stakeholders in it, outside its Scope 1, 2 and 3. Below are some existing concepts that address similar ideas.

Avoided emissions

An article from WRI[15] defines avoided emissions as "emissions reductions which occur outside of a product's lifecycle or value chain, but as a result of the use of the product". The Avoided Emissions Framework[16] places more emphasis on the comparison of emissions and describes avoided emissions as "a solution (product or service) that enables the same function to be performed with significantly less GHG emissions". The concept 'avoided emissions' can be applied to both Scope 3 emissions and emissions beyond value chain. Another similar term used to describe avoided emissions is Scope 4.

The concept of 'Scope 3+' focuses on emissions reduction scenarios beyond the corporate value chain. 'Scope 3+' emissions reduction has absorbed the concept of 'avoided emission' and innovatively includes another type of catalytic interventions that a company actively performs to engage and facilitate other stakeholders to reduce emissions, instead of directly providing lower carbon products or services. This makes 'Scope 3+' relevant to a wide range of sectors and companies. In this methodology, the concept and accounting methodology of 'avoided emissions' are mainly reflected under Enablement and enabled carbon abatement. (See Section 2.2A)

Beyond value chain mitigation

In the *SBTi 2021 Corporate Net Zero Standard*[17], companies are encouraged to go beyond their value chain emissions and contribute towards reaching a societal Net Zero goal. Beyond value chain mitigation refers to "mitigation action or investment that fall outside of a company's value chain, which includes activities that avoid or reduce GHG emissions, and those that remove and store GHG from the atmosphere." Some examples of efforts to pursue mitigation action outside of a company's main business include "securing and enhancing carbon sinks (terrestrial, coastal and marine, etc.) to avoid emissions that arise from their degradation" and "[investment] in nascent GHG removal technologies (e.g., direct air capture (DAC) and storage)". So far, this concept has not been explained in depth and its distinction from 'Scope 3+' emissions reduction remains unclear.

2.2 Categorisation of 'Scope 3+' emissions reduction

Companies across various sectors can generate 'Scope 3+' emissions reduction. The way in which they will drive 'Scope 3+' emissions reduction will vary depending on their business. Based on companies' roles and

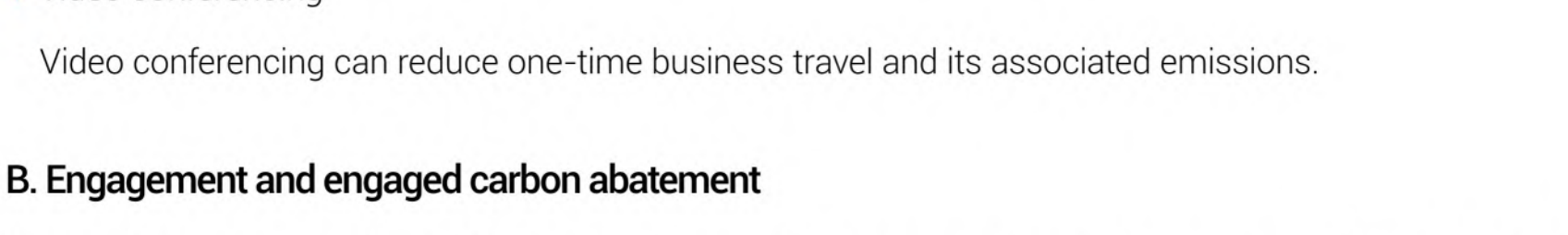
[15] Do We Need a Standard to Calculate "Avoided Emissions"? | Greenhouse Gas Protocol (ghgprotocol.org), 2021
[16] Net-Zero Innovation Module 2: The Avoided Emissions Framework V3, 2020
[17] SBTi Corporate Net-Zero Standard (Version 1.0), 2021

the types of their activities in driving 'Scope 3+' emissions reduction, 'Scope 3+' emissions reduction can be classified into **two categories:**

1) Enabled carbon abatement

2) Engaged carbon abatement

Figure 5: Illustration of 'Scope 3+' emissions reduction categories



A. Enablement and enabled carbon abatement

'Scope 3+' emissions reduction through enablement means a company provides a substitute solution (i.e., product or service) that enables the same function to be performed with significantly less GHG emissions beyond its value chain. Once the solution is adopted, enabled carbon abatement will occur without further human interventions.

This type of solution is **fundamental and indispensable** in realising the GHG emissions savings. Enablement adds value and reduces emissions as compared to the Business as Usual' (BAU) baseline scenario. Enablement solutions are mainly driven by technology development, with some driven by new and innovative business models.

The list below describes some examples of enabled carbon abatement:

- *Cloud data centre service*

  Shared virtual data centre provided by one company to substitute for offline deployment of servers and data centres by various individual customers.

- *Carpooling/ride sharing*

  Ride sharing can increase the use of one existing vehicle and reduce the need to take another car or taxi and its associated emissions.

- *Video conferencing*

  Video conferencing can reduce one-time business travel and its associated emissions.

B. Engagement and engaged carbon abatement

'Scope 3+' emissions reduction through engagement, means a company intervenes through engaging (educate, advocate, communicate, provide training, tools, technical assistance, provide incentives, etc.) with stakeholders (e.g., business and consumers) to help them reduce GHG emissions **that are not covered in the company's Scope 1, 2 and 3 emissions.** Engagement by itself as an intervention does not necessarily equate to a reduction in emissions. An eventual reduction in emissions requires stakeholders' buy-in and their willingness to actively reduce their emissions.

The 'Scope 3+' engagement category highlights that besides directly providing enablement solutions, a company can also play a prominent role in climate mitigation by proactively engaging with stakeholders to unlock their potential in reducing emissions. Different engagement tactics can be adopted, including optimising business models, prioritising resources, establishing standards and rules, etc.

The list below describes some examples of engaged carbon abatement:

- *Cutlery-free takeaways*

  Takeaway booking apps can add a cutlery-free option for users. To encourage them to go cutlery-free, virtual points — which can be redeemed for coupons — are rewarded. Every cutlery-free order can save a set of disposable cutleries and its lifecycle emission.

- *Smart meter*

  Made operable by M2M mobile technology, smart meters encourage behavioural change by providing transparent information, which can increase awareness of energy prices and enable customers to easily monitor their energy use[18].

- *Promotion of energy-efficient appliance*

  E-commerce platforms give extra exposure and carbon reduction information about energy-efficient appliance to strengthen awareness and promote sales. Every energy efficient appliance sold and used by consumer will save energy and avoid emissions.

Table 3: Comparison between 'Scope 3+' enablement and engagement categories

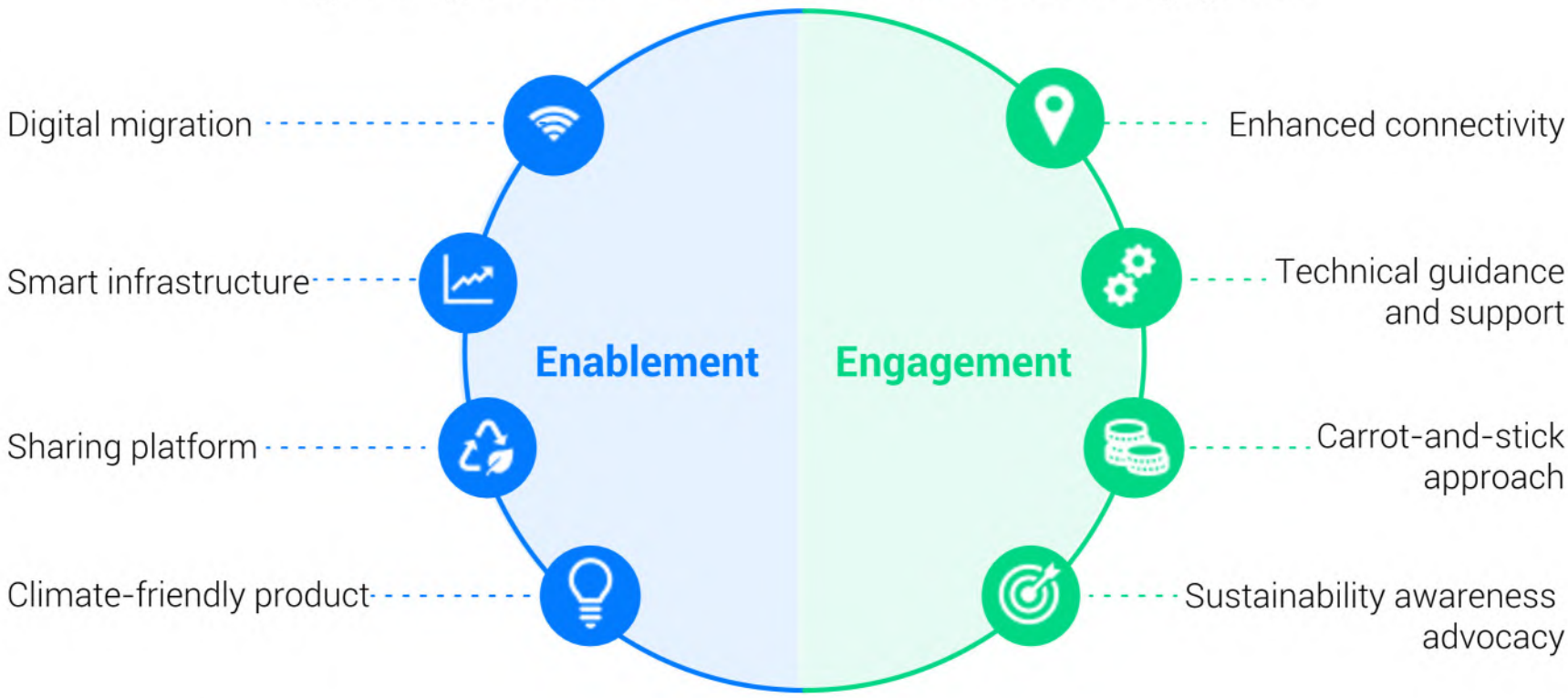
	A. Enablement	*B. Engagement*
Type of activity	**Substitutional** solution	**Catalytic** intervention
Leads to direct carbon abatement?	Adopted solution will result in **direct** carbon abatement	The company's intervention itself does not necessarily reduce emission. Stakeholder action is still required to lead to carbon abatement
Coverage of stakeholders	Direct users of solution	Can involve multiple stakeholders

2.3 Common levers in driving enablement and engagement

This section summarises the common practices companies can use as levers to drive 'Scope 3+' emissions reduction. The list is non-exhaustive, and its main objective is to inspire companies to look for potential 'Scope 3+' emissions reduction opportunities.

[18] According to a study conducted by the European Union in 2020, smart metering enables residents to use less energy. Data from a smart meter deployment project shows that smart metering provides an average energy saving of 2%-10%.

Figure 6: Types of common levers for enablement and engagement



Levers for enablement:

There are four common types of enablement practices:

1) Digital migration

Virtual solutions replace the traditional offline ones to save energy consumption.

Examples:

- Cloud data centre (see Section 2.2A).
- Online medical diagnosis and prescription: online service to avoid travel to hospital and associated emissions (see Section 1.2).

2) Smart infrastructure

Deployment of smarter management systems with technologies like the Internet of Things, Machine Learning, Artificial Intelligence and Cloud technologies offer a more transparent overview of usage and the associated emissions data, optimising operational efficiency.

Examples:

- Business-to-Business (B2B) software or platform as a service (SaaS/PaaS): Carbon monitoring and management system to optimise manufacturing processes.
- Automated building management system for HVAC: Machine-to-machine (M2M) technology assists automated monitoring and control of HVAC systems based on occupancy and temperature which enabled avoidance of 103 million tCO_2e of emissions in 2018[19].
- Smart parking: Sensors that help drivers detect available parking slots, reducing the emissions created when searching for a space.

[19] GSMA, The Enablement Effect, 2019

3) Sharing platform

Sharing platforms and services increase usage rate of existing products and may potentially reduce the demand for new products in the long run.

Examples:

- Sharing accommodation through apps such as Airbnb, helps avoid higher emissions associated with hotel stays. In the long run, this business model may reduce the need to construct new hotels[20].
- Carpooling and ride sharing decreases the quantity of cars making similar journeys, thereby reducing emissions.

4) Climate-friendly products

There are two types of climate-friendly products. One type of products serves as the entire solution and emissions reduction will generate directly after using these products. While the other type of products acts only as part of the bigger solution and can only function together with other necessary parts.

For example:

- High-performance glass (the entire solution) improves window insulation and makes building heating and cooling more efficient. This leads to lower energy consumption, and avoids emissions, as compared to regular glass.
- Silicon wafers for solar PV (part of the solution): Every unit of solar energy consumed can avoid emissions from the grid, which is fossil fuel dominant. As one of the key players in solar PV supply chain, silicon wafer manufacturers can have a share of 'Scope 3+' emissions reduction.

Levers for engagement:

There are four common types of engagement practices:

1) Enhanced connectivity

The intervention strengthens connections of different stakeholders and information through establishing channels, to accelerate emissions reduction activities.

Examples:

- Logistics company Cainiao establishes recycling stations in communities to collect and re-use courier boxes from different companies. This in turn reduces emissions generated from the production of new boxes.
- Connected information tools such as smart meters (see Section 2.2B).

[20] Same as 19

2) Technical guidance and support

Company provides practical capacity-building support to stakeholders including tools, guidebooks, suggestions, and training to empower emissions reduction actions.

Examples:

- Standards and guidebooks for carbon neutral factories or warehouses to provide technical support on transformation.
- Online GHG emissions calculator helps the party concerned to better understand their emissions which supports the next step of emissions reduction action.
- Carbon reduction training for restaurants provided by food delivery platforms.

3) Carrot-and-stick approach

Companies, especially platform companies, use extra incentives (e.g., extra brand exposure) to pull, or compulsory rules (e.g., threshold for vendor procurement) to push partners to transit to more climate-friendly behaviors, to jointly accelerate towards a decarbonised future.

Examples:

- E-commerce platform's seller engagement scheme for low-carbon products (see Section 1.2).

4) Sustainability awareness advocacy

Service providers raise users' awareness and promote sustainable behaviours by prioritising relevant choices, increasing transparency to emissions information, incentivising sustainable choices, etc.

Examples:

- Orders with smaller portions: Reduce consumers' food waste due to overordering and reduce emissions attributed to food waste.
- Promoting energy efficient appliances (see Section 2.2B).

Calculation method

3.1 General principles

This methodology adheres to five key accounting and reporting principles that align with the *GHG Protocol Corporate Accounting and Reporting Standard*[21], namely, relevance, consistency, completeness, transparency, accuracy. Another relevant principle, conservativeness, is appended.

- **Relevance:** Ensure that boundaries are defined and data selected in 'Scope 3+' calculation are relevant to the business solution. All data, methods, criteria, and assumptions should appropriately reflect the 'Scope 3+' emissions reduction in relation to the baseline case and support users' decision-making needs.

- **Consistency:** Use consistent accounting approaches, data collection and calculation methods to allow for meaningful comparisons over time and between scenarios. Transparently document any changes to the data, boundaries, methods, or any other relevant information when changes are made to the accounting approaches.

- **Completeness:** Include all sources of changes in emissions arising from and/or caused by the solution to be assessed. Disclose and justify any specific exclusions.

- **Transparency:** Address all relevant issues in a factual and coherent manner with a clear audit trail. Provide clear and complete assumptions and references to the accounting and calculation methodologies and data sources used, so as to allow stakeholders to evaluate the credibility and reliability of the results, such as choice of baseline scenario and emissions factor.

- **Accuracy:** Reduce uncertainties as far as possible and improve the accuracy in setting boundary and timescale, using data for calculation, and conducting relevant analysis to substantiate the method used, so that the level of accuracy is sufficient to enable users and stakeholders to make decisions based on the results.

- **Conservativeness:** On the basis of accuracy, adopt a conservative approach wherever assumptions are required (i.e., identifying baseline, selecting parameters, etc.). Avoid deliberately choosing favourable scenarios and exaggerating emissions reductions.

It is important to note that, as 'Scope 3+' emissions reduction calculation could be time and effort consuming, the reporting company should also ensure that the data collection and calculation can be executed within a reasonable timeframe with a feasible level of resource, while aligning with the principles listed above.

[21] WBCSD, WRI. The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (revised edition)

3.2 Overview of calculation approach

The calculation approach compares GHG emissions of a baseline scenario to the scenarios with decarbonising efforts under the two 'Scope 3+' categories. This process involves calculating the emissions for several categories:

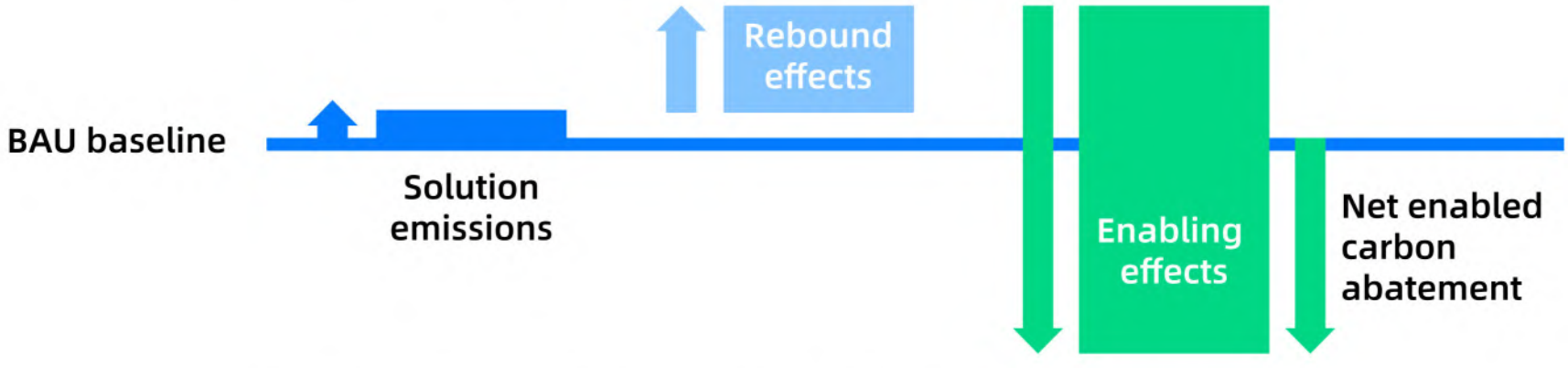
- BAU baseline: Emissions from the business-as-usual scenario without the introduction of the solution
- Enabling effect: Enabling effect is the reduction/avoidance of baseline emissions as a result of the implementation of the substituting solution
- Engaging effect: Engaging effect is the reduction/avoidance of baseline emissions as a result of the involvement of the catalytic intervention
- Solution emissions: Emissions produced by the implemented enablement solutions
- Action emissions: Emissions produced by stakeholders' actions which catalysed by engagement interventions
- Rebound effects: The increase in emissions occurring as a result of and usually following an introduction of the solution/intervention often driven by the behavioural changes of the solution/intervention implementers. However, introducing solution/intervention does not necessarily lead to rebound effects.

3.2.1 Carbon abatement through enablement

The calculation follows the below logic:

Net enabled carbon abatement
=
BAU baseline emissions - Emissions of the solution enabled scenario

Figure 7: Illustration of carbon abatement through enablement calculation[22]



Note: Chart is meant for illustration and does not indicate the actual emissions amount.

Net enabled carbon abatement is calculated as the difference between the emissions in the absence of the solution (i.e., BAU baseline) and the emissions of the solution-enabled scenario. Emissions of the solution-enabled scenario should include the emissions from the solution itself (i.e., solution emissions) and rebound generated emissions (i.e., rebound effects).

[22] Net-Zero Innovation Module 2: The Avoided Emissions Framework V3, 2020

3.2.2 Carbon abatement through engagement

Engagement as a catalytic intervention does not directly result in carbon abatement. The carbon abatement is in fact generated through actions taken by stakeholders to reduce emissions. When calculating carbon abatement through engagement, **only emissions driven or influenced by the company's intentional extra efforts can be included.** These efforts may include, but is not limited to, proactive adaptation of business deign, investment of extra resources, etc.

There are two emissions reduction calculation methods included in this section. **The difference of these two methods mainly stems from the difference in their objectives of comparison.**

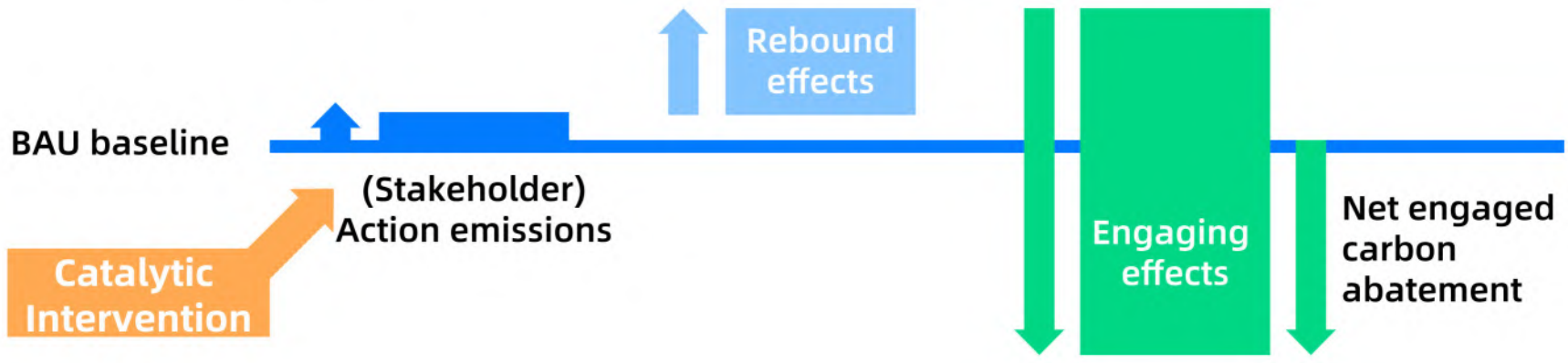
1) **Type 1:** Driven by company's engagement activities, the stakeholder decides to adopt lower carbon solutions / actions to replace ones with higher emissions. This type of carbon abatement mainly derives from avoidance. **The calculation comparison will be made between the emissions arising from stakeholder's adopted action and emissions from the baseline scenario** (see Section 3.5 for more explanation on the baseline scenario). For example, a navigation app provides virtual points, which can be redeemed for prizes, as incentives to encourage users to take public transport instead of private Internal Combustion Engine (ICE) vehicles. Through this user-engagement intervention, travel by private ICE vehicles, resulting in reduced emissions.

2) **Type 2:** The stakeholder optimises or changes its own behaviours to directly reduce emissions from its previous solutions. **The calculation comparison will be made between the data from the stakeholder's before and after actions.** For example, the e-commerce platform gives additional brand exposure to merchants who have taken action to cut their emissions. Inspired by the incentives, merchants accelerated their green energy transition and generated actual reductions in operational emissions.

[Calculation method for Type 1]: Emissions from engaged actions compared to ones from the baseline

Net engaged carbon abatement = Baseline emissions - Emissions of the intervention engaged scenario

Figure 8: Illustration of carbon abatement through engagement calculation type 1

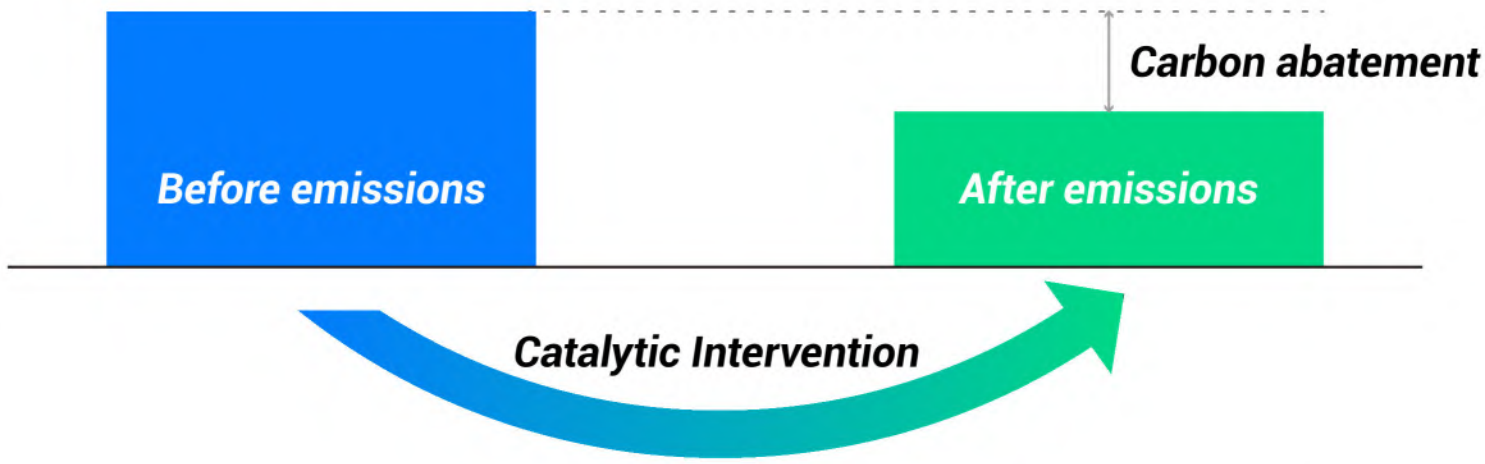


Net engaged carbon abatement is generated by stakeholder's preference to actions with lower GHG emissions over ones with higher emissions.

[Calculation method for Type 2]: Emissions after engaged actions, compared to previous actual data

Net engaged carbon abatement = (Baseline) Before actual emissions - After / current actual emissions

Figure 9: Illustration of carbon abatement through engagement calculation type 2



The before and after emissions data are based on actual figures. This data can be provided at an organisational level, a product level (product LCA footprint) or at the activity level where there was a reduction in emissions. The company needs to ensure that its actions do not cause significant increases in emissions in other segments of their business. Aligned with the accounting principle of completeness of data, the reporting company should identify the emissions and emissions reduction through a Life Cycle Assessment (LCA) (see Section 3.3.3 for LCA).

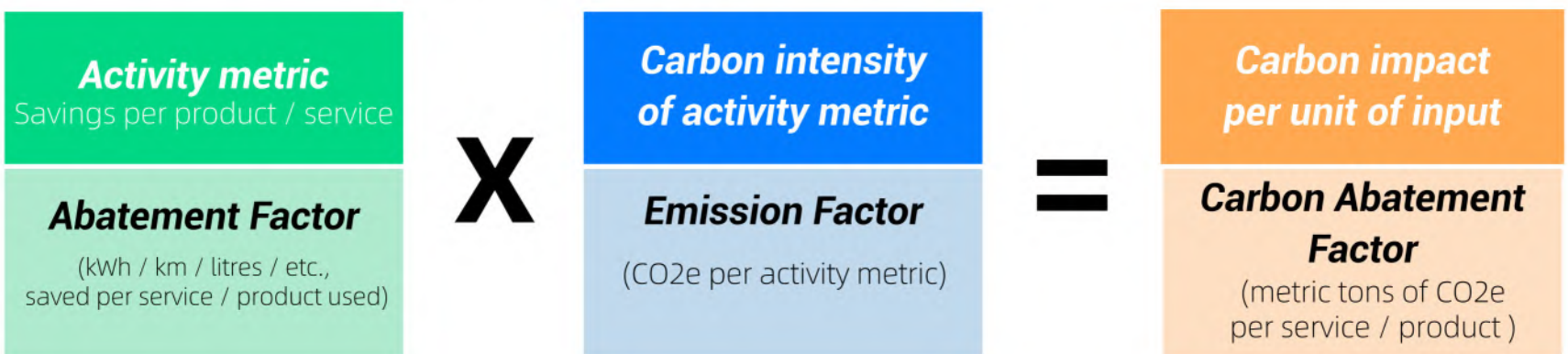
3.2.3 Carbon abatement factor

The carbon abatement factor is used to reflect the net carbon abatement per unit of the particular product or service, also known as functional unit (see Section 3.3.2). For example, the enabled emissions reduction for an online medical prescription would be measured in kgCO_2e per prescription.

The carbon abatement factor is applicable to enablement scenario, due to the direct causality between solutions and abatement generated. However, the factor does not always work for the measurement of 'Scope 3+' reduction through engagement. The carbon abatement factor may vary considerably from case to case depending on the target group, the intensity of the intervention, etc. Users are advised to measure based on their own circumstances.

The carbon abatement factor can be extracted from existing academic literatures or industry case studies. Otherwise, it can be calculated by modelling based on relevant data and supported assumptions. If required, the carbon abatement factor can be derived from the following equation:

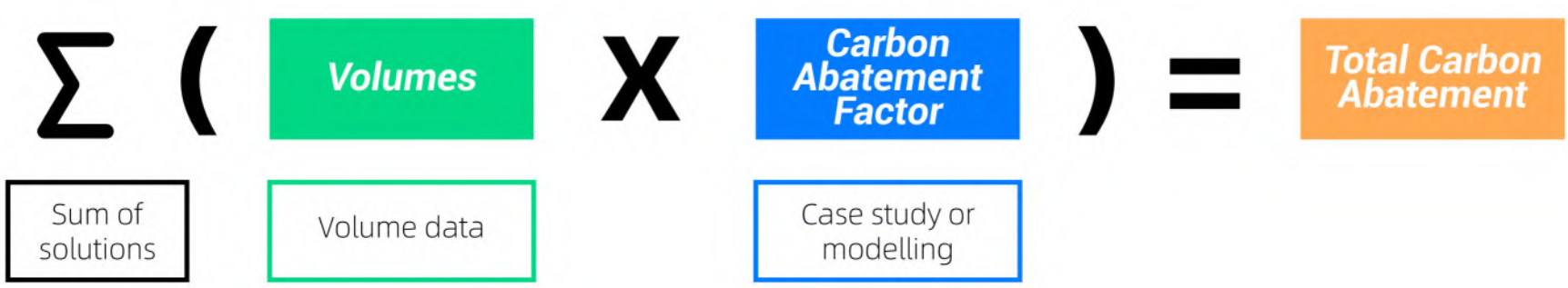
Figure 10: Derivation of carbon abatement factor



The abatement factor will often be expressed in terms of an activity metric, such as kWh of electricity savings per video conference. This then needs to be converted into carbon terms by multiplying it with the relevant emissions factor. If significant rebound emissions are identified, these should be included to obtain a net carbon abatement factor.

To calculate the total carbon abatement for a solution over a specific time period, the carbon abatement factor is multiplied by the volume of the solution deployed. For a company with multiple solutions, its total carbon abatement will be the sum of carbon abatement for each individual solution.

Figure 11: Total carbon abatement equation derived based on the Avoided Emissions Framework[23]



There are two major advantages of using a carbon abatement factor. Firstly, it provides a normalised factor that can be used to compare different assessments and studies. Secondly, once the carbon abatement factor in a certain scenario is identified, it sets a good foundation for future calculations in subsequent years.

3.3 Boundary and identification of solutions

To avoid confusion from definitions used in other sources of guidance documents, this methodology provides a definition of the following keywords, which are used throughout this document:

3.3.1 System boundary

A system boundary is defined as the collection of steps, processes, activities, sources/sinks, or lifecycle stages that form part of the business ecosystem. The system boundary used in 'Scope 3+' emissions reduction should be reasonably considered and documented appropriately following the accounting principle of completeness. Nothing should be deliberately left out and double counting should be avoided by checking overlaps between a company's solutions. The system boundary should explicitly define the list of items included and excluded.

For comparison purposes, a consistent boundary should be adopted for both the BAU and the assessed scenarios. It is also important to state the secondary enabling/engaging effects and rebound effects that are included and excluded in the system boundary (see Sections 3.4.2 and 3.6 for definitions of secondary enabling and rebound effects). Excluded items should be reasonably justified.

[23] Net-Zero Innovation Module 2: The Avoided Emissions Framework V3, 2020

It is also worth noting that that the two categories of 'Scope 3+' solutions/interventions are different in nature and should be taken into consideration when defining the boundary. As defined, a system boundary for **enablement** solution should include all steps, activities, and stages that the solution will impact. For example, the system boundary for telehealth solutions should include use of electronic devices, transportation, and any other carbon emitting activities in both telehealth and face-to-face consultation scenarios, if available and considered material.

Defining the system boundary for **engagement** interventions is less straightforward since the contribution to carbon abatement is not direct. The impact of carbon abatement can vary substantially, depending on the type of intervention the company is taking and its impact on the end-user.

3.3.2 Functional unit

According to the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD), a **functional unit** is defined as 'the performance characteristics and services delivered by the product being studied'. The functional unit establishes the basic reference point to identify carbon abatement effects and related consequences.

The functional unit should be clearly defined, measurable, and applicable to both the BAU and assessed scenarios. It should be used consistently to allow for comparisons across the different solutions/interventions available. The functional unit typically consist of a few parameters, including the number/quantity of the solution/intervention, the period to be assessed and the quality of the solution/intervention. For example, video conferencing solutions can use different functional units for calculation depending on the data availability. One functional unit option could be 'per video conference replacing an in-person conference for one year'.

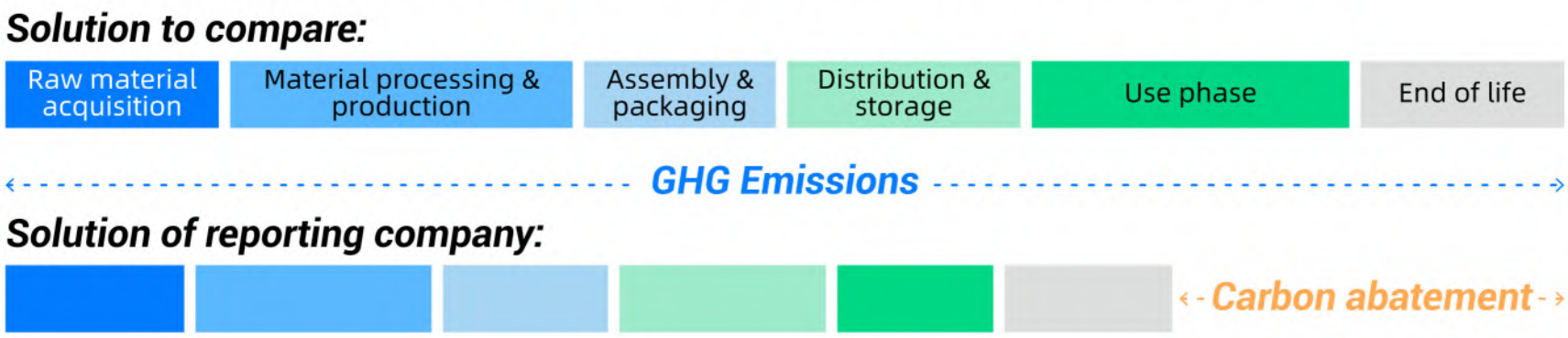
3.3.3 LCA approach

The Life Cycle Assessment (LCA) methodology allows for a comprehensive analysis of 'Scope 3+' emissions reduction in almost any relevant lifecycle phase of the solution[24].

The solution/intervention can include embodied carbon emissions of the solution itself and carbon emissions from the use of solution/intervention. For example, direct emissions from video conferencing can include the embodied emissions of the video conferencing equipment during its manufacturing phase and emissions from electricity in use phase.

Emissions reduction from a solution/intervention is the overall change in emissions across every phase of a product or service's lifecycle using the LCA approach (see Figure 12 below).

Figure 12: Emissions reduction comparison from an LCA angle[25]



[24] By definition, carbon abatement of any lifecycle phase can only be counted as 'Scope 3+' emissions reduction if not captured in the corporate's Scope 1, 2, and 3.
[25] 'Addressing the avoided emissions challenge' by ICCA & WBCSD Chemicals, 2013

However, some solutions/interventions are targeted at a specific stakeholder group that only causes emissions to reduce in one or several phases of the lifecycle. Therefore, enabling and engaging effects are not necessarily present in every LCA phase and should only be considered in relevant ones.

An alternative is 'consequential LCA' approach. This approach can be used to capture the emission changes caused by a specific decision or action in the lifecycle[26]. As 'Scope 3+' emissions reduction can derive from more than one system, this LCA approach used for calculation would reflect a chain of actions and consequences, especially long term and indirect impacts from changing consumption patterns. For example, online shopping offers consumers more choice and, in the long term, promotes more purchases than traditional shopping. These indirect effects will be further explained in the 'secondary effects' and 'rebound effects' sections (see Sections 3.4.2 and 3.6). In practice, the consequential LCA approach for an adopted solution/intervention can be difficult to implement. It is complex and requires high data availability across the lifecycle of solution/intervention.

3.3.4 Timeframe

'Scope 3+' emission reduction is often reported over a one-year span for consistency. Aligning the reporting timeframe of 'Scope 3+' emission reduction with that of Scope 1, 2, and 3 emissions also makes it possible for corporates to compare its carbon abatement efforts under the various scopes, which can facilitate further carbon reduction target setting.

However, timeframes that are longer or shorter than one year may apply in some cases, depending on the solution/intervention that is studied. Below are some scenarios where a non-standard timeframe is considered:

- There may be limited historical data on emissions when calculating carbon abatement for new solutions/interventions. There may also be fluctuations in adoption rate in its initial stages. Adopting a shorter assessment timeframe may lead to an inaccurate estimation of carbon abatement. Reasonable assumptions on timeframe must be made and uncertainty must be acknowledged when reporting the 'Scope 3+' reduction for new solutions/interventions.

- The assessment timeframes for capital-intensive solutions/interventions with a long service life, such as buildings and bridges, are impacted by the "carbon lock-in effect", and should be longer than one year. The carbon lock-in effect occurs when the infrastructure, which may initially appear to be a low carbon option when installed, delays the transition to low carbon alternatives during its lifetime. When selecting an appropriate timeframe, one must take note of such effects and its delayed potential reduction when looking at the lifetime abatement.

- As for engagement interventions, since carbon abatement is not direct, the timeframe for assessment is recommended to be more than a year to avoid seasonal variations and trends. Shorter period is also acceptable if data used is representative and has factored in the seasonal variations.

- The assessment timeframes can also be stretched for solutions/interventions that may have large "secondary enabling/engaging effects" to account for longer term consumer behavioural shifts (see Section 3.4.2).

[26] ILCD handbook (2010). General guide for life cycle assessments – detailed guidance.

3.4 Primary and secondary enabling/engaging effects

Enabling/engaging effects derive from positive carbon abatement of stakeholders as a result of the implementation of a solution/intervention. These effects are typically calculated based on a functional unit. For example, the total carbon abatement for a Mobility-as-a-Service (MaaS) solution is based on each trip on all the types of public transport as opposed to a private car.

Enabling/engaging effects can be divided into two types:

3.4.1 Primary enabling/engaging effects

Primary enabling/engaging effects are the direct reduction of BAU emissions generated by stakeholders upon adoption of enablement solution/engagement intervention. All primary enabling/engaging effects are an integral part of the total enabling/engaging effect and should be included in the calculation. For example, the primary enabling effects of an online diagnosis service would be the carbon that is saved by avoiding a round trip to the hospital under the BAU scenario.

3.4.2 Secondary enabling/engaging effects

Secondary enabling/engaging effects refer to indirect reductions of BAU emissions upon adoption of adoption of enablement solution/engagement intervention. These secondary effects typically take place over a long time period as behavioural shifts do not happen overnight. For example, installing high-performance glass reduces the cooling and heating needs of the building, and therefore, in the long term, reduces the number of equipment needed for cooling and heating and the embodied emissions of such equipment.

Hence, it may be challenging to quantify these secondary effects and the effects are often excluded in the calculation. However, to ensure completeness of 'Scope 3+' reporting, it is still recommended to qualitatively assess and report the secondary enabling/engaging effects, especially if they will result in large carbon abatement.

3.5 BAU / baseline

3.5.1 Baseline identification

A baseline or BAU scenario determines the carbon emissions levels in the absence of a solution/intervention. Choosing a reasonable and reliable baseline or BAU scenario for calculation is one of the key challenges of 'Scope 3+' emissions reduction calculation. A baseline or BAU scenario should accurately reflect the original market conditions and consumer behaviours so that the 'Scope 3+' reduction is not overstated. Selection of a more conservative baseline is preferred to avoid greenwashing.

A functional unit will be determined together with the baseline selection to form the reference point for comparison calculation. One should avoid establishing the reference point as a benchmark to another specific company with similar solutions/interventions, for example using two livestreaming service providers with differentiated offerings as a reference point in calculating 'Scope 3+' emissions reduction from movie livestreaming services. Fundamentally, 'Scope 3+' reduction compares the solution/intervention with the generic market-average alternatives.

There is often more than one alternative solution/intervention under a BAU scenario. For example, an alternative to carsharing includes taking public transport, cycling, or walking. To account for the various options, the **market-average approach** is used to form the baseline or BAU scenario. This approach takes the weighted average of all available options, and the emission of each option is multiplied by its market penetration rate.

This approach gives a fair estimation for a baseline but it takes significant effort to identify all available options and to quantify each of their market share. In cases where data is not available, or where one option is dominant in the market, the reporting company can take the option with the largest market share **(most widely used scenario approach)** as its baseline with clear justifications.

The reporting company should obtain accurate information on the baseline market situation through reliable and credible sources, like established market research or study. In-house market research can also be a valuable reference provided that the research methodology and assumptions are clearly explained. The baseline should be time- and location-specific for easy comparison with the emissions arising from the adopted solution/intervention.

While the market-average approach provides a reasonable estimation of the BAU scenario, the actual BAU data may be difficult to collect. In this case, if the historical emissions data for the BAU scenario is available from the stakeholders themselves, the reporting company may collect such data from them and adjust for any irrelevant variables.

Table 4: Sampling baseline[27]

Solution/Intervention	*Baseline/Alternative**	*Functional Unit*
EVs	ICE vehicles	tCO_2e per vehicle lifetime
Solar energy	Generic grid mix	tCO_2e per GWh
Geothermal energy	Generic grid mix	tCO_2e per GWh
Coal power plants equipped with carbon capture and storage (CCS)	Coal power plants not equipped with CCS	tCO_2e per GWh
Solid wall insulation	No insulation	tCO_2e per instalment lifetime
Plant-based beef	Beef	tCO_2e per tonne produced

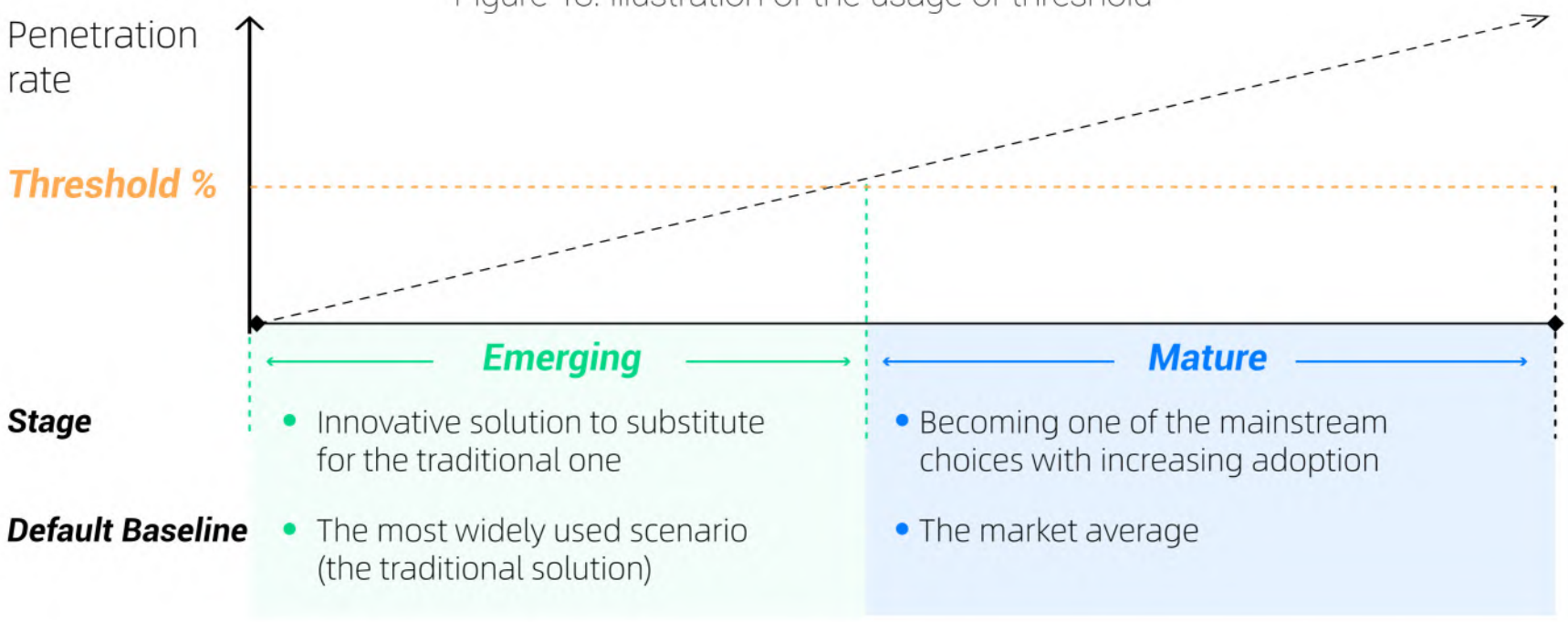
* Note: The baseline described here can differ by location and circumstance. The above examples are only listed to demonstrate baselines of a selected number of activities. These examples do not indicate that the corresponding activities should be classified as 'Scope 3+' solutions/interventions.

In practice, companies can link the choice of baseline to the maturity of the solution/intervention that is being assessed in some cases. For example, they can set a bespoke threshold of penetration rate to evaluate the maturity of their solution/intervention. The penetration rate can be calculated either by the percentage of users that adopt the solution/intervention (among all users), or the proportion of number of uses of the solution/intervention (among all the similar solutions/interventions). The threshold can also be set for several different values in different areas. A higher penetration rate means a more mature solution/intervention. When the penetration rate is below the threshold, the new solution/intervention can be regarded as an

[27] Schroders & GIC, A framework for avoided emissions analysis, 2021

emerging innovative activity that substitute the dominant traditional solution/intervention. When the penetration rate of the solution is above the threshold, the solution/intervention can be seen as mainstream. The application of this threshold as a dividing line, can help the company simplify and standardise the baseline selection process. For emerging solutions/interventions, the default baseline can be the most widely used scenario (if dominant), while for mature solutions/interventions, it is the market average.

Figure 13: Illustration of the usage of threshold



Hypothetical example – Online prescription service in China market (see Section 1.2 case)

Assumption: 10% as threshold	*Share <= 10%*	*Share > 10%*
Stage of online prescription service	Emerging solution	Mature solution
Baseline	In-person hospital visits to get prescription with potential travel emissions	The market average situation[28]

Note: This example is used to illustrate how a 'penetration rate' can be used in practice. All data and scenarios in this example are based on assumptions and do not represent concrete data.

3.5.2 Baseline adjustment

The established baseline or BAU scenario should be reviewed and validated regularly as the market shifts. For example, in the digital industry, change is the only constant when it comes to its solutions as the industry rapidly evolves to better serve consumers' needs. In China, e-commerce has become a major sales channel in less than five years. Video conferencing which was the only option during the pandemic is expected to continue to be used frequently even in the post-Covid era. The role of digital solutions is not just to substitute existing ways of performing everyday activities, but also to expand the plethora of options for consumers. With the ever-changing demand and external environmental influences, markets and industries grow and change year on year.

As a result, the baseline must be reviewed and validated regularly to reflect the actual market condition, and to ensure that accurate comparison between the reporting company's innovative solution and the market-average situation.

[28] Market average situation may include prescription by family doctor at home, etc.

It is recommended to review the baseline on a yearly basis to account for such changes in market conditions. If review on a yearly basis is not feasible, the minimum suggested frequency is every three years to give a fair estimation of an iterative cycle.

If a company determines the baseline for its solution based on its penetration threshold, it should evaluate whether the baseline reflects the actual penetration rate of the solution on a yearly basis. When the solution reaches the turning point where it should be regarded as a mature solution instead of an emerging one, its baseline should follow the market average approach from the reporting year and onwards.

3.6 Rebound effects

Rebound effects are the increase in carbon emissions due to the adoption of a solution. The effects are often unintended side effects that are related to hard-to-predict behavioural changes and these should be included in the net 'Scope 3+' calculation. For example, though energy efficient home appliances can reduce emissions, a general increase in use of these home appliances due to its affordability may cause an increase in overall emissions. This is also known as the Jevons Paradox[29].

As the level of carbon abatement is reduced due to rebound effects, the effects should be included in the calculation to give a better representation of the actual reduce in emissions. Identifying rebound effects requires a certain level of effort, as the effects cannot be defined at a product level but instead as a change in perception. Solutions which involve products manufacturing should be assessed with an LCA approach (see Section 3.3.3) to ensure consistency. It would be more difficult to define solutions which are services in nature, and corporates should always make their reasonable efforts to identify as many of the impacts as possible.

In practice, rebound effects are often excluded from the calculation as it is difficult to obtain data to quantify them. As 'Scope 3+' emissions reduction is intended to provide companies with a holistic view of environmental impact (whether positive or negative) from solutions and guide future strategy and development, companies are also encouraged to account for the scale of rebound effects that are expected or identified into future design and development of solutions.

However, if an enablement solution/engagement intervention is found to have a large rebound effect, a conservative approach should be taken. To prevent overestimation of the total carbon abatement, the calculations should be adjusted for the rebound effect or, alternatively, the solution/intervention can be excluded from the calculations altogether.

3.7 Negative impact on carbon abatement

With the help of technology and innovative business models, there is usually great potential to reduce 'Scope 3+' emissions. Nevertheless, some solutions may fail to achieve 'Scope 3+' reduction and generate a negative impact instead. A non-exhaustive list of some common reasons for negative impacts is summarised as follows.

1) Ripple effects in the system

[29] Jevons Paradox was first brought up by the English economist William Stanley Jevons in 1865. It described the resource consumption rebound effects from improved energy efficiency, that falling cost of use of a resource from technological progress or government policy could increase the rate of consumption of the resource. In the context of digitalization, Jevons Paradox occurs when enhanced digitalization invites increased use of lower cost digital technologies and generates more energy consumption.

Ripple effects occur when a solution that reduces emissions in one segment, led to an increase in emissions in other segments across the system, thereby increasing the overall emissions.

For example, extending the lifespan of some items

- Extending the lifespan of items can reduce the necessity of producing new ones. However, maintaining of the old items may require large energy consumption which surpasses the reduction in emissions. Based on the LCA approach, the solution will generate a negative impact on carbon abatement.

2) Imbalance between increase and decrease in emissions

A solution may cause both an increase and decrease in emissions. When it is designed properly, the positive impact should outweigh the negative ones, however, this is not always the case.

For example, online dry cleaning and laundry service in big cities in China

- The baseline scenario is that residents walk to dry cleaning stores in their community for laundry services. One substitute is an online service whereby the courier will instead pick up the clothes from a client's house, drive the clothes to a centralised laundry factory in the suburb by van and once cleaned, return the clothes back to client.
- While centralised cleaning could save energy consumption, transportation to the cleaning site can generate extra emissions and could potentially exceed the savings, especially when the site is far away from a client's home.

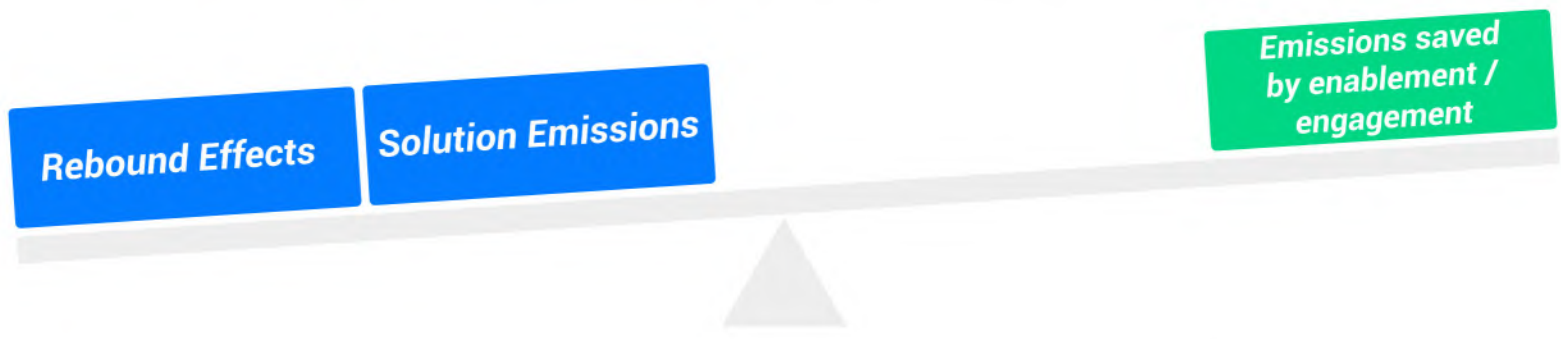
3) Consumer behavioural changes (influenced by the intended solutions directly or unconsciously)

There may be changes in consumer behaviour as a result of the solutions, whether directly or unconsciously. This may result in more emissions in some cases. For example, cost savings from using energy efficient air conditioners may encourage consumers to extend the usage time. Eventually, the energy use over the extended time could exceed the emissions savings.

4) Seasonality

The number of emissions caused by an activity can vary across the seasons, due to different levels of HVAC facilities. For example, in high latitude areas, homeworking in winter is likely to generate higher emissions than in summer.

Figure 14: Illustration of balancing the negative impacts on carbon abatement



To conclude, companies should examine their solutions to better understand their overall carbon impact. Once negative impacts are identified, companies should try to understand the situation and reduce or even eliminate them as much as possible. Since 'Scope 3+' involves multiple stakeholders, whose behaviours can be complicated and interlinked, a systematic mindset to address 'Scope 3+' is highly recommended.

3.8 Attribution and allocation

3.8.1 Attribution

'Scope 3+' emissions reduction is usually caused by not one solution alone but a combination of several solutions, and its ecosystem extends to companies in various industries. For example, car sharing solution requires mobile applications which allow car riders to send and receive location information and request, telematics systems which allow car riders to track the distance of a ride, and cloud servers which match the car ride orders through automatic computing.

Being involved in 'Scope 3+' emissions reduction activity does not directly translate to any degree of attribution. The reason why stakeholders made a choice of a lower-carbon option and who was the party responsible can be subjective. Determining who the carbon abatement is attributed to requires understanding of the carbon saving mechanism. To claim the credit for the reduction in emissions, the reporting company needs to meet the following two conditions:

1) The company has taken proactive and intentional efforts to drive or influence stakeholders to reduce emissions

2) The company can clearly demonstrate and correlate the relationship between its solutions /interventions and the stakeholders' actual carbon saving behaviours

If no feedback or data from the stakeholder in discussion is available, the reporting company can consult existing studies, research, or any other forms of evidence to justify that the solution attributes the carbon abatement effect to some extent. This test is required for most engagement interventions, while enablement solutions attributing to the carbon saving consequence is implied in their fundamental role, thus such test could be spared.

The reporting company can also go one step further to have the attribution validated by the stakeholders to whom the solutions/interventions were provided to. If the number of stakeholders is small and concentrated, the reporting company can conduct interviews and collect feedbacks about whether their stakeholders' decision-making is influenced by the adopted solution. If there are large number of stakeholders, tailor-made interviews would be difficult. Instead, the reporting company could conduct surveys from a sample group of consumers representative of the wider group, to understand if their decision making can be attributed to the adopted solution assessed.

3.8.2 Allocation

Once the attribution to the 'Scope 3+' carbon abatement is determined, the reporting company should consider how much of the 'Scope 3+' emissions reduction is a result of their own solutions and should be allocated under their 'Scope 3+' inventory. Below will introduce three major allocation methods available. These methods are aligned with the basic principle that carbon abatement effect should not be inflated or double counted. However, some exceptions do exist and will be explained in further detail.

Fair share based on contribution

A solution can be allocated a fair share percentage, also known as an equitable or reasonable portion, of the 'Scope 3+' emissions reduction based on its percentage of 'contribution'.

Determining the level of importance, or 'contribution', is often experienced-based and subjective, and difficult to quantify. Three proxies for 'contribution' that could be used in the fair share approach are indicated below.

1) Financial contribution

The fair share can be equated to the percentage of one solution's financial cost (may include R&D investment and operating expenses) amongst the overall cost.

2) Technical contribution

Indicating the technical necessity or importance of one element in the overall solution, the share can be estimated based on company-assigned value-add across value chain. The proxy should be evidence-based.

Example with hypothetical share split: Solar PV energy–a Solar PV project which reduces carbon emissions compared to a BAU grid scenario[30]

- Primary activity of value chain (50%): manufacturing company of solar panels.
- Secondary activity of value chain (30%): raw material providers (e.g., silicon).
- Tertiary activity of value chain (10%): producers of components (e.g., metal frames).
- Other activities (remaining share from 100%): raw materials of components (e.g., steelmaking).

3) Impact level

The share equals to the extent to which a solution has an impact on the eventual emissions reduction action. The impact level can be assessed in two ways:

i. Pre-post data comparison

With all other variables remain unchanged, the contribution can be equated to the difference in observations before the intervention and a certain amount of time after the intervention (for example, one year reporting period).

For example, an ecommerce platform incentivises the sale of energy efficient products by providing energy efficient product sellers with free advertising which helps improve product visibility:

- Pre-post data: actual sales volume before the advertising and one year after the advertising, adjusted for seasonality. The change in sales volume can be regarded as 100% attributable to the platform as it is a quasi-controlled experiment.

ii. Contribution split based on end-users' interviews or surveys

The generation of one emissions reduction action sometimes can be caused by a combination of explicit and implicit factors, especially when it comes to customer behaviours. Under these circumstances, it is difficult and inaccurate to allocate share by subjective speculation. First-hand research such as interviews and surveys with stakeholders are highly recommended, to better understand the importance of different decision factors.

[30] Please be noted that the elements and their corresponding allocation percentage used in this case are not based on any actual data or evidence and are only listed out to demonstrate the approach.

For example, a food delivery app which allows users to place cutlery-free orders. Conduct user surveys to find out the drivers of choosing cutlery-free option:

- What percentage of users intended to place cutlery-free orders without this function (e.g., by adding a note or giving the restaurant a call)?
- What percentage of users were provided with disposable cutlery by the stores even though they had chosen to go cutlery free?

The remaining percentage will be allocated to the food delivery app.

Consensus

Consensus on allocation between all solution providers (with other companies or other business units) of an activity ecosystem.

100% allocation (if justified)

For simplicity, it is possible to allocate all 'Scope 3+' emissions reduction to a single solution which has the fundamental role in enabling the abatement. A solution is fundamental if it can be proven that the carbon abatement will not be present without this solution. Performing this litmus test requires identification of commercially available alternative solutions and the justifications should be based on either widely accepted facts or the most up-to-date industry research. The justifications and sources of evidence should be clearly documented once a solution is regarded as fundamental in the 'Scope 3+' emissions abatement.

This approach is easy and practical but is most prone to risk of double counting. It should be ensured that, within the reporting company, no other solutions claim any attribution if one solution is allocated 100% of carbon abatement effect from a certain carbon saving scenario. It is therefore recommended that the reporting company can take a portfolio-level view when scoping and calculating the 'Scope 3+' emissions reduction effect, otherwise its reported 'Scope 3+' emissions reduction will be exaggerated.

However, carbon abatement might be due to several solutions from different companies, and each company may consider its solutions as fundamental for the carbon savings and likewise allocate 100% of the 'Scope 3+' emissions reduction to their solutions. This can cause double counting across organisations as the actual carbon saving only occurred once. Double counting of 'Scope 3+' emissions reduction across organisations can be accepted when it is impossible to allocate, similarly to when how cross-organisation allow double counting of Scope 3 emissions to facilitate simultaneous action by multiple companies. It should be noted that only cross-organisational double counting can be accepted, and the reporting company should make sure that there is no internal double counting between its own solutions. When cross-organisation double counting is likely, the reporting company should document such double counting and acknowledge the contribution of solutions/interventions from other companies. The reporting company is also encouraged to coordinate with other companies in determining the cross-organisation allocation in the long term.

The reporting company should always choose an allocation method that best suits its circumstances.

Although the reporting company is always recommended to allocate the emissions reduction driven by enablement solutions and engagement interventions following the above-mentioned approaches with reasonable efforts, it should be noted that determining the allocation percentage is difficult due to data availability and accessibility, especially for interventions. When allocation for engagement interventions following these approaches is impossible due to difficulty in collecting relevant data, the reporting company can allocate 100% emissions reduction and document accordingly. In this case, the emissions reduction from enablement solution and engagement intervention should be reported separately.

3.9 Double counting

Double counting is a form of reporting failure which could cause overstatement of the abatement effect and mislead the audience. In addition to overlapping claims in 'Scope 3+' emissions reduction from multiple companies, several other possible situations of double counting and their recommended treatment are listed below. It should be noted that double counting of 'Scope 3+' emissions reduction is not limited to these situations, and it should be identified whenever possible.

Double counting of 'Scope 3+' emissions reduction and Scope 1, 2, and 3 emissions of the company

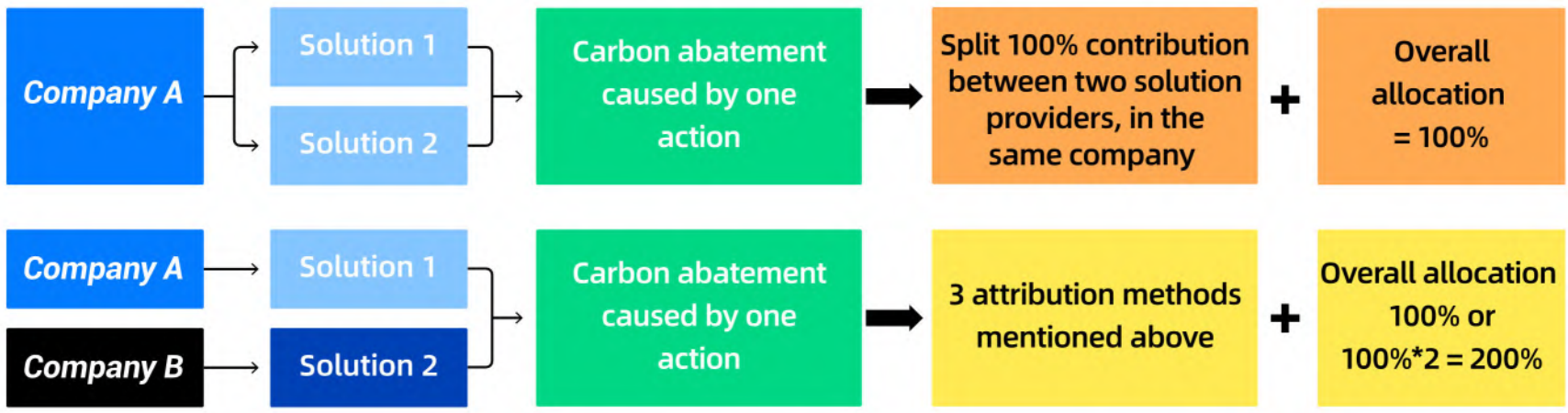
It is important to note that, depending on the stakeholder group receiving the carbon abatement effect, the emissions reduction could be captured in either 'Scope 3+' emissions reduction or Scope 1, 2, and 3 emissions of the company. For example, if the stakeholder group is within the company, for example, employees, the emissions reduction is likely to have been captured by Scope 1, 2, and 3, and, by definition, should be removed from the calculation of emissions reduction of the solution/intervention and documented accordingly. Taking videoconferencing as an example, company's employees are the users of the videoconferencing solution and this enabling effects from reduced employee travel should fall under Scope 3 emissions whereas solution emissions from increased consumption of electricity should fall under Scope 2 emissions. They should be removed from the calculation of 'Scope 3+' emissions reduction accordingly.

Double counting of 'Scope 3+' emissions reduction due to overlapping solutions/interventions

In theory, the allocation factor of different solutions and/or interventions for a specific carbon-saving scenario should add up to 100%, no matter who owns the solutions. The previous section introduced the only exception where double counting is acceptable–the cross-organisation double counting. The fair share approach and consensus approach are designed to minimise the risk of double counting. However, companies often have large and complicated portfolio of solutions and in the process, they may combine use of several allocation methods when calculating their 'Scope 3+' emissions reduction. These complex calculations may easily lead to double counting and companies should always conduct an examination if the addition of their own solutions/interventions exceeds 100% of single carbon abatement before reporting of the figures.

For example, a company may deem that two solutions provided by it are fundamental to a specific carbon-saving scenario and allocate 100% carbon abatement to both solutions. In this case, the company has double counted. It should either follow the fair share or consensus approach to reallocate, or it could classify one of the solutions as the fundamental one with 100% allocation and the other solutions as 0%.

Figure 15: Illustration of double counting between different stakeholders



3.10 Data quality

3.10.1 Data source

Overall principles

The data sources used in calculations should adhere to all four principles below.

- **Relevance:** Data source should offer relevant information about the geographic location and should have an appropriate level of granularity required for calculation.
- **Timeliness:** Data source should reflect up-to-date market conditions. As far as possible, data in the current reporting year should be used. If such data is unavailable, previous year's data can be accepted.
- **Credibility:** The reporting company should reference multiple credible sources of data, preferably from official sources, followed by industry sources. If neither is available, the company may refer to publicly released academic papers and reports.
- **Conservativeness:** When there are significant deviations between sources, the company should take the data that gives the most conservative estimates

All four principles should be taken into account while choosing the data source used for calculation.

Data source

To avoid choosing data or assumptions that are biased, the reporting company should consult multiple sources and choose the source(s) with the most relevant time and geographic information. All data sources, assumptions and relevant justifications that were used in calculations should be documented and clearly referenced.

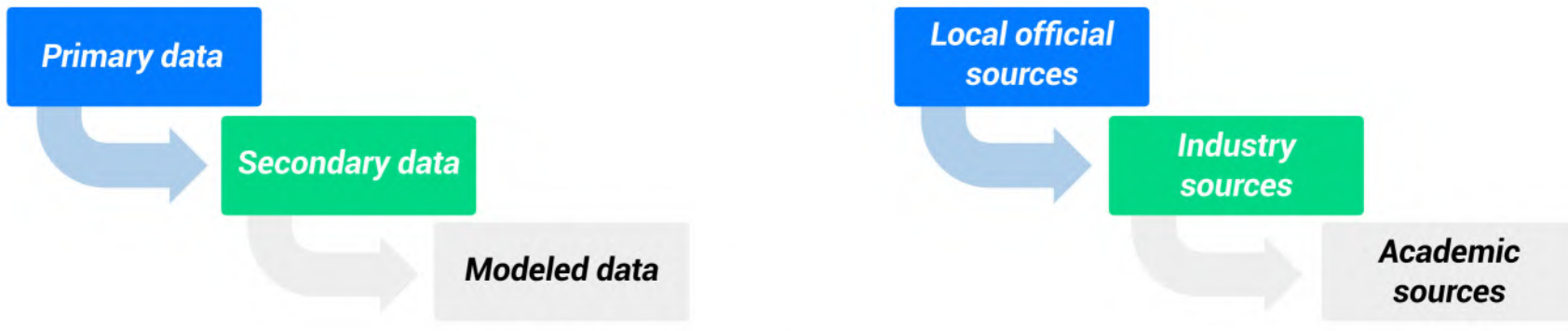
A reliable data source is key in ensuring data quality and credibility. Local data from authorities are the best sources as they provide the most accurate and relevant data specific to the regions in which the company operates. If official data is not available, the company can refer to industry sources. In the case that neither source is available, academic sources, including scholarly books, articles, and research papers, can be used.

Internal sources and sources from stakeholders may be biased but it is sometimes the only available source, especially when calculating engagement type of carbon abatement. If internal sources must be used, companies should provide more validation and reasonable justifications. When using information provided by stakeholders, the reporting company should also review the data quality and try to improve it together with their stakeholders if gaps are spotted.

The data for direct-to-consumer (D2C) solutions is usually not readily available and can be difficult to collect. The level of carbon abatement from these solutions depends largely on consumer behaviours, and these may differ from a company's original hypothesis that are often simplified and idealised. User engagement surveys could be one handy approach to collect data for D2C solutions.

For example, it is hypothesised that the purchase of a second-hand clothing substitutes the purchase of a new garment, therefore reducing carbon emissions in garment production. This hypothesis is not necessarily true, as consumers may still purchase large number of new garments and the second-hand clothing may just be an additional item in their wardrobe. Similarly, ride-hailing services may seem to reduce emissions by maximising the commuters in each ride. However, as ride-hailing applications brings convenience to the community, consumers may be increasingly dependent on private vehicle commute as compared to public transport in the long run. A report in 2020[31]suggests ride-hailing trips result in an estimated 69 percent more emissions on average than trips passengers would have otherwise taken by bus, train, bike, or walking, based on consumer survey in the US. It is a clear example of consumer behaviour change and the varying degrees of rebound effect that D2C solutions can bring (see Section 3.6).

Figure 16: Order of preference for data source selection



As far as possible, reporting companies should use primary data. If primary data is not available, secondary data can be a good compromise. If neither is possible, estimations based on data modelling from validated assumptions, proxies, and sampling can be used. The data used should also be reviewed and updated periodically.

For example, in cases which involve the product carbon footprint that is not available, the company shall use an estimated value based on the average emissions generated in the raw material and manufacturing stages of similar products from benchmarking companies. If actual data from other companies cannot be obtained, the reporting company can refer to literature and research papers for average emissions data of

[31] Published by Union of Concerned Scientists, a non-profit advocacy group. http://www.ucsusa.org/resources/ride-hailing-climate-risks

the product category being studied or utilise the physical production intensity approach to estimate the product emissions. When neither of these two methods is viable, the reporting company can go for the economic intensity approach which allows it to generate an approximate estimation of the product emissions.

Data quality assessment

Data quality is critical as it determines the overall accuracy and reliability of results. The level of data quality should be documented, including data sources, assumptions, relevant justifications, and any uncertainties.

It is recommended to conduct a data quality gap analysis to help improve on data quality for future 'Scope 3+' emissions reduction accounting. One way to better assess data quality is to use a scoring matrix. Data can be scored based on data types (primary, secondary or estimation) and data sources (official sources, or company data). Whichever data generates the highest score will be deemed to be of the best quality.

3.10.2 Uncertainty

Uncertainty describes how accurate the result is or how close it is to the theoretically true value. The concept is used in statistical assessments which involve large number of data points. However, the typical statistical uncertainty analysis is not applicable to 'Scope 3+' emissions reduction accounting, where the calculation methodology is largely based on assumptions and estimations.

With that being said, the reporting company should still be conscious and cautious about the level of uncertainty when calculating 'Scope 3+' emissions reduction and should always follow the principles and methodologies recommended in the previous sections. The reporting company should inform readers of the level of uncertainty in the calculation by providing a qualitative description on key parameters affecting the uncertainty of results presented.

A sensitivity analysis, through varying certain key parameters and assumptions, is also recommended to better understand how the results are impacted by the level of uncertainty. This sensitivity analysis can help to lend more credibility to the final result.

3.11 Step-by-step calculation guide for 'Scope 3+' emissions reduction

The following section provides a step-by-step guide in calculating 'Scope 3+' emissions reduction for a selected business solution/intervention. A company's total 'Scope 3+' emissions reduction will be the sum of carbon abatement result of each individual solution/intervention in its portfolio.

Step 1: Identify the solution and determine the boundary

A company should start by identifying the solutions/interventions that will lead to a 'Scope 3+' emissions reduction in the two main categories: enablement solution and engagement intervention. This step may involve a rough calculation of the 'Scope 3+' emissions reduction to determine its significance and whether it should be included in the calculation. In doing so, the company can balance its effort between coverage of Scope and accuracy in the calculation and reporting.

For companies with large portfolios, it is important to check for overlaps between different solutions/interventions to prevent double counting of carbon abatement that is achieved by more than one solution/intervention. Companies should involve subject matter experts in each business units in early stages of discussion to properly identify the carbon abatement mechanism for each solution/intervention. Cross-department collaboration is vital in obtaining the right boundaries, attribution, allocation, and data for the calculation of 'Scope 3+' emissions reduction.

Step 2: Define the baseline scenarios, functional units, enabling/engaging effect and rebound effect

The company should then establish the baseline and functional unit for the selected solution/intervention to be assessed. The company should understand and identify all the significant enabling/engaging and rebound effects, and determine what can be quantified in addition to the primary enabling/engaging effects. The reporting company should measure and report any quantifiable rebound effects. If rebound effects are large and likely to cause significant deviations on the results, their corresponding enablement solutions/engagement interventions should be excluded from the calculation altogether to avoid overestimation if the rebound effects cannot be quantified, as mentioned in Section 3.6.

Step 3: Identify and collect all data required

The company should identify all data and credible sources needed for the calculation of carbon abatement factor, volume, allocation and collect data following the best practices as described in Section 3.10.

Step 4: Calculation and documentation

Carbon abatement factor is a key component of the 'Scope 3+' calculation for enablement, and hence, if required, the calculation should be done first. It can be retrieved from existing published reports, literature studies or modelled estimation with raw data. The carbon abatement factor should be time and geography specific. Carbon abatement through enablement and engagement can then be calculated following the calculation approach introduced in Section 3.2.1 and Section 3.2.2.

Attribution and allocation for each solution/intervention should be determined with the approaches detailed in Section 3.8. In step 4, the company should look out for potential double counting from overlapping solutions and from emissions that fall under Scope 1, 2, and 3. Calculations should be adjusted accordingly.

The company can calculate the carbon abatement for each solution/intervention by multiplying the carbon abatement factor by the volume and allocation percentage. Afterwards, the total 'Scope 3+' carbon abatement will be derived through summation of the carbon abatement for each solution/intervention.

The company should document the methodology, calculation process, data sources, assumptions, and any justifications to allow assessment on the credibility and reliability of the final result.

Step 5: Review and verify process

It is best practice for calculation process to be reviewed and validated as it will add credibility to the final result. The review and validation can be performed by internal and external experts to ensure that an accu-

rate and conservative approach has been adopted. Process and calculation methodology that are validated can be used in future reporting periods but should be periodically reviewed when necessary.

A review can take multiple forms, including a sense check across all collected data and assumptions used for the calculation, a cross check against other sources of carbon abatement for similar solutions/interventions, and a sensitivity analysis to evaluate impact if key parameters are varied in the calculations.

Step 6: Report 'Scope 3+' emissions reduction

The reporting of 'Scope 3+' emissions reduction will be covered in Section 4.6.

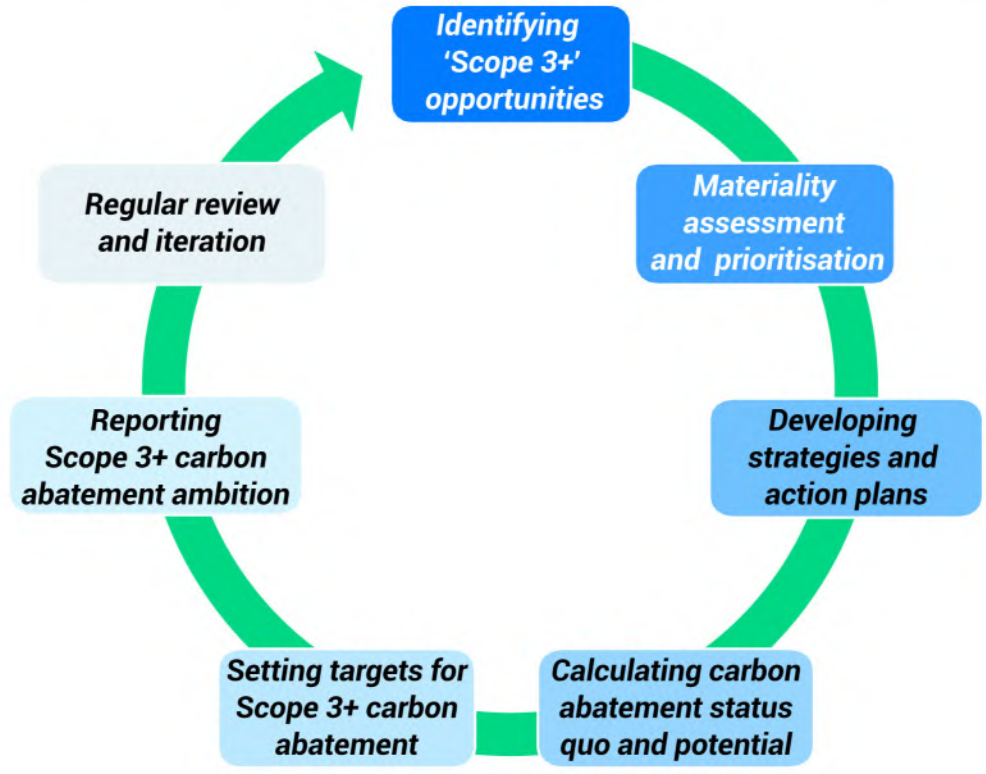
General steps to tackle with organisational 'Scope 3+' emissions

This section aims to provide general guidance to companies that have started to or intend to understand, calculate and action their organisational 'Scope 3+' emissions reduction.

Firstly, companies should always keep in mind that 'Scope 3+' emissions reduction is **not a substitution** for a company's efforts in reducing its Scope 1, 2, and 3 emissions. Every company **should prioritise its own organisational and value chain emissions** before accounting for its 'Scope 3+'. Moreover, 'Scope 3+' and Scope 3 are independent of each other, therefore, **emissions reduction within 'Scope 3+' cannot be used to offset Scope 3 emissions.**

Although the overarching concept of 'Scope 3+' emissions reduction is applicable to all sectors, companies from some sectors may have different priorities in climate action. For example, companies in energy-intensive sectors have a huge opportunity to cut their own emissions and should not focus solely on 'Scope 3+' emissions reduction.

Figure 17: General steps to tackle with 'Scope 3+' carbon abatement



4.1 Identifying 'Scope 3+' opportunities and risks

Identify the opportunities within the business scenarios that are relevant to 'Scope 3+'. This step requires a comprehensive understanding of current business models. The company can start from listing the business scenarios and respective stakeholders. It should then analyse all existing and potential sources of GHG emissions in the different business scenarios and rule out any emissions belonging to Scope 1, 2 and 3. The remaining emissions will be classified under a company's 'Scope 3+'.

At this stage, business models which are likely to produce a negative impact on 'Scope 3+' emissions reduction should not be deliberately excluded.

4.2 Materiality assessment and prioritisation

The materiality assessments in this step helps businesses shortlist 'Scope 3+ 'scenarios for further in-depth analysis. The assessment will include two key criteria: 1) importance and 2) feasibility.

Importance

Importance is the dominant criterion. It is defined as 'the company's likelihood on making a meaningful change', and can be further divided into two dimensions:

A) Company's control level of emissions (Can-do)

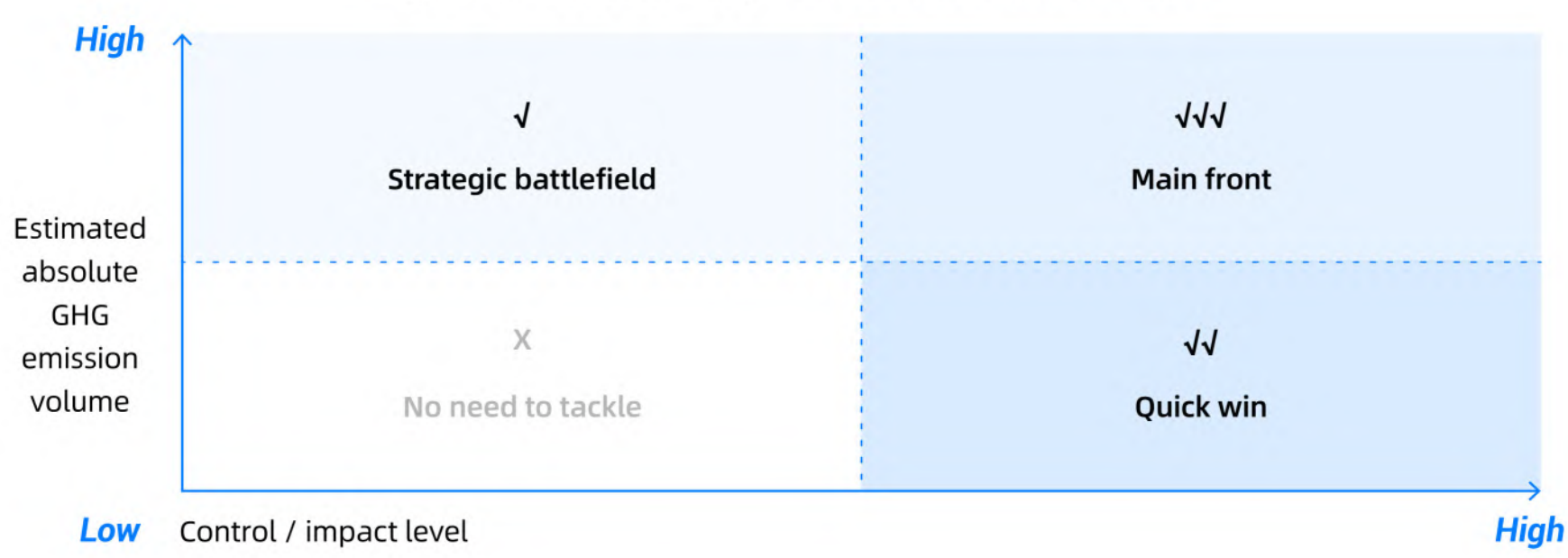
Company's control level over the emissions indicates the extent in which it can positively influence stakeholders to become more climate-friendly. The control level is subjective and relies on the company's judgement.

B) Absolute emissions volume (Should-do)

Absolute emissions volume requires the company to conduct rough estimations on all 'Scope 3+' business scenarios. To speed up the process, simple approaches such as intensity approach can be utilised.

Once general information on these two dimensions is defined, the company can categorise its 'Scope 3+' reduction opportunities in the matrix below.

Figure 18: 'Scope 3+' opportunities classification matrix



Opportunities within the 'Main front' zone with high control level and emissions impact should be ranked as Tier 1 and deserve the company's attention in the near- and long-term. The 'Quick win' zone covers opportunities with high control level yet relatively low emissions. They could be a company's second priority, especially in the short run. The 'Strategic battlefield' zone bears great potential in reducing emissions, but it can be difficult for the company to tackle these due to limited influence. The company would require more time to understand how it can leverage small efforts to harvest larger impact from stakeholders. Engagement interventions in this zone should be strategically deployed. The remaining zone, which has low emissions and low control levels, should be deprioritised unless the company has already addressed 'Scope 3+' emissions reduction across all other zones.

Lastly, potential business benefits, such as positive brand exposure, can be a third dimension that the company can consider when identifying opportunities to prioritise.

Feasibility

The measurement of feasibility involves how much resources and time that the company plans to invest. A feasibility assessment encourages companies to address 'Scope 3+' emissions in a cost-effective way, instead of trying to boil the ocean.

The materiality assessment will shortlist business scenarios to perform further in-depth analysis.

4.3 Developing strategies and action plans

Once the company has decided where to focus its efforts, the next step is to identify actions that can reduce 'Scope 3+' emissions and develop strategies that will help to achieve them (e.g., a change in business model, developing new innovative solutions). When developing the strategy plan, the company should balance between of the goal to decarbonise its ecosystem and its business goals.

4.4 Calculating the carbon abatement status quo and potential

Following the materiality study and once companies have planned their next steps (see Section 4.3), they can calculate 'Scope 3+' emissions reduction potential, using the information on the core principles (see Section 3.1)

- the accounting methodologies (see Section 3.2 until 3.10), and
- the step-by-step guidance (see Section 3.11).

4.5 Setting targets for 'Scope 3+' emissions reduction

Once the company has established sufficient quantitative information on its 'Scope 3+' emissions, it is highly recommended to set 'Scope 3+' emissions reduction targets. Doing so will help the company to accelerate its transformation and showcase a stronger commitment to tackling climate change. Targets should be quantifiable and trackable.

Identifying the type of target to be set

There are currently two common types of targets in practice:

The first type is an **absolute emissions reduction** target, which helps to demonstrate a company's ambition and commitment regardless of changes in the future environment. For example, Alibaba's target to cut 1.5Gt 'Scope 3+' emissions by 2035.

The second type is a **ratio target**, mostly used by companies in ICT sector when reporting avoided emissions. Below is a list of examples of ratio targets.

Figure 19: Examples of ratio targets

Company Name	Target	Details
verizon	**2022 Ambition: Enable the carbon savings of more than double the emissions its global operations produce (Ratio 2:1)**	Their operations (Scope 1 and 2)
Telefónica	**2025 Ambition: Enable the carbon savings of 10 tons per 1 ton of CO_2 emitted by its services (Ratio 10:1)**	Their operations (Scope 1 and 2)

Ratio targets can create an incentive for companies to reduce 'Scope 3+' emissions. They highlight the link between the net increase in emissions from their own operations and the emissions reduction driven by the company.

Companies can choose either or both target types depending on where they are in their GHG emissions reduction. To illustrate this, we will use AT&T as a case study. In 2015, AT&T established the 10x goal to enable carbon savings 10 times the emissions produced by its operations by 2025. In 2020, AT&T announced its goal to be carbon neutral by 2035. With this new carbon neutrality goal, operational emissions could drop drastically over time, rendering the original 10x ratio target not practical in driving carbon reduction efforts. Recognising the correlation, AT&T announced its Gigaton goal in 2021 to replace the original 10x target, committing to an absolute emissions reduction target to 'develop connectivity solutions that enable customers to reduce a gigaton (1 billion metric tons) of greenhouse gas emissions by 2035' [32].

Setting short- and long-term quantitative targets

For short- to mid-term (2-5 years) targets, a bottom-up approach is recommended. Targets can be set in line with the predicted reduction of 'Scope 3+' footprint from its baseline taking foreseeable business changes into account.

For long-term (10-15 years) targets, a hybrid of bottom-up (dominant) and top-down (supportive) approaches will be practical. Sectoral trend analysis and peer review in top-down approach can help to provide a factual reference for target setting.

1) For absolute target setting, the recommendation is to apply a linear rate of reduction.

[32] AT&T Gigaton Goal Overview and Methodology, 2021

2) For ratio target setting, the recommendation is to apply a fixed ratio between Scope 1 and2 (operational emissions) or Scope 1,2 and 3 (operational and value chain emissions) and 'Scope 3+' emissions

Long term targets should be reviewed every three to five years and adjusted according to the latest economic and societal changes where necessary. Especially for ambitious targets it is reasonable and acceptable to update the target as work progresses and more solid evidence emerges.

4.6 Reporting 'Scope 3+' ambition

Reporting 'Scope 3+' emissions reduction can be key in demonstrating a company's ambition in its climate action. It should be noted that the reporting of 'Scope 3+' emissions reduction should be done in parallel with the reporting of Scope 1, 2, and 3 emissions and their reduction plans. A company might be deemed as not taking proper responsibilities of its own emissions while claiming credit for carbon reductions of other companies. Similarly, a company can be criticised for greenwashing if it mixes the 'Scope 3+' emissions reduction and Scope 1, 2, and 3 emissions or attempts to offset Scope 3 emissions by 'Scope 3+' emissions reduction in reporting.

The reporting of 'Scope 3+' emissions reduction should always be transparent. This can be achieved by explaining the selected accounting methodology, its data sources and all other assumptions in detail. A litmus test is that the reporting can allow the public to use the parameters and independently calculate the 'Scope 3+' emissions reduction and produce the same results.

Transparency is also crucial when companies decide what to report. Carbon abatement with proper allocation is ideal for reporting. However, a perfect allocation is often challenging due to the uncertainty of various stakeholders' contributions to the carbon abatement and poor data availability, especially for engagement type of solutions and engaged carbon abatement. If the reporting company chooses to allocate carbon abatement for enablement but not for engagement, it should report these categories separately rather than adding all types of emissions reduction together for clear comparisons. For carbon abatement that is not allocated, there must be a clear overview of the actions that were taken as well as discretion around wording.to reflect the company's actual contribution and avoid any exaggerated statements.

Lastly, the frequency of company level reporting can be on an annual or biennial basis.

Application to other frameworks and methodologies

'Scope 3+' emissions reduction and targets can be used in various climate action evaluation frameworks, such as section c4.5a of the CDP climate questionnaire ('Provide details of your products and/or services that you classify as low carbon products or that enable a third party to avoid GHG emissions.') [33] . Under the Task Force on Climate-Related Financial Disclosure (TCFD) framework, companies are encouraged to identify their climate-related opportunities, to which 'Scope 3+' emissions reduction reporting can contribute. With this in mind, reporting can benefit companies financially from stronger relationships and communication with key stakeholders. By identifying and calculating 'Scope 3+' emissions reduction, a company is

[33] CDP Climate Change 2020 Reporting Guidance, 2020

better informed of the positive impacts it produced for its stakeholders, both qualitatively and quantitatively. Companies are therefore encouraged to report their 'Scope 3+' efforts and calculate their impacts during evaluation under other climate action frameworks and methodologies.

4.7 Regular review and continuous improvement

The 'Scope 3+' emissions reduction methodology and its corresponding data should be reviewed on a regular basis. The review will help to understand how the market and stakeholders have changed. This could lead to adjustment in existing accounting as well as new emissions reduction opportunities for future improvement. During the review, the reporting company can check its solutions for any potential 'Scope 3+' emissions reduction driven by new solutions which have not been accounted for in previous reporting. The company should also make sure that the carbon abatement factor and baseline used for 'Scope 3+' emissions reduction always represent the latest market situation.

The review frequency can be aligned with a company's reporting cycle, annually or biannually.

Step 4.3, step 4.4 and step 4.5 are sometimes interchangeable in sequence, depending on the company's under-standing of its 'Scope 3+' and potential emissions reduction plans.

Appendix: Abbreviations

BAU	Business as usual
CCS	Carbon capture and sequestration
DAC	Direct air capture
D2C	Direct to Consumer
EV	Electric vehicle
GHG	Greenhouse gas
GWh	Gigawatt hours
HVAC	Heating, ventilation and air conditioning
ICE vehicle	Internal combustion engine vehicle
ICT	Information and communication technology
IoT	Internet of Things
IPCC	Intergovernmental Panel on Climate Change
LCA	Life Cycle Assessment
MaaS	Mobility-as-a-Service
M2M	Machine to Machine
Solar PV	Solar photovoltaic

Disclaimer: