

LOW
CARBON
LEADERS



TRANSFORMATIVE CALCULATIONS

Calculating the impacts of transformative
low-carbon solutions

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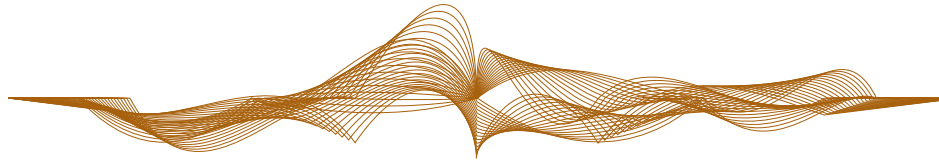
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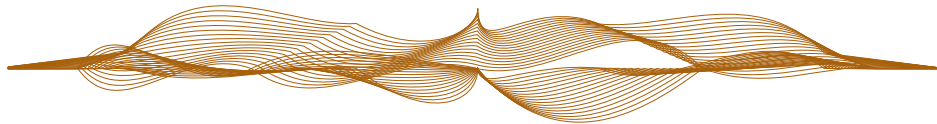
The Low-Carbon Leaders project is developed with the generous support of WWF, A.P. Moller – Maersk, and Global Initiatives.

Art on the cover:
Macoto Murayama, *Lathyrus odoratus* -side view-, 2009, Courtesy of Frantic Gallery

ACCOUNTING FOR REDUCED EMISSIONS IN SOCIETY FROM LOW-CARBON MARKET OPPORTUNITIES



This paper provides a brief overview of the possibilities for calculating and reporting a company's positive contributions to societal emissions reductions. A Q&A can be found in the appendix.



INTRODUCTION AND OBJECTIVE

The objective of avoiding dangerous climate change, sustaining economic development, ensuring job creation, and supporting innovation has expanded the focus of the climate discussion. Over the last few years, discussions and strategies have shifted from an exclusive focus on big emitters and the need to reduce emissions by improving existing systems, to also focus on providers of low-carbon solutions and transformative change whereby services are provided in totally new ways (such as modal shifts and dematerialization).

As a consequence the need for new reporting that can capture contributions from companies that provide solutions has emerged. The terminology is still under development, and the concepts are working names that have been used in the discussion related to the GHG-protocol and other systems for calculating emission reductions:

- Total emissions approach¹: A focus on the total impact, both positive and negative
- Climate Positive²: A company that helps reduce more emissions in society than it emits over the whole value chain, Scope 1-3
- Low-carbon market opportunities³: The emissions that a company can contribute to reducing in society through the use of the products/ services and that are outside Scope 1-3

Such reporting enables companies, investors, policy makers, NGOs, and other stakeholders to better know what products and services could be developed and promoted to support low-carbon development. In addition to the traditional measures that use the company's emissions as the reference, measuring low-carbon market opportunities focuses on how the company's activities affect the total GHG balance in society (including the company's emissions).

Furthermore, an opportunity to credibly report low-carbon market opportunities will help policy makers better understand the amount of emission reductions that fundamentally different ways of providing a service will result in and also better understand the underlying infrastructure, and the carbon emissions from this infrastructure, that different solutions depend on.

Policy makers can also better assess the impact of different policies on rapidly growing companies and companies that provide transformative solutions that at the societal level result in lower carbon emissions.¹ Credible reporting of low-carbon market opportunities can also support optimal acceleration of low-carbon solutions to market as companies can identify solutions and business units that have to grow in order to help reduce emissions at the societal level. Finally, such reporting could support a shift away from a focus on insufficient incremental solutions in existing systems to also include transformative solutions in society in general.

In addition to measuring and managing the traditional scope 1 to 3 emissions, some companies have already begun to analyze how their activities influence total emissions in society. Companies are doing this for different reasons, but the result is that they can increase their revenues by developing products and solutions that reduce emissions in society compared to existing products and solutions. Companies are also developing strategies to explore ways to have a positive impact over the whole value chain, for example by helping suppliers that provide goods/services to additional companies become low-carbon.

The low-carbon market opportunities reporting does not replace the traditional scope 1-3 emissions reporting but complements this for companies with important solutions, providing a more comprehensive description of the strategic opportunities in relation to the overall climate impact.

This paper provides an initial overview of the challenges and opportunities associated with measuring and reporting low-carbon market opportunities. Based on a first set of cases where companies have engaged in measuring and reporting low-carbon market opportunities, a structure of key areas has been identified and suggestions developed where possible. This is a scoping paper which identifies key areas that need further elaboration. As such, it highlights areas that need to be developed further before a final guideline on how to report low-carbon market opportunities can be provided.

This paper was developed in conjunction with an exploration of the opportunities to account for contributions to reduced emissions not included in the existing scope 1, 2 and 3 accounting.² During this process the following main challenges were identified (these are elaborated below under ³ "Accounting and Reporting Challenges and Guidance"):

- Clarifying system boundaries (what emissions should be included)
- Accurately quantifying reductions (e.g., estimating existing and future behavior)
- Determining an appropriate baseline scenario (i.e., which technologies to use for comparison)
- Avoiding cherry picking (i.e., accounting for both emissions increases and decreases in society due to business decisions)
- Allocating reductions among multiple entities in a value chain (i.e., to avoid double counting of reductions among producers of intermediate goods, producers of final goods, retailers, etc.)

The following pages attempt to provide some guidance regarding these challenges.

The author, Dennis Pamlin, wants to thank the group working on the GHG-protocol process (in alphabetical order):
John Kornerup Bang, Maersk;
Olle Blidholm, IKEA;
Nicola Paczkowski, BASF;
David Rich, WRI;
Peter Saling, BASF;

Valuable input has also been provided by Sean Gilbert GRI, Paul Dickinson, CDP and Stefan Henningsson, WWF Sweden.

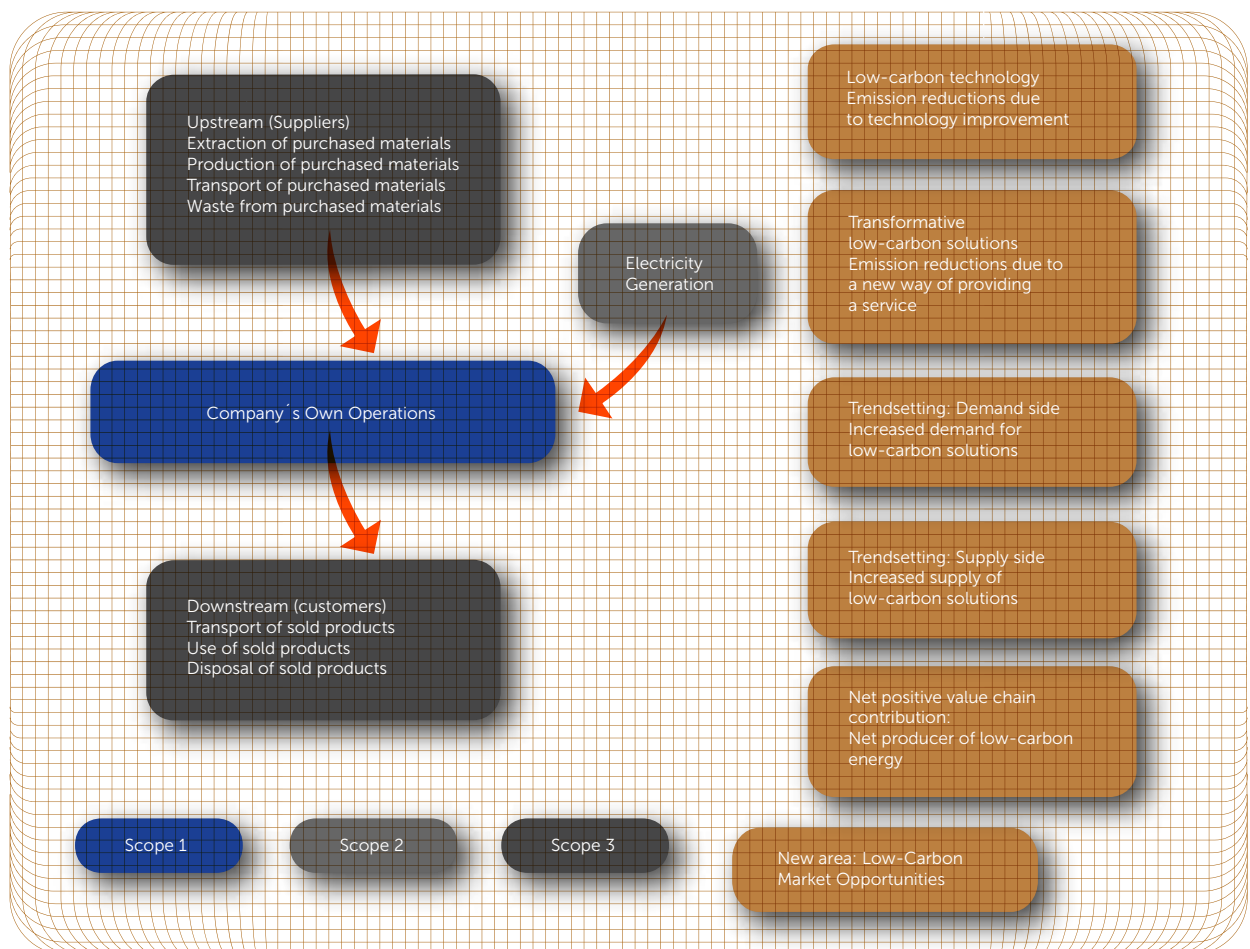
LOW-CARBON MARKET OPPORTUNITIES IN RELATION TO "SCOPE 1-3"

Scope 1: emissions from sources that the company owns or controls

Scope 2: indirect GHG emissions from purchased electricity, steam, or heat – emissions associated with the generation of electricity, steam, or heat purchased and consumed by facilities or equipment that the company owns or controls

Scope 3: emissions from other sources the company does not own or control. This may include waste disposal, leased/outsourced activities, or emissions such as those related to business travel and employee commuting

Low-carbon market opportunities can be described as indirect effects that are not captured in scope 1 to 3 emissions. These effects are often affected by activities that also affect scope 1-3, but instead of a focus on the emissions from the company and its value chain these measures focus on the emissions in society. When shifting perspective from a company to a society perspective a number of impacts becomes visible that are of importance when companies are developing strategies to support a low carbon economy. Five aspects can be distinguished:



1. Emission reductions due to replacement of less energy efficient products

With a traditional Scope 3 perspective, emissions during the use-phase are calculated without reference to what the solution replaces. If a company provides a steady amount of products year to year and improves the use-phase efficiency of the product, Scope 3 reporting gives a good overview of the situation. If a company is growing very fast and increasing its market share, or for instance is implementing solutions that are very different in terms of life-time emissions, the effect can be very different at the societal level.

If a company provides an energy efficient solution such as an appliance or energy efficient lighting, this helps reduce emissions in society if these new solutions replace less efficient products. If the solution instead replaces a similar product or method, the company's contribution is neutral with respect to emissions at the societal level. If the solution is instead simply additional, emissions will instead increase. If a company puts a less energy efficient product on the market the emissions will also increase. The difference between a Scope 3 perspective and the new approach is that the actual emissions in society, not the emissions from the company and its products, are used as the reference.

2. Changes in emissions due to a new low-carbon way of providing a service

Scope 3 emissions reporting focuses on the energy used by the product, but for many solutions other aspects are just as important, or even more important. A company selling video conference solutions will report the energy used by the video conference equipment as Scope 3 emissions, but from a society-perspective low-carbon market opportunities related to this service should also be included. The low-carbon market opportunities allow a company helping customers transition from air travel to use of video conferencing to report this and a company helping customers transition from air freight to shipping by sea can report this. A company can also report reduced emissions if it provides goods or services that help improve energy efficiency in other ways, e.g., by providing insulation materials or enzymes that help reduce the need for high temperature water.

3. Trendsetting on the demand-side

Companies often influence, and even create, new markets, with marketing and lobbying in ways that go beyond their direct sale of products. A company can promote energy efficient lighting, e-readers, teleworking, etc., in a way that creates a broader movement toward a low-carbon society. Through information, communication, and marketing a company can help increase demand for low-carbon solutions. Leadership is important and should be encouraged; for this reason, estimating the savings from trendsetting on the demand-side is important. Even if such savings are often difficult to estimate, efforts in this direction can be reported.

4. Trendsetting on the supply-side

Companies often influence suppliers beyond what is included in the traditional Scope 3 reporting. A company can help a supplier improve its energy efficiency in ways that also affect the supplier's other customers. Again, as leadership is important, and should be encouraged, estimating the savings from trendsetting on the supply-side is important. Companies engaging with their suppliers often have reasonable systems to track and measure emissions. The savings from trendsetting on the supply side may often be difficult to estimate, but efforts in this direction can be reported.

5. Net producer of low/zero-carbon energy

With the traditional Scope 1-3 emissions reporting, a company can reduce its emissions to zero. From a societal perspective it is possible to become a net producer of low/zero-carbon electricity and have a net positive impact in different parts of the value chain, e.g., by helping a supplier become a net producer of renewable energy, or making the office buildings net producers of renewable energy. Opportunities to become net producing entities can range from suppliers that use forest material and can use residues from production to generate energy, to stores that enable the charging of electric cars, or a shipping company that builds net-producing ports. In each case, a low carbon market opportunity would allow companies that are innovative to report their positive contributions.

REPORTING EMISSIONS

Any emissions avoided through low-carbon market opportunities should be reported separately from Scope 1, Scope 2, and Scope 3 emissions. No avoided emissions should be subtracted from these Scopes. Instead, these avoided emissions should be reported separately and different kinds of avoided emissions should be reported separately. In addition, companies should report on the methodology used to calculate avoided emissions and the baselines used to make the comparison. When possible, companies should also report on activities related to dynamic effects such as measures to reduce negative rebound effects and how low-carbon feedback (when reductions result in further reductions) is supported and how high-carbon feedback is avoided.

All products, technologies, and measures that help society reduce (or increase) emissions can be accounted for.

Emissions reductions in society due to low-carbon market opportunities must be transparent. For example, a company should be careful not to claim credits for emissions reductions that are required by law, but it can be interesting to know which companies provide the services that make it possible to follow the law and over time possible strengthen the demands for reduced emissions. Therefore, a company can report what solutions they have provided in order to meet the requirements by law. This lets all stakeholders see which companies provide low-carbon solutions. It should be clear that legislation drives the provision of these solutions and that the company is not claiming any other kind of credit for these reductions.

Options for reporting reductions from low-carbon market opportunities transparently include:

- Separate reporting for Scope 1- 3 and for low-carbon market opportunities
- Include all assumptions and data sources
- Explain how current measures help accelerate a low-carbon development and ensure a low/zero-carbon economy by 2050 at the latest

ACCOUNTING AND REPORTING CHALLENGES AND GUIDANCE

Developing new technologies and solutions, promoting low-carbon solutions, and developing net-producing solutions for renewable energy are all critical components of a strategy for reducing GHG emissions in society. Claims regarding avoided emissions need to be accurate and credible. Transparency in measuring such reductions faces several accounting challenges, including how to:

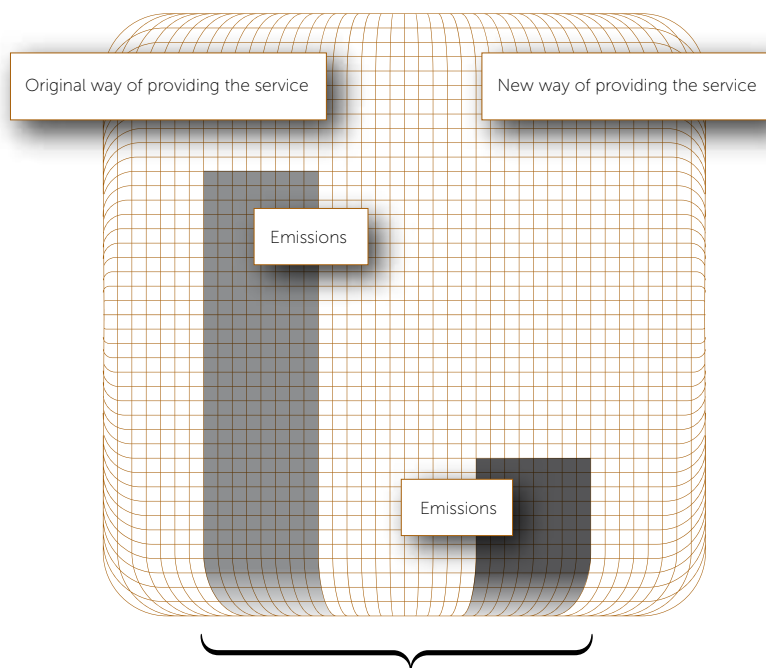
1. Accurately quantify reductions (e.g., estimating existing and future behavior)
2. Determine an appropriate baseline scenario (i.e., which technologies to use for comparison)
3. Avoid cherry picking (i.e., accounting for both emissions increases and decreases in society due to business decisions)
4. Allocate reductions among multiple entities in a value chain (i.e., to avoid double counting of reductions among producers of intermediate goods, producers of final goods, retailers, etc.)

The basic challenge of all emission calculations, the need to establish the system boundaries, i.e. what is included and what is not included in the assessment, cuts across all of these. For emission reductions in society this is even more important as it is a new area and no guidance or standards exist. Compared to traditional accounting, which is often done due to legal requirements based on risk and liability (where a company's legal responsibility is the focus) and reputation, the low-carbon market opportunities should be based on what is needed in society to ensure emission reductions.

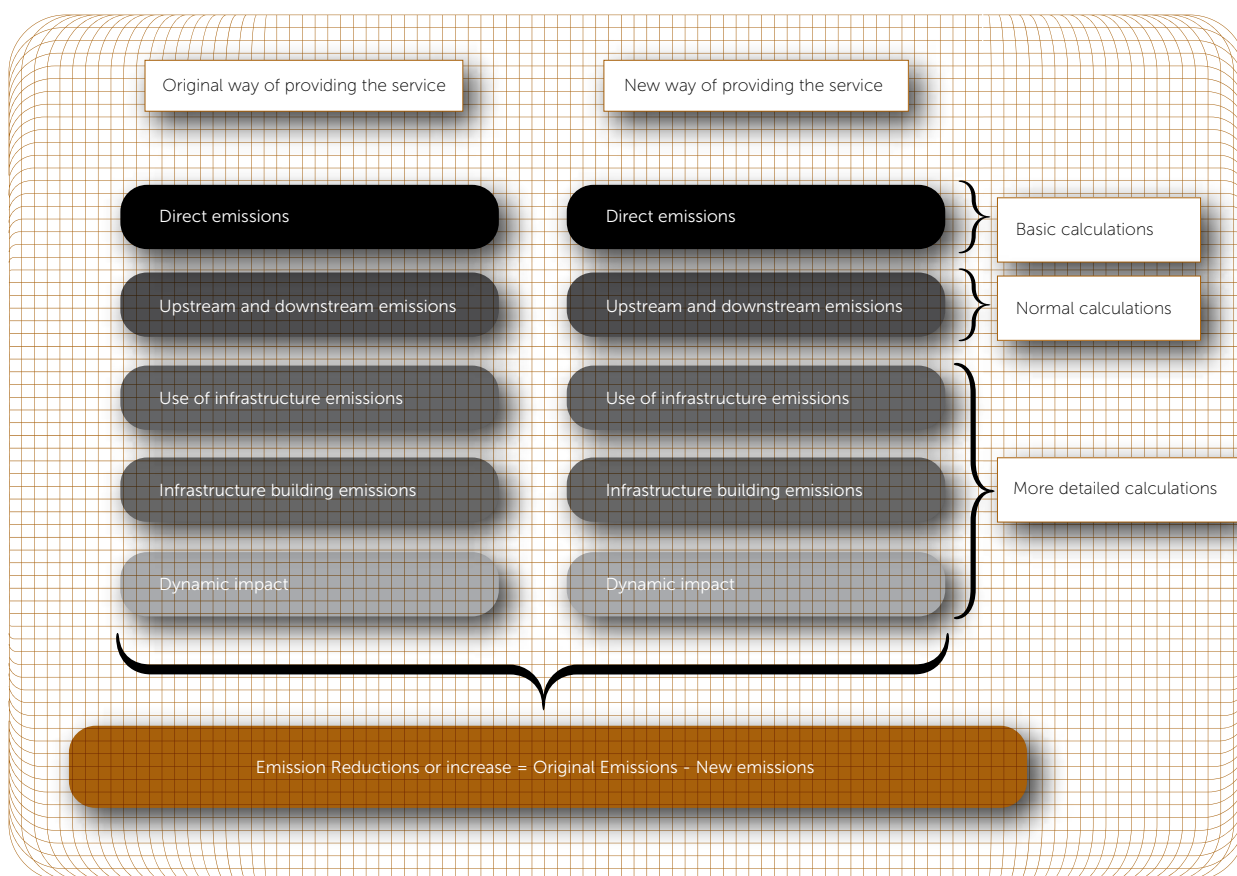
A credible and widely agreed-upon methodology for meeting these challenges has not yet been developed. In order to provide some guidance, this paper outlines some of the issues and challenges associated with accounting for avoided emissions from the use of products sold. This section does not provide answers to all of the accounting challenges raised.

QUANTIFYING EMISSIONS AND REDUCTIONS

To account for avoided emissions from the use by third parties of products sold, companies should use a project accounting methodology. Under the project accounting approach, companies account for changes in emissions compared to a baseline. See the GHG Protocol for Project Accounting for more information (www.ghgprotocol.org).



Emission Reductions or increase = Original Emissions - New emissions



Depending on the solution, the emissions reductions (or increase in emissions) can be mainly due to changes in the broader use-phase (not included in traditional LCAs), in the upstream/downstream emissions, or in the underlying infrastructure and dynamic effects. In an ideal world all emissions should be calculated, but as this is often not possible a company should explain what is included (and not included) and why.

Basic calculation: Calculating Avoided Emissions from the Use of energy efficient insulation (smart temperature)

Avoided direct GHG Emissions from the use of new insulation material = Savings from new solution

Example of formula:

(Use Phase GHG Emissions per square meter without the insulation material - Use Phase GHG Emissions per square meter when using the insulation material) * Number of square meters of buildings using the insulation material

Normal calculation: Calculating Avoided Emissions from the Use of energy efficient lighting (smart lighting)

Avoided GHG Emissions from the Use of LED lighting = Savings from substitution - additional LED lighting + savings due to lower LCA emissions from new solution - LCA from additional LED lighting

Example of formula:

(Use Phase GHG Emissions of the old lights - Use Phase GHG Emissions of the LED) * Number of LED replacing less energy efficient lights

- (Use phase GHG emissions from LED * Number of LEDs that are additional)

+ (the LCA from the old lights it is replacing - the LCA emissions from the LED) * number of lights substituted) - LCA for the LEDs that are additional

For transformative solutions—i.e., solutions that are more than incremental improvements in existing systems—the underlying infrastructure is important for estimating the emissions savings from low-carbon solutions. When comparing teleworking to commuting by car, it's not simply a case of comparing the emissions from the energy used by the mobile device to the tail-pipe emissions. Both systems have up- and downstream emissions. The mobile device must be produced and so must the car; the fuel for the car must also be extracted and refined. The two solutions also depend on different underlying infrastructures. Cars require roads, parking spots, fueling stations, street lights, etc. Mobile devices require fiber optic cables and base stations.

Companies that provide transformative solutions and/or support a zero-carbon economy may also be interested in providing information about the dynamic impacts, such as positive and negative rebound effects. Increased use of cars may result in more roads and more shopping centers built outside city centers, resulting in further increases in emissions. Increased use of teleworking may result in increased use of dematerialization services, such as e-banking and other digital rather than physical content, resulting in further decreases in emissions. A freight liner can have a strategy to reinvest increased revenues in net-energy-producing ports and zero-emitting ships that enables and supports sustainable global trade in a way that air freight carriers do not. The dynamic effects are important for policy makers who want to avoid high-carbon lock-in (i.e., a situation in which the investments result in a system where it is impossible/very difficult to go beyond the first reductions.)

Detailed calculation: Calculating Avoided Emissions from modal shift (smart movement of goods)

Avoided GHG Emissions from the use of smart shipping may in its totality include the following dimensions: use phase, LCA of use phase, infrastructure, use + construction and re investment. The two important factors here are if shipping is resulting in additional transport that would not happen, and if the re-investment will be used to develop zero carbon solutions at the speed that is needed.

Example of formula:

(Use Phase GHG Emissions when flying the goods * ton-km needed to move the goods - Use Phase GHG emissions shipping the goods per ton-km* ton-km needed to move the goods) - emissions from additional shipping.

+ (the LCA emissions from flying the goods -the LCA emissions from shipping the goods) - the LCA emissions from additional shipping.

+ (the use of underlying infrastructure required for flying - the use of underlying infrastructure required for shipping)

+ (the construction of the underlying infrastructure required for flying- the construction of the underlying infrastructure required for shipping)

+ (low/high carbon solutions provided through reinvestment due to flying - low/high carbon solutions provided through reinvestment due to shipping)

Options for quantifying emissions and reductions include:

- Providing the basic calculation. When use-phase emissions dominate, it makes sense to only provide the basic calculation. Reasons for excluding lifecycle emissions can be provided to enhance credibility.
- Providing the normal calculation. When the provided services depend on different underlying infrastructures, it makes sense to include upstream and downstream emissions.
- Providing a detailed calculation. When a transformative solution is provided, it makes sense to include dynamic effects.

DETERMINING AN APPROPRIATE BASELINE SCENARIO

Determining an appropriate baseline is a critical step in accounting for avoided emissions. The following question must be resolved:

- What kind of baseline should be used? Current emissions in society, a BAU-scenario-based extrapolation of historic emissions, relative to the technology/lifestyle development in society or in relation to a sustainable level of emissions?

There are additional questions that need to be addressed but are only covered very briefly in this paper, e.g., What approach should be used to create the baseline? Existing solutions, solutions used by the customer, or average technology in the marketplace? Better than average technology in the marketplace? Best technology in the marketplace? What assumptions should be made about the consumers using new solutions? Keeping current solution, buying an alternative solution, actually using the solution and using it in the right way?

Different baselines can be used, but a company must explain clearly why

a certain baseline is chosen and if possible also provide calculations using different baselines.

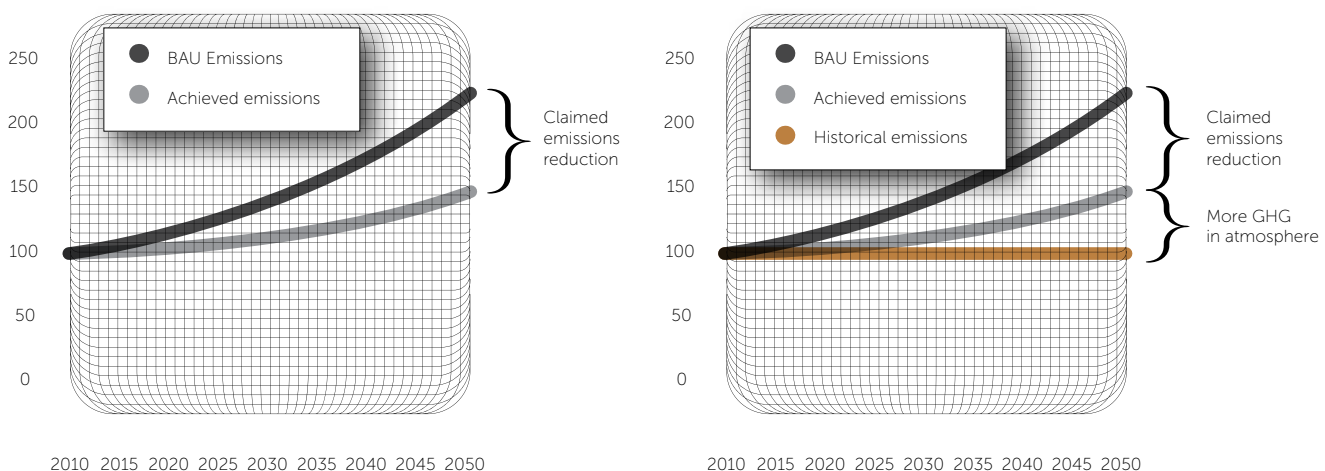
Using increasing future emissions as a baseline

In many situations the current trends indicate that emissions will continue to grow, especially in emerging economies. A company that provides solutions that help reduce emissions compared to such a baseline can calculate these.

Comparing future emission reductions resulting from the introduction of a low-carbon solution (future achieved emissions) to a BAU benchmark of growing GHG emissions may show a significant reduction in GHG emissions (see figure below, left) even though actual emissions compared to a historical level (what has been emitted so far) are still growing over time (see figure below, right). This approach is often used today as companies look at the relative benefits of their new (often marginally) improved products.

This can lead to the conclusion that the climate benefit achieved is going in the right direction (claimed emission reductions) when in fact more GHG may still be emitted in the atmosphere compared to historical emissions (what has been emitted so far from the products a company provided). Using this benchmark allows a company to grow/expand without considering the impact on the planet and still report “climate benefits” from their solutions.

If the calculations are done over decades it is important also to calculate the absolute increase in the atmosphere as absolute reductions are necessary across the globe in the medium- to longterm.



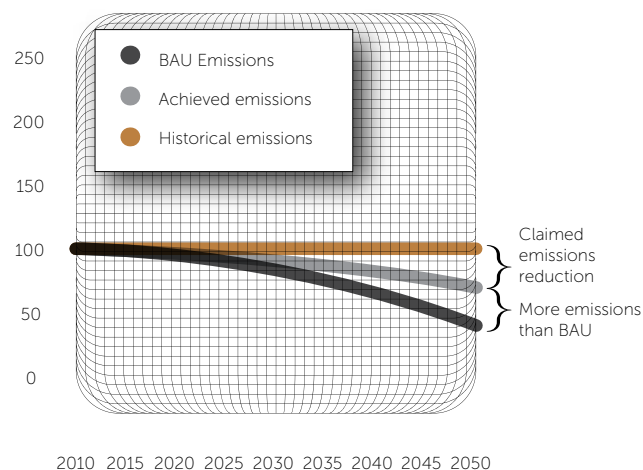
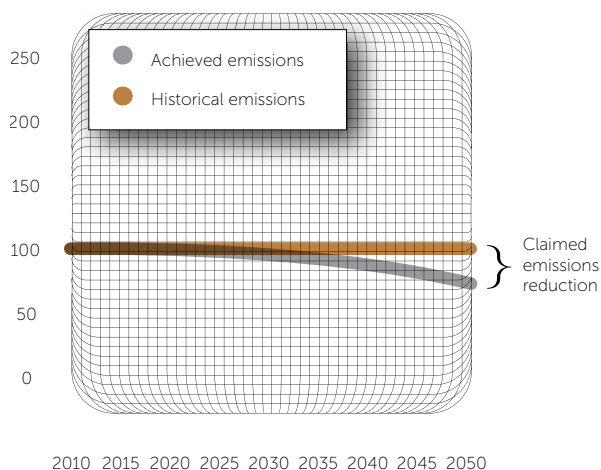
Using historic emissions as a baseline when emissions are decreasing

Comparing future achieved emission reductions (projection of emission reductions after implementing a new solution) to a historical emissions benchmark (emissions from an old version of the solution) can show a positive development indicating that emission reductions are achieved (see figure below, left), yet this benchmark may miss that emissions would decrease anyway due to, for example, technology development, improved legislation, or increased level of renewable energy in the energy system. It may even prove that reductions would have occurred faster than what was achieved with the solution the company provided (see figure below, right)!

The reported reductions may incorrectly be understood as progress—climate benefit—via the introduction of a new solution (claimed emission reductions) while emission reductions without the introduction of the

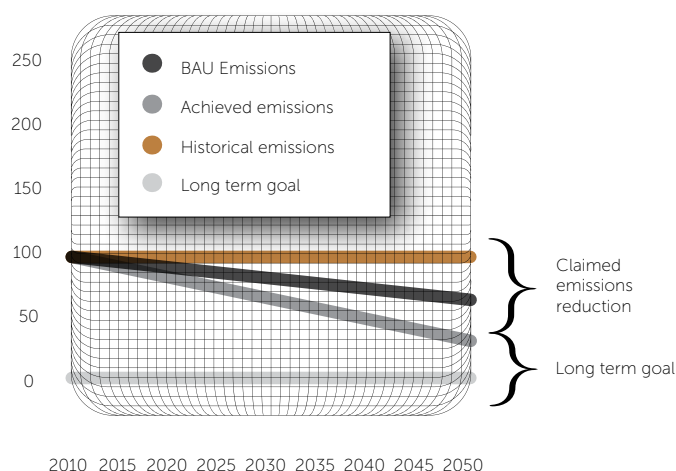
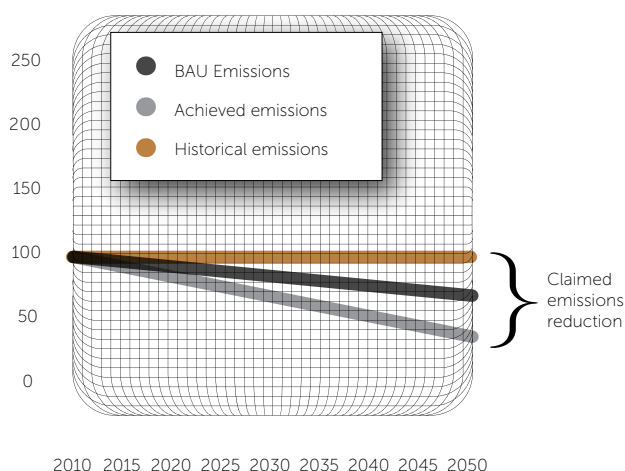
new solution from the company could have been even greater. In these circumstances, using such a benchmark allows a company to report climate benefits from solutions that may in fact prevent society from using existing solutions with even greater reduction potentials.

Companies that use historic emissions must explain what assumptions they have used to calculate savings based on a situation where there is no change. Explaining these assumptions is particularly important if the company is claiming reductions over a long time, such as 20 years or longer, as significant emissions reductions are needed over this timeframe. A company not projecting any reductions over the next decades may plan their business strategy on this and thereby contribute to a high-carbon lock-in and signal to policy makers and other stakeholders that they don't want/believe in significant carbon reductions.



Using actual needed reductions as a baseline

Finally, future achieved emissions may actually be lower than both BAU and historical emissions (see figure below, left). This can be interpreted as an indication that emission trends are going in the right direction. However, when the benchmark is the emissions needed to avoid dangerous changes to the Earth's climate, a substantial gap may be seen (see figure below, right). This may provide a more sobering picture highlighting conclusions about future climate benefits compared to what is needed.



This approach is important when companies, governments, and other stakeholders develop long-term strategies. For instance, when looking at services, it's key to consider different ways to provide the same service, instead of focusing narrowly on similar processes of different efficiencies, in order to identify the solutions that can deliver the emissions reductions needed to avoid dangerous climate change. This perspective is not often applied today, but will most certainly become more used as the climate challenge is translated into concrete actions. With this perspective, the focus will be on identifying benchmarks that allow for the comparison of different solutions that satisfy similar needs.

Options for establishing an appropriate baseline scenario include:

- Use a BAU scenario; the assumptions for the BAU scenario should be provided to ensure transparency
- Use historic emissions; the reason for using historic emissions should be provided to ensure transparency
- Use long-term emissions targets; targets and their justifications should be provided to ensure transparency.

To strengthen transparency a company can include more than one baseline or present arguments for the baseline that is chosen. When possible different assumptions can be used to test how robust the assumptions are.

Using real data and avoiding cherry picking

To the extent possible, companies should measure and report actual emissions reductions, rather than emissions reductions estimates based on general assumptions and statistics. For example, a manufacturer of web-based meeting software may correctly claim that studies show that the product's use by third parties reduces emissions from air travel, by eliminating the need for business travel. However, in order to improve transparency and enhance credibility, the company can collect data to demonstrate that users are indeed reducing business travel due to the use of the web-based meeting software, rather than simply assume this substitution is occurring.

If a company reports on low-carbon market opportunities in its corporate inventory, the company should avoid cherry picking in order to provide a correct assessment of its contribution to reduced emissions.

Options for using real data and avoiding cherry picking include:

- Base emissions reductions on actual data based on use of the solution, rather than general assumptions based on general statistics.
- Account for the sale of all relevant product categories across the product portfolio, not only those products assumed to generate net GHG reductions.
- Account for both indirect emissions from the use of sold products (emissions increases) as well as avoided emissions from the use of sold products (emissions decreases), in order to be comprehensive.

Allocating Reductions among Multiple Entities in a Supply Chain

Over a supply chain multiple suppliers will contribute parts to a solution that saves emissions. For example, multiple components are inputs to an energy efficient LED light. When an LED replaces an incandescent light bulb or a CFL, emission reductions claims may be made by the component suppliers, the LED manufacturer, the retailer, and the consumer.

Companies should be aware that multiple companies in the value chain may report reduced emissions due to the solutions they provide. Therefore it is necessary to use a transparent methodology to determine the allocation of the reductions among multiple entities in a supply chain.

Options for allocating reductions among companies in the supply chain include:

- When it is difficult to obtain information about those closer to the end-use (e.g., if you are far back in the value chain): Allocate reductions according to the market value added at each step in the supply chain.

- When information is available about the end-use (e.g., when a company is close to the end-user): The user should verify that the reduction is due to the relevant product and service. The provider of this service then agrees with the providers/suppliers that it is due to this provider/supplier that the reductions happened, how much their contribution helped reduce emissions, and so on. So the user of LED lamps, or of low-carbon ships, establishes how much they have saved with these products/solutions with the providers, then the provider/manufacturer of the lamp/ship discuss their contribution with the provider, etc.

¹ Such companies include renewable energy companies, IT/shipping companies that allow for use of low-carbon services, or retailers/chemical companies that provide low-carbon solutions to their customers, etc.

A large, stylized letter 'Q' in a brown color. It has a thick circular body and a short, diagonal tail. Below the letter is a solid horizontal brown line.A large, stylized ampersand (&) in a brown color. It has a thick, rounded body and a horizontal crossbar. Below the letter is a solid horizontal brown line.A large, stylized letter 'A' in a brown color. It has a thick, triangular body with a horizontal crossbar. Below the letter is a solid horizontal brown line.

Q & A For The Concepts:
"Total Emissions Approach",
Low-Carbon Market Opportunities
and "Climate Positive"

Q & A FOR THE CONCEPTS: "TOTAL EMISSIONS APPROACH", "LOW-CARBON MARKET OPPORTUNITIES" AND "CLIMATE POSITIVE"

This Q&A attempts to cover some of the most common questions about the possibilities for a company to use a "total emissions approach" and become "Climate Positive" by focusing on "low-carbon market opportunities" (these concepts are working names but have been used in the discussion related to the GHG-protocol and other systems for calculating emission reductions). The document does not address ethical or scientific questions about why reduced emissions are important or what kind of solutions are necessary. The focus is on the opportunities and challenges of an approach that allows companies to also measure and report their positive contributions at the societal level by providing goods and services that help reduce emissions.

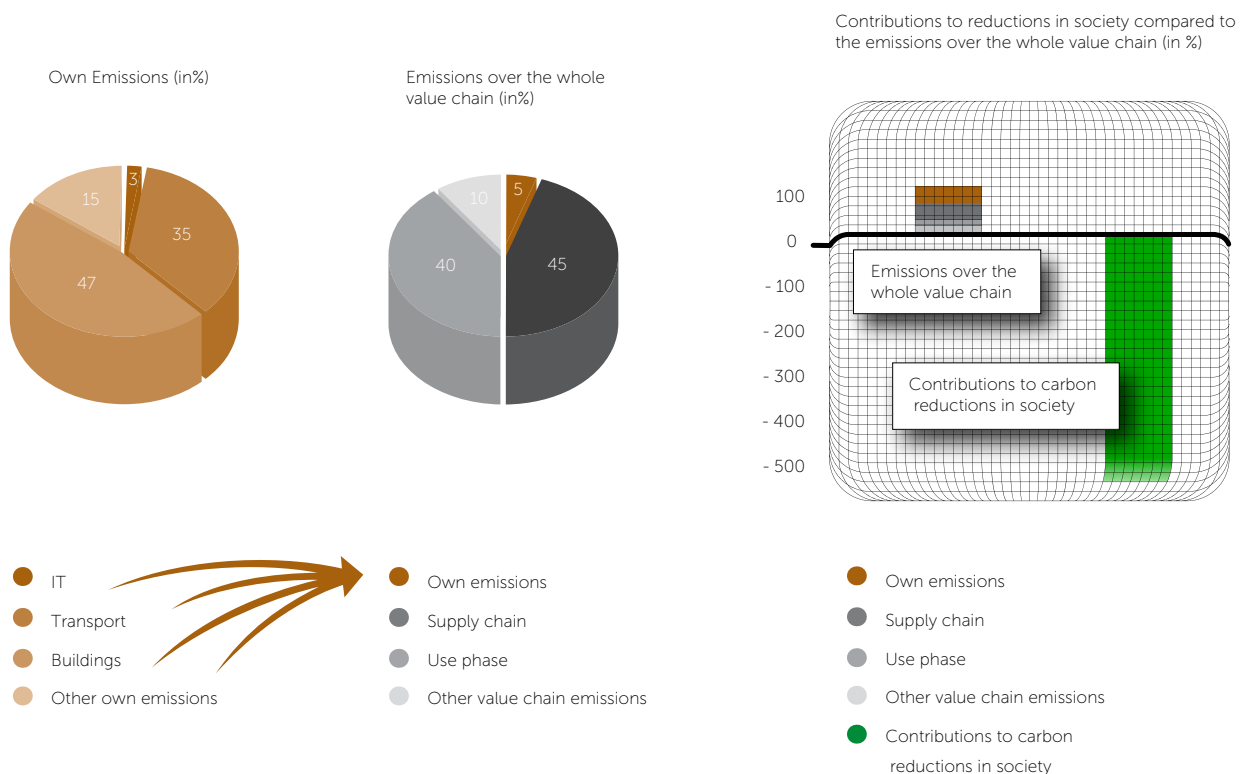
Q1: What is new in this "Total emissions approach" with its focus on "Low-carbon market opportunities" compared to the traditional way of measuring GHG emissions?

The approach allows companies and societies to assess the full impact of a company's activities on emissions.

Traditionally the focus has been on emissions from the company's own operations (Scope 1 and 2). This focus was expanded to include emissions from the supply chain and the use-phase part of the value chain (Scope 3).

The approach discussed in this paper expands the focus on emissions further, to include the effects a company has on society from a "service" perspective, so that the focus is not on, e.g., "the car," but on the service provided by the car, such as "commuting." The "total emissions approach" includes both the emissions from the company and the effects on society that are not included in traditional ways of measuring. This perspective enables companies to measure their own emissions, but also measure their positive and negative impacts on society through the services they provide.

The "total emissions approach" measures how society's footprint is changed/influenced by a company's operations and products/services in a given time period.



For example a company may provide energy efficient lighting that replaces inefficient lighting. By including a focus at the societal level, this company can measure these savings. Likewise, a company providing support for low-carbon food and reduced waste can measure its impact at the societal level; a company providing transport solutions that allow for freight by sea rather than by air can measure its impact; a company providing enzymes that allow for laundering at lower temperatures can measure the impact at the societal level; a company providing e-book solutions that reduce the need for paper and physical storage can measure its impact, and on and on. All these solutions help society reduce emissions. Recognizing and rewarding these contributions requires a new way of calculating and reporting emissions.

The focus on impacts at the societal level is a complementary approach, not an alternative, to the traditional Scope 1-3 reporting. This expanded focus highlights companies with important solutions. It is relatively easy to develop protocols for measuring Scope 1-2 emissions, but the changes in emissions due to broader contributions at the societal level are at least as complicated to assess as Scope 3 emissions. The total emissions approach involves much more individualized modelling and is harder to standardize within sectors or across sectors or product/service lines. In order to avoid speculative reporting/communication standardization is necessary to the extent possible.

Q2: What is a “total emissions approach” and can this allow companies to become “Climate Positive”?

A total emissions approach is an approach where both the emissions from the company (the whole value chain including own operations as well as the supply chain, energy during product use and end-use) as well as the positive or negative contributions from a company are included when measuring and reporting emissions. Companies should not only calculate Scope 1 and Scope 2 and then compare this to their positive contributions if they want to use a total emissions approach and claim to be climate positive.

A total emissions approach allows a company (and society) to see if a company has an overall positive or negative climate contribution. For instance, IT companies can measure not just the production and energy use of a video conference solution, but also the reductions in air travel that it contributes to. For a retailer, support for low-carbon living (energy, food, transport) with products and information can help customers reduce emissions.

In order to become climate positive the reductions in society, as a direct consequence of changes in the company’s operations or its product innovations, must be larger than the emissions from the company.

Q3: Why should policy makers and stakeholders focus on emissions in society and encourage companies to set climate positive targets?

From the perspective of society and policy makers, it is important to not only focus on companies with large emissions, but also on the companies that provide solutions. Focusing only on reductions among companies results in three significant problems.

- Companies, and especially new/small companies, with solutions are often ignored if the focus is on reducing emissions. These companies need to grow (and will initially increase their own emissions) in order to provide the solutions society needs. A focus on reductions therefore hampers innovation on the market.
- The exclusive Scope 1-3 focus keeps society locked in the current industrial structure and sectors. Incremental reductions in current

systems are not enough to reach the dramatic reductions needed to avoid dangerous climate change a “reduction perspective” and will result in a “high carbon lock-in,” i.e, a situation in which the investments result in a system where it is impossible/very difficult to go beyond the first reductions. E.g. investments in more energy efficient coal power plants will result in reductions, but also make society dependant on a solutions where the necessary reductions to avoid dangerous climate change are very hard to achieve as capital is locked in high-carbon solutions.

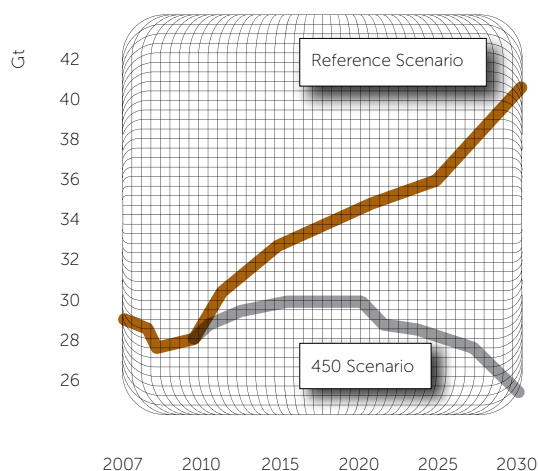
- The exclusive Scope 1-3 focus frames companies as a problem to be minimized, while the climate positive focus encourages a perspective in which companies are seen as an important part of the solution.

Q4: Can increased emissions from a company result in decreased emissions in society?

Yes. Societies will not only reduce emissions by lowering emissions from current solutions, we need new solutions and new living patterns/lifestyles. Many of these solutions will come from companies that don't exist today or that must grow very fast in order to deliver these solutions. Other emissions reductions in the short term may come from sectors that need to grow in order to provide solutions that other sectors have provided before, e.g., IT companies providing video conferencing equipment resulting in less air travel.

In the future we can also assume that more investments in smart appliances and smart houses are needed. This will result in less need for investments in power plants. While some power utilities will change their business models, others will not. Under such a scenario emissions will initially increase from those providing smart homes, but at the same time emissions will dramatically drop from the power utilities. Over time low/zero-carbon solutions will be available that allow providers of smart homes and other solutions to reduce their emissions, too.

For many large companies the same logic holds: some business units must increase their emissions and other business units reduce their emissions, in order for overall emissions to be cut. A Climate Positive approach can therefore also be useful within a company. This can help companies see if revenues from high-carbon business units can be used to invest in low-carbon business units with growth potential.



One way to explain low-carbon development including increased emissions among some companies is to use the concept of a carbon budget. In the curve (see figure) that represents the 450 scenario—this is the approximate level of CO2 that society must stay below in order to avoid dangerous climate change; the latest research shows that emissions must

be reduced even faster/more and that a 350 scenario is needed—we can see how the global carbon “budget” peaks and then declines around 2020. Even if the global trend were to look something like this, the emissions from different companies will not. In a market and a society with technological development and innovation this budget should be allocated to those who use it to deliver the means to meet the long-term goals. Building factories for energy efficient appliances and transporting batteries to a new generation of electric cars are examples where initial emissions increase (and are covered by today’s way of measuring emissions), but emissions in society (that are not included) will decrease. Companies increasing their emissions obviously have a responsibility to ensure that these emissions will result in overall reductions.

Q5: Why should companies focus on emissions at the societal level and set a climate positive target?

The most important reasons include:

○ STRATEGY: If a company sees growth potential in a low-carbon economy and has important solutions, while the company’s emissions may increase, the reductions the company contributes to may grow even faster. The total emissions approach enables a company to focus on the most important contributions as well as communicate to key stakeholders (from customers to policy makers) that while their own emissions may grow in the short-term, emissions in society will be reduced.

○ INNOVATION: If a company wants to explore different business models and solutions it is important to include all emissions, including possible contributions to reductions in society. If a company only focuses on reducing emissions in the conventional accounting framework, it risks missing rapid growth opportunities in important new areas.

○ CREDIBILITY: To engage with policy makers and other stakeholders, it is important to have evidence to demonstrate what the company contributes and what kind of policies and measures that have the most significant effect on overall emissions. This allows policy makers and other stakeholders to approach companies as solution-providers and not only sources of emissions. This demonstration needs to be as standardized as possible and performed based on accepted criteria.

Companies may choose only to look at the emissions that are easy to measure (often Scope 1, 2 and parts of Scope 3) as well as their positive contributions. This is not a total emission approach, and these companies run the risk of being seen as trying to hide their Scope 3 emissions. Transparency is critical, and the different emissions and avoided emissions must be reported separately. The companies should explain what they have done and why. On the path to a total emission approach and a climate positive target this kind of assessment is possible, but should where possible not be communicated externally as climate positive so as not to confuse.

Q7: Can emissions be seen as investments?

It is possible to argue that emissions can be seen as investments. In a society dominated by fossil fuels anything new, or anything that grows rapidly, will result in increased emissions when measured in the traditional way. If emissions are seen as investments the important question is what the impact over time will be. For instance, building a factory for solar panels, designing a container that can transport food on ships instead of planes, transporting LED-lamps, research to develop enzymes for the third generation of biofuels, and marketing for teleworking all result in increased emissions directly. All of these will however result in significant

reductions if implemented in a strategic way. The direct emissions from the company can be seen as an investment and should be seen in relation to the result in society. Using a total emissions approach and setting climate positive targets allow companies to make strategic reductions that result in the kind of solutions society needs, instead of only focusing on their own emissions.

Q8: Does a focus on a company's impact on society and becoming Climate Positive reduce the need for reductions of a company's own emissions?

No. Many of the reductions in society are linked to reduced emissions (especially reduced Scope 3 emissions). For example, when helping suppliers that also supply other companies, the reductions are multiplied when the total emissions approach is used. The climate positive result is the positive contributions in society minus the own emissions, so reductions of the own emissions result in an increased climate positive result.

As always transparency is important, and the reporting of positive and negative contributions should be separated from the reporting of the own emissions.

Q9: Can a climate positive target be used for "greenwashing"?

Everything can be misused. There will most certainly be cases where less serious companies will try to use the concept of climate positive to distract from their actions. Below are some of the ways that companies can use the concept to mislead as well as suggestions for how this can be avoided:

1. PROBLEM: The concept can be used in a dishonest way by making assumptions that few would agree with.

SOLUTION: Use a transparent system; provide all assumptions; develop guidelines for appropriate assumptions.

2. PROBLEM: The company cherry-picks positive contributions, ignoring negative contributions.

SOLUTION: Use a comprehensive system in which all significant impacts are calculated and presented transparently. The company should also allow for stakeholder input regarding their choices of which contributions to calculate.

3. PROBLEM: The concept can be used to highlight short-term gains that do not contribute to long-term sustainable reductions.

SOLUTION: This is a problem for all reduction targets. Therefore, disclosing the strategy for long-term societal reductions is important.

4. PROBLEM: "Climate positive" can be used as spin by companies that today have problems in areas other than climate change, to divert focus from the areas where they probably should focus more of their attention.

SOLUTION: This is a general problem with sustainability work where companies with problems in other areas, such as toxic pollution, water, or human rights may focus communication on climate change. For all companies, an assessment of where their most significant impacts are is important. All relevant stakeholders should be allowed to provide input.

5. PROBLEM: A company has a lot of work left to do with its Scope 1, 2, and 3 emissions but produces low-carbon products, e.g., vegetarian food that outweighs Scope 1, 2, and 3 emissions so they report openly that they are climate positive.

SOLUTION: It is important to clarify that by 2050 there should be no carbon emissions from a company, and leading companies should not use any fossil fuel long before 2050. This requires companies that want to demonstrate leadership to have zero-carbon strategies regardless of their positive contribution.

Q10: What methodologies are used to calculate the impacts on society?

Impacts are assessed using the same lifecycle analysis (LCA) methodologies that are used to calculate internal emissions and assess CDM projects and other initiatives that result in reduced emissions. It will also be necessary to develop new methodologies that focus on the service society needs rather than the product provided by the company. This is particularly true when the “positive” approach is extended to other materials that will be needed to provide services. As companies shift toward providing services instead of products and governments begin to encourage sustainable ways to provide a service instead of improving existing technology this will increase the urgency for such methodologies.

Q11: How should positive contributions be reported?

For the company’s own emissions different systems have been developed, e.g., GHG-protocols Scope 1,2 and 3 emissions. For positive contributions no such system exists today. Any positive contributions should therefore be reported in a transparent way where all relevant assumptions and data are provided. The positive contributions should be reported separately from the emissions from the company. Positive contributions should be verified by an independent third party.

Q12: How should negative contributions be reported

Negative contributions should be reported the same way as positive impacts. It is important that companies report all their emissions, both positive and negative, in order to provide a correct assessment of their contribution.

Q13: Will societal impact/ climate positive reporting become standard for companies in the future?

In one shape or another this will probably become standard, at least for companies that contribute to significant reductions in society as they have an incentive to report these reductions. The leading institution for collecting data about CO₂ from companies, the Carbon Disclosure Project (CDP), already includes a question that allows for companies to report the positive contributions. Below is question 14 from the CDP questionnaire 2009.

14. missions Avoided Through use of Goods and Services:
(New for CDP 2009)

14.1.If your goods and/or services enable GHG emissions to be avoided by a third party, please provide details including the estimated avoided emissions, the anticipated timescale over which the emissions are avoided and the methodology, assumptions, emission factors (including sources), and global warming potentials (including sources) used for your estimations.

The GHG-protocol is currently exploring ways to allow companies to report reductions, so is Global Reporting Initiative (GRI), the de-facto

standard for corporate sustainability and CSR reports. A number of investors have also begun to explore how they can identify and measure a company's positive contributions.

Q14: How can double counting be avoided?

By ensuring that systems are in place to keep track of emissions from companies, it will be easy to implement a system that avoids double counting. This will allow two systems to exist in parallel, one where companies report their own emissions, and another where companies report how they help others reduce emissions. By linking the reported own emissions to the reported reduced emissions in society, double counting of reduced emissions can be avoided.

E.g., when company A reports Scope 1 emissions due to lighting that uses incandescent lighting, it is possible for this company to verify that the purchase of CFLs/LED lights from company B helped them reduce their Scope 1 emissions. In this way, company B can keep on reporting Scope 3 emissions from the use of the lights, but also report the savings generated when CFL/LED's replace incandescent lights. These two numbers would be reported separately. This allows a company to give a more current account of their impact in society and understand their contribution to a low-carbon society. It also ensures that no other company can claim that they helped company A reduce the same emissions.

Company C has high emissions in their supply chain due to air freight. When they get help from company D by moving much of their goods to freight by ship, company C will report reduced Scope 3 emissions, and company D can report that they helped company C reduce their emissions. This allows company C to demonstrate that their investment in shipping is a low-carbon solution, even though company D's Scope 3 emissions will probably increase due to service performed for C.

Q15: Are there different ways to deliver reduced emissions?

Traditional reporting includes different categories (Scope 1, 2 and 3). Likewise, positive effects on society will take place in different ways. Today, five different categories are often discussed. These can all be delivered through products and services, information, or a combination of these:

1. Emission reductions due to replacement of less energy efficient products

With a traditional Scope 3 perspective, emissions during the use-phase are calculated without reference to what the solution replaces. If a company provides a steady amount of products year to year and improves the use-phase efficiency of the product, Scope 3 reporting gives a good overview of the situation. If a company is growing very fast and increasing its market share, or for instance is implementing solutions that are very different in terms of life-time emissions, the effect can be very different at the societal level.

If a company provides an energy efficient solution such as an appliance or energy efficient lighting, this helps reduce emissions in society if these new solutions replace less efficient products. If the solution instead replaces a similar product or method, the company's contribution is neutral with respect to emissions at the societal level. If the solution is instead simply additional, emissions will instead increase. If a company puts a less energy efficient product on the market the emissions will also increase. The difference between a Scope 3 perspective and the new approach is that the actual emissions in society, not the emissions from the company and its products, are used as the reference

2. Changes in emissions due to a new low-carbon way of providing a service

Scope 3 emissions reporting focuses on the energy used by the product, but for many solutions other aspects are just as important, or even more important. A company selling video conference solutions will report the energy used by the video conference equipment as Scope 3 emissions, but from a society-perspective low-carbon market opportunities related to this service should also be included. The low-carbon market opportunities allow a company helping customers transition from air travel to use of video conferencing to report this and a company helping customers transition from air freight to shipping by sea can report this. A company can also report reduced emissions if it provides goods or services that help improve energy efficiency in other ways, e.g., by providing insulation materials or enzymes that help reduce the need for high temperature water.

3. Trendsetting on the demand-side

Companies often influence, and even create, new markets, with marketing and lobbying in ways that go beyond their direct sale of products. A company can promote energy efficient lighting, e-readers, teleworking, etc., in a way that creates a broader movement toward a low-carbon society. Through information, communication, and marketing a company can help increase demand for low-carbon solutions. Leadership is important and should be encouraged; for this reason, estimating the savings from trendsetting on the demand-side is important. Even if such savings are often difficult to estimate, efforts in this direction can be reported.

4. Trendsetting on the supply-side

Companies often influence suppliers beyond what is included in the traditional Scope 3 reporting. A company can help a supplier improve its energy efficiency in ways that also affect the supplier's other customers. Again, as leadership is important, and should be encouraged, estimating the savings from trendsetting on the supply-side is important. Companies engaging with their suppliers often have reasonable systems to track and measure emissions. The savings from trendsetting on the supply side may often be difficult to estimate, but efforts in this direction can be reported.

5. Net producer of low/zero-carbon energy

With the traditional Scope 1-3 emissions reporting, a company can reduce its emissions to zero. From a societal perspective it is possible to become a net producer of low/zero-carbon electricity and have a net positive impact in different parts of the value chain, e.g., by helping a supplier become a net producer of renewable energy, or making the office buildings net producers of renewable energy. Opportunities to become net producing entities can range from suppliers that use forest material and can use residues from production to generate energy, to stores that enable the charging of electric cars, or a shipping company that builds net-producing ports. In each case, a low carbon market opportunity would allow companies that are innovative to report their positive contributions.

In the same way as one company's Scope 3 emissions is another company's Scope 1 emissions there can be different kinds of climate positive impacts. When company A demonstrates market leadership (by lowering the price on LEDs on the whole market for example) it will help company B reduce emissions. This is not double-counting since the reductions are claimed only once in each category.

Buying offsets is not part of a total emissions approach and cannot be used to become climate positive in the way described here. The reason is that this approach is meant to support innovation and measure if a company's core business is sustainable or not. Buying offsets can in the best cases be seen as philanthropy and support for good projects, and in the worst as greenwashing, innovation distraction/destruction, and a contribution to inequity.

Q15: How much of the societal reductions can different companies account for?

As reductions in society often are due to the actions of more than one company, it is important that different companies don't claim the same emissions reductions. This is a question that will have to be resolved on a voluntary basis until governments develop guidelines or companies create voluntary standards that clarify what the allocation between different companies should look like.

The company calculating positive impacts in society needs to communicate this impact to those the company is helping reduce emissions. This will ensure that the latter can verify that the emissions reductions have taken place and that the reductions are only counted once. As the company/government/institution/individual is the "owner" of the emissions they can ensure that the same emissions are not claimed more than once. In B2B relations (such as between a retailer and a supplier) this is easy to ensure as there are often systems for tracking the emissions, and the number of relations are limited. For companies helping to reduce emissions among customers/citizens it is more difficult, and indirect measures may be necessary. The Japanese government has explored systems that could be used for allocation of GHG reductions. Transparent reporting will be key.

Q16: What is the difference between "Climate Positive" with a "total emissions approach" and "Climate Neutral"?

To be climate positive with a total emissions approach is to measure all the emissions from a company (Scope 1, 2 and 3) and then see if the reductions in society from the company's activities are larger or smaller than all the emissions from the company.

Climate Neutral is an approach in which a company buys emission allowances/credits/offsets to compensate for the emissions it produces (often only the own emissions, i.e., Scope 1-2). It does not say anything about how sustainable a company is, and when only Scope 1-2 are included it does not even give information about the overall impact of the company. The quality of the "credits" that a company buys is usually hard to verify, and many of the existing systems today have been shown not to reduce the emissions they claim to reduce. Many climate neutral schemes also try to provide the lowest possible costs for the reductions they sell and this results in projects that are of dubious long-term value. By buying emissions reductions outside the company, different kinds of emissions may be mixed up. A company with emissions from a coal power plant may buy forests, thereby buying an unsure reduction (the forest can burn) in exchange for emitting and supporting further investments from a source that will make society more dependent on fossil fuel.

The most serious problem with most of the current "climate neutral" schemes is that they undermine innovation. Instead of focusing on how a path to a sustainable business model should look, companies pick the low hanging fruit and then communicate this. There are a number of examples in which companies have spent more on communicating their climate neutral target than on the investments. It is possible to foresee more serious schemes for offsetting that could drive innovation and support long-term deep reductions, but these schemes have not been the focus of the consultants making money in this business.

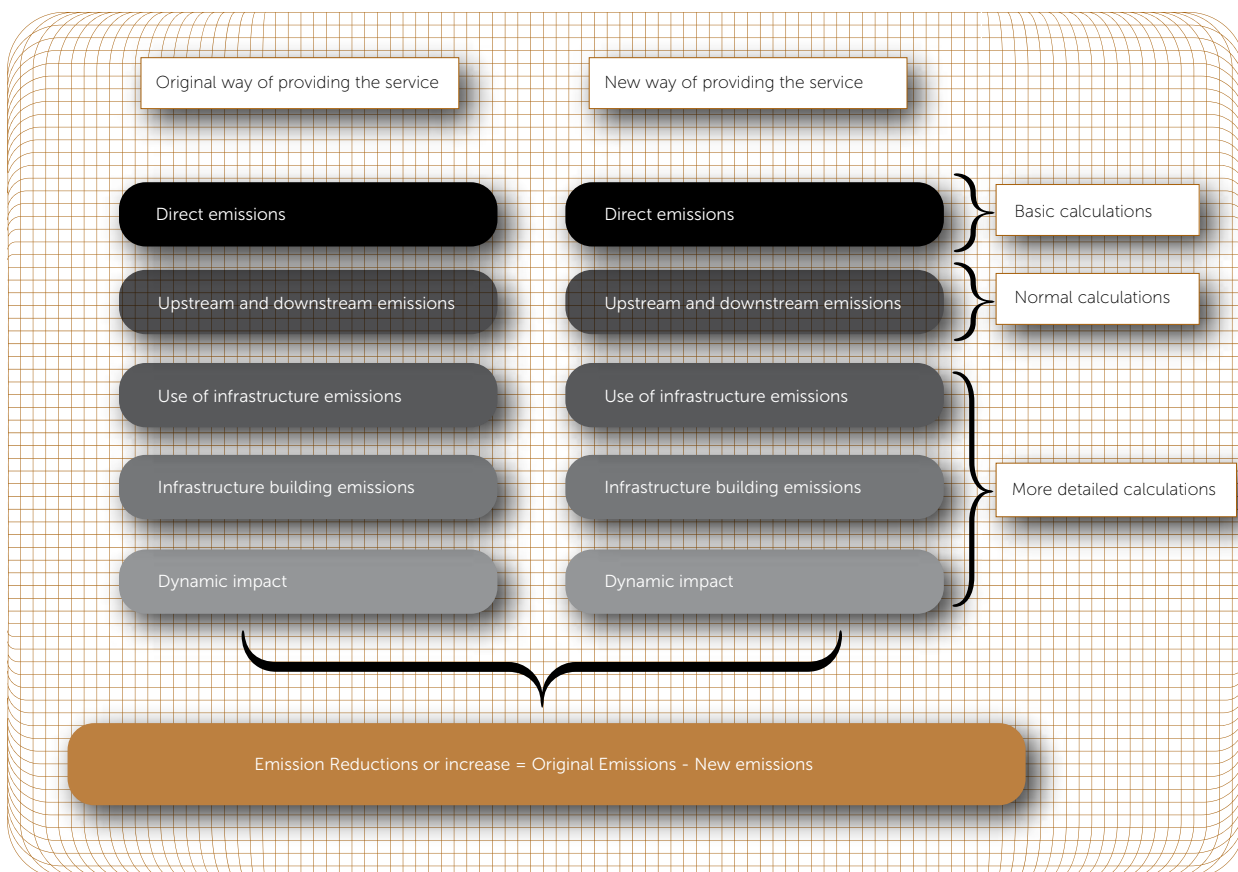
Q17: Can high-carbon lock-in be avoided with the help of a total emissions approach?

By using a full assessment of the positive and negative contributions based on the full value chain, the underlying infrastructure will also be included in the assessment. This is important as new smart solutions often depend on a very different infrastructure. When commuting there are very diffe-

rent underlying infrastructures that are needed if a fossil car, electric car, electric bike, ordinary bike, or a laptop is used.

Often when commuting by car is measured today, only the emissions from the tailpipe are included. This is not appropriate and hides many of the underlying emissions. The extraction of oil, the refineries, the transport of oil should all be included. On top of this, the car also uses an infrastructure with street lights, parking spots, fueling stations, and bridges that require energy. The heavy 20th century infrastructure must also be built, and this results in further emissions. Last but not least the investments in these solutions trigger further investments and activities that often result in a spiral of increased emissions and what could be described as high-carbon lock-in.

By also including the underlying infrastructure and dynamic effects, transformative low-carbon solutions can be identified. These solutions support further investments and use of a low-carbon infrastructure based on transport of bits instead of atoms when possible, and use logistic systems that are energy efficient and support a global production and consumption system that is based on what nature can provide with renewable solutions.



Q18: What companies are calculating positive impacts today?

A number of companies are providing initial calculations in this area, including:

- | | | |
|-----------------|-------------|------------------|
| 1. China Mobile | 8. NEC | 14. TCS |
| 2. Ericsson | 9. Fujitsu | 15. Suntech |
| 3. IKEA | 10. Siemens | 16. Trina Solar |
| 4. Novozymes | 11. GE | 17. Yingli Solar |
| 5. HP | 12. Cisco | 18. Maersk |
| 6. ICEHotel | 13. BASF | 19. Vestas |
| 7. Acciona | | |



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The Low-Carbon Leaders project is developed with the generous support of WWF, A.P. Moller – Maersk, and Global Initiatives.

