BEYOND CORPORATE CARBON FOOTPRINTS

Expanding from only footprint emissions (Scope 1-3) to selling solutions to deliver sustainable handprints (avoided emissions)

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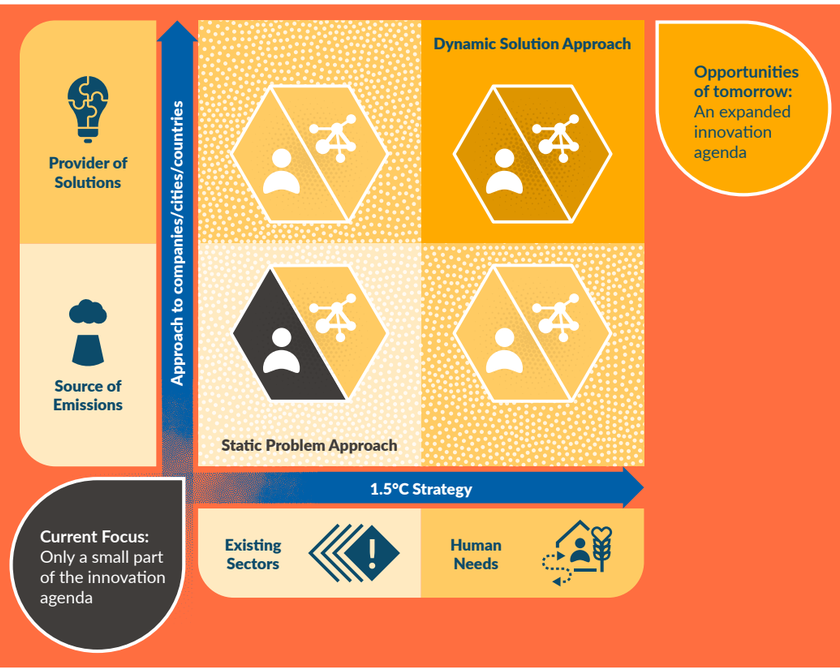
1. Introduction

Climate Action and the two roles of companies

> *Everything is bilateral in the domain of thought. Ideas are binary.*
> *Janus is the myth of criticism and the symbol of genius*
> *– Honore de Balzac, 1799-1850*



Sources of problems and sources of solutions

So far, the climate challenge has primarily been approached as a problem, where the focus is on reduction of emissions from companies and their value chains. Most tools and initiatives have therefore focused on measuring and reporting emissions from value chain emissions. Incentive structures have been developed based on the assumption that the best a company can do is reduce emissions and reach "Net-Zero". The common denominator is that all of the above is based on a "static reduction approach", an approach where the large companies, the infrastructure and consumption patterns, are assumed as static and where improvements in existing systems is the focus.

This static problem perspective is supported by climate negotiations and media only asking for reduction targets, investors wanting to know how companies address the risks related to scope 1-3 emission, reporting frameworks, and tools that help companies keep track of and report their emission reductions, etc.

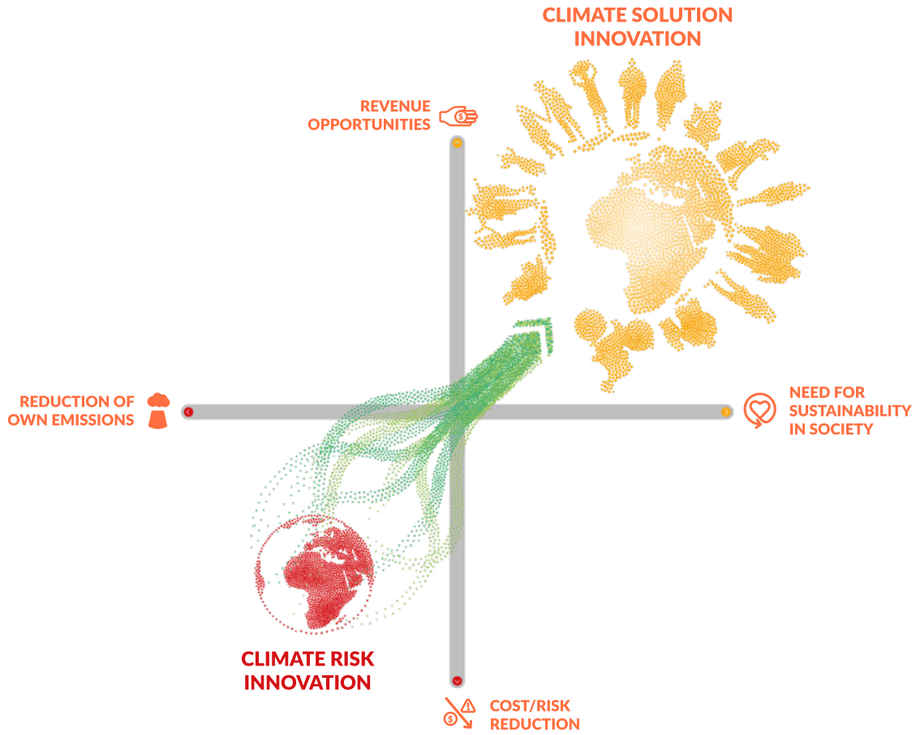
The idea of "zero" as the goal for companies has become so dominant that for many companies this is the ultimate climate goal, and an industry has emerged to provide guidance for accounting and selling offsets so that companies can claim zero emissions from their own operations and value chain. The climate risk innovations that have developed based on this situation have often not even focused on how current systems can reduce emissions, but how companies can report zero, or low, emissions.

While companies must ensure that the emissions over the value chain are compatible with a 1.5 °C development path, these emissions are only one side of the coin, and arguably the less important from a long-term perspective.

The reason companies exist, why they have been given limited liability, and why many new companies emerge, is to provide society with the solutions we need in the smartest possible ways. As we now urgently need solutions that can provide us with what we need in a sustainable way, companies as solution providers need to move into the center of the climate discussion.

The fact that companies can provide innovative solutions and use the need in society as drivers for innovation is a key reason why avoided emission are important to include in corporate climate strategies, strategies that cover innovation, product development, marketing, sales and overall business model innovation. The need for companies as solution providers becomes even more important when we shift the focus to what is ultimately needed, i.e solutions that allow everyone on the planet to live flourishing lives. Today 8 billion people have the right to live flourishing lives, by 2050 we will probably be 10 billion and by the end of this century the most likely scenario is about 11 billion, before the population is estimated to stabilize.[1]

Instead of the reduction of emissions from existing companies and structures that are inherently unsustainable, the main challenge from a long-term perspective is to avoid emissions and deliver on human needs with the help of innovative companies that can deliver what is needed in a sustainable way, i.e. we need incentive structures to ensure that companies deliver solutions in support of a 1.5 °C compatible pathway where at least 11 billion can live flourishing lives. The UN assume that "with a probability of 95 per cent, the size of the global population will stand [...] between 8.9 and 12.4 billion in 2100"[2] While the current trajectory and actions by business and policy makers make a 1.5 °C future increasingly unlikely the climate is not a negotiating partner and giving up on this goal is to give up on future generations.



There are many reasons for the current one-sided static problem approach with a focus on reducing emission from current structures. Critically, most climate related initiatives and organisations that dominate the current discussion were created:

- **before the impacts of the fourth industrial revolution became obvious**
- **in a time when many large polluters openly questioned if climate change was real**
- **before many sustainable solutions we today take for granted became cost competitive**
- **in a time where neo classical economics dominated and anything more transformative was seen as impossible or unnecessary**
- **before the scope and scale of the reductions needed in society were well accepted and understood.**

Because the focus of most initiatives and tools were to deal with the laggards in the corporate sector the result today is a situation where companies, but also cities and countries, are viewed only as source of emissions and not providers of new smart solutions. The best these "sources of emissions" can do is to reduce their emissions to zero, resulting in a **"climate risk innovation approach"**. With innovations focusing on reporting zero rather than delivering what the world needs, creative reporting methods, reduction initiatives, and offsetting have come to dominate.

To view companies, as well as cities and countries, only as sources of emissions ignore many opportunities and limits the scope of innovation to a very narrow range of activities.

Expanding the climate and innovation agenda to also include a **"climate solution innovation approach"** provides the opportunity to focus on the solutions the world needs and how companies, as well as cities and countries, can provide these solutions. With the fourth industrial revolution accelerating technological innovation, with new values and new business models emerging, it is also becoming increasingly counterproductive to only ask companies, countries and cities to reduce emissions from current systems. Such a reactive approach will undermine many disruptive innovations and ignore most solution providers. Instead of starting by asking stakeholders how they shall reduce their emissions, it is time to identify low-carbon leaders by starting to ask what solutions they can provide. Such an approach can accelerate the uptake of both individual solutions as well as transformative system solutions that require new clusters for implementation.

Commitment from existing stakeholders to only reduce their emissions (scope 1-3), rather than focus on how they can contribute to a 1.5 °C compatible development path through the solutions they provide, can be a step in the right direction. However, such a limited perspective has established a static problem approach with several challenges.

1. **Strategies that only reduce greenhouse gases from existing systems are not enough to achieve a sustainable 1.5 °C compatible pathway, as such a system will be too resource intensive, too unequal and continue to undermine poverty reduction, biodiversity, and other SDGs as the IPCC 1.5 Special report demonstrated.[3]**

2. **Many of the static problem commitments are based on business-as-usual strategies with unproven technologies, such as carbon capture, utilization, and storage (CCUS), and assumptions that these will reach a scale and price that might not actually materialize. If they do, it would allow these stakeholders to continue without any significant changes. However, if these technologies do not become available we will be stuck in a situation with outdated and unsustainable technologies that are so resource intensive that even if the carbon issue is addressed they can never be part of a future where 11 billion can live flourishing lives. In order to support sustainable innovations that can deliver both reduced emissions and a flourishing life for everyone, strategies that deliver net-zero without technical carbon capture should be the reference and the carbon capture strategies should only be considered as a back-up.**

3. **Strategies based on a static problem approach tend to deploy tools that support improved versions of existing products, such as most environmental labels, environmental taxes and investment decisions based on existing sectors. While such strategies can deliver improvements in existing systems they tend to undermine opportunities for a new generation of solutions.**

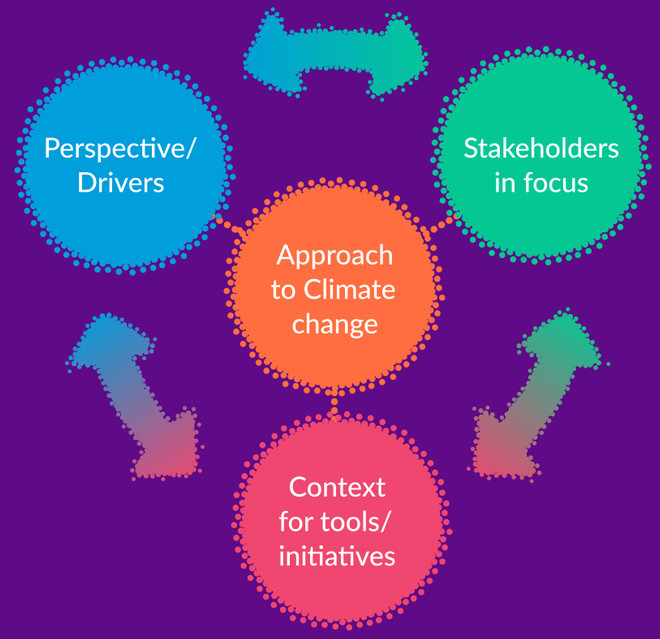
4. **The main challenge with the static problem approach is, however, a combination of all the above and can be called "the fossil free typewriter dilemma", where existing unsustainable production and business models are assumed as the default option that just needs to be made more climate friendly, and smart new solutions that support global sustainability are ignored or marginalized. With a focus on what citizens need rather than only improving existing products companies can use the need for resource efficient and fossil free solutions as a driver for business innovation.**

This paper discusses both how and why companies with climate risk experience (a risk/footprint/scope 1-3-approach) can expand the climate action agenda to also include a climate opportunity strategy (opportunity/handprint/avoided emissions approach).

2. Expanding

the current focus on carbon footprints to handprints
From the climate problem innovation of the 1990's to a 21st century climate solution innovation agenda

> *If you want the present to be different from the past, study the past.*
> *– Baruch Spinoza, 1632-1677*



How companies respond to the need for reduced emissions in society depend on three interrelated areas:

1. **Perspectives and drivers in society**

   What are the goals that companies are supposed to deliver on and what role should companies have in a 1.5 °C compatible development path?

2. **The stakeholders in focus**

   Depending on the goals for companies and what they are supposed to deliver on, different companies and stakeholders will be in focus.

3. **The tools and initiatives**

   The way the need for a 1.5 °C compatible development path is framed, and the capacity among the stakeholders involved, will result in use of different tools and initiatives. The different tools and initiatives will also be shaped based on what kind of innovation is seen as possible

The three areas are developed in conjunction and stakeholders, theories and approaches create interdependences. The result of these interdependences is that stakeholders, theories and approaches in each area tend to resist change. Instead of a smart agile adaption to new situations, as the world changes, there is a tendency for a new paradigm to grow in parallel until the pressure becomes so significant that a disruptive paradigm shift happens leaving behind companies that struggle to adapt.[4]

The current approach to climate change by most companies, policy makers, investors, NGOs and media makes it hard to deliver more than incremental improvement in existing systems and is the reason why the focus on a company's footprint is so dominant, even if that makes little sense in the current situation.

By comparing the situation back in 1992, when climate change was established as an international priority, with the situation today 30 years later, we can better understand the current bias and explore possibilities to expand the focus, from companies only as a source of problems and a focus on carbon footprints (scope 1-3 work), to also include a focus on companies as climate solution providers with a focus on climate handprints (avoided emissions).

It is important to note that companies will still be required to address their footprints as the handprint includes the footprint (but the footprint does not include the handprint), but it will happen in a new context, with new stakeholders and new tools. The following sections outline the three interrelated areas and the dramatic changes that have taken place since the '90s, while the approach to companies has stayed the same.

2.1 Perspective/Drivers 1992 – 2022

Before the Climate meeting in Paris in 2016 most of the world lived in the shadow of the Kyoto protocol, dating back to 1997. In Kyoto the world's countries agreed that the rich countries would begin to incrementally reduce the emissions within their national borders. The so-called "Kyoto target" agreed that the rich countries should reduce their greenhouse gas emissions by an average of 5% against 1990 levels, over the 2008-2012 period.[5] So in 20 years the rich countries agreed to make a symbolic first step to break the trend with increasing emissions. Currently, UNFCCC estimates that almost 8 percent reductions are needed globally per year between 2020 and 2030. Rich countries, or more correctly rich people, obviously need to reduce emissions much faster than 8 percent per year.

Even the small change of 5% total reduction, under the Kyoto protocol, was seen as too radical for many governments and companies. In a comprise to bring onboard the US a loophole was also created that would influence the corporate climate approach for decades, the idea of emissions trading. Described under Article 17 it allows countries to report reduced emissions by buying someone else's emission reductions and thereby claim that they have met their own emission targets.[6]

Three perspectives and drivers were established during the '90s in conjunction with the Kyoto protocol:

1. Incremental improvements:

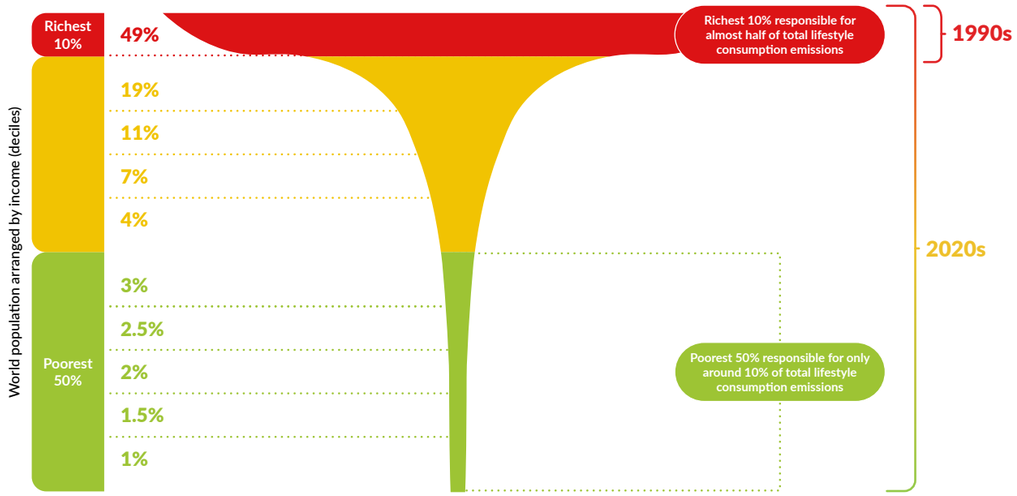
the goal in focus was to reduce emissions in rich countries by a total of 5% over 20 years. Instead of a focus on what was needed to avoid dangerous climate change and to help people live better lives, cost-efficient incremental reductions of carbon emissions became the goal.

2. Action as reporting:

Instead of actual emissions reductions in society and a long-term sustainable pathway the focus was on improving risk transparency among large polluters through reporting systems. The result was consultants and organizations rapidly emerging around reporting with a focus on reporting own emissions rather than solutions needed in society, as well as offsetting and other creative and cost-efficient ways to report scope 1-3 emissions that were introduced.

3. Responsibility:

During the '90s the focus was on big emitters in the OECD. Instead of a focus on human needs and those new clusters that have innovations that deliver on those needs, the sectors with high emissions were seen as those mainly responsible for addressing climate change. The idea was established that companies could buy offsets, often from poor countries, to show leadership. Decades have been lost with companies buying offsets instead of moving away from unsustainable business models and exploring how they can develop the solutions society needs. These offsetting companies and the consultants and NGOs around them have created an ecosystem where they celebrate each other and even hand out prizes for "climate leadership" for companies, PR agencies and offsetting companies that manage to use creative reporting instead of delivering solutions that meet human needs in a sustainable way.



Today a new set of perspectives and drivers have emerged. After the climate meeting in Paris the world reached the Paris agreement in 2015, an agreement that sets out a global framework to avoid extreme dangerous climate change by limiting global warming to well below 2 °C and pursuing efforts to limit it to 1.5 °C.[7] Still, even 1.5 °C will still likely result in large-scale drought, famine, heat stress, species die-off, loss of entire ecosystems, and loss of habitable land, throwing more than 100 million into poverty.[8]

Instead of reporting the focus has begun to move to actual impacts in society. Finally, the global focus and the fact that most people on the planet still do not live flourishing lives have begun to shift the focus from the current emissions from OECD countries (emissions reductions), to the question of what solutions are needed to allow 11 billion citizens to live flourishing lives (avoided emissions). Instead of emission reductions from current structures the question becomes how to avoid emissions while meeting people's needs.

Three perspectives and drivers are emerging in the 2020s:

1. Transformative change will happen and is needed

With the goal to be 1.5 °C compatible transformative system changes and totally new ways of meeting human needs becomes the focus. The 4th industrial revolution, and digitalization in particular, will result in transformations, but these can be both sustainable and unsustainable. How the disruptions that will happen, can be directed in a direction where they are needed is therefore a key question for any climate and innovation initiative.

2. Actions evaluated based on how they improve people's lives

Instead of focus on cost savings and financial/governmental stakeholders demand for reporting of scope 1-3 emissions, the focus is shifting towards those who can deliver on human need in a sustainable way (globally sustainable 1.5 °C compatible solutions).

3. Solution providers/Start-ups

In the 2020's the focus is shifting from large multinational emitters that are protecting old business models and their reduction commitments and offsetting communication, towards solution providers. Especially new clusters and start-ups with the potential to deliver the next generation of solutions that can deliver a future where 11 billion can live flourishing lives are becoming the new climate leaders.

2.2 Stakeholders in focus 1992 – 2022

It is easy to forget how different the world looked in the 1990s compared with today. Back in the '90s much of the discussion about companies focused on the fossil fuel companies who openly questioned climate change. Many of the largest companies on the planet were part of organizations like the "Global Climate Coalition (GCC)", an organization whose main purpose was to object to any action that would result in reducted use of fossil fuels. This is how Wikipedia describes GCC:

"The Global Climate Coalition (GCC) (1989–2001) was an international lobbyist group of businesses that opposed action to reduce greenhouse gas emissions and publicly challenged the science behind global warming. The GCC was the largest industry group active in climate policy and the most prominent industry advocate in international climate negotiations. The GCC was involved in opposition to the Kyoto Protocol, and played a role in blocking ratification by the United States."[9]

Why the world could only agree on incremental reductions in the rich countries, and still include loopholes such as emissions trading that reduced the pressure in the rich countries to begin a transition, is easier to understand if we look at the top 25 global companies 1992. But, there is also room for some optimism when it comes to the largest companies and their approach to climate change if we look at the top 25 companies from 2022 and compare them to the 1992 list. Most of the new companies are still stuck in a static problem approach and have business models linked to accelerated overconsumption, but they are not linked to use of fossil fuel and don't deny climate change the way the companies in 1992 did.

Global Fortune 500: 1992

Name	Country	Business area
General Motors	US	Fossil
Exxon	US	Fossil
Ford	US	Fossil
Royal Dutch/ Shell	US	Fossil
Toyota	Japan	Fossil
IRI	Italy	Public holding (heavy in fossil)
IBM	US	ICT
Daimler-Benz	Germany	Fossil
General Electric	US	Fossil
Hitachi	Japan	Conglomerate
BP	UK	Fossil
Matsushita Electric	Japan	Conglomerate
Mobil	US	Cigarettes
Volkswagen	Germany	Fossil
Siemans	Germany	Industry
Nissan	Japan	Fossil
Phillip Morris	US	Cigarettes
Samsung	South Korea	Conglomerate
Fiat	Italy	Fossil
Unilever	Britain-Netherlands	Consumer goods
ENI	Italy	Fossil
Elf Aquitaine	France	Fossil
Nestle	Sqitzerland	Food and drink conglomerate
Chevron	US	Fossil
Toshiba	Japan	ICT

In 1992 a majority were fossil companies (energy and automotive companies dominated). This group constituted 15 of the top 25 companies (60%). Most of these companies were involved in lobby organizations questioning climate change. In 2022, only nine of the top 25 companies were energy or automotive companies, and three of them can be defined as in “transition” away from fossil, making it only six of 25 companies, or 24% with a fossil fuel based agenda. Numbers is not everything, a major difference compared with 1992 is that none of the large fossil companies on the list is publicly questioning climate change and the need for emission reductions.[10]

In addition, it can be noted that Tesla was one of the world’s fastest growing among the large companies, a company founded 2003, six years after the Kyoto protocol was signed.

A comparison between 1992 and 2022 should also take into account that some of the fossil companies in 2022 should probably have been on the 1992 list if China and Saudi Arabia had listed their companies at that time. Hence, the move towards a solution agenda and away from a dominance of fossil fuel companies is even more significant than the difference between the 1992 and 2022 top lists indicates.

The geopolitical changes the last 30 years are also reflected in the changes in the lists. In 1992 eleven of the top 25 companies where European (40%) and zero (0) where from China. In 2022 the number of European companies were two (8%) while there were eight (32%) Chinese companies.

Global Fortune 500: 2022

Name	Country	Business area	Not in 1992 top-25 company list
Walmart	US	Retail	New
Amazon	US	Retail	New
State Grid	China	Fossil in transition	New
China National Petrolium	China	Fossil	New
Sinopec	China	Fossil	New
Saudi Aramco	Saudi Arabia	Fossil	New
Apple	US	ICT	New
Volkswagen	Germany	Fossil, but in transition	1992 Top company
China State Construction Engineering	China	Construction	New
CVS Health	US	Health	New
United Health Group	US	Health	New
Exxon	US	Fossil	1992 Top company
Toyota	Japan	Fossil, but in transition	1992 Top company
Berkshire Hathaway	US	Finance	New
Shell	Britain	Fossil	1992 top company
McKesson	US	Medicine	New
Alphabet	US	ICT	New
Samsung	South Korea	ICT	New
Trafigura	Taiwan	Singapore	New
Hon Hai Precision Industry	China/Taiwan	ICT	New
AmerisourceBergen	US	Health	New
Industrial & Commercial Bank of China	China	Finance	New
Glencore	Switzerland	Fossil	New
China Construction Bank	China	Finance	New
Ping An Insurance	China	Insurance company	New

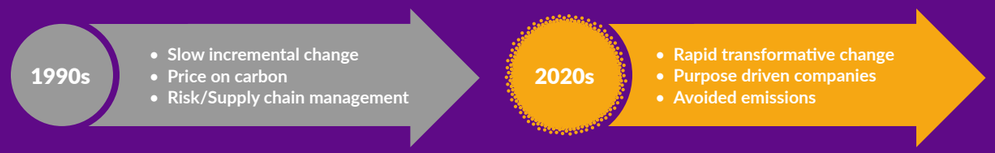
The significant dominance of fossil companies, and in particular fossil companies that questioned climate change, made them a logical target for climate action. Trying to get large emitters to acknowledge climate as a risk and commit to cost efficient emission reductions was an obvious focus for most policy makers and NGOs working with climate change in the 1990s. In addition, the lack of companies that delivered solutions, renewables, electric cars, dematerialization, sharing, etc. made it hard to find any large corporate allies for a solution agenda.

A quick look at the most influential companies today with regards to business model innovation and public support for climate action shows that many of them where start-ups, or did not even exist back in the 1990s. Amazon was founded in 1994 (29 years ago), Netflix was founded in 1997 (26 years ago), Google was founded in 1998 (25 years ago), Tesla was founded in 2003 (20 years ago), Facebook was founded 2004 (19 years ago), Spotify was founded in 2006 (17 years ago), and Uber was founded in 2009 (14 years ago). As a reference the climate convention is from 1992 and the Kyoto protocol was negotiated in 1997.

While many of these new companies have pushed new technologies and business models, almost all of them are still helping to accelerate unsustainable trends. Some more obvious than others, such as Amazon’s push for over consumption and Google/Facebook turning users into products for advertisers that also want to see continued overconsumption.

In addition, many initiatives have emerged since Kyoto where companies as solution providers have been the focus. Many have used new smart solutions, such as digitalization, for sharing and dematerialization, but also traditional sectors have been exploring avoided emissions.[11]

2.3 Context for tools and initiatives 1992 – 2022



Back in the 1990s it was assumed that coal would be used for 200 years.[12] Major car companies used decade-long planning and did not see a significant future for electric cars as a response to the climate challenge.[13] Even most mainstream environmental NGOs did not look beyond natural gas for energy and transportation, as solar PV and electric cars were seen as too radical for most mainstream experts.

In the '90s the world's think tanks, policy makers, business leaders, and also NGOs, were shaped by the neoliberal economic dominance of the 1980s (often personified with the duo of Ronald Regan and Margret Thatcher[14]). Neoliberalism defines citizens as consumers only, whose choices are best exercised by buying and selling, a process that is seen as rewarding merit and punishing inefficiency. It maintains that "the market" (companies and consumers) delivers benefits that could never be achieved by planning (policy makers and citizens).[15]

The experts emerging during the 1990s were neoclassical economists with the skill to optimize products. Leading NGOs also recruited neoclassical economists to attempt to convince a system that did not value nature as something with intrinsic value, and did not see transformative system change as an option.

The acceptable trio of tools under the neoliberal paradigm were those that optimized the existing system:

- **A price on carbon**

Still today many neo classical shaped thinkers think that a global price on carbon is the only, or at least the most important, action that is needed. Even though no major breakthroughs, from digitalization and electric cars to sharing and renewables have happened primarily due to a high price of carbon. Obviously, a price on carbon is not bad, but transformative system change is much more dependent on smart policy, regulation, a culture of risk taking and the opportunities for start-ups with new solutions to reach the market. Also, to ensure that the poor on the planet do not carry the main burden of the transition, more sophisticated tools are needed.

- **Environmental product labels**

Product labelling was also a default tool during the 1990s. Such labels allow consumers to support incremental changes in existing systems. They played an important role to show that optimization was possible. Today when new solutions are available and transformative system change is needed most product-based labels are holding the innovation that is needed back rather than supporting it. There are many environmental labels for meat, but almost non for smart sustainable protein (making it hard for plant-based meals to grow), for "green" paper, but almost no labels supporting accelerated digitalization, "green" flights, but almost no labels that support a shift from travel agencies to meeting agencies promoting virtual meetings, for "green" cars, but few for smart city planning delivering a future for walking, biking, use of drones and 3D printers. The list goes on.

- **Risk reporting**

In an attempt to show the big polluters that cost efficient measures could be taken to (marginally) reduce emissions NGOs came together to demand transparency relating to the risks companies had in relation to carbon. These attempts made perfect sense for optimization. However, by only approaching companies as sources of problems and climate action as a risk, policy makers and the financial system, together with leading NGOs, have created a culture in companies where sustainability tends to be the responsibility of compliance staff, PR people and supply chain experts.

Transformative systems change was never part of the neoliberal paradigm, and some even proclaimed the end of history and assumed that no other system could come after this. Francis Fukuyama and his book *The End of History and the Last Man* is the archetype for this thinking, but it reflected much of the mainstream thinking in the early 1990s.

"Humanity has reached not just ... the passing of a particular period of post-war history, but the end of history as such: That is, the end-point of mankind's ideological evolution and the universalization of Western liberal democracy as the final form of human government."[16]

Hence, only a narrow set of tools were the seen as acceptable in large parts of the world during the '90s. Since the '90s this narrow approach has been challenged and the end of history was "cancelled". Two trends are particularly relevant for the climate discussion and the role of companies; digitalization and unsustainable social/environmental trends.

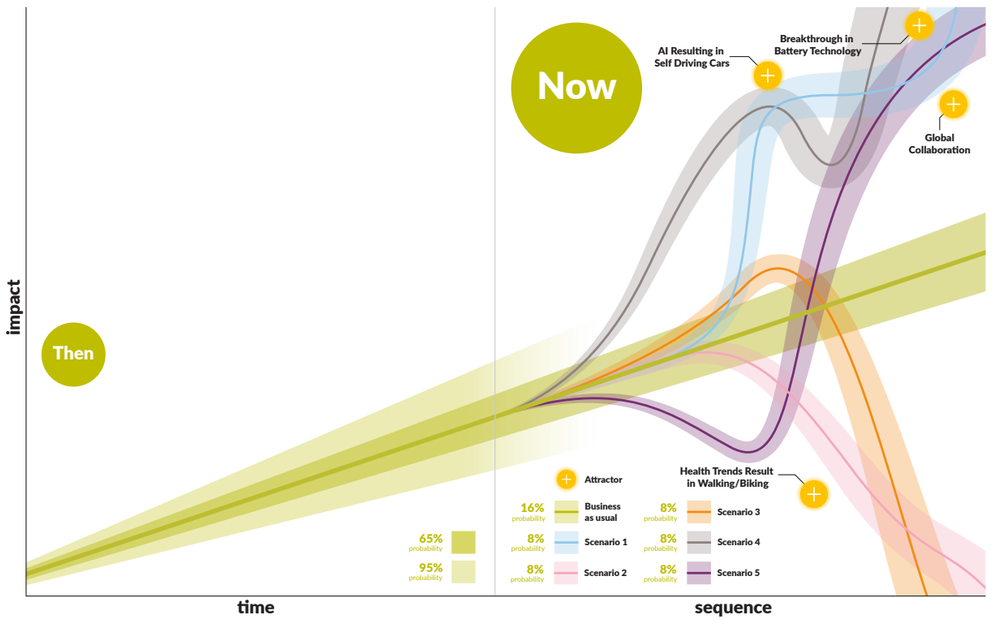
With digitalization, disruptions became the new normal, with new opportunities and challenges rapidly emerging. Sectors that had seen little change over decades, or even centuries, where suddenly challenged at the core. Many did not even know what they are competing against.[17]

The growing understanding that the industrial development and the ideas it rested on was unsustainable became increasingly mainstream in the decades following the 1990s and it was combined with a realization that the future would look very different due to digitalization. Initially most companies only saw digitalization as a tool for optimization, but as whole sectors became disrupted, starting with the media industry, books, music, video, etc., it became obvious that the future was not a given. It is worth remembering that back in 1992, when the climate convention[18] was established, the world wide web was only three years old and most business leaders and policy makers had never heard of it, let alone integrated it into their business strategies.

As sectors and products back in 1992 had seen mainly incremental improvements over decades, the tools and initiatives created during this time reflected this slow incremental development path.

As mentioned above the three obvious tools for optimization of existing systems are price/taxation, product labels and reporting. Hence, “price on carbon”, “environmental product labels” and “climate risk reporting” emerged as the default climate toolbox. For the 5% reductions required during the 1990s this trio of climate tools worked reasonably well. Improvements in energy and transport systems including fuel shifts and route optimizations together with general energy efficiency could deliver the 5% reductions needed.

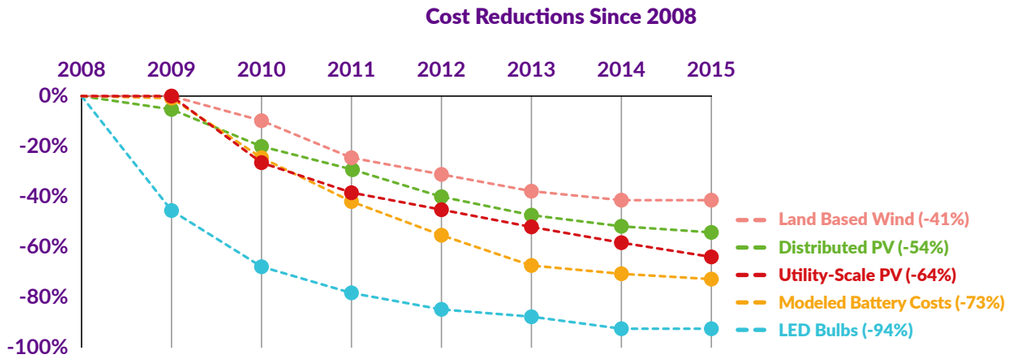
But a combination of accelerated technological development, digitalization, new values, and new business models began to emerge in the 1990s and was in full swing by the early 2000s. Still, most stakeholders working with climate change did not pay much attention to these transformative changes and traditional expert bodies like the International Energy Agency (IEA), and mainstream consultants like McKinsey kept producing models that ignored the opportunities for transformative change.



IEAs curves for solar PV and McKinney’s cost curves are two well-known examples of how the 1990s mindset survived far into the 2000s. IEA has since revised its approach to solar, but struggle to integrate system change in its models. McKinsey is still holding on to its cost curve, even if there are signs that they might soon shift focus as a new generation of analysts with knowledge beyond the static neoclassic economic models that shaped the original cost curve, move into more senior positions.[19]

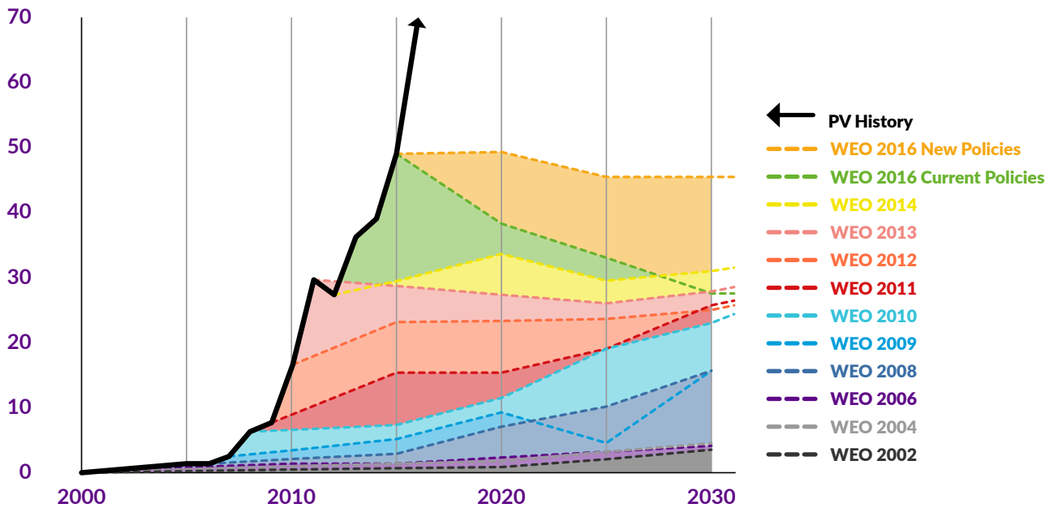
It is still common to hear experts use the 90s mindset and say that a global price on carbon is the most important action that is needed, that product labelling will deliver what is needed, and that ESG reporting will drive the necessary changes in companies. However, these voices are becoming less credible, as they are obviously disconnected from reality.

The “90s toolbox” is usually promoted by groups, organizations, and individuals who also promote extreme growth of biofuel production, green versions of materials like steel and aluminum in combination with electrification of current systems. These same groups often realize that their approach will not deliver what is needed, so carbon capture, or even geoengineering, also becomes a key part of the message.



During the 2000s it became harder to ignore the rapid changes and the new opportunities these provide. Different traditional experts begun publishing reports that highlighted the exponential change in many different areas, such as the report “Revolution Now: The Future Arrives for Five Clean Energy Technologies”[20]and the “Digital Transformation Initiative” from WEF.[21]

Annual PV additions: historic data vs IEA WEO predictions
In GW of added capacity per year –sources WEO and PVMA



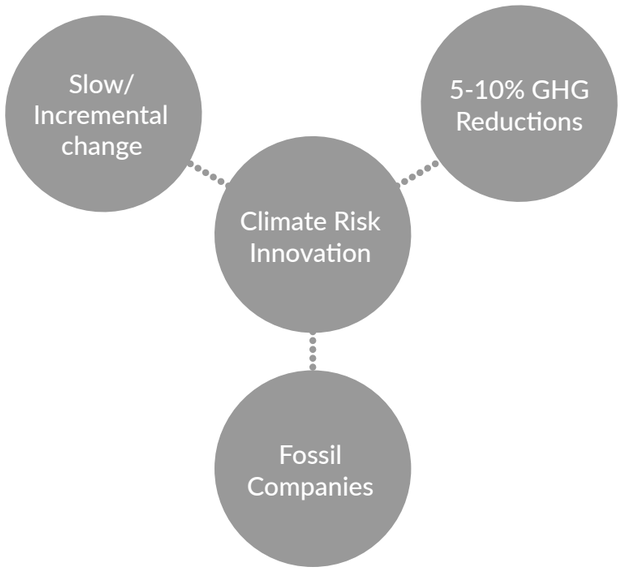
The exponential change and disruptive changes have so far seldom been guided, and definitely not in a sustainable direction. A reason for this is that the tools used by current mainstream sustainability experts and consultants are based on risk management and optimization of existing systems, shadow prices on carbon, environmental product labels and risk reporting (scope 1-3). With such tools global sustainability becomes impossible and the main path forward becomes an extreme increase in renewables, extreme electrification and then adding CCS in order to make current systems "net-zero".

With the opportunities provided by the fourth industrial revolution it is not enough to focus on optimization and ask for fossil free versions of current solutions. Instead, incentive structures that support a new generation of solutions that can deliver flourishing lives for 11 billion citizens with a 1.5 °C compatible just transition are needed, such as a human need-based innovation agenda.

2.4 Moving from the static problem triangle of 1992 to a dynamic opportunity triangle for the 21st century

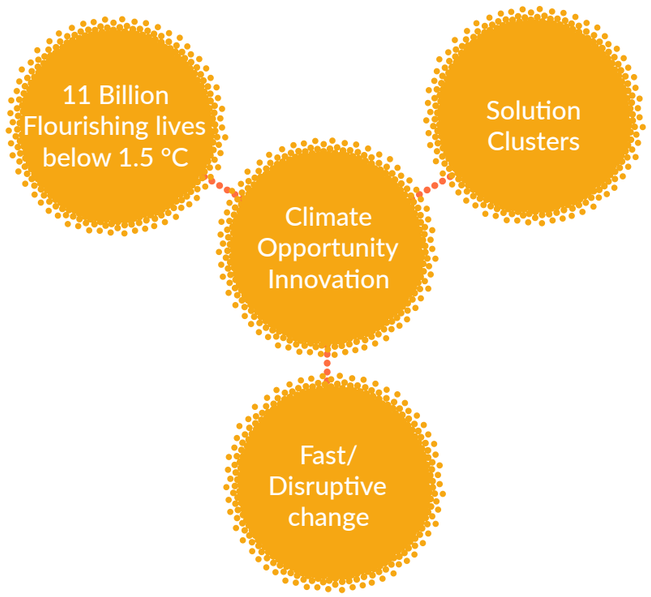
A significant challenge today is the fact that few stakeholders have the capacity to shift focus at the same time for A. drivers, B. tools, and C. stakeholders, something that is needed for transformative system change. This results in many well intending ideas that are stuck in old structures where only small changes happen. A few examples:

- **Many governments, business organizations, NGOs, and financial institutions that are stuck in a climate risk innovation structure realize that the old goals with 5-10% reductions are outdated. However, instead of a solution agenda where the focus is a 1.5 °C compatible pathway where 11 billion can live flourishing lives they just increase the required reduction demands to 100%. But they still focus on companies only as sources of emissions and assume that current sectors and ways to provide needs will stay the same. The result is that they ask for deep reductions, and want companies to report that, and push for an increased price on carbon as the key tool to get there, but also allow companies to buy offsets as they also keep the focus on reporting rather than actual impact in society.**



- Others look at the work done to get fossil fuel companies to reduce emissions and apply the same logic to cities and start-ups approaching them only as sources of emissions and provide them with an opportunity to buy offsets to be able to report reduced emissions. This undermines the innovation needed and keeps society in a static problem state.

- New opportunities tend to emerge when avoided emissions in society from new solutions are delivered and assessed by solution clusters with the aim to deliver a new generation of solutions to human needs, and where the transformative opportunities provided by digitalization and new business models are part of the strategy. Such approaches support a shift from a climate risk innovation approach to a climate opportunity approach.



- If an avoided emissions assessment is done with climate risk innovation approach it can easily be reduced to simple accounting tool that helps in the climate risk reporting, where the only purpose is to contribute to net-zero reporting rather than the business model innovation required to focus on needs in society and how the company can deliver 1.5 °C compatible solutions for human needs.

2.5 Living in the 1990s in the 2020s: Caught between two worlds

Below is a summary of the difference between the climate risk innovation agenda of the 1990s and the emerging expanded climate innovation agenda that also focuses on companies as solution providers.

	1990s climate agenda	2020s emerging 1.5 °C and global sustainability agenda
Companies in Focus	Individual large emitters, and sectors	Solution clusters, including enablers (financial, PR, legal, cultural, etc.) based the networks that have capacity to delivery on human needs.
Reductions/avoided emissions focus	5-20% reduction from the company (later expanded to 100% with offsetting and CCS)	Avoided emissions in society that are 1.5 °C compatible and support a sustainable future were 11 billion can live flourishing lives
Expected outcome	Reporting reduced emissions and commitments to net-zero	Development and deployment of solutions that society needs and exponentially scale this contribution
Drivers	Cost reduction/Compliance	Revenues/Purpose/Human needs
Ultimate climate goal	The capacity to report zero emissions	Delivery of solutions that society needs to be sustainable
Assumed speed of change in society	Slow, incremental, and linear	Fast, disruptive, and with transitions
Main tools	Internal price on carbon, environmental product labels and scope 1-3 reporting	Business model innovation, clustering of solution stakeholders, 1.5 °C global sustainability compatibility assessments, accelerators/incubators
The best a company can do	Reduce scope 1-3 emissions to zero as fast as possible, or find ways to be able to report acceptable scope 1-3 emissions reductions in creative ways (such as reporting emissions in relative terms such as per revenue/sales, or by using offsetting).	Provide as much solutions as possible that are 1.5 °C compatible and support a future where 11 billion can live flourishing lives and make profits doing this.
Key drivers	Compliance and cost/risk reductions that are cost efficient	Revenues and customer satisfaction, based on providing what society needs for a sustainable future in line with the purpose of the company
Innovation approach	Often an incremental decarbonization approach that supports reduction of current emissions from existing sectors.	Transformative approach based on human needs and how 1.5 °C compatible solutions can be provided by the company to meet the needs of 11 billion
View of companies	A source of emissions (footprint only)	A potential provider of solutions (that have both a footprint and a handprint) that are needed for a sustainable society
Part of company mainly responsible for climate action	Supply chain mangers, Risk managers, staff involved on Cost saving measures, PR department, classic CSR staff, sometimes C-suite but rarely	CEO, CFO, rest of C-suite, Head of innovation, Head of sales, Head of R&D and all others involved in identify tomorrow's markets and the development of new offerings, including a new generation of CSR staff

3. Differences

between scope 1-3 emissions, avoided emissions, 1.5 °C compatibility, and a future where 11 billion can live flourishing lives

> *We don't see things as they are, We see them as we are. – Anaïs Nin*

> *"Avoided emissions includes everything the most ambitious climate risk agenda does (scope 1, 2 and 3) in addition to also assessing the actual impact in society based on what the product provided is substituting. It also has the capacity to guide companies to become solution providers for a future where everyone on the planet can live flourishing lives"*

As this paper has shown there are two fundamentally different ways for companies to approach the climate challenge.

A climate risk agenda

The carbon footprint approach, with scope 1-3 emissions, is a reactive risk approach where the focus is on the reduction from the company's operation. This approach was born out of a legal responsibility approach and then extended to also include the emissions up and down the value chain. The language around these (scope 1-3) emissions are filled with words like "compliance" and "reporting", as the drivers are external. Hence the main question is "how to reduce emissions from current systems" (in the best case), but more often "how can we use creative accounting and offsetting to be seen as reducing the emissions we are responsible for".

A climate opportunity agenda

The solution approach, with avoided emissions due to solutions from the company, is a proactive climate opportunity approach that focuses on what is needed in society. It was born out of the need to assess innovations that deliver positive impacts in society and that purpose driven companies especially want to contribute to. There are four different approaches to avoided emissions. The first is product substitution, the second is system substitution, the third focuses on how different human needs can be met by supporting different lifestyles, and the fourth and final is about contributions to low-carbon feedback.

There also exists a funnel where different categories of avoided emissions can be found. At the top are any avoided emissions. This includes any cases where emissions in society are reduced, which includes many strategic actions that result in high-carbon lock-in. E.g. an expensive investment to make a coal powerplant marginally more efficient, a slightly more fuel efficient SUV, or most investment in new natural gas infrastructure. Such actions do result in reduced emissions compared with business as usual, but not enough.

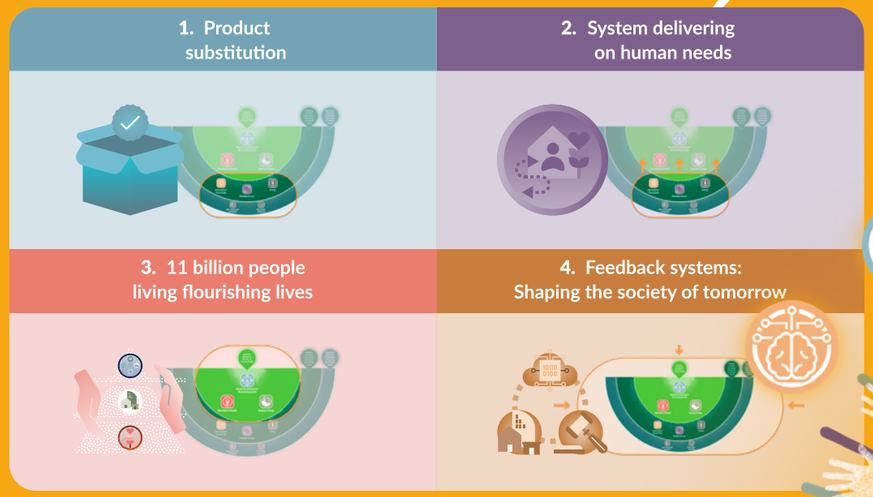
In order to exclude actions that do not allow fast enough emissions reductions a 1.5 °C compatibility criteria can be used. Such a criteria filters out actions that are not compatible with a 1.5 °C development path where emissions reductions of almost 10% per year are needed.

Still, even if a solution is 1.5 °C compatible it does not necessarily mean it is compatible with a future where 11 billion can live flourishing lives. Currently many initiatives try to switch from fossil fuel to biofuel or electrification, but as the current system is extremely resource inefficient such a switch is not globally sustainable. E.g. shifting to biofuel driven airplanes and luxury yachts is clearly not compatible with a future where 11 billion live flourishing lives, but rather a world where a few use most of the planets resources and the rest need to remain poor.

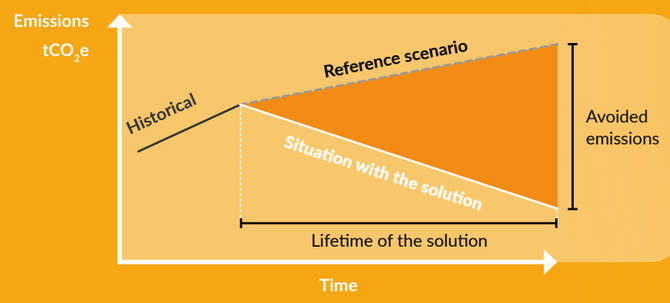
Differences

Carbon Handprint/ Avoided Emissions

The GHG emissions avoided, or added, in society due to the products the company provides



Avoided Emissions



LCA of product/service/system Compared with the LCA of the product/service/system it substitutes

Impact Funnel/ Sustainability Scope

Different impacts

Solution Level 1:
Avoided emissions from sales

Scope: Society today including the poor of the world

Aim: Sell solutions that reduce emissions in society

Driver: Revenue opportunities for solutions that are needed in society often from product substitution

Solution Level 2:
1.5 °C compatible solutions

Scope: Society today and tomorrow including the poor of the world

Aim: Sell solutions that reduce emissions in society that are compatible with a 1.5 °C pathway

Driver: Revenue opportunities for solutions that are fast and cost efficient enough often from system transformation

Solution Level 3:
Delivering solutions for 11 billion people living flourishing lives

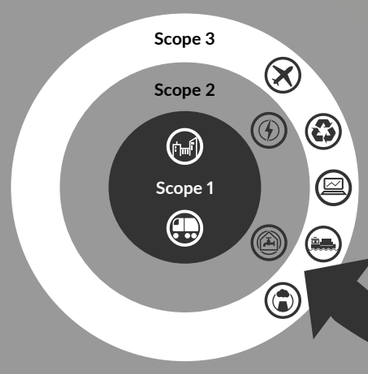
Scope: Society and nature today and tomorrow including the poor of the world

Aim: Work in clusters to deliver solutions for a just and creative world where everyone can live flourishing lives

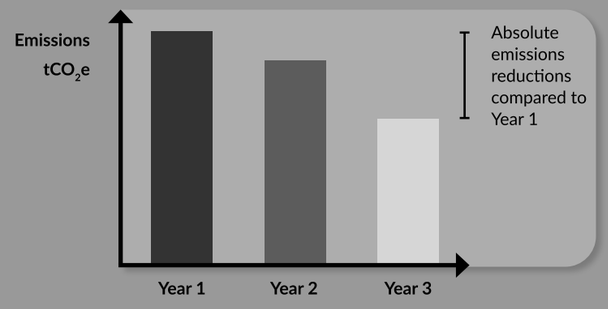
Driver: Purpose driven companies with a goal to make the world a better place in a profitable way due to blue ocean opportunities

Carbon Footprint/ Scope 1-3

The GHG emissions from the company and the value chain needed to produce and use the product



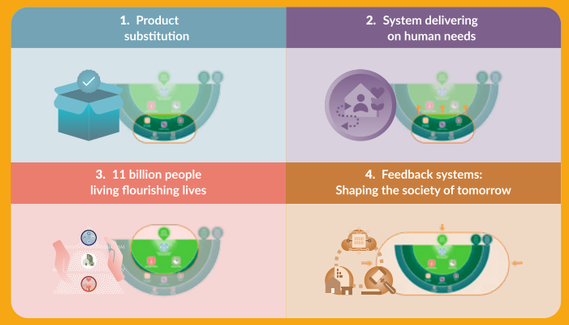
Carbon Footprint



LCA of the company

Carbon Footprint / Scope 1-3

The GHG emissions from the company and the value chain needed to produce and use the product



The GHG emissions avoided, or added, in society due to the products the company provides

The footprint approach can be illustrated as three concentric circles that are assumed as a static part of society. From the narrowest perspective only the emissions from the structures owned by the company are included (scope 1). Expanding the perspective slightly and the emissions due to the energy purchased is also included (scope 2). The last stage expands the problem scope to the whole value chain to include all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.[22]

As the GHG Protocol, which is in charge of the scope 1-3 structure, describes it: This static problem approach "provide a comprehensive approach to value chain GHG measurement and management."[23] Note, they do not claim that scope 1-3 work is about what solutions society needs, it is not about new transformative innovations and solutions that deliver on human needs, it is an accounting tool to measure and manage current value chains and has great value to improve existing structures. While the GHG Protocol is clear about the limits of scope 1-3, many consultants and policy makers think that scope 1-3 emissions always deliver emission reductions in society, drive the innovation that is needed, and is the only thing companies should focus on.

Many countries only have initiatives that focus on how to make existing sectors fossil free, and no initiatives that focus on solution providers and what society needs. The results from such initiatives are predictable and tend to result in the same list of recommendations: Rapid increase of renewables, electrification, and CCS with some energy efficiency in existing systems added to the mix. Hence, they support a future with almost no system innovation, an extremely resource intensive economy with no changes in business structure, in short a "fossil free typewriter approach".

The handprint approach, with a focus on avoided emissions from products sold, shifts the focus from the company in isolation to its impact on society. It asks what impact the company has when the products sold are used compared with alternatives. The handprint approach and avoided emissions can be illustrated as four different assessment perspectives.

Perspective 1: Product substitution

The first is a product substitution perspective where the LCA (scope 1-3) from the company is compared with the LCA for the product it substitutes. Cases: a new tire compared with an existing tire, a new pair of trousers compared with an existing pair, a new airplane compared with an existing, etc.

Perspective 2: System substitution

The second is a system substitution perspective. Here the focus shifts to what is the unit that provide a service to people. The tire is not used in isolation, neither are the trousers, or the airplane. This perspective requires the company to move the focus to the system it is a part of to deliver a service to people. The producer of tires needs to assess the impact from e.g. bicycles or SUVs depending on where the tires are used. The provider of trousers needs to assess if they contribute to large wardrobes of low quality that encourages people to only care about short-term external gratifications due to looks and disregards empowerment of individuals as well as environmental challenges in society, or if they support small efficient wardrobes with garments that empower and encourage sustainable lifestyles. The provider of airplanes needs to ask how they influence the use of trains and virtual meetings.

Perspective 3: Delivery on human needs with different lifestyles

The third is a human need/lifestyle perspective. Here the focus is on how sustainable lifestyles that deliver on human needs can be supported. Here a tire provider can collaborate with bicycle providers to support sustainable access to nutrition and local vacations where personal growth is supported by allowing people to reconnect to nature. A clothing company can support low consumption lifestyles based on experience and creativity and healthy nutrition with an active lifestyle. These kinds of business models and clusters are still very unusual and there are many companies, and sustainability consultants, that prefer to talk about net-zero targets with offsetting as this only requires companies to pay for their "sins" rather than rethinking their business model so they can become part of the solution.

Perspective 4: Feedback systems

In addition, a fourth perspective is included with a focus on feedback systems. In a rapidly changing society in need of fast sustainability changes the feedback systems the company supports are important. High- or low-carbon feedbacks can be supported though advocacy, marketing and different collaborations that support, or undermine, institutional changes in support of a 1.5 °C compatible pathway.

For the carbon handprint / avoided emissions, a funnel can be used to illustrate what kind of avoided emissions are in focus.

Solution level 1: Any Avoided Emissions.

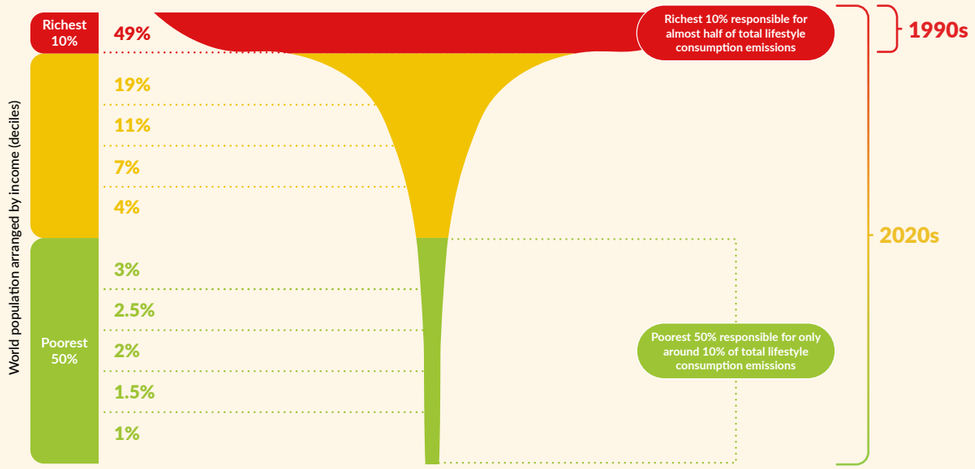
This is the most common approach. While making a simple comparison between the product the company provides and the product it substitutes can help companies begin to focus on actual emissions impacts in society, rather than a static problem approach with scope 1-3 emissions, it is not enough for global sustainability. Many avoided emissions suffer from the same problems as scope 1-3 emissions, including science-based scope 1-3 reduction targets, i.e. they do not account for possible high carbon lock-in, ignore new system solutions and are not built for a time of disruptions. In addition, they do not consider if the corporate strategies they encourage are compatible with a future where the whole population can live flourishing lives.

Solution level 2: 1.5 °C compatible solutions.

The next level includes only the solutions that are compatible with a 1.5 °C development path by providing solutions to human needs. To ensure synergies with other sustainability targets and to support innovation the solutions should be 1.5 °C Low-Energy-Demand (LED) compatible as this is the IPCC pathway with the strongest synergies with other SDGs and also the pathway that acknowledges and focuses on innovation beyond CCS and more renewables.

Solution level 3: Delivering solutions for a sustainable future where 11 billion can live flourishing lives in a half-earth world that address existential risks.

This is a level few companies address. It challenges any company that push unhealthy and unsustainable over-consumption such as fast fashion, fast food, digital consumption platforms, and most providers of natural resources as almost all of these have as a goal to sell as many goods as possible that accelerate current over consumptions as well as physical and mental unhealth. It also challenges almost all social media companies that are advertiser driven, from Google and Facebook to TikTok and Twitter, but also most mass media outlets that today have readers/listeners/watchers as products they sell to advertisers. Finally, it challenges most consulting companies, cloud providers, legal firms, PR agencies and architects that support current unsustainable trends by making the companies with unsustainable solutions more efficient.



Note, that the “carbon footprint” was never meant to address global sustainability, and the science-based targets are not really science based, more science inspired in relation to global sustainability. The only thing most footprint initiatives require is that companies should reduce emissions, and if they are more ambitious, they want to see faster reductions in current systems. But, the carbon footprint approaches do not say if there are solutions that are scientifically much better if we want even faster reductions, or if there are new science breakthroughs that open up new opportunities that also address other sustainability challenges. So, a better name might be “static problem-based science-inspired targets with focus on existing sectors”.

Compared with targets that have no relation to what is needed, science-inspired targets are a step in the right direction, and there are some initiatives like the exponential roadmap that focus on exponential emission reductions, and this can trigger a demand for new innovative and globally sustainable solutions.[24] The challenge is that many still do not understand the limits of a carbon footprint approach. And for those that do not understand, more science-inspired targets are often the best they can use.

To sum up, three major benefits with a dynamic solution focus where avoided emissions assessed are:

1. **It can assess what society ultimately needs, a 1.5 °C compatible pathway that delivers what is needed for a sustainable future where 11 billion people can live flourishing lives.**

2. **It acknowledges the need to provide solutions for the majority of the global population where the focus needs to be on avoiding emissions as they move out of poverty and hardly emit anything today.**

3. **It embraces solution providers, and especially SMEs, as well as everyone in the innovation ecosystem that supports solution providers delivering on human needs.**

Differences

3.2 Cases: Comparing Scope 1-3 and different solution approaches

Below are some short examples to illustrate the difference between a carbon footprint approach and a climate handprint approach. It also illustrates the difference between the three levels of avoided emissions: any avoided emissions, 1.5 °C compatible, and solutions for 11 billion living flourishing lives. It also briefly discusses impact in society and innovation impact.

The cases are meant as illustrative examples to show what different ways of approaching the climate challenge will highlight, but depending on context, the actual results can differ significantly.

Example	Variation in scope 1-3	Any avoided emissions in society	1.5 °C compatibility	Solution for 11 billion living flourishing lives	Impact in society	Impact on Innovation
Car manufacturer shifting its portfolio to EVs	+	Short-term + Long-term -	-	- -	-	-
	Reduction of scope 3 emissions, while scope 1 emissions might increase due to the need for new production capacity	Positive impact in the short term, but negative in the mid/long-term. In the short term ICE is the reference, but as smart city planning and other mobility solutions become the new reference, these will be better than electric cars in most cases.	Negative impact due to high risk of lock-in into high resource demanding, inefficient systems based on personal car ownership	Very negative impact. The current transport system is extremely resource intensive and built around unsustainable production and consumption systems. Totally new systems to provide access are needed for a world where 11 billion can live flourishing lives.	Initially incremental positive impact, but not globally sustainable, as a situation where each EV sold replace/ displace ICEs but also push the Global South into inefficient systems is not sustainable.	Incremental product innovation. Currently significant money is being spent on old car companies with very poor track record for any kind of significant business model innovation.
Bike manufacturer selling less bikes	+	0	0/?	+	?	0/+
	Assuming the scope 1-3 reduction	Unclear as it can result in increased emissions if people use a car instead, no change if bikes are bought from another company with similar impact, or reduced emissions if people are walking instead.	The signal that less bikes are needed can be negative as we currently live in such a car dominated society	Basically, all companies moving away from selling products to providing services, e.g. virtual access, is a good thing. But the challenge is obvious if the gap is filled by even worse providers of transport solutions.	Unclear as there might be better providers of biking and walking solutions that rent instead of selling bikes making it easier to afford and also encourage better design for longer lifetime.	No direct innovation impact unless the competitors are affected, and that can be walkability providers (good) or car manufacturers (bad). A positive innovation that might be unintentional is that the company might reemerge as a service company that rents mobility solutions.
Company purchasing green electricity (GoO)	+	0	-	-	0/-	0
	Reported Scope 2 reduction (market based)	Unclear as the impact in society relate to the total production. Hence if the purchase did not affect the production it has no impact.	As the current society is too resource intensive the first measure should be energy conservation (not energy efficiency in existing systems)[25] and for 1.5 °C solutions new decentralized sustainable renewables with smart storage is needed.	Purchasing green electricity without any demand for new production and energy efficiency deals is better than offsetting, but not much.	Often no impact, as guarantees of origin are often not additional, can have a positive impact if discussions about a sustainable energy system are encouraged. Can have a negative impact if the reporting discourages the investments that are needed.	No significant innovation, beyond innovation related to creative accounting, as most GoOs do not trigger any additional low-carbon capacities.
Home insulation company experiencing high growth	-	+	?/-	-	+/-	+/-
	Scope 1-3 increase due to increased manufacturing	Positive impact, due to more efficient buildings, but potential high-carbon lock-in where fundamentally unsustainable buildings are just slightly more energy efficient.	Unclear as the insulation can be both part of a high-carbon lock-in and a 1.5 °C compatible pathway depending on where the insulation takes place.	Probably negative impact. While these kinds of companies deliver elements that can be part of a sustainable solution, clusters are needed to provide sustainable systems for living. Isolated, these companies may only be able to deliver incremental improvements in existing sectors.	Potentially positive impact, as more and more homes become energy-efficient, but unless it is in a package that support buildings that are globally sustainable there is a risk for resource intensive buildings that are too expensive for most to own. The result would then be high-carbon lock-in and a failure to meet the needs for 11 billion people.	New smart efficiency solutions may be encouraged and if system solutions are developed with clusters of stakeholders the innovations can be significant. However business model innovation is needed that focus on human needs and not just improvement of existing systems

Differences

Example	Variation in scope 1-3	Any avoided emissions in society	1.5 °C compatibility	Solution for 11 billion living flourishing lives	Impact in society	Impact on Innovation
Heat pump manufacturer and installer targeting customers equipped with highly emissive heating solutions	-	+	?	-	+/-	+/-
	Scope 1-3 increase for the heat pump manufacturer and installer if they need to increase manufacturing and transportation to customers.	Positive impact, as the customers move away from a very unsustainable solution, but potential high-carbon lock-in.	Unclear as heat pumps can be part both of a high-carbon lock-in if they are not if they are not combined with energy efficiency measures/system solutions and a 1.5 °C compatible path if they are.	Probably negative impact. While these kinds of companies deliver elements that can be part of a sustainable solution, clusters are needed to provide sustainable systems for living. Isolated these companies will only be able to deliver incremental improvements in existing sectors	Potential positive impact, as more and more carbon-intensive heating solutions get replaced. But energy conservation must be the first priority with system solutions.	New smart efficiency solutions are encouraged and if system solutions are developed with clusters the innovations can be significant. If only single solutions are being promoted the business model innovations required will not happen.
ICE manufacturer reducing emissions from its suppliers of parts to its slightly more fuel efficient fossil SUVs	+	-	-	-	-	-
	Scope 1-3 decrease	Negative as emissions in society increase with SUVs compared with electrification, public transport and tele-meeting trends	Negative as society needs to move away from fossil SUVs	We need to move to a human need approach and develop new smart resource efficient solutions to provide access to human needs	Negative impact, if this manufacturer use this as a marketing argument to sell more SUVs, or of more customers buy/use it instead of smarter access solutions due to lower use costs.	Negative as resources are invested in fossil technology that is extending the lifetime and attractiveness of inherently unsustainable products rather than smart sustainable solutions.
Fast food and fast fashion companies buying carbon offsets and claim the products to be net-zero (or even climate positive)	0/-	-	-	--	-	-
	No actual change in scope 1-3, but with creative accounting they sometime make it sound as if they have reduced their emissions. If this is used to sell more unhealth and unsustainable food/apparel scope 1-3 will actually increase.	Negative impact, as it increases emissions in society from their products, instead of avoided emissions from sustainable nutrition and apparel	Negative impact, as society needs to move away from unsustainable nutrition and apparel	Extremely negative impact. These companies represent fundamentally unsustainable business models and need to rethink how they can deliver a positive impact in society.	Very negative impact if sales increase due to marketing making consumers more likely to buy more unsustainable products	Very negative as resources are spent on marketing instead of developing sustainable solutions.
Rapidly growing plant-based company collaborating with a grocery chain to sell 11 billion compatible healthy meals with a fair-trade business model.	-	+	+	+	+	+
	These companies would in most cases report increased scope 1-3 emissions	Positive impact and also synergies with other global sustainability goals.	Very positive impact. This is the kind of clusters that are needed to ensure 1.5 °C compatibility.	Very positive impact. Very few companies today focus on how they can deliver globally sustainable solutions.	Very positive as it helps the Global North transition to sustainable production and consumption patterns, while also allowing the Global South to rapidly move out of poverty with access to affordable sustainable nutrition that is based on fair-trade and deliver flourishing lives.	Very positive as a cluster innovation where the focus is on meals delivering on human needs, instead of selling the maximum amount of goods (in this case groceries)
Cloud provider offering green server halls	+	+/-	-	-	-	-
	The scope 1-3 are usually decreasing with simple procurement of green energy	Depending on scope. The simple approach where cloud is compared with the old system to provide computer power tend to result in significant relative savings. A more relevant perspective is more difficult as most cloud providers tend to deliver solutions that lock-in companies in old business models that only focus on maximum sales of physical products and use of AI based on non 1.5 °C compatible data.	In most cases negative as the focus is on the server hall instead of the solutions the cloud provides. It is as if an airport authority thinks it is sustainable by providing sustainable buildings rather than addressing the airplanes (something that also happens)	Very negative as few cloud solutions are compatible with a future where 11 billion can live flourishing lives Because their offerings are based on maximizing utilization of services, rather than delivering on human needs.	Positive in the margin (energy use from the server halls), but negative where it matters (the use of cloud solutions).	Distracting innovation as the first focus should be what the cloud is enabling.
A travel agency, and the management consultants, legal company, and PR-company supporting them in transforming into a meeting agency and helping people move from flying to virtual meetings	0/-	+	+	+	+	+
	This is either invisible or actually negative if they are growing in this area. It is a good example of one of the key problems with the footprint/ scope 1-3 approach, as enablers must play a significant role for global sustainability, but are often ignored or told to focus on the wrong things by scope 1-3 stakeholders.	Very positive and the kind of dematerializing that is needed in many areas.	For a sustainable 1.5 °C system changes are required that deliver totally new solutions.	Potentially positive, but without support for new structures and value changes the virtual meetings risk becoming small additions to a unsustainable system.	This shift towards new smart solutions delivered by new clusters is exactly what is needed.	Business model innovation of this kind is very important for a sustainable transition.

4. Synergies

between carbon footprint reduction work and avoided emissions in society from sales

The following table summarizes strategic potential synergies between a footprint (scope 1-3) approach and a handprint (avoided emissions) perspective.

	Footprint Reporting and reducing own emissions	Handprint Identify, support and accelerate solutions that result in avoided emissions
Focus	Measure, manage, and report the greenhouse gas (GHG) emissions a company is responsible for (scopes 1-3).	• Identify and accelerate the uptake of solutions that reduce emissions in society / that are compatible with and support a 1.5°C compatible pathway where humans can live flourishing lives.
Benefits for the society	A company's emission reduction can result in global emission reductions and lower dependency on fossil fuels, but doesn't always stimulate demand for climate innovations to reduce emissions delivered by other companies	• Focus the company's time and energy on required emissions reductions and avoided emissions in society. • Enhance transformative change in society to align with a 1.5 °C pathway
Direct support for each other	An innovative approach to scope 1-3 creates markets for solution providers and helps companies understand that scope 1-3 is just a small part of the climate equation if they have solutions.	• Companies with solutions that society needs also have to reduce their own emissions and can use parts of the existing framework for scope 1-3 emissions.
Benefits for the company	Act to reduce emissions from the company Reduce the company's dependency of fossil carbon Be exemplary from a carbon risk perspective Innovate to reach corporate emission reduction targets Strengthen extra-financial reporting from a risk perspective Anticipate regulatory constraints Reduce operating costs Motivate risk-oriented teams Increase knowledge about internal and supply chain challenges Communicate about reduced emissions from the company	• Act to reduce emissions in society • Reduce society's dependency of fossil carbon • Be exemplary from a carbon opportunity perspective • Innovate to reach emission reduction targets in society • Strengthen financial and extra financial reporting from an opportunity perspective (including intangible assets) • Anticipate regulatory opportunities for new and growing markets • Increase revenues • Motivate opportunity-oriented teams • Increase knowledge about new business opportunities and disruptive risks • Communicate about reduced emissions in society • Move up the value chain to better understand and improve the positive impact in society by the products and services provided • Develop an understanding of the relevance of solutions in a 1.5 °C scenario • Mitigate transition risks integrating a clear vision of end-markets • Identify opportunities in the transformative change needed in society to meet the 1.5 °C objective • Develop understanding of the markets that need to be decarbonized • Enhance the work to use the need for reduced own emissions to accelerate the development and implementation of solutions that can be sold • Improved collaboration with stakeholders with focus on transformative system change • Engage all staff related to innovation and sales with a focus on the company as a solution provider • Be identified as a purpose-driven company delivering what is needed in society

5. Ways forward

for current and future solution providers

Companies that want to accelerate their role as solution providers, or explore opportunities as solution providers, are urgently needed to deliver on a sustainable 1.5 °C development path. Below are five steps that can help companies move from only reporting scope 1-3 emissions and approaching climate change as a risk, to also assess avoided emissions from sales and approach the need for reduced emissions as a business opportunity.

Step 1: Scan key documents to assess solution-and-human-need leadership

Many companies today have solutions and focus on human needs, but not in their climate strategies, as these often have been developed from a risk perspective with a static problem approach.

A result of the footprint approach is that many companies, investors, policy makers, and even some NGOs, only see the need for fossil free versions of existing materials (steel, aluminum, and cement) and structures, electrification of cars, fossil free buildings, etc. When actions in these areas are not enough the response is to ask for large investments in renewable energy and CCS. Such a carbon footprint approach also tends to miss many of the transition risks

Companies can use the climate innovation scanner to identify their solution-leadership and their human-need-leadership. Such scanning helps companies identify strategies and parts of the company involved in the development and implementation of new smart solutions. It also helps companies to move away from a focus on making “fossil free typewriters”, or typewriters that use offsetting to claim being “climate positive”, that PR driven scope 1-3 work tends to result in.

Instead the company can explore how it can become a provider of the solutions the world needs.

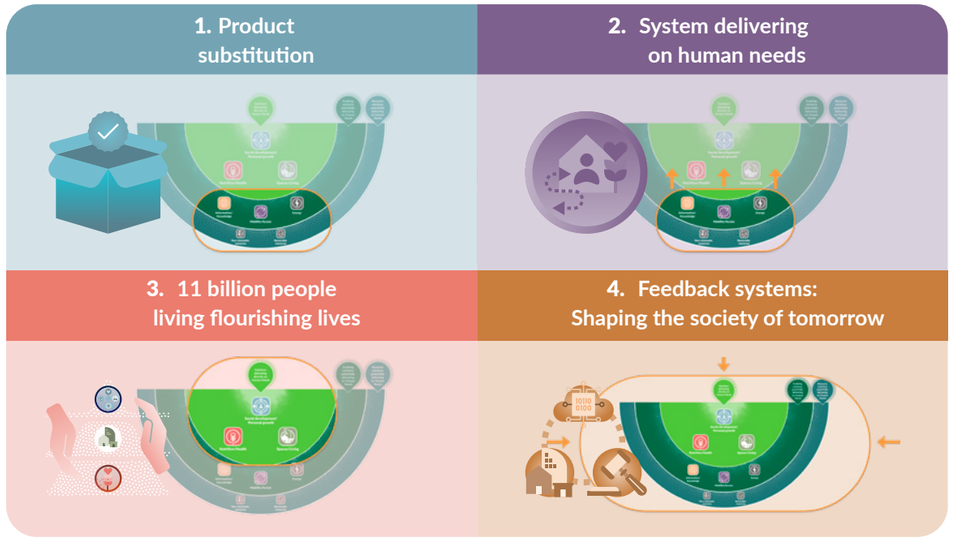
The climate innovation scanning tool can be found here:
https://climate-innovation-assessment-iclei.misolutionframework.net

Step 2: Benchmark your current business model and your vision for the future

After a scanning of current solution-and-human-need leadership companies can explore how they can change their climate strategy to not only help avoid emissions, but to do that in a 1.5 °C compatible, and even globally sustainable way in support of a future where 11 billion can live flourishing lives.

The benchmarking focuses on four areas.

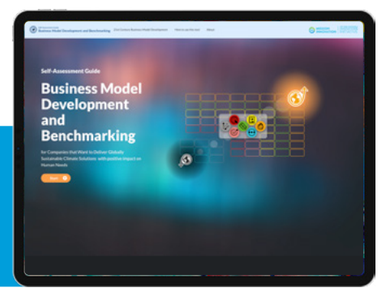
1. **What human needs does the company deliver on**
2. **The value proposition captured by its role and goal**
3. **The focus for sales**
4. **The expected impact**



These areas are benchmarked against different climate opportunity innovation approaches that companies can relate to. This transformation towards a human-need based innovation approach is currently being led by new stakeholders, including many start-ups and incubators, but also larger companies such as Tesla that already use avoided emissions to focus on its impact in society.

In addition to the four main areas, the benchmarking also covers the underlying structure needed to deliver the solutions (scope 1-3).

The benchmarking tool can be found here:
business-model-development-and-benchmarking.misolutionframework.net



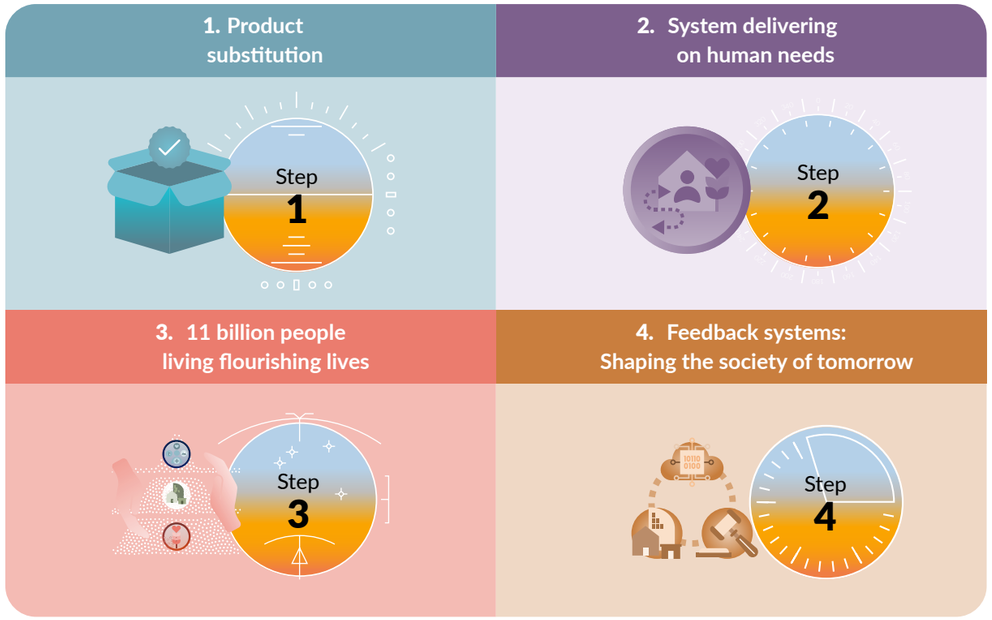
Step 3: Conduct a "Full Climate Impact Assessment"

After a scanning and benchmarking a full climate impact assessment can be conducted. Most companies today only use avoided emissions for product substitution, but this is not enough. The really significant changes tend to happen on a system level and also require the company to contribute to changes in regulation and values. By using a full climate impact assessment, the company can assess possible impacts for/on:

In addition to the impacts that are quantified the full climate impact assessment also assesses contributions to high- and low-feedback through marketing, advocacy and other actions that influence structures in society with a traffic light system.

These assessments can be done to help companies develop impact strategies, build new clusters, engage with investors, and identify new business model innovations.

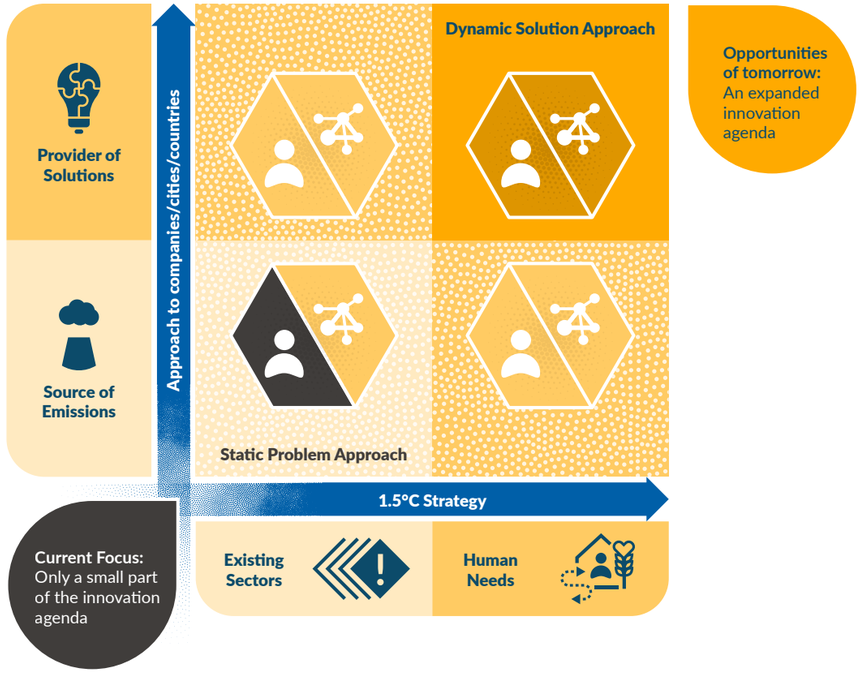
The four steps are described in the report Full Climate Impact Assessment.



The full climate impact assessment can be found here:
https://full-climate-impact-assessment.misolutionframework.net

Step 4: Support an expanded climate innovation agenda in society

Climate innovation is a huge opportunity to create value for all stakeholders involved. With an expanded climate agenda, where companies are approached as solution providers that deliver on societal needs, companies can create business advantage and value by accelerating climate action to future-proof their business and help meet the 1.5 °C target.



To support an expanded innovation agenda companies should insist that key processes, initiatives, and events include a focus on avoided emissions in society and on how companies can deliver on human needs in ways that are compatible with sustainable 1.5 °C development paths.

The report 21st Century Climate Innovation Assessment that discusses the expanded climate and innovation agenda can be found here:
https://www.misolutionframework.net/pdf/8407_MISF_Climate_Alignment_Assessment_Report_02.pdf

The UNFCCC Global Innovation Hub can be found here:
https://unfccc.int/topics/un-climate-change-global-innovation-hub

Step 5: Avoid mixing avoided emission assessments with scope 1-3 reporting

Scope 1-3 emissions and avoided emissions are two very different approaches. To keep them separated is usually very good, especially when it comes to reporting.

Scope 1-3 focuses on climate risk innovation and is about reducing emissions from the company and its value chain. The reason to address these emissions are usually risk and compliance, with potential for cost savings. This is often the traditional focus for companies that are significant polluters.

Avoided emissions focuses on climate opportunity innovation and is about guiding strategies and action towards positive impact in society. The assessments are mainly used to guide strategy development and in dialogue with strategic partners. It is not a PR or compliance tool.

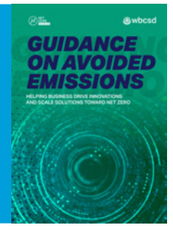
Due to the dominance of the footprint approach, and the idea that the best companies can do is to reach zero, some companies and consultants have begun to use avoided emissions from sales to "compensate" the scope 1-3 emissions to be able to report net-zero results. Sometime these stakeholders also include offsetting, including forest plantations, and call these avoided emissions also, as they try to communicate a low carbon footprint and do not focus on business model innovation.

While a company should aim for a net-positive impact it is important to note that the ultimate goal is not to be able to report a nice number with the help of creative accounting, but rather show that the company is contributing to a future where 11 billion people can live flourishing lives.

If reporting is done for both avoided emissions and scope 1-3 it should be done separately and with an explanation of how the assessments are done, including assumptions. But reporting should not be the most important part for avoided emissions as it is a strategic tool to support sustainable business development, while scope 1-3 is about compliance and risk management. Transparency is always important and providing data for avoided emissions as a solution provider, in the way that for example Tesla has begun exploring, provides an opportunity to build relations with other solution providers and show current as well as future employees that the company is part of the future.

For general guidance the report "A Three-Step Solution Framework for Net-Zero Compatible Innovations" can be found here:
https://www.misolutionframework.net/pdf/Net-Zero_Innovation_Module_1-A_Three-Step_Solution_Framework_for_Net-Zero_Compatible_Innovations_(TSF)-v1.pdf

A guidance from WBCSD that provide guidance for avoided emission reporting for companies that are used to scope 1-3 work can be found here:
https://www.wbcsd.org/Imperatives/Climate-Action/Resources/Guidance-on-Avoided-Emissions



6. Endnotes

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10 The fact that the large fossil companies no longer offically supports organisations that questions climate change does not mean that there are no controversies.

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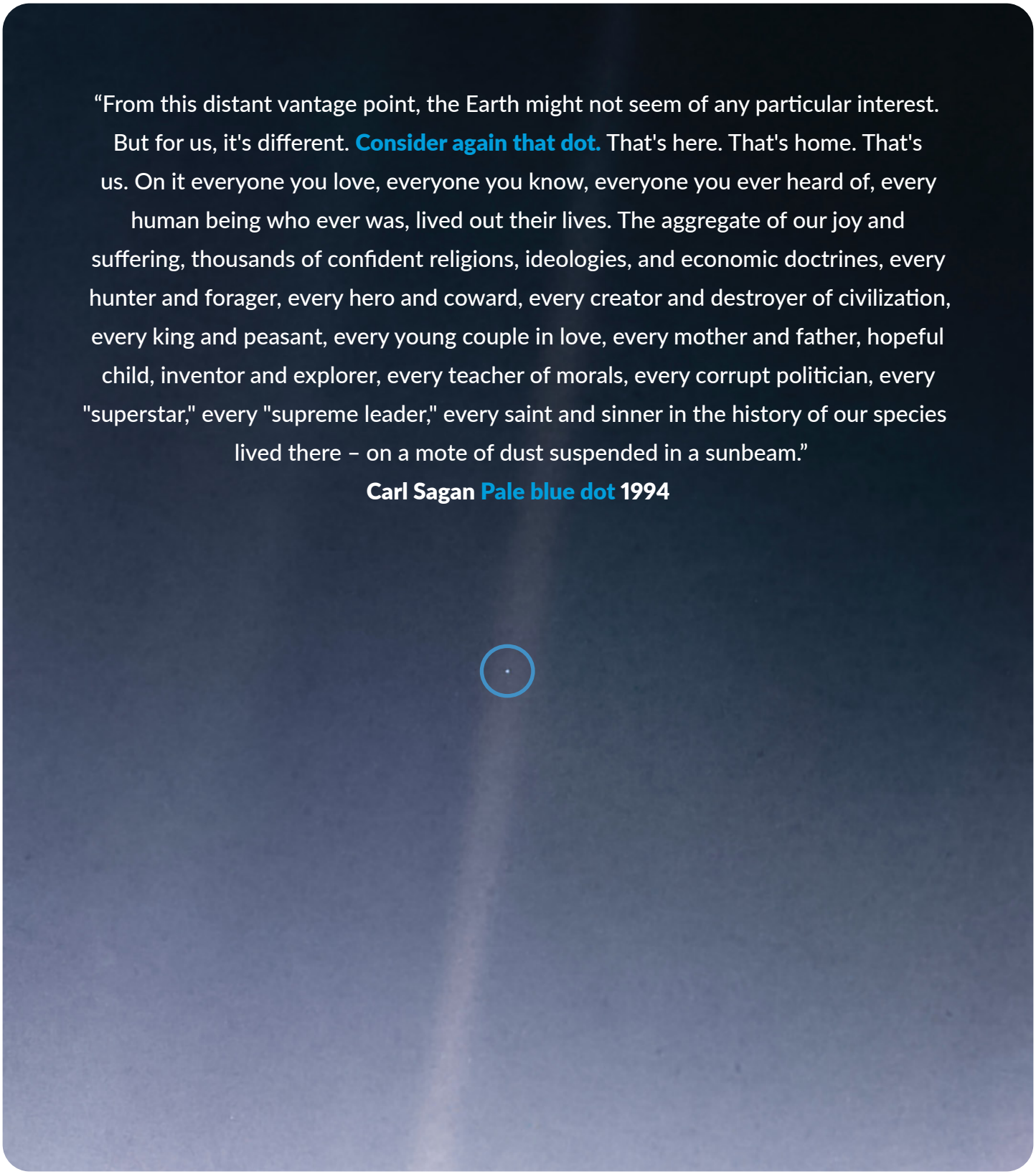

“Our planet, the “Pale Blue Dot”, as seen from Voyager 1 the 14th of February 1990 from its vantage point beyond Neptune. The first ever “portrait” of our planet and the solar system from the outside, 150 million kilometres away.”

Credits: NASA/JPL-Caltech

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