

# ALIGNING FINANCE FOR THE NET ZERO ECONOMY:

New ideas from leading thinkers

**#2** TRANSFORMATIONS REQUIRED FOR 1.5°C  
ALIGNMENT AND GLOBAL SUSTAINABILITY  
Dennis Pamlin

in partnership with

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# Foreword

Eric Usher, Head of UNEP FI &  
Dr. Kirsten Dunlop, CEO of Climate-KIC

**S**ince the 2015 Paris Agreement, conditional pledges have fallen well short of the target of holding the global temperature increase to well below 1.5°C above pre-industrial levels. To reach the aim of decreasing global greenhouse gas emissions annually by 7.6% up to 2030<sup>1</sup>, we need to increase collective ambition by more than fivefold over the next ten years.

The low-carbon transition will require the integration of climate action into the economic, social and environmental dimensions of development: a distinguishing feature of the 2015 UN Sustainable Development Goals (SDGs). Interlinkages within and across the goals have been created to build on lessons from the past that sustained systemic change cannot be achieved through single-sector goals and approaches. Investing in climate-resilient infrastructure and the transition to a zero-carbon future can drive job creation while increasing economic, social and environmental resilience. Investing in innovation will further reduce the costs of climate change and generate

options for alternative business models and ways of living that contribute to economic stability and to a smooth transition.

Short-term thinking in investment cycles and in ideas of economic value are acting to prevent the 1.5°C transition we need, and this will require transformation and innovations in the financial system. Financial institutions play a leading role in allocating and pricing the investment necessary for business development and economic growth. Our financial systems cannot afford to view investments in economic recovery as separate from the sustainability agenda. Therefore, financial actors need to embrace new concepts of value, monetization and externalities, and to address underlying behaviours and mindsets, including short-termism, that govern choices and decisions. Above all, the financial system needs to redefine what it is in service of.

Reviews of the effectiveness of research and innovation activities funded by Europe's Horizon 2020 programme have led to calls for more systemic and cross-sectoral approaches, breakthrough thinking

1 United Nations Environment Programme (2019) Emissions Gap Report 2019. Nairobi, Kenya. Available at: <https://www.unenvironment.org/resources/emissions-gap-report-2019>

and solutions, deep demonstration projects and social inclusion through citizen engagement and participation. The final Report from the High Level Panel of the European Pathways to Decarbonisation initiative, released in November 2018, specifically calls for a focus on: “system-level innovation, promoting sector-coupling so that the individual elements of decarbonisation fit together in a coherent whole” and recommends the establishment of large mission-oriented programmes of a cross-cutting nature for the deployment of system-level transdisciplinary innovation.

In the meantime, the coronavirus pandemic has triggered a major global public health and economic shock. We can draw comparisons between pandemics and the climate emergency: as systemic, non-stationary, non-linear, risk-multiplying and regressive shocks. Many countries have been unprepared for a global shock of this scale and it is clear that we must collectively build a more coherent response to the potentially more disruptive climate emergency and build an anti-fragile capability for resilience and renewal.

The pandemic has also shown that business-as-usual cannot deliver the necessary emissions reductions. Despite international travel plummeting, factories scaling down production, and employees working from home, the annual drop in emissions has only been around 8% and unemployment has soared. Emergence from lockdown

in China, for example, has shown that emissions quickly reach or even exceed pre-CoVID levels, while government stimulus packages have only partially delivered transition-oriented funding and, in some cases, thrown a lifeline to high emissions industries.

Leading banks and investors have recognised that there is no alternative to a low-emissions, sustainable economy. Convened by UNEP FI and partners, the Net-Zero Asset Owners Alliance and the Collective Commitment to Climate Action by banks worldwide, have brought together over 70 financial institutions, committed to working with governments and other stakeholders, to support the financial and economic transformation needed to help deliver the Paris Agreement by aligning financial portfolios with the corresponding emissions pathways – a step that was hitherto unheard of – and deliver what the IPCC report calls, “rapid, far-reaching and unprecedented changes in all aspects of society”.

However, the climate emergency will require current thinking and paradigms to be challenged and questioned. This is why EIT Climate KIC, in partnership with UNEP Finance Initiative, is convening leading thinkers to present their ideas for sustainable financial and economic transformation. We hope that this inspires financial actors to work across the field to draw up a financial system that enables the low emission societies of the future.



Eric Usher  
Head of UNEP FI



Dr. Kirsten Dunlop  
CEO of Climate-KIC



THERE IS  
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# Aligning Finance to the new carbon economy: new ideas from leading thinkers

## Series Introduction

**T**he IPCC Special Report released in late 2018, highlighted the urgency of minimising global temperature rise to 1.5°C and emphasised the need for systems transitions that can be enabled by investments in climate change mitigation and adaptation, policy and acceleration of technological innovation and behavioural changes (IPCC; 2018). Amongst the emissions pathways scenarios, it proposed, for the first time, a limited or no overshoot scenario – the P1 low energy demand (LED) scenario, where future energy demand could be met through low-emission energy sources and enhanced energy efficiency. This scenario presupposes that system changes are more rapid and pronounced over the next two decades.

Five years after the Paris Agreement, and with calls by the IPCC for urgent action in the coming decade to prevent climate change catastrophe, 2020 has been billed as a key year for climate action. The COVID-19 crisis that has accompanied this year marks a point of transformation for the economy and society: it has demonstrated how remarkable and rapid systems change can be. The global pandemic has given us a clear opportunity to pave the way for building back better and establishing new

norms, as well as lessons that can inform how we might face the unabated climate crisis and future climate shocks.

A paradigm shift is needed if we are to move towards a limited or no-overshoot climate scenario. Stakeholders in financial markets, capital and investment represent important levers of change, as they have a key allocative role in society, and can enable investment into a net-zero low-energy future. Financial intermediaries can effectively support and enable societies to mobilise the investment required for the systems change needed to transition economy and society onto a net-zero pathway that is compatible with 1.5°C by 2100.

EIT Climate KIC has been working over the past decade to catalyse systemic transformative change through innovation and has supported the development and uptake of innovations that could help financial markets scale up investment in green technologies and transformative alignment. Action has to move beyond disclosure of climate-related financial risks towards proactive interventions, from engaging the world's emitters to set GHG reduction targets that are sufficiently ambitious, credible and science-based to investing in, financ-

ing and helping enable the breakthrough technologies and business models of the future. Moreover, a focus on the role of regulators, fiduciary duty and other fiscal incentives is imperative to understand how we might reset the rules to develop a more regenerative and resilient economy.

The United Nations Environment Finance Initiative (UNEP FI) is a partnership between UNEP and the global financial sector to mobilise private sector finance for sustainable development. UNEP FI have been leading two initiatives, which aim to move beyond a passive risk disclosure perspective to a more active engagement of private sector actors in committing to meet the objectives of the Paris Agreement and support the low-carbon transition. 38 banks have committed to align their portfolios with Article 2.1c of the Paris Agreement under the aegis of the Principles for Responsible Banking, while UNEP FI has partnered with PRI, WWF, and Mission 2020 to launch the Net Zero Asset Owner Initiative, bringing together 29 institutional investors as of September 2020 to commit to net zero emissions by 2050.

EIT Climate-KIC has therefore partnered together with UNEP FI to produce this thought leadership series that aims to inspire financial actors worldwide to move from risk to alignment, challenge current assumptions around climate alignment and develop ideas and concepts on how alignment can best be achieved. We hope to encourage stakeholders that a proactive climate response is not only about disclosing risks, but also about investing in green opportunities that can enable the low emissions societies of the future. This series convenes innovators and industry experts to provoke discussion, challenge the status quo and guide the transformation of business and finance towards a sustainable future.

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## THE PAPERS IN THIS SERIES WILL RESPOND TO A NUMBER OF KEY QUESTIONS :

- What economic system transformation is actually required to deliver the Paris Agreement?
  - How do financial institutions achieve alignment with the Paris Agreement and how does it differ from transition risk transparency as captured in the TCFD?
  - What is the future of financial institutions as a result of these changes?
  - What are the various strategies and action tracks through which financial institutions can enhance and achieve full portfolio alignment?
  - What are the pathways and choices needed for financial institutions and the financial system to drive an active transition to a net zero-carbon economy?
-





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He is a senior advisor at the Research Institutes of Sweden (RISE), accelerator of digital sustainability at Cybercom, senior associate at the Chinese Academy of Social Sciences, visiting research fellow at the Research Center of Journalism and Social Development at Renmin University, and advisor to the Centre for Sustainable Development at the Confederation of Indian Industries (CII).

Among his many ongoing projects, Dennis is working to establish a framework for companies, organisations and cities to measure and report their avoided emissions and 1.5°C compatibility. He is also developing an AI-based global trend assessment tool to support sustainable disruption, exploring the impact of our “digital twins” and development of fossil fuel-free roadmaps and innovation ecosystems for the 4th industrial revolution and global sustainability. Central to his vision, he is currently working on the development and implementation of the concept of “ecological civilisation”.

Dennis is currently leading Mission Innovation’s Net-Zero Compatible Innovation Initiative and a Trend Scanning project that includes UNDP and UNFCC.





# TRANSFORMATIONS REQUIRED FOR 1.5°C ALIGNMENT AND GLOBAL SUSTAINABILITY

Dennis Pamlin



Much of the work in the financial system so far has focused on transparency and reducing risk and how such work can improve through better data and tougher criteria. However, in a rapidly changing world, the important question is how actions in the financial system support the concrete solutions needed in society and how they relate to what is needed for a 1.5°C compatible scenario, in particular a scenario with significant innovation and transformative system solutions, such as the IPCC's Low-Energy-Demand (LED) pathway.

This paper discusses the necessary transformations and new opportunities in the global economy and finance sector to meet the objectives of the Paris Agreement. The paper is presented in five sections. The first section introduces a matrix identifying stakeholder roles and actions for climate alignment, compatible with a 1.5°C pathway. This matrix has two axes:

1. Y-axis: What actions in society are perceived to be necessary in relation to climate change?
2. X-axis: What are the perceived roles of individual stakeholders or companies?

Plotting different companies, initiatives and tools on this matrix allows us to track how perceived mainstream actions and roles move over time. It can also be used to discuss possible ways forward, beyond

symbolic measures and improvements (often incremental) in existing systems towards the actual solutions needed in society.

The second section takes a closer look at the Y-axis of this matrix and explores what actions in society are perceived as necessary in response to climate change, with a particular focus on the opportunities provided by the 4th industrial revolution. It also argues for adoption of the IPCC's Low-Energy Demand pathway (P1) as the reference scenario for driving strategy, innovation and action.

The third section places the current discussion in a historic context to highlight the need to look beyond the stakeholders and ideas dominating the conversation today.

The fourth section presents different approaches to sustainability by companies and how classical risk reduction approaches that focus on emissions' reduction from scope 1-3 can evolve into an approach where companies act as solution providers.

The fifth and final section presents possible ways forward for companies and financial stakeholders who are interested in moving beyond an emissions' reduction perspective and towards supporting transformative system change and 1.5°C compatible business models.

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# Introduction

**T**he main reason I was happy to accept the invitation to contribute to this thought leadership initiative by UNEP-FI and EIT Climate KIC is that the timing is perfect. For almost 20 years, climate discussions have been focused on a “problem perspective” and the greening of existing product and tools.

Cost-efficient incremental improvement in existing systems, with a particular focus on large emitters, has dominated most initiatives, tools and campaigns. The mainstream response from the financial sector engaging in climate work has been to ask large emitters for transparency regarding emissions, and divestments have been at the centre of the discussion. This first-generation problem perspective viewed climate change as a risk for companies, sent signals that companies should keep track of carbon emissions and helped put the need for reduced emissions on the agenda.

We now live in a very different world and it is time for leaders in the financial sector to develop strategies that deliver what is needed for a sustainable 1.5°C future. In my work with companies, the problem perspective, with a focus on

scope 1 to 3 emissions, is increasingly seen as a challenge by many change makers and progressive companies. This approach put climate on the corporate agenda, but may now be undermining the necessary social and economic transformations required to keep global temperature rise to +1.5°C. By approaching companies only in terms of an emissions reduction perspective, business model innovation, new revenue streams, many solution providers, and the need for system change are often excluded. In addition, powerful tools and concepts with transformative potential, such as digitalisation, artificial intelligence, biomimicry and circular economy, are reduced to optimisation tools.

The focus of this paper is on what is needed to deliver, what the IPCC calls, a 1.5°C low-energy-demand (LED) pathway. This is something that requires much more than science-based reduction targets for scopes 1 to 3, divestment strategies and other tools from the emissions problem perspective. This problem perspective can still provide important contributions, especially by ensuring pressure on laggards, but it is not enough to deliver the transformative system change needed and support companies with transformative solutions.





In this paper I explain why a problem perspective, where we only focus on scope 1 to 3 emission reductions and divestments, is increasingly undermining innovation and the changes needed. Such a perspective is still important, but must be integrated in a broader solution agenda with focus on what is needed in society, where companies are also acknowledged as potential solution providers and transformative solutions are supported. Both perspectives are therefore needed, but not all stakeholders need to address both the emissions reduction and the solutions delivery perspectives. Stakeholders like UNEP FI and Climate KIC have important roles to play to support a solution perspective that builds and expands on the existing focus on scope 1 to 3 emissions.

I hope the ideas will inspire those who have been first generation leaders, with a focus on companies as a problem, and now also want to be part of the second generation of leaders, with a focus on solutions and what is needed in society for a 1.5°C low-energy-demand (LED) pathway. But I also want to open a door to those who helped companies improve their core business and now want to add a climate focus and be part of the second generation of transformative solution leadership.

**Dennis Pamlin, August 2020<sup>1</sup>**



SYSTEM  
CHANGE



NOT  
CLIMATE  
CHANGE



# 1.

## Framing Relevant Climate Action: Alignment and Beyond

**T**he idea of climate alignment, as well as going 'beyond' alignment, for the financial sector is happening as the focus in the corporate sector moves from a one-dimensional focus on reducing risk and major polluters' emissions to a broader system solution perspective with 1.5°C compatible business models and clusters that deliver what is needed to avoid dangerous climate change.

With a world that is far from delivering the emission reductions needed, we need to understand why and what can be done. The discussion about what is needed to address climate change, and the respective roles of different stakeholders in that process, is not new and history can provide important insights and lessons.

In 1988, the "World Conference on the Changing Atmosphere: Implications for Global Security" was held in Toronto (WMO UNEP, 1989). During this meeting, also described as the first global climate meeting, it was concluded that "humanity is conducting an unintended, uncontrolled, globally pervasive experiment whose ultimate consequences could be second only to a global nuclear war." The participants called on governments and industry

to work together to "reduce CO<sub>2</sub> emissions by approximately 20% ... by the year 2005 ...": the Toronto target (WMO UNEP, 1989).

That same year, governments and scientists came together to form the United Nations Intergovernmental Panel on Climate Change (IPCC) and the foundation of modern international climate policy was established (IPCC, 2020).

Over the more than 30 years since the meeting in Toronto, policy makers, business and civil society have set many different targets that address the climate challenge, but they have all tended to be either insufficient and only intended as a first step (e.g. the Kyoto target), or have not been met (e.g. the Toronto target).

The latest attempt at a global target, but most likely not the last, was the Paris agreement delivered at COP21 in 2015. This established the goal "to keep the increase in global average temperature to well below 2°C above pre-industrial levels; and to pursue efforts to limit the increase to 1.5°C" (UN, 2016). Anyone claiming leadership should have 1.5°C as the minimum ambition.

## The Toronto Target 1988: Reduce emissions by 20% by 2005

### The Paris agreement (COP21): Well below 2°C / 1.5°C

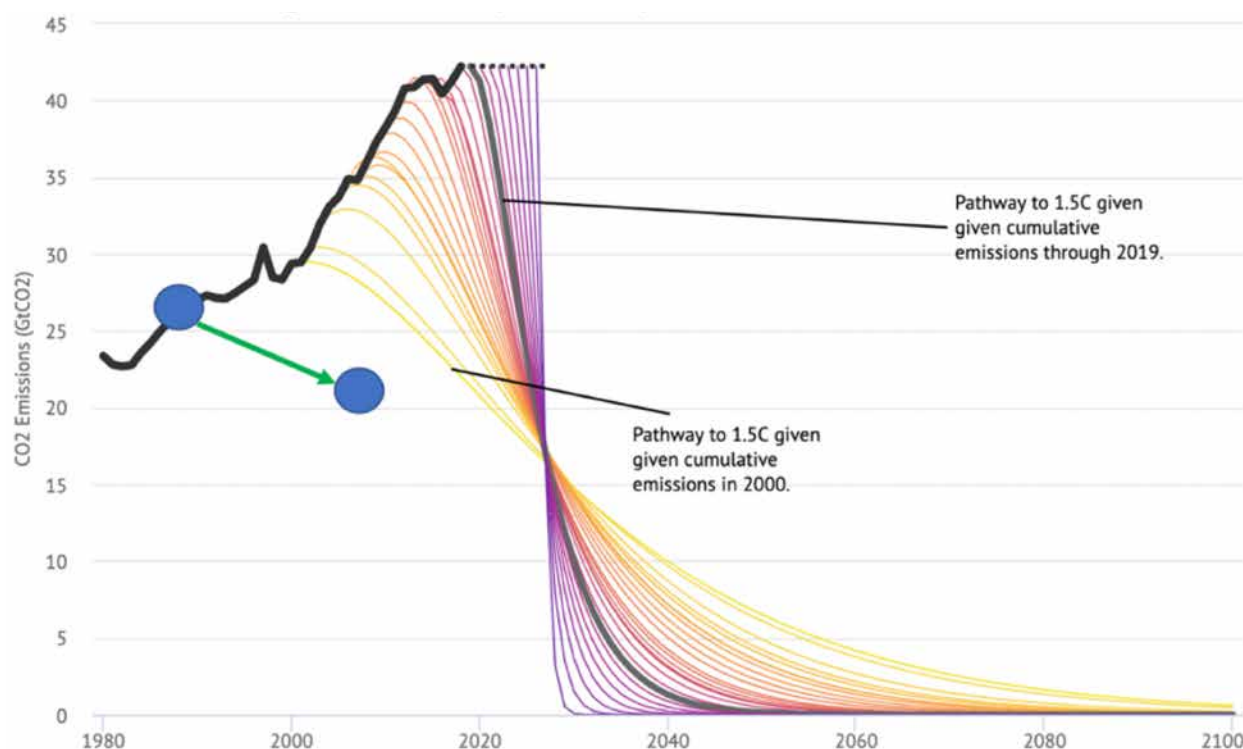


FIGURE 1: Toronto Target and Paris Agreement 1.5C. Based on original figure from Robbie Andrews (2020)

In October 2018, the IPCC released a Special Report on Global Warming of 1.5°C (IPCC, 2018). What made this report special, beyond the fact that it was the first report to explore paths towards a 1.5°C compatible future, was that it also included an innovation-driven pathway that had strong synergies with other global sustainability goals: the P1 / Low-Energy-Demand (LED) pathway (IPCC, 2018).

For the first time the world now had an agreed target, 1.5°C, with a science-based option to reach that goal, based on the tools provided by the fourth industrial revolution, including business model innovation and new smart system solutions, such as digitalisation, rather than a supply-side focus on improvements in existing systems. For many in the climate community,

this LED pathway was a significant departure from business as usual and required a fundamental rethinking of many existing strategies and approaches (Wilson et al, 2020).

Most tools developed over the last 30 years to address climate change, and sustainability in general, have focused on incremental improvements in existing systems with a focus on those creating the problems. Such tools include traditional environmental labels (helping customers to choose a better version of the same products), best-in-sector rankings (ranking companies in relation to companies providing the same product, rather than on how services can be provided in much more sustainable ways), carbon offsetting and emissions trading between large polluters.

These tools did not claim to deliver sustainability initially, only less unsustainable products and get companies to start thinking about sustainability. They were introduced in a situation when many companies did not acknowledge the need for reduced emissions in society as a relevant issue for them.<sup>2</sup> Over time, an industry was created around these incremental ideas and some groups started to communicate as if these tools were enough to deliver sustainable development and also saw new ideas as a threat to their business of selling ESG assessments and offsets.

The result was a pre-COVID-19 society on track towards a global temperature rise of 3°C or more, even after decades of negotiations and initiatives (Climate Analytics and New Climate Institute, 2020). In such a world, offsetting, geo-engineering and carbon removal are easy to see as inevitable, as a future where we can deliver what we need in society in a sustainable way and without emissions seemed impossible (The Economist, 2019).

In the corporate sector there are currently many climate action initiatives. Most of the initiatives can be divided into two groups:

First, there are the traditional “problem”-focused initiatives, which perceive companies as sources of emissions. These “reduction” concepts dominate today and include ideas such as carbon footprinting, science-based targets for scope 1 to 3 reductions, offsetting and divestment.

Second, there is a group of emerging “transformative solution initiatives” that, in addition to recognising companies as a source of emissions, focus on the core business of the company and how the products and services, as well as marketing and lobbying, affect society. These initiatives allow for companies also to be understood as a source of climate solutions through the products and services they provide. These “solution”-oriented initiatives use concepts such as avoided emissions (Stephens & Thieme, 2019), handprints (VTT Research, 2018), 1.5°C compatible investments (EIT Climate KIC,

2018), green revenues (Financial Times, 2016), and net-positive impact (Forum for the Future, BSR & Shine, 2020).<sup>3</sup>

With the problem-focused initiatives well established there was little room for a transformative agenda for global sustainability, but then COVID-19 happened. The experiences from COVID-19 responses around the world have shown that it is possible to do things that were once seen as impossible and take advantage of the many opportunities that digital infrastructure provides for transformative solutions, rather than optimisation of existing systems. We have seen companies, governments and civil society deliver new innovative solutions at a scale and pace that is needed for a 1.5°C future. Even conservative stakeholders have argued that solutions that were once seen as too radical, should be considered in future economic policy (Financial Times, 2020).

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“If there is a silver lining to the Covid-19 pandemic, it is that it has injected a sense of togetherness into polarised societies. [...] Radical reforms – reversing the prevailing policy direction of the last four decades – will need to be put on the table. Governments will have to accept a more active role in the economy. They must see public services as investments rather than liabilities, and look for ways to make labour markets less insecure. Redistribution will again be on the agenda; the privileges of the elderly and wealthy in question. Policies until recently considered eccentric, such as basic income and wealth taxes, will have to be in the mix.”

FINANCIAL TIMES, 3 APRIL 2020

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Perceptions of what are appropriate actions to be taken by companies are rapidly changing and depend on two related questions, which are addressed in sections 2 and 4 of this paper:

- 1. What actions in society are seen as needed and possible to address climate change? (Section 2)
- 2. What role do companies, and those working with companies, see themselves having in relation to climate change? (Section 4)

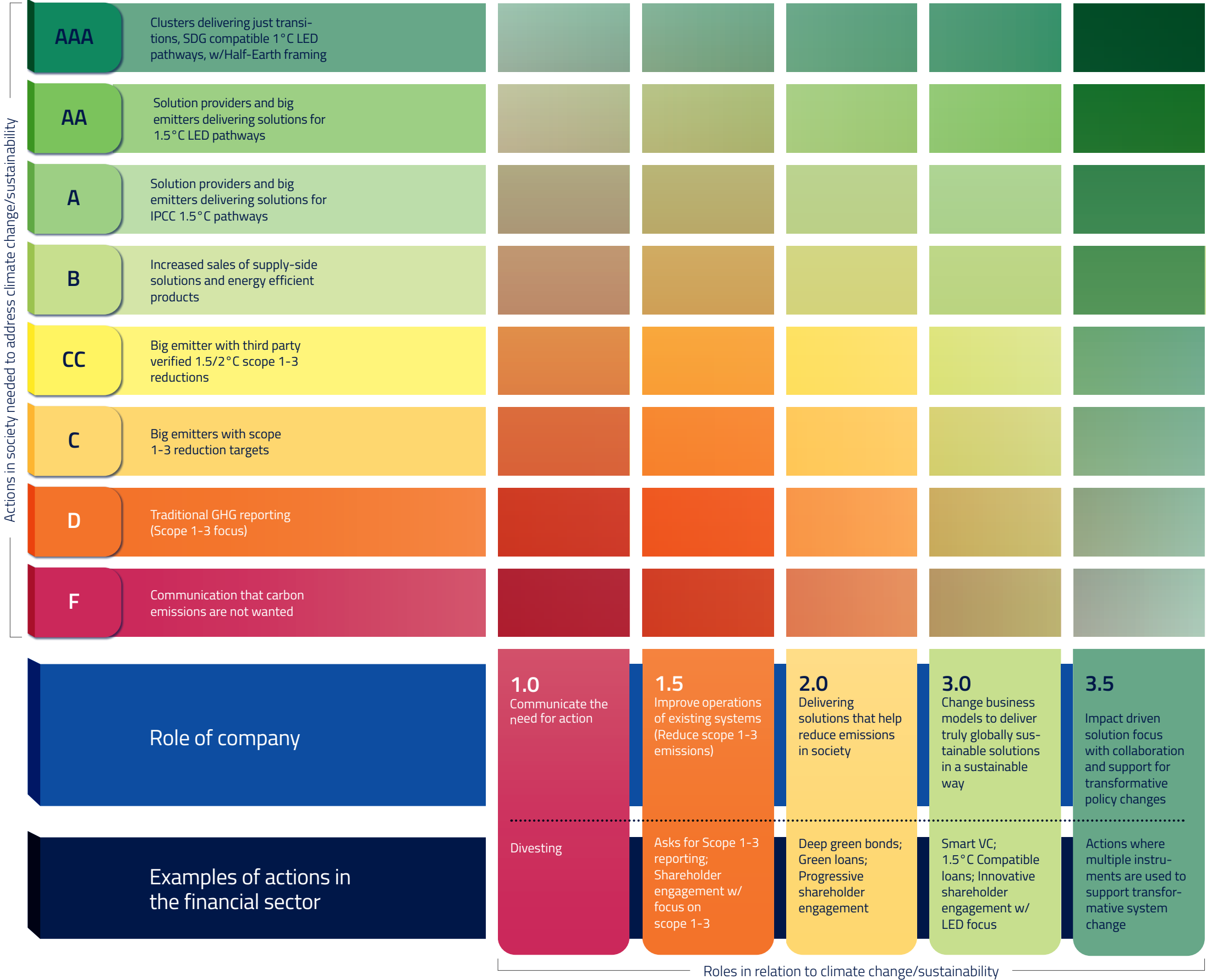
Based on the two questions above, a matrix can be constructed. On the y-axis, we can plot the various actions needed to address climate change and, on the x-axis, the different roles that companies can have in relation to climate change.

Plotting different companies and initiatives on this matrix allows us to track how companies and initiatives move over time. It can also be used to discuss possible ways forward, depending on our current position in the matrix.

In Section Two of this paper, different approaches to alignment will be discussed, while Section Four will look at the different roles of individual stakeholders/companies to ensure different kinds of alignment.

In these two sections, a traditional best-practice approach will be contrasted with a possible 'next-practice' approach, using the IPCC's 1.5°C P1 (Low-Energy Demand) scenario as the reference for a 'next-practice' approach. The matrix is described in more detail in Appendix 1.

FIGURE 2:  
Actions/Role-matrix: Climate Alignment and Beyond for 1.5°C Compatibility / Global Sustainability





## 2.

# Actions in society seen as necessary and possible to address climate change: Low Energy Demand (LED) as the default option for climate alignment

**A**t the UNFCCC's 21st Conference of the Parties (COP21) in Paris, the world agreed to hold the global temperature rise this century to "well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C."

Based on this agreement, the IPCC profiled ninety 1.5°C pathways in its special report (SR15). Four key pathways (P1 to P4) were presented based on different assumptions, including the degree of business model innovation and the use of smart solutions in different areas of business and society (IPCC, 2018).

The two main differences between the pathways are:

1. The dependence on technical solutions for carbon capture, storage and removal: lowest in P1 and highest in P4.
2. The degree of business model innovation, global sustainability, number of innovations, synergies

with other global sustainability goals: lowest in P4 and highest in P1.

P1, or the Low Energy Demand (LED) pathway, is innovation-driven and focused on new smart ways of delivering our needs based on existing solutions and business models. This is also where it is important to move from individual technologies to system solutions in order to deliver the transformative change that is needed for a resource efficient low-carbon pathway. It is also the pathway that delivers best across the other Sustainable Development Goals (SDGs).<sup>4</sup>

Pathways P2 to P4 increasingly depend on carbon capture technologies, such as bio-energy with carbon capture and storage (BECCS), carbon capture and storage (CCS) and direct air capture (DAC). They are also increasingly closer to business-as-usual (BAU) with increasingly inefficient and resource intensive ways of delivering solutions in society. Such pathways therefore also require much larger amounts of renewable energy in ways that hamper



## Breakdown of contributions to global net CO<sub>2</sub> emissions in four illustrative model pathways

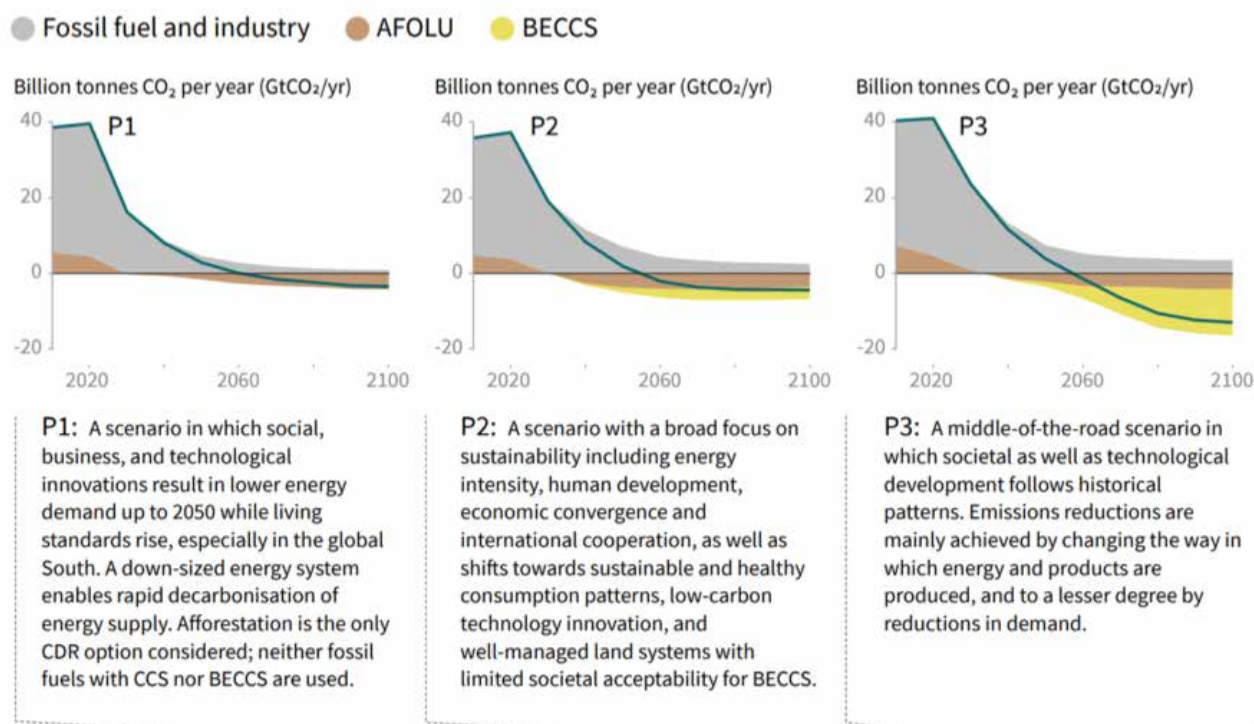


FIGURE 3: Four pathways to 1.5°C from IPCC's 1.5°C Special Report

other sustainability goals such as food security and biodiversity (IPCC, 2018).

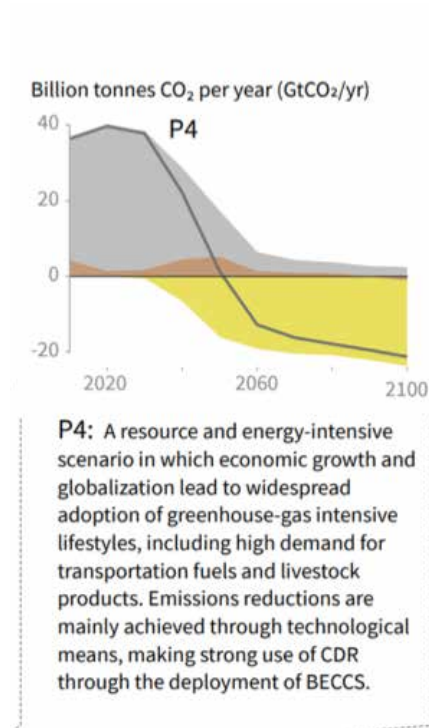
### New opportunities emerging from rapid technological development

With new opportunities emerging from rapid technological development, changing business models and societal values, old ways of delivering what is needed in society cannot be taken for granted. For example, a car, or even physical transport, is no longer needed to access work; now opening a laptop where there is a good broadband connection is enough. In a similar way, most companies need to rethink how they can provide societal needs in a way that is 1.5°C LED compatible.

The opportunities in a LED pathway require system changes in many dimensions, but this IPCC

pathway is still based on existing best practice. Further technological developments and business model innovations – the next practice – are already emerging as key innovation drivers for a new generation of sustainability leaders in cities, companies, NGOs, governments, incubators, and think tanks. With COVID-19, there are many policy responses that could accelerate the trends towards a P1 pathway, but there are also responses that will result in lock-in and a focus on end-of-pipe solutions – for example, on CCS – and an increased reliance on biofuel as a substitution for fossil fuel in excising inefficient systems such as flying.

Combined, the factors above provide three key arguments for the LED/P1 pathway as the default option for all relevant future policies, investment strategies and innovation initiatives:



## 1. Accelerated Sustainable Technology and Business Model Innovation

The first argument for LED as the default option is that it supports sustainable technology and business model innovation.

Currently, many low-carbon strategies and roadmaps are being developed by groups representing old industries that are resource intensive and large emitters. Many of these are based on the assumption that those companies will continue with similar business models, while using CCS and offsetting when improvements in existing systems are not sufficient.<sup>5</sup> These plans tend to exclude new smart ways of providing the same service, especially more resource efficient solutions that would reduce the use of their current products (e.g. cars, airplanes, steel, cement,

fast fashion, and fast food). Supporting such plans with offsetting, CCS and/or BECCS will result in a significant risk of excluding/undermining new smart solutions.

In contrast, a focus on the 1.5°C LED pathway supports innovation through a broad acceleration of solutions in society and supports business model innovation that shifts thinking from products to services. Instead of a focus only on how carbon-intensive industries can reduce their emissions, a LED focus also considers companies as solution providers. This focus on needs also encourages new cross-sectoral collaborations, e.g. for net-positive energy districts (Making City, 2020).

## 2. Increased Support for the Sustainable Development Goals (SDGs)

The second argument is that a LED pathway has the strongest synergies with other SDGs. As the IPCC states:

“Choices about mitigation portfolios for limiting warming to 1.5°C can positively or negatively impact the achievement of other societal objectives, such as sustainable development (high confidence). In particular, demand-side and efficiency measures, and lifestyle choices that limit energy-, resource-, and GHG-intensive food demand support sustainable development.” (IPCC, 2018; p.97)

“LED pathways show the largest number of synergies and the least number of potential trade-offs [...]. In general, pathways with emphasis on demand reductions and policies that incentivize behavioural change, sustainable consumption patterns, healthy diets and relatively low use of CDR (or only afforestation) show relatively more synergies with individual SDGs than other pathways.” (IPCC, 2018; p.157)

Avoiding dangerous climate change is extremely important, but it must be done in a way that also avoids ecosystem collapse,

reverses the unsustainable use of resources, and addresses global inequity. In addition to delivering reduced emissions on the scale and speed needed, the LED pathway also supports a more resilient and resource efficient circular economy. (Wilson et al, 2019)

### 3. Reduced dependence on large scale unproven technologies that are likely to fail

The third argument for LED as the default option is that a focus on LED reduces dependence on unproven technology. As the IPCC states:

*"[Carbon dioxide removal] CDR deployed at scale is unproven, and reliance on such technology is a major risk in the ability to limit warming to 1.5°C. CDR is needed less in pathways with particularly strong emphasis on energy efficiency and low demand. The scale and type of CDR deployment varies widely across 1.5°C pathways, with different consequences for achieving sustainable development objectives." (IPCC, 2018; p.96)*

This is not an argument against all forms of carbon capture and storage with or without biomass and as a way to reduce – or even achieve negative – emissions in all contexts, but it is an argument to develop strategies and policies based on the assumption that:

#### i. CCS might not happen on a scale that is relevant

There is a significant probability that CCS and associated technologies might not deliver any significant contributions in time. Even mainstream organizations with a track record of supporting CCS, such as the IEA, have noted that the operationalization of CCS technology is very far from earlier estimations. In a recent report, the IEA wrote that, in order to deliver relevant contributions, CCS would have to grow more than 100 times in ten years and that is not a scenario that is globally sustainable. The default assumption should therefore be that CCS will not deliver any emission reductions and all CCS-related reductions that take place will be additional

to a resource efficient and just transition to a low-carbon society.

*"Two large-scale CCS power projects are currently in operation with a combined capture capacity of 2.4 MtCO<sub>2</sub> per year. This is well off track to reach the 2030 SDS level of 310 MtCO<sub>2</sub> per year."*

#### ii. Resources are better used elsewhere

Investments in carbon capture technologies might use resources that could be better used to deliver smarter, more resource efficient and sustainable solutions. A strategy with a strong focus on carbon capture could also create a political situation where innovation initiatives and incentive structures focus only on improvement in existing systems, and not on system innovation. The resources

## Pathways for reduced emissions

- Yesterday's best practice focuses on non-scenario-based emission reductions, or on old scenarios that are not 1.5°C compatible, increasing the probability of high-carbon lock-in and 3°C or more warming.
- Next practice uses the P1 pathway from the IPCC's 1.5°C special report, the Low Energy Demand (LED) pathway, or even more ambitious scenarios for emission reductions and sustainable outcomes in society.



in the fossil fuel industry could also be used to help them move towards sustainable business models where they provide energy, and related services such as temperature and lighting, as a service.

The LED pathway is based on existing technologies and business models at scale and does not depend on CDR technologies at all (Grubler, Wilson, Bento

et al, 2018). In addition, the LED pathway is, in many ways, a conservative pathway as it does not assume any new technologies. As many new technologies, business models and policy innovations will emerge during the coming decades, especially if policy makers and businesses collaborate, the uptake of these solutions will accelerate. Such an acceleration of new innovations will make it much easier to achieve the 1.5°C goal.

## Impacts and risks associated with the Reasons for Concern (RFCs)

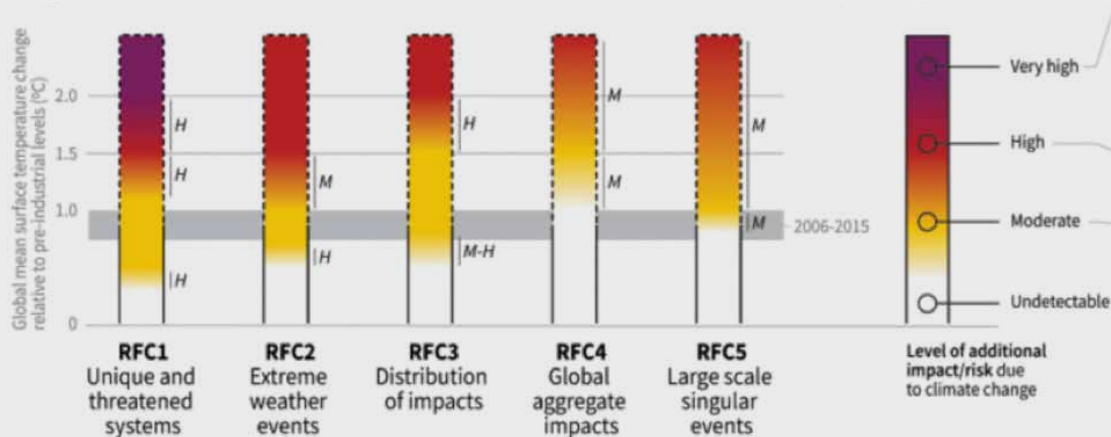


FIGURE 4: SPM.2 (IPCC, 2018)

While the focus of this paper is the most ambitious politically agreed target, 1.5°C, it is important to note that stakeholders showing leadership have good reasons to look beyond politically agreed compromises and towards the science.

For example, it is possible that the political risk acceptance will be lower after COVID-19 when it becomes clear that, even with a 1°C warming, the consequences will – with high probability – be magnitudes larger than for COVID-19. Furthermore, many of the likely impacts, such as warm water coral loss and unique and threatened systems, are irreversible (IPCC, 2018).

A thought leader with a science-based approach therefore has good reasons to align their actions in order to deliver solutions, reduce their scope 1-3 emissions and support policy actions compatible with long-term warming below 1°C. In the same way, thought leaders are likely to focus on climate tipping-points, not only the most likely scenario, as these tipping-points pose a potential existential threat and thereby provide an argument for much faster reductions (Lenton et al, 2019). A broader sustainability focus that cover areas such as a just transition and a Half-Earth future also require deeper transformations that most current strategies that claim to be “climate aligned”.



# 3.

## Beyond a focus on large companies and improvement in existing systems<sup>8</sup>

**M**ost initiatives, incentives, and models today assume a short-term perspective where the world is seen as almost static and developing in a linear way. The default approach is to look at the world today and extrapolate to an identical world, but with net-zero targets. The logical conclusion from such an approach is to ask all companies to reduce their emissions from current supply chains and operations to zero.

While such a static reduction approach might be seen as sufficient and a reasonable approximation for what is possible within a short-term perspective in times of slow change, this is a fundamentally flawed approach over decades and when society is going through rapid change.

There are just 30 years between today (2020) and 2050, when most IPCC scenarios require net-zero or even negative emissions at the latest. With a society experiencing the fourth industrial revolution, rapid technological development, and a new generation of sustainable start-ups, a static linear approach is not only flawed, it significantly undermines sustainable innovation and system changes.

Below are concrete case studies of innovations that were excluded from most emission reduction agendas. They can provide lessons and inspiration for how we should be open to different kind of innovations in our climate strategies moving forward.

### 3.1.

#### CLIMATE RELEVANT TRANSFORMATION CASES FROM THE LAST 30 YEARS

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Below are examples of different innovations, ideas, technologies, business models, collaborations that have played an important role in shaping our current society. Examples that can be used to identify the gaps in current initiatives and strategies for a 1.5°C compatible future.

It might be hard to believe, but 1990 was only one year after Tim Berners-Lee invented the World Wide Web and, in the same year, he designed and built the first web browser. In practice, what we



now call the internet, i.e. the web and cyberspace, did not even exist 30 years ago.

In 1990, Kodak was a leading company, famous for its innovation. They, and many similar companies, were invited to talk about the future and asked to provide input on different innovation policies. Few of the established experts guessed that the Kodak would file for bankruptcy only 20 years later (Mui, 2012). What is particularly interesting about Kodak is that they invented the digital camera and had huge capacity in terms of knowledge about digital solutions. But because the company was trying to preserve old revenue streams, related in part to traditional film and film developing, Kodak failed to adjust its business model and stay relevant when times changed (Anthony, 2016).

Based on the Kodak example, and many similar business failures, it is important to celebrate companies today with new sustainable technologies, but without business model innovation these technologies are unlikely to have more than marginal impacts. Car companies, steel companies, cement companies, airline companies, fast fashion companies and fast food companies are examples of business models which will generate increased emissions when increasing revenue.

In trying to identify which companies and individuals will develop the solutions we should focus on, it is worth keeping in mind that Jeff Bezos did not even create Amazon, the second company (after Apple) to be valued at over one billion dollars, until 1994 (DePillis, 2018). The implication is that a new future company that revolutionises the world as much as Amazon.com has, may not be created until 2024 if we consider a 2020–2050 roadmap.

It would also take five years before Steve Jobs returned to lead Apple in 1995, after having been sacked (Weinburger, 2017). It took another 16 years before Apple launched its most successful product, the now iconic iPhone, in 2007. Lest we forget, the iPhone was also panned by many experts when it was launched (Heisler, 2016).

With good reason, we can presume that most – perhaps even the vast majority – of the most innovative people and companies who will be shaping the world in 2030 and 2040 are start-ups today or business ideas pursued by a small group of intrapreneurs in large companies. Furthermore, we can assume that most solutions that will disrupt society are being ignored by mainstream experts and consultants who get most of their funding/income from today's large companies.

As regards new business models and ways to deliver solutions, it might be worth remembering that encyclopaedias were popular in 1990. In Sweden, the National Encyclopaedia was a political priority and had just published its first volume. Eleven years later in 2001, Wikipedia was launched to the almost universal derision of experts on encyclopaedias and by many journalists. By 2018, it was the most frequently visited website and has redefined how knowledge can be collected and distributed.<sup>6</sup> As with many new ideas, the weaknesses of Wikipedia have been highlighted by many conservative stakeholders and traditional media. Wikipedia – as all sources of information – is not perfect, but a study by Nature that compared Wikipedia and the Encyclopaedia Britannica found that the open-access encyclopaedia is about as accurate as the old standby (Giles, 2005).

Still today, many initiatives claiming to be innovation-driven are dominated, not only by large companies, but often by those parts of the companies that only focus on incremental improvement of existing solutions. To make things even more problematic, many innovation-driven initiatives require participating entrepreneurs and companies to co-fund their participation, further strengthening the bias towards companies with significant resources. This is true of most innovation agencies funding for different projects (OECD, 2016).

The twenty-two year old Linus Torvalds, who released the first version of the Linux operating system in 1991, did not get any innovation support, and few would provide it today (Wikipedia, 2020b).

Open collaboration without a strong focus on making money was not seen as relevant by most stakeholders. Delivering global public goods outside a system where profit is the most important are still ignored by most innovation initiatives.

Another example is the team behind Skype. Thirteen years went by after 1990 before the founding of Skype, a company that has helped to redefine meetings – and contributed to a situation where many companies now have “meeting policies” instead of “travel policies” (Bristow et al, 2013). This innovation was not seen as a climate solution by any of the entrepreneurs, and few working with transport today include the use of virtual collaboration in their strategies.

A third example is Napster launched by Sean Parker, Shawn Fanning and John Fanning in 1996. At the time, file-sharing was virtually unknown, but after a turbulent period in which traditional enterprises spent most of their time trying to stop new technologies distributing music, new players took the stage. Still today new ways of delivering solutions are often ignored.

As a final example to highlight the need to let young people have a voice, few predicted the genesis of Spotify in 2008 back in 1990 (EMA, 2011). Daniel Ek, one of the founders, was eight years old in 1990 (Nicolaou, 2017).

The transformation of business models is extremely important. Back in 1990, few people were anticipating that the world’s largest hotel chain (Airbnb) in 2020 would have no buildings of its own or that the world’s largest ride-hailing business (Uber) would not own any cars (Hartmans, 2017).

In 1990, Ford was focused on making fossil fuel-powered engines more efficient. Anyone who said that one of Ford’s (and many other carmakers’) biggest competitors would be a company whose business was based on letting car owners act as taxi drivers with the help of their mobile phones would have had a hard time getting people to lis-

ten. This should come as no surprise, since one of the companies that dominates this development, Uber, was started almost 20 years later, in 2009.

Similar lessons regarding technological development can be learnt. No leading organisation in 1991 came anywhere near guessing that the price of PV, batteries and LED lightbulbs would drop 60-90 percent in the eight years between 2008 and 2015 (Donohoo-Vallett, 2016). It is especially important that we realise that such dramatic price reductions could have happened considerably earlier if powerful special interests had not focused on improving old technologies and blocking initiatives for new, sustainable solutions (Wikipedia, 2020c). And yet, there is much that is still the same compared to 1990 and dramatic changes up to this point have occurred mainly in smaller segments of the economy. However, almost all experts believe that the next 20 to 30 years are going to bring much bigger and much faster changes than we have seen in the last 20 or 30 years.

Looking ahead, there are several factors that suggest the process of industrial transformation is going to move even faster than in previous decades. Concepts such as Artificial Intelligence, Big Data and the Internet of Things (IoT) have already begun to impact society, but we are only in the infancy of a society in which digitalisation is being combined with biotechnology, materials science, neuroscience, etc., on a serious level. It is important that digitalisation is not regarded as solely a technical issue. Big changes come when new technology is combined with new business models and new ways of organising society.

## 3.2

### THE NEXT 30 YEARS

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What we have seen in areas like music, in terms of streaming; transport/mobility, in terms of ride-sharing, drones and teleworking; nutrition in



terms of plant based, local and healthy food; city planning in terms of smart green spaces that support smart mobility and improved health, is only a beginning. Novel solutions such as these are creating entirely new opportunities, but also challenges. Several studies indicate that huge changes are coming in terms of jobs, privacy, rebound effects and employment.

One study, “Emerging Technologies’ Impact on Society and Work in 2030”, estimates that 85 percent of the jobs that will exist in 2030 have not yet been invented. The study, which was published by the Institute for the Future (IFF) in 2017, was based on a panel of 20 technology, business and academic experts from various parts of the world (Dell & IFF, 2017). If jobs are going to be created, they will probably be in education, healthcare and creative occupations (Frey & Osborne, 2013). In energy, construction, transport, etc., it is highly likely we are going to see a development corresponding to that seen in agriculture during the last industrial revolution.

Opinions vary as to what the future labour market will look like. Some people think the number of jobs is going to increase, at least in the short term (Nair, 2018). However, a scenario in which large groups of people are not employed should also be included in robust strategies, which few governments have today (The Economist, 2014). According to the World Economic Forum study, “Our Shared Digital Future”, 60 percent of global GDP is going to be digitalised, while only 45 percent of people trust that technological progress will improve their lives (WEF, 2019). The authors of the study also write that all sectors are beginning to face deep questions about what the implications of present-day technological advances will be. Showing that technological advances can be socially fair and environmentally sustainable and how this can happen, is essential in this situation.

There is also a relatively large group of experts who are predicting much greater and faster changes in the next 20 to 30 years than in the past 20 to 30 years (UNIDO, 2019). Hence, it might

be worth including scenarios with fundamental changes, e.g. significant value changes, extending the human lifespan to 120 or 150 years, and a society where much of current work is obsolete. Examples of these issues are discussed in a webinar by Ray Kurzweil and Peter Diamandis – two of the world’s leading thinkers and futurists – and these kinds of disruptions should also be included in strategies for a sustainable fossil-free future, for example, by government innovation agencies (Kurzweil & Diamandis, 2018).

Based on this historic overview, six different archetype solutions to a 1.5°C compatible future can be distinguished ranging from geoengineering at one extreme to needs-based smart system solutions at the other. All these archetypes exist in society, but what is seen as the default approach and what leading stakeholder and initiatives focus on has changed over time. Depending on the role of companies and what kind of action that is seen as appropriate, the focus and combination of archetypes will differ.

In the early 90s, many studies assumed that coal power would be the dominating energy source for the next 200 years and private vehicles would continue to be the main ways to commute and provide access. At that time much of the discussion also focused on whether climate change was even a serious threat, with leading fossil fuel companies ignoring their own scientists (Supran & Oreskes, 2017).

In current climate discussions, we can identify two major groups. On the one hand, the dominant “problem-focused group”; this group focus on companies as sources of emissions and, in particular, on highly polluting industries. They use a neoclassical economic approach that assumes linear changes in existing systems with carbon pricing is the central tool. This perspective and the associated models and tools almost always ignore companies as solution providers, the need for business model change, and system innovations. The result is a short-term approach

## Six Archetype Solutions to a 1.5°C Compatible Future

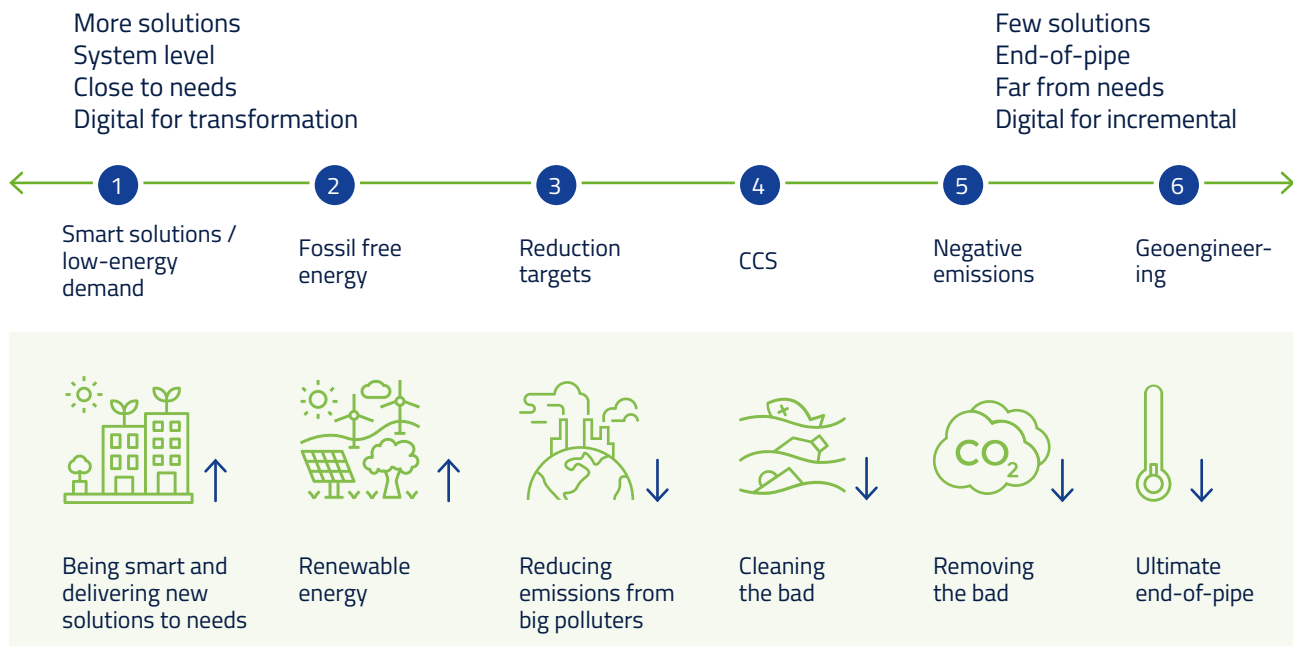


FIGURE 5: Six Archetype Solutions to a 1.5°C Compatible Future

where, after cost-efficiency measures, offsetting tends to be seen as sustainability leadership. As the models and tools exclude companies as solution providers, business model innovation, and system change, they see carbon capture and storage (CCS), negative emissions, or even geoengineering as necessary. Climate leadership is still often defined as the least unsustainable or polluting company in a sector, rather than in relation to what is actually needed to deliver emission reductions.

On the other hand, new technologies, business models, and new values, have created the opportunity to deliver solutions in totally new ways. These have become the focus for a new generation of entrepreneurs, CEOs, investors, policy makers and stakeholders. A growing group of larger companies have begun to focus on smart, needs-based solutions.

Often both perspectives can be seen side-by-side, e.g. in publications such as Bloomberg Green.<sup>7</sup>

### Kind of reductions in focus

- Yesterday's best practice focuses on emissions reduction from large polluters with a significant reliance on CCS, or even geo-engineering.
- Next practice embraces the opportunities of the 4th industrial revolution with new system solutions capable of delivering needs in new sustainable ways that not only reduce emissions, but also deliver on a just and sustainable transition.







# 4.

## Ensuring Climate Action: The role of companies

In Section Two, the 1.5 °C LED pathway was introduced as a baseline for an innovation-based alignment. In this section, the other aspects of alignment will be discussed, i.e. the role of different stakeholders in relation to the emissions reductions needed.

### 4.1.

#### WAYS TO ALIGN WITH A 1.5 °C PATHWAY

There are very different approaches that companies can take to align their business with climate change mitigation scenarios, depending on their definition and perception of climate change and what is needed, as well as their perceived role. One way is the True Business Sustainability framework that defines three categories (Dyllick & Muff, 2016).

Society will always have companies working for sustainability across the three different categories, as well as those that ignore sustainability; hence rules, regulations and initiatives must provide sup-

port and guidance for all categories. Such guidance requires companies' different needs to be balanced. For example, for companies at sustainability 1.0, responsibility for reduced emissions falls squarely on governments to define a tough, rigorous framework for action. For companies pushing sustainability to 3.0, the role of government becomes one of assessing, selecting and accelerating support to the best strategies.

The most basic approach for companies is to see climate change only as a risk (economic or brand) and to minimise this risk by hiding or reducing links to high carbon activities. This approach has little or no impact on the real world, preferring only to disengage from its more negative impacts. This is similar to how many people view weapons, pornography and gambling. They do not like to earn money from such activities or even be linked to them, but they accept that they exist in society. We might call this approach, "Business Sustainability 1.0".

A second approach is to consider a more proactive response to climate change, which we could call "Business Sustainability 2.0". Companies in this group set ambitious reduction targets and develop green versions of existing offerings and sell them



FIGURE 6: Business Sustainability 1.0 to 3.0 (Dyllick & Muff, 2016)

at a premium. These are companies that do what they see as reasonable to reduce their emissions within the current system. The current business model is taken as a given.

The last and rapidly emerging group, especially among start-ups, are companies that start from what is needed in society and identify solutions to meet those needs, which we might label a “Business Sustainability 3.0” approach. They are also active in discussions about how rules and regulations need to change in order to support a 1.5°C compatible development path. This is a fundamentally different category and requires the company to be ‘purpose-driven’.

Using the automotive industry as an example, a Business Sustainability 1.0 company would try to hedge against increased oil prices and maybe explore opportunities to shift towards biofuels.

A 2.0 automotive company would support a shift to electric cars and begin to explore business models that allow for car sharing.

A 3.0 company would ask what the mobility needs of society are and explore new transfor-

mative system solutions that cover everything across mobility and communications including public and private transport services, walkability and teleworking.

The shift from 1.0 to 3.0 sustainability is also reflected in what is perceived as leadership. In 2017 the GlobeScan-SustainAbility Survey identified two eras of leadership (Lee & Brackley, 2017):

**“1997–2006: The Do-Less-Harm Era of Leadership:** During the first decade of our survey, the list of corporate leaders was dominated by heavy industrial companies, with fossil fuel giants Shell and BP having enjoyed the longest leadership track. GE, ABB, Dow and DuPont also enjoyed positive perception of their leadership during this period.

**2007–2017: The Sustainable Growth Era of Leadership:** The second decade of the Sustainability Leaders saw the rapid rise of consumer facing brands, with Unilever and Patagonia showing the strongest performance.

It is worth noting that the environmental NGOs mentioned in the study above as leaders, WWF, WRI, Nature Conservancy and Greenpeace are still

primarily focused on the “do-less harm” and, with the exception of Greenpeace, are leading supporters of offsetting and with considerable revenues coming from the large polluters. This indicates that there is a gap that a new generation of organizations with a transformative solution perspective can fill. However this is also a challenge for companies and financial institutions, as it is easy to get help and be recognized as “do-less-harm” leaders, but in most cases they will have to look for new groups for support if they want to explore a “sustainable growth” agenda.

How legislation, economic incentives, and the market valuation of companies are structured influences how companies with different strategies are supported or undermined. Stakeholders only encouraging “Business Sustainability 1.0” might do so with good intentions, as they define their role in such a way that this is their responsibility and the limit of their skill set. But if they market their approach as ‘transformative’, they are likely to undermine 3.0 companies.

### Sustainability approach

- Yesterday’s best practice is a company or initiative with a focus on 2.0 companies. Reduction of scope 1-3 emissions is the focus.
- Next practice is a proactive stakeholder who starts from what is needed, a 3.0 company, and then develops new business models and value propositions to build solutions, which can be implemented at scale and at speed.

## 4.2

### COMPANIES AS SOURCES OF EMISSIONS AND COMPANIES AS PROVIDERS OF SOLUTIONS

Many of the tools related to environmental outcomes in society currently only focus on mitigating negative impacts; not supporting opportunities to provide smart solutions. Therefore, responses to climate challenges today tend to focus on:

- self-regulation or increased transparency for the most conservative policymakers and business strategists (and neo-classical economists);
- environmental taxes or labels for slightly more progressive approaches; and,
- offsetting.

It is across this spectrum that much of the first generation of climate measures were born. These measures are appropriate for incremental improvement in existing sectors, such as when we need a slightly more efficient fossil-fuel car, or a less polluting power plant. This approach may even stretch to a totally fossil fuel- or pollution-free car if we are very ambitious, but often this logic results only in targets as ambitious as companies find possible, based on their existing business model, while adding CCS or offsetting to compensate for any remaining emissions.

This approach will not deliver new smart solutions that make the car redundant, as the focus is on the car, and not the need that is behind the use of the car. As discussed before, a narrow focus on the car limits the options available, while a focus on mobility and access opens up the options for many other solutions.

The problem perspective and incremental thinking is easy to understand, as smart solution providers for most of our industrial society had a mar-



ginal role in society, but this is rapidly changing. Comparing the largest companies in the US in 1992 and 2018, the diminishing dominance of fossil-fuel-dependent companies is clear, but a historic comparison also highlights the significant changes in how companies approach the need for reduced emissions. In a situation with so many new low-carbon opportunities, from streaming music and e-readers to teleworking and green walkable cities, it is clear that a new generation of solution providers exists.

Implementing a policy aligned with 1.5°C and sustainable development can no longer only be about putting pressure on the companies creating the problems. Companies and clusters engaged in delivering new system solutions should also be included.

It is worth noting that few, if any, incumbent sectors have supported the kind of rapid and transformative change needed for a 1.5°C pathway. However, this is not to be expected: farmers did not drive the industrial revolution, and horse carriage manufacturers did not drive the automotive revolution. In recent years, the printing industry did not drive the e-reading revolution and the record industry did not lead the streaming industry. The current revolution in mobility has not been driven by the automotive industry, and fast fashion, fast food and fast consumption companies tend to focus on offsetting and incremental improvement in existing business models instead of new smart 1.5°C compatible lifestyles.

Limits to the improvement of existing systems have increasingly been recognised by business magazines and mainstream media.

*Clothing that is designed to be worn only a handful of times cannot be truly called "sustainable", no matter how many times the material it's made from has been recycled, or how little pesticide has been used on the cotton. [...] If H&M really want to move towards a sustainable future, they kind of have to not exist. Or not in their current form, anyway.*

Jemima Kelly, FT, 7 November 2019

## 1992

- 14 of the 20 largest companies (70%) of the Fortune 500 focused almost exclusively on delivering fossil-fuel-based products.
- At the time of the Kyoto protocol, many of the world's largest companies, nine out of 20, were part of the Global Climate Coalition (GCC) opposing any binding climate goals and questioning the science.

## 2018

- 2 of the 20 largest companies (10%) of the Fortune 500 focused almost exclusively on delivering fossil-fuel-based products.
- 0 is publicly challenging climate science.
- 5 out of 20 actively pursue opportunities to deliver smart low-carbon solutions (highlighted in green).
- An additional five tech, retail and financial companies could easily become important solution providers.



*We have a limited time to reverse the course of climate change. If CEOs of highly polluting companies don't radically rethink their businesses from the ground up, there will be no way for us to avert the worst consequences of global warming.*

Elizabeth Sergan, Fast Company, 28 October 2019

*Even if major brands implemented sustainable practices at every stage of their businesses, they would eventually encounter a roadblock: increased profit demands increased consumption, when the climate crisis requires we consume less.*

Emily Dixon, CNN, 11 October 2019

## Companies as sources of emissions from operations and sources of solutions needed

- Yesterday's best practice uses tools which only consider companies as sources of emissions (Scope 1-3).
- Tomorrow's next practice uses tools where companies are also transformative solutions providers, (as well as sources of emissions). Proactive stakeholders also help develop new tools that promote and recognise this new generation of leadership.

## 4.3

### FROM INDIVIDUAL STAKEHOLDERS TO SYSTEM CHANGE

Increasingly, the need for new clusters is recognised as a key ingredient for transformative change, while most initiatives still address stakeholders in an isolated way, often with sector approaches, whereas opportunities to deliver much more resource efficient solutions exist. For example, initiatives to reduce emissions from the airline sector ignore new digital opportunities to meet and only focus on fuel shifts or electrification, thus ignoring the shifts that have occurred during the CoVID-19 pandemic.

An example of the need for new clusters are the opportunities that emerge when the perspective changes from products and sectors, such as cars and transport, to needs such as mobility and access. With a product approach focusing on a vehicle, for example, the source of the problem and innovations tend to be limited to electrification and vehicle sharing. If the focus shifts to communication needs, a much larger pool of innovations and system solutions emerge. For example, energy needs would look at using batteries and hydrogen storage as back-up to support an intermittent energy supply of renewable energy as only a first step. Disruptive business model innovations related to virtual meetings and new city planning would also be part of a new generation of strategies. In a similar vein, strategies would also look at technological innovations far from a car-focus, to also include laptops, wireless connectivity, software for collaboration and drones.

In addition, it is important to link the clusters providing new innovations with clusters from the financial sector that can provide the necessary resources and reduce the transition risks. These two groups also need to collaborate with potential users of the new solutions, such as cities and large companies.



## Need: a driver for policy making / innovation

### Case cars / mobility / access

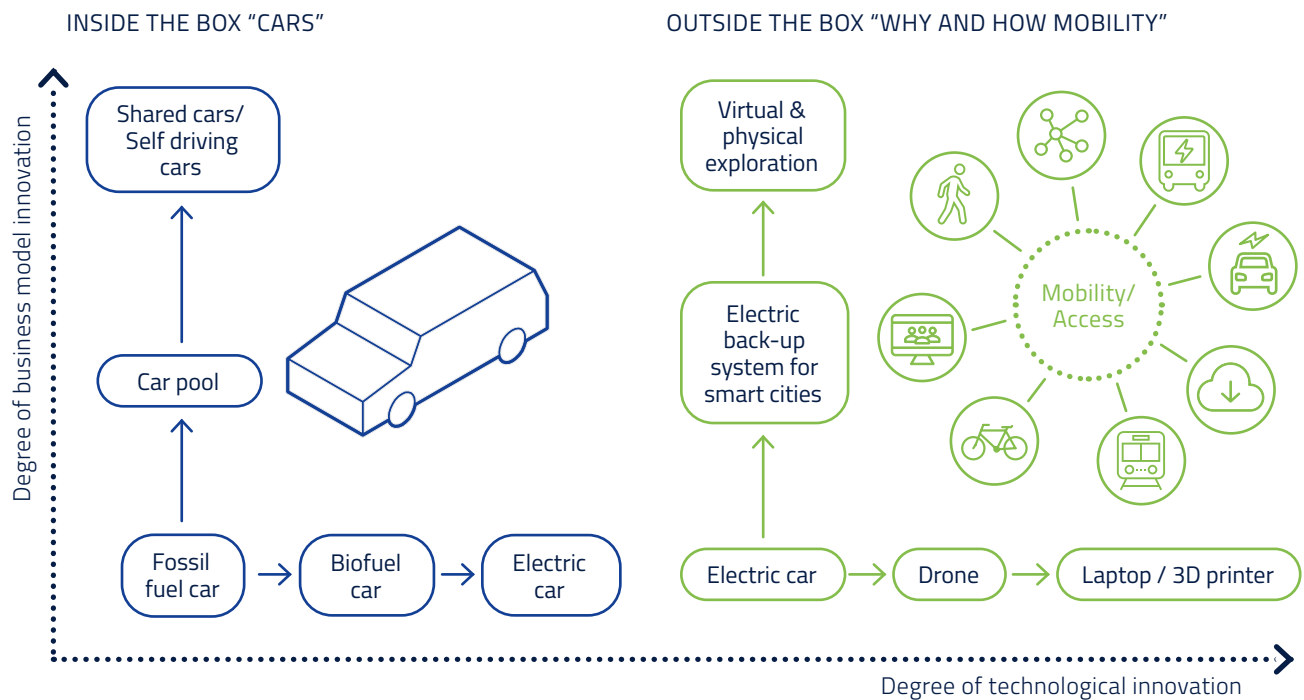


FIGURE 7: A need based innovation perspective: Cars/mobility/access developed by Dennis Pamlin for WEF Circular Cars Initiative

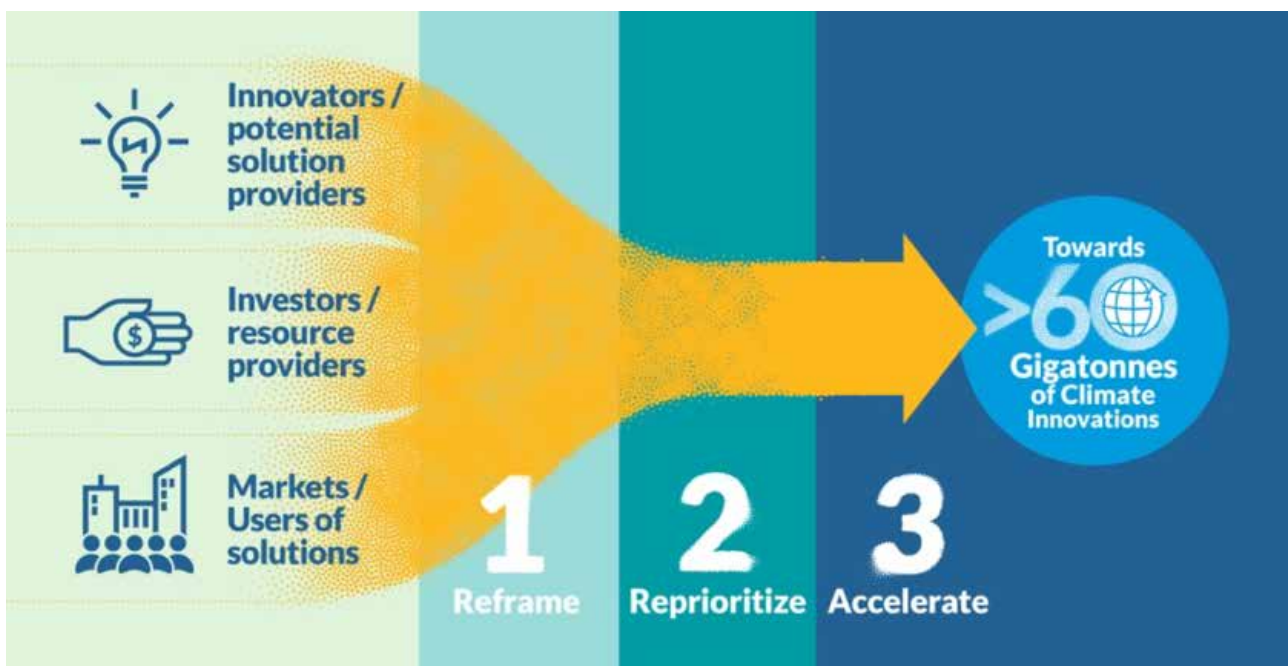


FIGURE 8: Stakeholders needed to deliver the innovations needed for avoided emissions from "A Three-Step Solution Framework for Net-Zero Compatible Innovations (TSF)", Mission Innovation (2020b)

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## Collaboration

- Yesterday's best practice is focused on initiatives where companies work on and commit to actions in an isolated way, or in industry groups where action is based on what is seen as acceptable by the sectors, not what is needed for a 1.5°C LED compatible pathway.
- Next practice is focused on collaboration in clusters which include all the different stakeholders required to deliver the solutions needed for a 1.5°C LED compatible development path.

The result is that the definition of mainstream is constantly changing, as the assumptions around society and the roles of companies and the financial sector are changing. The 'Overton window' is one way to understand how the "mainstream" changes over time. This models how the acceptability of certain actions to different groups changes over time.

The COVID-19 pandemic has shaken many 'Overton windows' to the core. Before COVID-19, society was already changing rapidly. Furthermore, the path society was on before the pandemic had a number of characteristics making a "return" to a pre-COVID-19 mainstream business not just impossible, but also unwanted, in addition to the emission levels:

1. Unsustainable production and consumption patterns that would result in an ecological collapse if continued.
2. An almost total lack of capacity to address global catastrophic threats due to a lack of international collaboration and institutions that can track, evaluate and ensure compliance.
3. Growing inequality and priorities driven by short-term economic interests.

The rapid changes in society and the need for significant changes have generated rapidly moving "Overton windows" (Wikipedia, 2020d). An Overton window used to refer to the range of policies acceptable to the mainstream population at a given time. With a society divided into many different groups and social media creating echo chambers, it is becoming harder to identify a mainstream population and it is more relevant to use multiple Overton windows to understand different groups.

With COVID-19, the speed of change has reached a momentum where tipping points are emerging in many different areas. Many values and ideas that were seen as unthinkable are now seen as issues that should be discussed, from universal basic

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## 4.4.

### FROM MAINSTREAM TO (CURRENTLY) UNTHINKABLE ALIGNMENT

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Climate alignment decisions are based on different assumptions regarding society, technology development, innovation capacity, the role of companies and the financial sector, and so on. Most companies, like individuals, tend to see themselves as the reference point. Any firms addressing climate change with less focus and rigour are seen as laggards, and those setting tighter targets and being more active are seen as dreamers or special cases.

income and intragenerational equity and a new relation to nature (Mission Innovation, 2020a).

Any framework looking beyond incremental changes in existing systems must establish what different stakeholders see as 'mainstream' on the one hand, what is needed to deliver a 1.5°C LED compatible pathway on the other, and the gap between these two positions.

Role of companies

- Yesterday's best practice for companies is to accept their current role, base their climate alignment on this role and ignoring strategies that would require actions beyond this role.
- Tomorrow's best practice is a pro-active company who defines its role and actions around what is needed to deliver the necessary emission reductions in society. If the new role is viewed as unthinkable by policy makers, customers and suppliers, they try to change the system to make the new role possible.

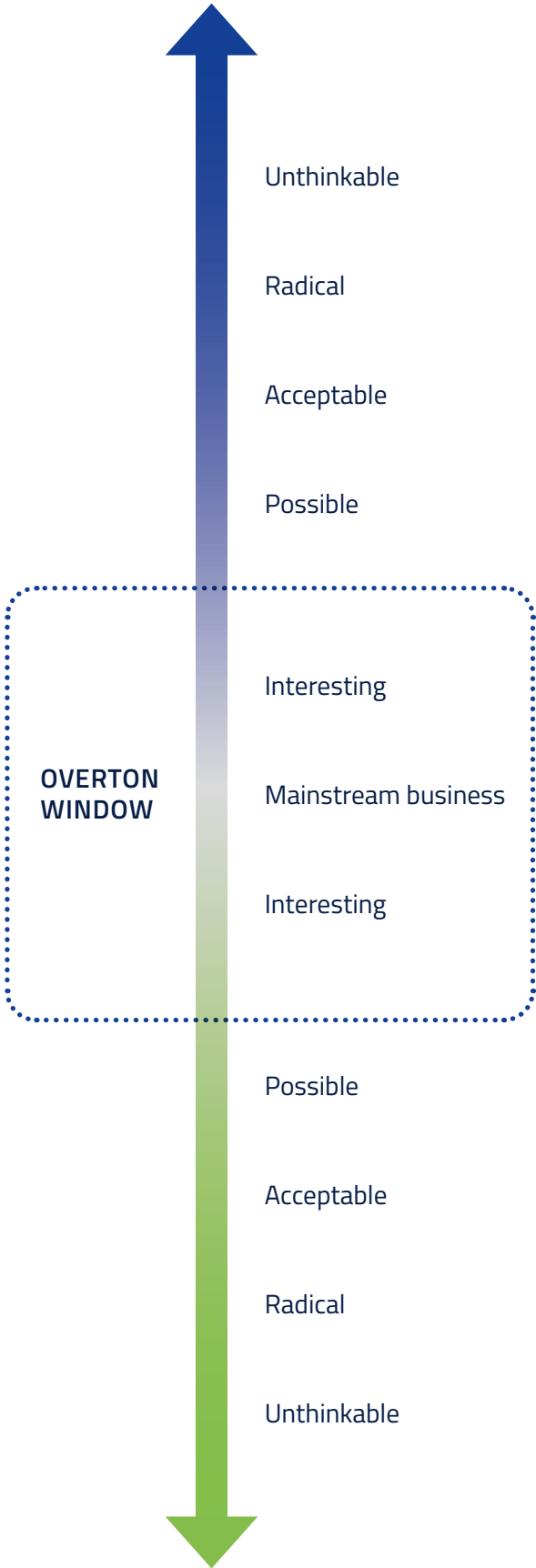


FIGURE 9: The Overton Window adopted for companies by Dennis Pamlin







# 5.

## Possible ways forward

**B**ased on the changes among companies, citizens and policy makers due to the COVID-10, as well as the opportunities highlighted in the IPCC's 1.5°C special report, the financial sector can explore different ways forward. Below are five possible actions for 1.5°C LED compatible alignment in support of an innovation driven agenda and global sustainability.

While it is important that companies improve on their current work, more of the same is just not enough. Tougher reduction targets, less pollution from existing products, etc. can be important steps, unless they result in high-carbon lock-in, but they are not enough for the transformative system shift needed.

A lot of time and resources are currently being spent discussing ESG data from companies and how to improve these (*reliability*) in order to create funds that divest from companies that do not meet certain criteria. However, more important from an innovation and transformation perspective, is to deliver actual impact on emissions in society. ESG-based

funds should clarify their impact in the real world, or clearly explain that they exist for people who, for different reasons, do not want to own certain companies, but do not expect any relevant change in the real world due to a divestment approach.

Taking a step back to identify what support is needed for transformative system change, while developing systems to measure and evaluate actual impact in society, should be a priority moving forward (*validity*).

The current paradigm of fund managers asking for better ESG data runs the risk of moving from today's situation where the funds lack both reliability and validity, to one where there is higher reliability, but still no validity, i.e. impact.

The five areas below outline possibilities for developing tools and initiatives that would be valid, but potentially would have low reliability initially. Starting from such a situation would allow for data and tools, including AI driven, to be improved over time, while supporting measures necessary for a 1.5°C LED compatible pathway.

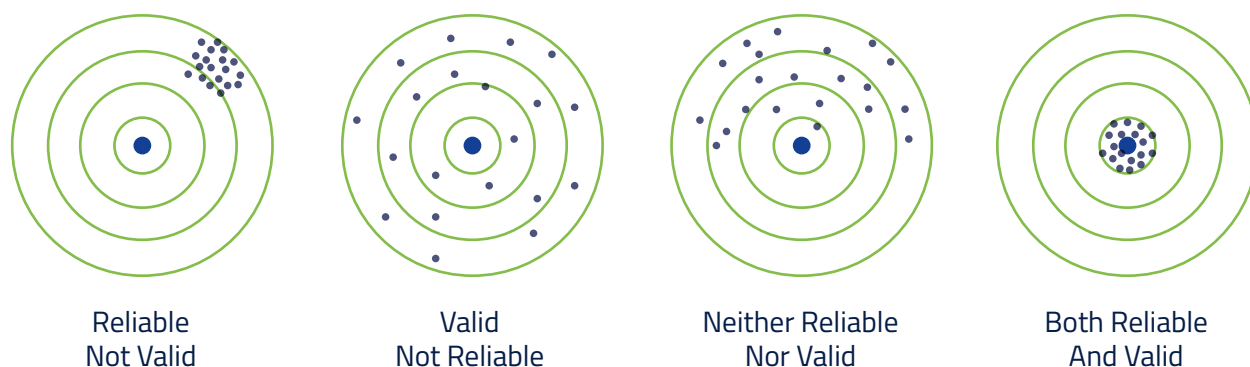


FIGURE 10: Reliability and validity, based on Babbie (2010)

## 5.1

### EXPLORING POSSIBLE NEW ROLES AND NEW GOALS WITH GREATER IMPACT: MOVING IN THE MATRIX

Depending on the position of a financial organisation in the matrix, it can explore ways to move up towards 'AAA' actions in society and/or move towards the right and a 'Business Sustainability 3.0' role in society.

#### Case 1:

An institutional investor might be in the bottom left corner, with a policy to reduce their portfolio's carbon intensity based on scope 1 to 3 emissions that are self-reported. These investors could take a significant step to move across the matrix by exploring the possibility of assessing companies based on their 1.5°C LED compatibility. This would send a signal to the market that low emissions and reduction targets for operations are not enough to deliver the solutions needed for a low-energy-demand future. Beyond assessment, the investor could also aim to move along the x-axis and engage in dialogue with companies about their capacity to deliver solutions needed for a 1.5°C LED compatible pathway.

Those who see their responsibility to reduce the emissions of current big emitters to zero can focus on C/CC actions in society and a 1.5 sustainability role. Those interested in transformative system solutions must move towards A/AAA actions in society and a 3.0 sustainability role. The latter would use the IPCC's LED pathway as guidance to not only evaluate how fast reductions needs to happen, but also what kind of solutions are necessary and their contribution to other sustainability goals. The latter would also require collaborations with policy makers, business leaders and other thought leaders, rather than initiatives for only financial stakeholders.

#### Case 2:

For banks, venture capital, and other financial firms that are more directly involved in their clients' business strategies, a key action would be to move from a simple emissions reduction perspective to a 1.5°C LED compatible assessment. This is of particular importance as many traditional green solutions assume ongoing unsustainable development with rapidly increasing energy and resource use. Assessing if the supported companies and their proposed solutions might result in a high-carbon or high-resource use lock-in is therefore a priority.

FIGURE 2: → p. 18–19



## 5.2.

### MEASURE ACTUAL IMPACT ON EMISSIONS IN SOCIETY AND ENSURE THEY ARE 1.5°C LED COMPATIBLE

Financial organisations should report on their contribution to emissions reduction impact by explaining how different measures result in actual avoided emissions in society. Such an assessment should follow the Mission Innovation framework to ensure that potential lock-in and LED compatibility are assessed, not only the avoided emissions (Stephens & Thieme, 2019; Wilson et al, 2019). Financial organisations reporting on green bonds, carbon intensity in portfolios, green lending should report on the real world impact of these tools and initiatives from a 1.5°C LED compatible perspective using the Mission Innovation framework.

#### Case 1:

Institutional investors should begin to disclose how much they think their initiatives have contributed

to actual reduced emissions in society. If they only claim that the funds are a way for investors and shareholders to feel good about not owning stocks in certain companies then this should be clarified, e.g. those that only keep a passive ownership. If they claim that those funds have an effect on the real world, data should be provided to back those claims.

This transparency regarding actual impact would also encourage pension funds and others to innovate. This could include setting up dedicated funds for investments in key areas where low-carbon innovation is needed.

Explaining what is needed for people's money to have a real impact is also important for environmental NGOs and others who encourage people to move their savings. Today, one of the recommendations for citizens to contribute to the climate transition, is to move their money or put pressure on their banks or fund managers. This has resulted in a lot of green funds that have little real-world impact, while funds that actually invest in the solutions needed could benefit from greater capital despite not offering the high returns demanded by most financial institutions.

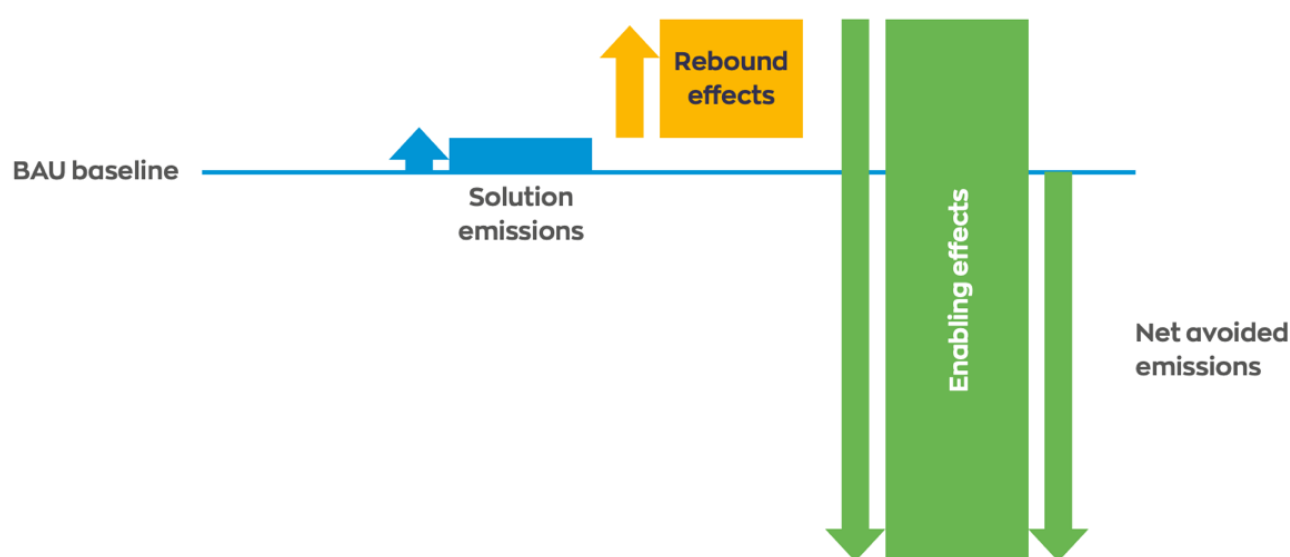


FIGURE 11: Assessing Avoided Emissions from The Avoided Emissions Framework (AEF), Mission Innovation (Stephens & Thieme, 2019)

## 5.3.

### ENSURE SUPPORT FOR TRANSFORMATIVE TECHNOLOGIES AND BUSINESS MODELS

Financial institutions should explore the possibility of developing strategies and supporting transformative system solutions rather than only improvements of existing solutions.

Many financial institutions focus on numbers and data. It is time to apply this approach to actual climate impact. Many institutional investors are cur-

rently engaged in divestment, where little evidence exists that this activity has any significant impact, and especially not when it comes to supporting the next generation of transformative solutions. Those providing capital and support tend to use this for a limited number of solutions, such as renewables, electric vehicles, and energy efficiency solutions. A first step would be to demonstrate the climate impact from those investments, assuming that additionality can be demonstrated. However, the urge for projects that are easy to calculate and categorise as “green” has resulted in a situation where certain solutions have an easy time attracting funding, while other more complex and more transformative solutions have a hard time attracting funding.



FIGURE 12: Categorizing innovations/solutions from Cybercom and Roadmap for a fossil-free Sweden: The Digitalisation Consultancy Industry (Pamlin, 2019)

A technology/market matrix could be established in companies seeking leadership where they can plot different instruments and asset classes against the kind of solutions they support. Such a matrix could also be used to guide the databases created for new AI tools to ensure that these are capable of identifying and supporting more than incremental improvements in existing systems.

### Case 1:

Banks, VC firms and other sources of funding that want to show leadership should provide an overview of the kind of projects that they invest in. Moving away from improvements in existing systems could help bridge the gap between R&D funding and incubators that are pushing out new innovations, and the existing market where transformative system change is needed.

### Case 2:

For multi-stakeholder initiatives, it is also important to identify solutions in different categories to better understand existing barriers. Many private and governmental supported innovation initiatives and agencies require significant co-funding when they provide resources, resulting in a bias towards incumbents with little to no interest in transformative system solutions. Those in the financial system providing funding, as well as insurance and ratings of different kinds, should develop new initiatives and tools to help initiatives move from the bottom left corner to the upper right in the matrix below.

## 5.4.

### MOVE FROM EXISTING SECTORS TO NEEDS AND FROM COMPANIES TO CLUSTERS

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One of the major ways that the financial system affects companies is through the way they are

structured and are organised. Often, financial stakeholders are organised based on yesterday's ways of providing solutions. In order to support sustainable system transformation, financial stakeholders should explore the possibility to structure work based on needs in society, rather than on traditional sectors. Such an approach could catalyse new ways of delivering what is needed, rather than improving the existing system. It would also allow indices and other instruments to support what is needed, rather than only simply divesting and/or selecting those parts of the economy with low emissions when they use metrics, such as carbon intensity per unit of revenue, which do not relate to what is needed in society (TCFD, 2017).

Knowledge of new innovative companies and business models are also important. Banks and other stakeholders have been shown to have strong representation from the fossil fuel industry and other unsustainable sectors, and a low representation from sustainable companies (Kishan, Tartar & Gambrell, 2020). Financial institutions claiming climate leadership should have a strategy for recruiting experts from new smart sustainable clusters delivering 1.5°C LED compatible solutions.

The financial sector also influences companies through the kind of data they require companies to provide. Currently, most companies are asked about the risk that climate change impacts pose to their business, or how the emissions from the company might be a risk. Financial stakeholders should also ask about existing and future revenue streams under a 1.5°C LED pathway.

### Case 1:

Many institutional investors are trying to lower their carbon intensity. Financial services firms providing investment management services help them by developing funds that meet those criteria. Such funds and the firms developing them would benefit from a needs-based framework to show what socio-economic and environmental services the funds provide. This would help high-



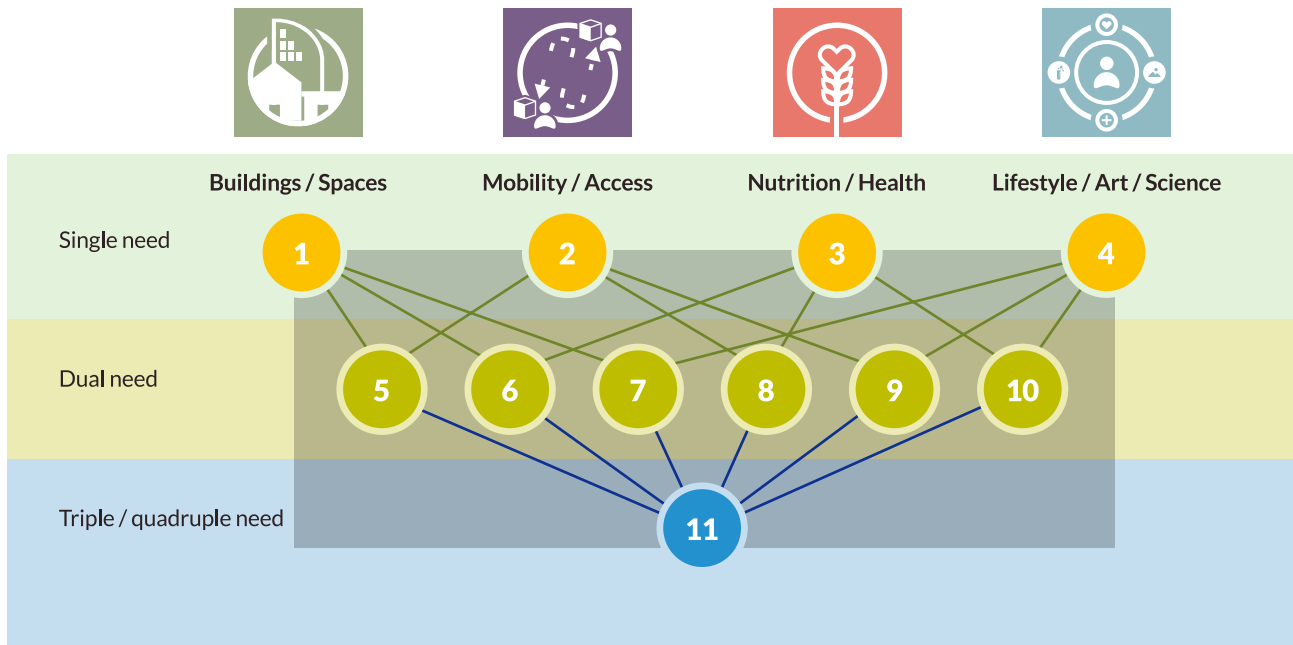


FIGURE 13: A Need-Based Innovation System from Mission Innovation (2020b)

light situations where lower carbon intensity is achieved by divesting from certain sectors that provide essential services (mobility, food, buildings), and investing in high-tech companies that provide services of limited value to society. Such a need-based approach would encourage a discussion of how to support new smart solutions beyond current sectors and limits with a divestment approach without any flanking measures (Brown & Granoff, 2018).

### Case 2:

Venture Capital (VC) and early stage investors could also benefit from a needs-based framework, as many of the most important solutions in society are difficult or even impossible to scale in a way that is attractive for many VC or early stage investors. Developing strategies to support solutions, including those with low potential for scaling from an economic perspective, but still can deliver significantly reduced emissions through uptake by stakeholders copying successful business models in local contexts, something that co-working spaces have done (Church, 2016).

## 5.5.

### SHIFT FOCUS FROM PRODUCTS AND COMPANIES TO SYSTEM AND SOCIETY

To deliver transformative system solutions, changes are needed at all levels, from individual products, where stakeholders such as venture capital companies, banks and bond issuers traditionally play an important role, to society where stakeholders such as rating institutions, reinsurance companies and actuaries traditionally play important roles. In an age of transformation, changes at all levels are needed and an assessment of their impact is needed. Most work in the financial sector is currently focused on incremental improvements at a product or company level. Exploring possible ways to support transformative change at all levels should be a priority.

Leading financial stakeholders should communicate to policy makers what policies are needed to make a sustainable 1.5°C path the most likely and least risky.



It is essential that 1.5°C compatible investments are not seen as something special and with higher risk, that only special green tools are aiming for. 1.5°C compatibility must become the least risky option.

### Case 1

Collaborations between investors and incubators could explore how to move beyond individual products that provide improvement in existing systems towards clusters of solutions that can provide transformative system change on a societal level.

### Case 2

Institutional investors could explore what kind of reporting and level of transparency would encourage accelerated uptake of disruptive products, e.g. helping the transport sector to move beyond a focus on physical mobility to also embrace new smart ways to provide access, such as virtual meetings and 3D printing. Such an approach would be supported by viewing problems through a needs-based lens (see 5.4. above).

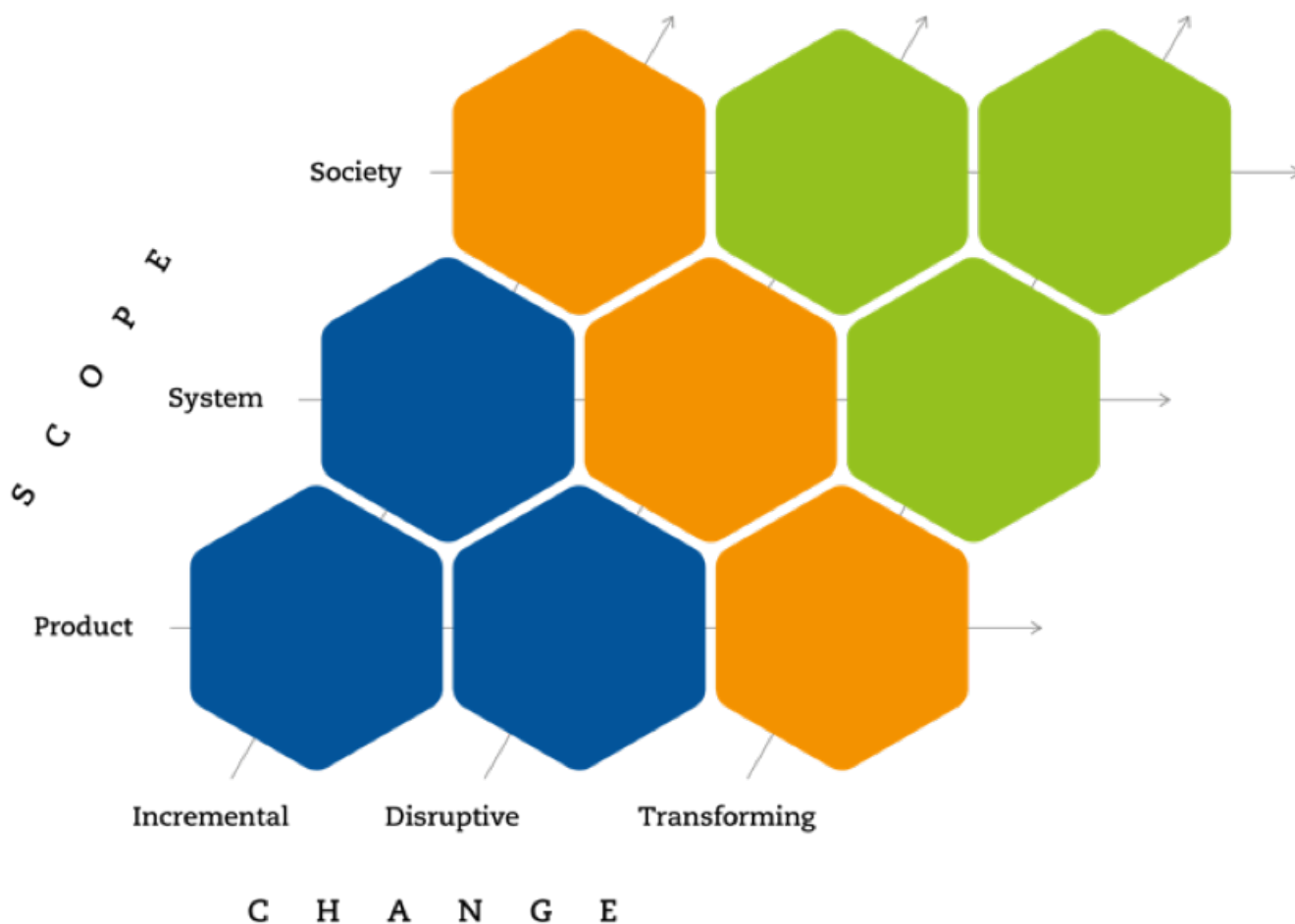


FIGURE 14: Categorizing innovations/solutions from Cybercom and Roadmap for a fossil-free Sweden: The Digitalisation Consultancy Industry (Pamlin, 2019)

## 5.6.

### SUPPORT AN INNOVATION ECO-SYSTEM FOR 1.5°C AND GLOBAL SUSTAINABILITY

#### Case 1

Most innovation ecosystems today focus on improving existing systems, have a technology focus and are based on a linear model. In a situation where fundamentally new ways to deliver solutions exist, business model innovation is key and system changes are required, a traditional ecosystem approach is not enough.

All financial stakeholders should explore ways to support a shift from a traditional innovation ecosystem to an innovation ecosystem for 1.5°C and global sustainability in the 4th industrial revolution.



## Matrix comparing a traditional innovation ecosystem with an Innovation Ecosystem for 1.5°C and Global Sustainability in the 4th Industrial Revolution

	Traditional Innovation Ecosystem	Innovation Ecosystem for 1.5°C and Global Sustainability in the 4th Industrial Revolution
Purpose	No purpose beyond economic growth through improved "productivity" and employment	Sustainability => IPCC's 1.5°C Low-Energy Demand/P1 pathway
Assumptions	Linear improvements in existing systems	Non-linear and fast changes as well as creation of new systems
Focus	Incremental and disruptive technologies	Incremental, disruptive and transformative innovation in both business models and technologies
Challenges	1. One valley of death	1. Two valleys of death: - Development => Commercialisation - Commercialisation => Roll-out 2. Isolated companies in need of clustering 3. The need for 1.5°C compatible markets 4. Lack of capacity and knowledge of how to develop a purpose driven companies guided by global sustainability
Scope	Individual product/ technologies and Individual start-ups	Individual product/ technologies and Individual start-ups as well as clusters delivering on needs
Process	Linear from discovery to mass market	Multiprong with a supply and demand perspective designed for disruptions
Success measure	Traditional business success (revenues and profit)	1.5°C and SDG Compatible + Traditional business success

FIGURE 15: Comparison of different innovation ecosystems

APPENDIX :  
ACTION / ROLE MATRIX

Over the years, different strategies to address the global climate challenge have framed the challenge in different ways. From initial ideas of climate stabilisation, suggested approaches have focused on percentage CO2 emissions cuts, atmospheric CO2 concentrations, carbon budgets and today’s dominant framing of temperature rise limits (McLaren, 2020).

The Action/Role-matrix has two axes. On the y-axis, we plot different actions seen as needed to address climate change and, on the x-axis, different roles that companies can have in relation to climate change.

Plotting different companies and initiatives on this matrix provides an opportunity to track how companies and initiatives move over time. It can also be used to discuss possible ways forward, beyond incremental improvements in existing systems.

The axes in the Action/Role-matrix:

1. Y-axis: Actions in society needed to address climate change

On the y-axis different categories of actions in society are listed. All of these are needed in some shape or form. They are an approximate reflection of history, moving from the earliest actions to the most recent. They are also a reflection of the degree of complexity and maturity, moving from a focus on incremental improvement with assumption of a perfect market to the realisation of the need for transformative system solutions and imperfect markets.

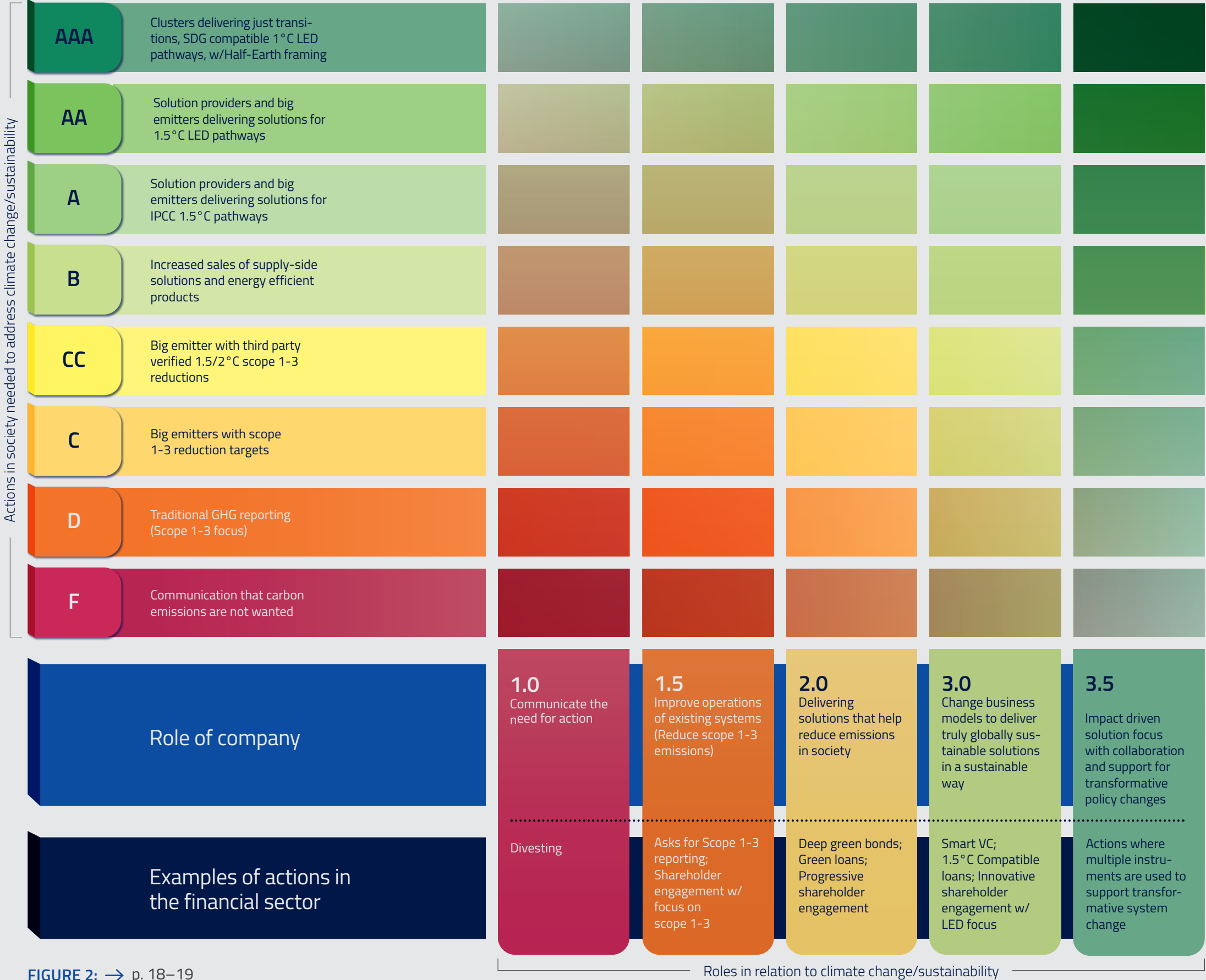


FIGURE 2: → p. 18–19  
Action/Role-matrix: Climate Alignment and Beyond for 1.5°C Compatibility

→ **LEVEL F:**

*Communication that carbon emissions are not wanted.*

This category of actions is the most basic and many of the first initiatives from the late '80s and early '90s belong to this category, where governments and companies signed statements to demonstrate their concern on climate change. This has also been a key priority for NGOs and governments to increase the understanding of climate change among the general public. While important, the question about communication is complex and the relation to action not clear. For example, Americans' level of worry about global warming has seesawed over the past two decades even though communication efforts have increased over time (Saad, 2017). Extreme climate events and macro-economic changes, together with the perception of how attractive sustainable solutions are seem to influence people's perception on how serious climate change is more than information about climate change (Marlon, Howe, Mildenerger, Leiserowitz & Wang, 2019).

Communication is necessary, by companies and others, but no serious experts claim that making the general public more informed is the only thing needed to address climate change (Whitmarsh, 2017).

→ **LEVEL D:**

*Traditional GHG Reporting by Companies*

This category covers traditional reporting of emissions by companies. This category emerged after 1992 and the Kyoto meeting, which prioritised the need to increase transparency in society in general and to get companies to acknowledge climate change as an issue. The main driver in this category is risk management and compliance, but cost savings can also be a key driver. This approach focuses on companies as sources of emissions, not as solution providers. CDP and GRI are well known initiatives in this category. When linked to Level

F, reporting becomes part of a PR strategy where branding is the key priority. When linked to Levels C or B, the focus is on operational efficiency and cost savings. When these initiatives emerged in the early 1990s they played an important role in increasing transparency and starting conversations within many companies about climate change. Currently these frameworks struggle to stay relevant as the need for solution providers and transformative system solutions increase.

Furthermore, studies have shown that "there is limited evidence that carbon reporting is driving substantial reductions in emissions" (Tang & Demeritt, 2017).

Reporting is needed, but it is not enough and reporting frameworks need to be updated. New reporting frameworks need to focus on how companies can deliver the required solutions in a sustainable way, i.e. without emissions and other negative sustainability impacts. These report schemes focus on needs in society and, if the business model is 1.5°C compatible, not only on the scope 1 to 3 emissions (Mission Innovation, 2020b).

→ **LEVELS C-CC:**

*Operational Emission Reduction Targets*

This category covers commitments to emission reductions. Initially they started with any reduction, based on absolute emissions or emissions intensity, that could demonstrate a company's commitment to reducing their carbon footprint. Climate Savers was an example of one such early initiative (WWF, 2020). Currently the Science Based Targets initiative (SBTi, 2020) is probably the best known together with Mission Possible (Energy Transitions Commission, 2020). Instead of an arbitrary reduction, the SBTi attempts to link different companies' own operational emissions to a trajectory that is in line with an emissions scenario compatible with the reductions needed. Mission Possible focuses on harder-to-abate sectors. Both approaches consider companies



only as sources of emissions and focus primarily on the large emitters. While these initiatives can play an important role in getting large emitters to explore ways to lower their emissions, they can also undermine business model innovation, if initiatives that focus on business model innovation and new ways of providing solutions are excluded.

The idea that companies today should set reduction targets for their operations (scope 1 to 3) to achieve zero carbon emissions by 2040-2050, without focusing on business model innovation and new ways of providing what is needed in society, might have been an appropriate approach early in the 20th century, when most changes were gradual and sectors did not change much. However, even 30 years ago, the same logic would have celebrated reduction commitments from CD companies, typewriter manufacturers, VHS producers, while ignoring or undermining attempts to stream music/videos, develop word processing software and laptops. The best case scenario would have been one where these reduction initiatives were wasted on dying companies, but in the worst case they have resulted in a situation where companies with low innovation and resource intensive solutions are celebrated as sustainability leaders and kept alive with different support measures, blocking the emergence of solutions that are significantly more resource efficient and have the possibility to provide services in a sustainable way for 10 billion people.

We know that the future of mobility, cities, nutrition will require significant business model innovation, but current initiatives to support reductions from operations are either neutral or actively undermining sustainable business model innovation.

The reason many of the current reduction commitment initiatives often undermine business model innovation is not because the organisations behind them do not like business model innovation, but because they do not understand it. In the same way as most of the current environmental labels focus on the improvement of existing products, reduction initiatives focus on incremental improvement

in existing systems. Better dead-forest paper, not e-readers; better cars, not teleworking or city planning; better meat, not smart plant-based protein; better airplanes, not virtual meetings.

Emission reduction commitments that only focus on operations (scope 1 to 3) and ignore the impact from the product on society, together with traditional environmental labels, and existing environmental taxes, converge to promote gradual improvements in existing systems. Such approaches can play an important role, but only with complementary measures that also support transformative system change.

There is a growing group of companies that, instead of a focus on what society needs, double down on a reduction approach and use offsetting to claim climate leadership. For example, when dairy companies around the world were challenged by start-ups providing equivalent products, but plant-based with the potential to be 1.5°C compatible, many hoped for a major shift in business practice (Oatly, 2020). Instead, leading dairy companies increased offsetting and claimed to be carbon neutral (Coyne, 2019). Even more extreme cases were seen in the fast food sector. Here, traditional hamburger restaurants were challenged by start-ups providing healthy and sustainable food (Gigafood, 2020). Instead of rethinking their business model they begun to overcompensate with offsetting and communicate that their red meat burgers were climate positive (MAX Burgers, 2020). Similar approaches have been seen among airline companies. When confronted with the opportunity to provide virtual meetings, instead most chose to offer passengers the opportunity to buy offsets (Buckley, 2019).

As all serious frameworks suggest, offsetting should be separated from emission reporting. As offsetting is not a core business activity, it belongs in the philanthropy or PR basket (Dugast & Bettin, 2019).

Reduction targets for operations (scope 1-3) will always be important, and an absolute must for

companies with significant emissions in their supply chain. Moving forward, the focus must shift to also include impact from sales of products and services, as well as impacts from lobbying and marketing. The focus on individual companies and individual solutions must also be expanded to include transformative system solutions.

→ **LEVEL B:**

*Increased sales of supply-side solutions and energy efficient products*

This category moves the focus from problems to solutions, but it is limited to increasing the sales of existing products and without any specific reduction path. The focus tends to be on renewables or energy efficient products. Japan's Top Runner Programme, initiated in 1999, is an example of initiatives supporting such solutions (Energy Conservation Centre, 2020).

Ecomagination from GE is probably the most well-known initiative where a company begun to focus on its sustainability role through sales (GE, 2015). It was launched in 2005 to "aggressively bring to market new technologies that will help customers meet pressing environmental challenges" (GE, 2005). While GE has changed leadership and shifted focus from sales of solutions to a focus on internal emissions, other companies are moving forward (Holdredge & Condon, 2017). Companies including Vestas (2017), Novozymes (2018) and BT (2020) have begun to measure emission reductions in society due to the sale of products that reduce emissions in society.

To include solutions, companies in high emitting sectors must be allowed to move from a product- to a service- or function-based business model. This is also in line with trends in the energy sector with companies now moving towards energy efficiency and need-based approaches (Zerrenner, 2017; Cleary & Palmer, 2019). Similar shifts are happening in the automotive industry, where the focus is shifting from cars to mobility as a service.

GE's Ecomagination is also a good example of why a focus on solutions is not a silver bullet and sales strategies needs to be linked to 1.5°C reduction pathways. After a few years, GE began to call investment in improvements in oil sands and fracking, green solutions, something even mainstream business magazines reacted to (Winston, 2014).

Simply accelerating sales of existing solutions is not enough; it is also crucial that companies have a strategy for their whole portfolio and not only a few sustainable solutions.

Forward looking initiatives, such as Project Breakthrough and investor advice from Oxford University, are embracing the need for "Profitable net-zero business models" where scope 1-3 emission reductions are one part of a strategy that also includes sales of sustainable solutions that help reduce emissions in society (Stewart-Smith, Ives, Hepburn & Allen, 2018; UNGC & Volans, 2019).

→ **LEVELS A-AAA:**

*System solutions for climate alignment and beyond*

This category focuses on system solutions needed to reduce emissions, not only single solutions. While the focus is on the impact on society by solutions, the way solutions are developed are also included in the strategy. In this group, some have a general goal to support a 1.5 or 2°C pathway with groups of solutions (A). Here the work by the Global Enabling Sustainability Initiative (2020) and Project Drawdown (2020) are two leading examples (2020).

Others specifically focus on 1.5°C LED compatible solutions, IPCC's most innovation-driven and sustainable path (AA). Here the work by Mission Innovation's Net-Zero Compatible Innovation Initiative and the 1.5°C Business Playbook<sup>9</sup> are included.

Finally, there is a group that include a broader sustainability agenda where a 1.5°C pathway also

delivers a just transition, and environmental sustainability based on a more eco-centric approach such as the Half-Earth vision (AAA). The arguments for comprehensive and multidimensional goals range from utilitarian that focus on the need to reduce the risks of existential threats and support an open and transparent society to philosophical arguments that argue for an expanded ethical sphere based on biophilia and other ideas where other living beings and ecosystems have intrinsic values, not only instrumental (Sandler, 2012).

## 2. X-axis: Roles by companies and companies in relation to climate change

On the x-axis different roles companies are listed.

### → LEVEL 1.0:

*Communicate the need for action*

When climate change is seen mainly as a reputational/PR issue. Here the focus is to avoid having a legal, or perceived, connection to high emitting activities. Reporting emissions is often a priority. The focus is not on delivering solutions that are sustainable, or even emissions reductions in society, but to be seen as not connected to the high-carbon parts of society or to compensate for their high-emission investments.

### → LEVEL 1.5:

*Improve operations of existing systems*

When an economic risk approach is adopted with a focus on emissions reductions within the current business model. At this level, the reductions must be delivered with an acceptable return on investment. Sometimes it is only about cost savings, at other times it is also seen as having a PR/brand value. Often the approach is relative, where companies compare their emissions to others

in the same sectors, e.g. different airlines compare their emissions with other airlines instead of looking at the emissions reductions needed for 1.5 C and how sustainable mobility can be achieved (with trains, virtual meetings and new business models).

### → LEVEL 2.0:

*Innovations for new solutions in existing systems*

Those who innovate and try to deliver new smart solutions through moderate changes in their business model. Those moving from products to services and introducing new green versions of existing products exist in this category.

### → LEVEL 3.0:

Here the focus is on the products provided by the company and how they can help reduce emissions in society. Products with positive impacts are highlighted, but companies work on their own and does not challenge the system.

### → LEVEL 3.5:

*Impact driven innovation for transformative system solutions*

Those who build their strategy based on what is needed in society and then build their business around this, in clusters with other like-minded providers of sustainable solutions in order to contribute to sustainable transformative system shifts. A strong focus is on changing the system to make sustainability mainstream and not a competitive advantage.



## ENDNOTES

- 1 I want to thank the team behind the initiative Remco Fischer and Paul Smith from UNEP-FI and Riyong Kim from EIT Climate KIC. This paper started with a number of assumptions from my side and have been revised, expanded and reformed based on input from the team. The ideas and conclusions are my own, but the arguments and logic behind them have been strengthened significantly throughout the process. I also want to thank everyone from the financial systems and companies at the forefront of the change needed, this text is based on your work.
- 2 See part 4.3 for example
- 3 It should be noted that these concepts are not always used in an honest way, and many “problem-companies” are trying to use them to hide their unsustainable business models.
- 4 The SDGs were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030 (UNDP, 2020).
- 5 Examples include most of the roadmaps developed under Fossilfritt Sverige (2020) and reports such as IEA (2018)
- 6 Part 3 is based on the chapter “Looking ahead in retrospect: What did people in 1991 believe the world would be like in 2018?” from the fossil free roadmap by the Swedish Digitalisation Consultant Industry (Pamlin, 2019)
- 7 Citing Wikipedia was considered unacceptable for a long time (Wikipedia, 2020a)
- 8 An example of the emerging solution perspective can be seen in a Bloomberg Green article about green billionaires (Metcalf & Mak, 2020), while a traditional neoclassical problem perspective is represented by Gernot Wagner, who, in one article, assesses “supply” and “demand” in relation to companies only as sources of emissions and a focus on divestment and carbon pricing (Wagner, 2020a), and in another discusses the “inevitability” of geoengineering (Wagner, 2020b)
- 9 The playbook is a mix of the LED pathway and others, with a strong focus on innovation rather than supply-side measures and CCS (Exponential Roadmap, 2020)

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#### About EIT Climate-KIC

EIT Climate-KIC is Europe's largest climate innovation initiative, leveraging the power of innovation in pursuit of a zero-carbon, climate-resilient, just, and inclusive society. Established in 2010 and headquartered in Amsterdam, EIT Climate-KIC orchestrates a community of more than 400 organisations including large corporations and SMEs, municipal and regional governments, universities and research institutes, as well as non-governmental organisations and uncommon actors. The organisation uses a portfolio approach for developing and deploying innovation to achieve systemic change in those human systems that matter for long-term prosperity, combining activities and innovation outputs from applied research, education, start-up incubation, and innovation ecosystem building. EIT Climate-KIC is supported by the European Institute of Innovation and Technology (EIT), a body of the European Union.

[www.climate-kic.org](http://www.climate-kic.org)



#### About UNEP FI

United Nations Environment Programme Finance Initiative (UNEP FI) is a partnership between UNEP and the global financial sector to mobilize private sector finance for sustainable development. UNEP FI works with more than 300 members – banks, insurers, and investors – and over 100 supporting institutions – to help create a financial sector that serves people and planet while delivering positive impacts. We aim to inspire, inform and enable financial institutions to improve people's quality of life without compromising that of future generations. By leveraging the UN's role, UNEP FI accelerates sustainable finance.

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