WHITE PAPER

Climate compensation 2.0: Extending carbon compensation schemes by ownership

by **Maximilian Koslowski**

Summary

Being a hybrid of impact investing and carbon markets, ClimatePoint establishes itself right where existing sustainable finance initiatives and carbon markets end. This white paper outlines current approaches and describes major players in the field of sustainable finance while also illustrating the noteworthy intentions yet dramatic shortcomings of both compliance and voluntary carbon markets. Based on these portraits, we present a new approach for how to meaningfully accelerate the decarbonisation of our economy. We call it climate compensation 2.0, with the help of which we democratise sustainable finance.

Note: We use the icon in the text for referring and, upon clicking on it, directing the reader right to the relevant section in the appendix for more detailed information on specific topics.

White Papers summarise the status-quo of a topic and our views of it. In addition, we may present alternative approaches. White papers may eventually be published in another form and their content may be revised.

Suggested Citation: Koslowski, Maximilian. 2021. "Climate compensation 2.0: Extending carbon compensation schemes by ownership." White Paper. ClimatePoint. Available online at https://en.climatepoint.com.

Contents

1. Introduction

1.1. The Elephant in the Room

Droughts. Coral bleaching. Melting glaciers. Biodiversity losses, and so much more. All that is not a dystopian future – it is happening now already, and it is the reason for why the current age we are living in has been coined the Anthropocene.[1,2] One of the biggest drivers of these changes is anthropogenic climate change.[3,4]

Climate change is nothing new. Already decades ago, it was discovered that our addiction to fossil fuels[a] has negative consequences on the climate.[5,6] Much has happened since then – for the better and for the worse. While the broad public has just recently received the wake-up call, political leaders have long been forging treaties and legislations, even on the United Nations (UN) level, dealing with how to slow down climate change in order to avert negative impacts. Multilateral organisations were created, such as the Intergovernmental Panel on Climate Change (IPCC) in 1988. Climate summits were held, such as the Rio Earth Summit in 1992. And new systems emerged, such as the Clean Development Mechanism that went into force as part of the Kyoto protocol in 2001.

Unfortunately, most of these efforts have shown to be insufficient. We are currently on track towards a warming of around 3°C by the end of the 21st century as compared to pre-industrial levels.[7] This is nowhere close to what governments have agreed upon in the Paris accord in 2015, which is well below 2°C, preferably below 1.5°C.[8] Given that we are already at a temperature increase of more than 1°C, doing more faster to slow and eventually stop the global heating is of utmost importance.[9] We need a rapid decarbonisation of our global economy (Figure 1)!

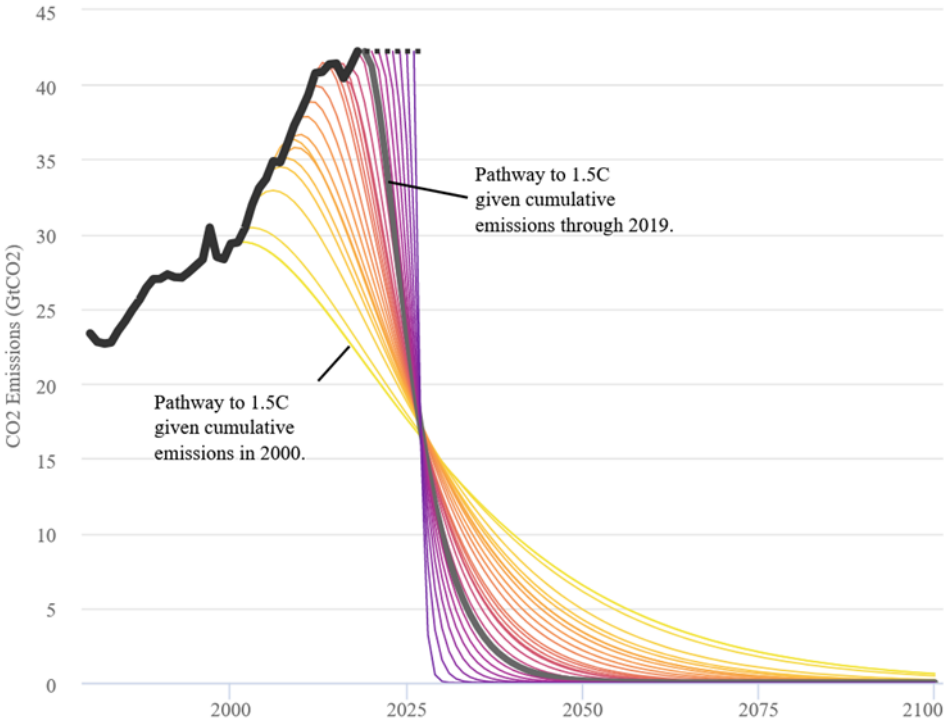

Figure 1: Emission reduction trajectories associated with limiting warming below 1.5C by starting year. Source: Carbon Brief[10]

[a] We want to note here that, in terms of anthropogenic drivers of climate change, not only greenhouse gas (GHG) emissions have effects on the climate but also aerosol emissions as well as land use and land use change (specifically via the albedo effect and evapotranspiration). However, GHG emissions are shown to have the biggest leverage and carry the risk of inducing dangerous knock-on effects, so-called feedback effects, that make exceeding tipping points even more likely.

1.2. A Breeze of Change

Climate change impacts keep getting more frequent, more impactful, and closer to us, while also becoming ever costlier. It is not only governments anymore that have recognised the dangers of a hothouse earth. The public as well as businesses are increasingly confronted with the direct effects of climate change and their repercussions along supply chains. Who would have thought a generation ago that globalisation could make matters so much more difficult in the face of an environmental crisis[b]?

Reports by the IPCC, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), and the International Resource Panel (IRP), as well as those by industry-facing organisations such as the International Energy Agency[c] (IEA) have long warned us that we cannot continue like before, and that change is crucial. Change of our behaviour, change of our energy systems, change of our economy! Yet not everybody who wants to change, can.

Businesses face multiple constraints when it comes to reducing their environmental footprints. Lock-in effects may be one issue, but more important are the lack of capacities/ resources (particularly of financial nature) for the organisations' own transformation and the dependence on existing supply chain structures; think of small airlines that want to electrify their fleet, or construction firms that want to use zero-emission materials, or grocery chains that want to offer regionally grown seasonal, organic produce. And what about pure service organisations (doctors' practices, law firms, design agencies…) with little to none direct emissions? More often than not the majority of organisations' emissions lies outside their core business or are associated with the technologies and services they work with.

> We need a rapid decarbonisation of the economy! […] Yet not everybody who wants to change, can.

Because it is easier and cheaper to pay others for reducing or removing emissions elsewhere than to change one's own business model, many organisations turn to offsetting their emissions. While offsetting is an important interim solution, it shall not distract us from the need to fundamentally change our economy. At the same time, the field of sustainable finance is growing, providing in theory the urgently needed capital for the green shift. But (with few notable exceptions) it suffers from greenwashing and the exclusivity of their products for primarily large organisations and institutional investors. Small and medium-sized enterprises (SMEs) are left out although they make up the largest share of the economy. And by that, these SMEs have the least capacities – and very often only little incentive apart from marketing purposes – to contribute to climate change mitigation.

We want to change that. We want to give businesses the means and the motivation for actively decarbonising the economy. The How is the big question, which we will explain in this white paper. The basic idea is to connect companies (aka our clients) that want to reduce their carbon footprints with companies (aka our investees) that provide novel solutions for doing so. The medium of choice is a fund through which our clients invest into their low-emission technologies of tomorrow and earn a return on investment as well. In addition, the avoided emissions are then attributed to the individual investments so that our clients have control (via our SaaS platform) of how much of their own carbon footprint can be reduced through their investments. Although our current focus is on the Nordics while scaling, the idea itself is rather generic and can be operationalised in any market – which suits our expansion plans. Since such an endeavour takes time to be realised, we fare a two-stage plan: while we

[b] It is actually crises – in plural; deteriorated ecosystems should really give us headache. We will stick to climate change, however, throughout this paper and our work for now.

[c] We do note here, however, that the IEA's stance towards the urgency of climate action has only recently changed, expressed through their long-awaited Net-Zero by 2050 report.

set up our very own fund, called Green River, we leverage existing funds that we scrutinize minutely before letting our customers invest into those.

Before outlining the above principal idea behind ClimatePoint and our vision for a sustainable economy in more detail in chapter 4, we provide some background on sustainable finance and carbon markets in the following two chapters.

2. Background

2.1. Greening the Economy

Long before sustainability became mainstream, Hans Carl von Carlowitz laid the foundation for this concept in 1713 when writing about forestry.[11] Carlowitz defined sustainability as using only so much of natural, renewable resources so that people can continue to rely on their yields in the long term. The idea has developed further, and in 1987 the so-called Brundtland report was published, declaring that sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[12] Based on the outcomes of the 2005 World Summit on Social Development, sustainable development is now usually described using the depiction of the three pillars it relies on: environmental, social/societal, and economic development.[d] A newer representation of this concept is the so-called doughnut economy that combines the three-pillar model with the planetary boundaries concept from 2009[13] so as to describe a safe and just space for humanity within a regenerative and distributive economy and below an ecological ceiling.[14] Another take on sustainability, among many more, is to describe it by its three characteristics: sufficiency, efficiency, and consistency. Sufficiency describes a reduction in consumption, while efficiency is the ability to achieve more with less. Consistency, in turn, has lifecycle thinking and value retention at its core, hence reflects largely the circular economy idea. Whatever the representation, sustainability is a powerful concept.

Because of this holistic nature of the sustainability concept, it was eventually also chosen as a guiding theme for the successor to the UN Millennium Development Goals (MDGs). The MDGs were a list of eight international development goals for the year 2015 that had a strong focus on health and societal aspects like poverty, hunger, and gender inequality. In contrast to that, the runner-up UN Sustainable Development Goals (SDGs) for the year 2030 take a more systemic stance by including multiple environmental and economic goals in addition and thus covering all three dimensions of sustainability.[e] Such comprehensiveness comes not without its problems, though: With 17 individual goals, 169 defined targets, and 232 unique indicators, there is certainly room for some contradiction among the SDGs.

The non-consideration of ESG issues would represent a failure of fiduciary duty.

With the echo for sustainability and its three pillars being enormous among scientists and policymakers, it was only a matter of time until it would be taken up in the business and finance world. With some baby steps already in the last century (back then under the term corporate social responsibility), ESG has become *the* new kid on the block during the early 2000s and is now experiencing even stronger tailwinds.[f] ESG stands for Environmental, Social, and Corporate Governance, and it refers to these three factors when measuring the sustainability of an investment in a company or business. While until then mainly financial factors played a role for the investment

[d] Inspired by this, the famous triple bottom line accounting framework was formulated, which arguably gave rise to various sustainability reporting initiatives that we will encounter shortly.
[e] Often, the goals are grouped into the categories: people, planet, prosperity, peace, and partnership.
[f] Corporate Social Responsibility (CSR) and ESG are not the same, though. Roughly speaking, CSR makes a company accountable, whereas ESG makes a company's efforts measurable.

decision-making process, the advent of the ESG frenzy nudges financial institutions to also consider less-traditional areas of concern, e.g. pollution, human rights, animal welfare, or employee relations. This may in part have been spurred by the 2015 publication of "Fiduciary duty in the 21st century", a report by a range of UN organisations that concluded with the statement that the non-consideration of ESG issues would represent a failure of fiduciary duty.[15] Needless to say, ESG has, in the views of many, the potential to contribute strongly to greening our global economy. In the face of a global climate crisis, one could think that this a great outset. And it becomes even better when you consider one more factor: climate risk.

Financial institutions face many risks, for example volatility changes in stock prices or the inadequacy of their statistical models; but climate risks are a new category and their importance as well as potential impact on such institutions increases with every day that we have not come closer to (net-)zero emissions and stabilising Earth's climate. Climate risk can be divided into physical and transitional risks.[16] Physical climate risk is related to the physical impacts of climate change, for instance abrupt supply chain disruptions due to extreme weather impacts. Transitional climate risk, on the other hand, is of a different nature and may be just as costly: climate policy, liability, and technology risks are its three sub-components that may result in extraordinary financial pressures. If these points are not clear, think of carbon pricing to reduce future emissions, lawsuits against big carbon emitters, or missing out on technological disruption. These risks are all the more reason to bring more sustainability theory into finance.

2.2. Sustainable Finance Initiatives

With the increased consideration of ESG issues, especially negative externalities, the finance industry was facing a dilemma: where to draw the line between conventional and sustainable finance practices. So, what is sustainable finance really?[g]

> Negative environmental impacts can backlash at economic performance.

Abstractly, sustainable finance seeks to reconcile economic performance with positive environmental and social impacts. In more practical terms, it is about understanding and reducing material impacts – not least because, for instance, negative environmental impacts can backlash at economic performance (remember climate risks?) – and providing the substance for a more sustainable future economy.

Sustainable finance can be seen as an overarching term for a variety of approaches. The expressions sustainable finance and green finance are often used synonymously, although green finance most commonly comprises financial activities specifically targeted at reducing environmental pressures. It aims to a great extent at the energy transition and the fight against climate change; if the explicit aim is to financially support climate change mitigation and adaptation actions, one also speaks of climate finance. Social finance, in turn, is the arm of sustainable finance that follows ESG's S-dimension; areas of interest include health care and employment. Although misleading, the term socially responsible investing (also known as social investing, responsible investing, or sustainable investing) can be understood as the branch of sustainable finance that focuses on investment-related themes across all ESG dimensions. If one seeks to deliberately create positive social and/or environmental impact through investments, one speaks of impact investing.

[g] One could arguably state that sustainable finance should be the norm – so, what is conventional finance, really?

Participants in the realm of sustainable finance include banks, investors, asset managers, insurers, enterprises, NGOs, regulators, and many more. The main instruments of financial institutions with respect to sustainable finance are bonds and loans that receive sometimes prefixes like "green" or "sustainability". These instruments are often claimed by their providers to have "five-star" ratings or to be "dark-green", yet actual quantifications of socio-environmental implications are almost non-existent. Aside from such debt-based instruments, venture capital and private equity are two other classes of financial instruments that become increasingly prominent within sustainable finance. But also here, proper quantitative assessments of ESG performance are rare. While the weakest sustainable investment strategy, negative/exclusionary screening ($19.8 trillion in assets under management), is the most common, the presumably most powerful one, impact investing ($444 billion), appears to be more like a baby brother to the first.[17]

For reaching its climate and energy targets, the EU needs to invest €350 billion more every year until 2030.

We would not be in the field of finance if there were not also opportunities. And these are tremendous when it comes to sustainable finance. In the European Union (EU) alone, the European green deal investment plan will mobilise at least €1 trillion of sustainable investments over the next decade.[18] And this is crucial: For reaching its climate and energy targets, the EU needs to invest €350 billion more every year until 2030.[18] Globally, to reach the 1.5°C target, $3 trillion per year are required to fund the energy transition – over the next three decades. And for implementing the 2030 Agenda for Sustainable Development, annual investments of $5-7 trillion will be required,[19] with investment funds for sustainable development currently providing $1.2-1.3 trillion.[20, h]

But with opportunities also come duties. Sticking with the EU example, new regulations make reporting on and compliance with sustainability targets mandatory. A huge building block in this regard is the EU's action plan consisting of a variety of measures with the goal: to reorientate capital flows towards sustainable investments, to mainstream sustainability into risk management, and to foster transparency and long-termism.[21] Among others and much looked forward to by environmentalists and sustainable finance enthusiasts, the measures that have been/ will be implemented over the next few years, include the Sustainable Finance Disclosure Regulation (SFDR; applied since 10 March 2021), the Corporate Sustainability Reporting Directive (CSRD), previously called Non-Financial Reporting Directive (NFRD; adopted in 2014 and in force since 2018), and the EU Taxonomy for Sustainable Activities (hereafter: the EU taxonomy; in force since 12 July 2020 with planned roll-out over the next few years).

With progress on achieving the SDGs and the targets set in the Paris Agreement being slow,[8,22] the implementation of such ambitious measures is welcomed by many market participants and observers, including environmental NGOs. Excited by such opportunities, entire jungles of sustainable finance actors, agreements, and tools emerged.

It is hard to find the one thread that guides you through [the sustainable finance landscape].

Looking at the sustainable finance landscape, it is hard to find the one thread that guides you through it. Perhaps it does not even exist. Initiatives got started and were joined by other initiatives to set up platforms and dialogues,

[h] You may notice that these numbers are considerably lower than the combined values of sustainable investment strategies. After all, it is a question of distribution and degree of impact that determine how much cash will be needed really.

from which other initiatives, alliances, and coalitions emerged, that again gave space for other organisations to sprout that offer new platforms, engage with older initiatives, and develop novel tools. Is this an oversimplification? Yes, for sure. But when studying this vast network of sustainable finance, it looks rather like a gigantic hairball. Within that, there are many players that are more instrumental than others. Please consult the appendix for more insights[i] into how various governmental organisations (e.g. the United Nations Environment Programme Finance Initiative; UNEP FI), business alliances (e.g. the Net-Zero Asset Managers Initiative), disclosure frameworks (e.g. CDP or the Global Reporting Initiative, GRI),[j] certifiers/validators (e.g. the Science-Based Targets initiative, SBTi), and tools (e.g. the Paris Agreement Capital Transition Assessment (PACTA) by the 2° Investing Initiative) are connected.

If you have followed closely so far, you might have noticed that we have not dropped a single word about another sustainable finance instrument (more precisely it is a climate finance mechanism): carbon markets. Since these are a whole different calibre and do not connect too well with the here largely followed ESG impact investment theme, we look at them separately in the following chapter.

3. Traditional Carbon Markets and Offsetting

3.1. Flexible mechanisms[k]

When the impacts of climate change could finally be felt on the ground, only relying on passive environmental policies was shown to be insufficient. Stronger political action was required. But when in the early 1990s governments were confronted with a range of possible instruments to tackle the continued high emissions of greenhouse gases, they did not vote for rigorous policies such as tough carbon taxes, banning certain activities, or limits on household consumption. Instead, within the Kyoto Protocol, the respective signatories, also called Annex B countries, decided to go for something more flexible, something that is known as flexibility mechanisms. Inspired by the principles of the-polluter-pays and cost effectiveness, three of those were agreed upon, namely: the clean development mechanism (CDM), joint implementation (JI), and emissions trading.[23,l] The general idea behind these mechanisms is to put a price on carbon and let those who emit greenhouse gases (GHGs) pay for it, while the place of climate action is not necessarily the place of emission.[m]

[…] put a price on carbon and let those who emit GHGs pay for it, while the place of climate action is not necessarily the place of emission.

[i] We do not claim this overview to be comprehensive but believe that the largest and/or most important actors, agreements, and tools are included. Mind that the overview is slightly biased towards the E-dimension of ESG.

[j] Here, it will be interesting to see what the double materiality perspective of the CSRD will mean for businesses and sustainability reporting – and not only large companies, but SMEs, too. We refer to this Q&A for a teaser.

[k] For more information on the topics of this chapter, please consult the website of the UNFCCC.

[l] With all these nice mechanisms, it is, however, to be noted that signatories of the Kyoto Protocol are to meet their emission reduction targets primarily through national measures; the flexibility mechanisms are supposed to only aid these countries in achieving their targets (while certainly also reducing their financial burden).

[m] In case you are wondering: The underlying reasoning for this is that the effect of the majority of GHG is not local but global.

The flexibility mechanisms effectively create two types of commodities: carbon allowances and credits (together also called (Kyoto) units). While both are measured in metric tonnes of carbon dioxide equivalents (1t CO2e),[n] a credit is 1t CO2 that was either removed from the atmosphere or whose release was prevented, whereas an allowance (also called an emission permit) is the permit to emit 1t CO2 into the atmosphere. Both types are tracked in so-called registries, e.g. national ones or the CDM registry operated by the UN Framework Convention on Climate Change (UNFCCC).

Now comes the tricky part: As the Kyoto Protocol's second commitment period expired in 2020 and was superseded by the Paris Agreement, also its mechanisms are about to be superseded. Because of continued disagreement on the exact wording of Article 6 of the Paris Agreement, however, its operationalisation has been delayed so far, impacting the continuity between the Kyoto Protocol and the Paris Agreement. The coronavirus pandemic has certainly contributed to further delays. All hopes rely now on the 26th UN Climate Change Conference of the Parties (COP26), to be held in Glasgow in November 2021. So, what is so problematic with Article 6 of the Paris Agreement, a text of only nine paragraphs covering just a little more than a single A4 page? Welcome to the sandbox fights of adults!

While there certainly are open points regarding the exact formulation of Article 6, there is strong consensus that emissions trading is one of the most powerful tools for mitigating climate change. Hence, there is little doubt that existing carbon markets will be continued (some of them in slightly adjusted form) and that new ones may emerge to deliver overall mitigation in global emissions. Since we at ClimatePoint embrace the existence of carbon markets but source part of our motivation from the criticisms towards them (particularly the voluntary market), we will explain in the remainder of this chapter what carbon markets are, how they work, and what their shortcomings are.

3.2. A Tale of Two Markets

While the original international carbon market under the Kyoto protocol has by now effectively collapsed,[o] new systems have emerged in the meanwhile. Generally, one can distinguish between two different kinds of markets: compliance markets and voluntary markets.

> A heavily regulated [compliance] market where only fractions of the economy take part in, [… and a] segmented voluntary market [where entities are not encouraged to change their business models and behaviour].

Compliance markets

Compliance markets, also called regulatory markets, are one interpretation of the basic principle outlined further above: GHG emissions are being priced under the conditions of the-polluter-pays and cost-effectiveness. Next to carbon markets, other carbon pricing instruments exist, including, for instance, carbon taxes such as the one in Norway. While there are a few variations of compliance markets, e.g. baseline-and-credit programmes or rate-based approaches, the most common alternative is a cap-and-trade system. After the global one set out under the Kyoto Protocol did not work as expected, regional ones emerged under varying governing bodies, such as the EU Emissions Trading System (EU ETS), basically breaking down Kyoto's country-level flexibility mechanisms to the level of organisations.

Cap-and-trade schemes operate on a supply and demand basis, where the supply is fixed. That is, an annual emissions cap is introduced which creates artificial scarcity. This finite carbon budget is set in

[n] GHG can be made comparable by a range of metrics. The most common one and used in climate politics is the global warming potential, according to which the warming effect of, for example, 1 kg of CH4 is equivalent to the warming effect of 28 kg of CO2. Different studies yield different values for this conversion factor, though.

[o] We are curious to see whether Article 6 can set requirements for a global market.

accordance with emissions reductions plans (e.g. the EU ETS uses a 2.2% reduction rate from the 2010 baseline) and is sliced up into allowances. The allowances are either allocated to organisations for free, proportionate to their historical emissions,[p] or auctioned on exchanges; regardless of the mode of reception, the allowances can then be surrendered (i.e. used for covering the emissions), traded, or saved for the following year. Tradeable commodities and a scarcity thereof - Voilà! That's the foundation of a market; in this case, a heavily regulated market where only fractions of the economy take part in; a market where organisations are only indirectly encouraged to reduce their emissions; a market where excess polluters (i.e. those who require additional allowances) can buy allowances from clean operators (i.e. those that sell surplus allowances) but may have received some additional allowances for free to not commit the fallacy of carbon leakage.[q, r] Hence, like other real/ realistic markets, it is far from what Adam Smith once had in mind.

Voluntary markets

Is it one voluntary market or many? The perhaps most correct answer to this seemingly simple question is: there exists one segmented voluntary market.[s] What does that mean?

On the voluntary market happens what is known as carbon offsetting. Individuals and organisations buy carbon credits, also called offsets, to compensate for their emissions elsewhere. Because of the well-mixing behaviour of many GHG, the locations of emissions and compensation do not need to be the same. With many companies setting now net-zero strategies, the demand for carbon credits is growing dramatically – because offsetting is much easier than changing one's *modus operandi*.

The voluntary market functions outside compliance markets and enables governments, businesses, and individuals to purchase carbon credits on a voluntary basis. Such carbon credits are essentially GHG emissions reduction/ removal claims and are "produced" in carbon offset projects involving for instance renewable energy development (the biggest project class measured by carbon credits created) or avoided deforestation. Credits that were created in both voluntary and compliance markets can be traded in the voluntary market, whereas typically only those resulting from regulatory mandates, e.g. under the flexibility mechanisms, can be traded in compliance markets.[t] And while compliance markets set caps and the number of allowances, the number of offset credits can, in theory, grow as long as there are new projects to feed them into the market.

> […] offsets should be seen [only] as a valuable temporary complement to aggressive internal climate action.

Since there is no single globalised carbon offset standard, a handful of registries issues credits according to their own specific sets of criteria checked by third-party verifiers. Using Kyoto's CDM as a global benchmark, a range of carbon project registries emerged

[p] This process is also called grandfathering; this way of allocating allowances will be gradually phased out in the EU ETS.

[q] In addition to allowances, also CDM carbon credits could be traded on the EU ETS until last year.

[r] Carbon leakage describes the phenomenon that (typically carbon-intensive) organisations may move to other countries because regulations there are laxer and possible environmental premiums lower.

[s] Let us not delve into Corsia (the Carbon Offsetting and Reduction Scheme for International Aviation developed by UN's International Civil Aviation Organisation (ICAO)) and the issues around it, since this is a topic for itself. Briefly, Corsia blurs the lines between voluntary and compliance markets. Read this as a starter.

[t] Mind that next to carbon offset credits also other environmental commodities can be traded in some compliance markets and on the voluntary markets, such as renewable energy certificates (RECs) and energy efficiency certificates (EECs). The units of these certificates may be denoted in, for example, energy reductions.

in the voluntary market, including the Gold Standard (established by, among others, the WWF), Verra's Verified Carbon Standard, and the community and forest-focused Plan Vivo standard. These registries also run under the titles offset programs, certification schemes, and verifiers. Either way, it is a long and windy road until carbon credits from these carbon offset programs are created and eventually purchased by end-users – for greatly varying prices.

3.3. The Dark Sides of Offsets

Although carbon offsets may in some circumstances be traded in compliance markets, the vast majority is being traded in the voluntary carbon market. Not everything is sunny there. While the concept of carbon credits certainly has its merits, improper realisations of the concept and market effects highlight its shortcomings.

One critique towards carbon offsetting are its two major moral implications resulting from: shifting emission reductions to a large degree from developed countries to developing ones; and, on the organisational level, relying on offsetting as part of a long-term sustainability strategy – which allows drawing a comparison to buying indulgences. Instead of being the non-local, primary mitigation instrument, however, offsets should be seen as a *valuable temporary complement* to aggressive internal climate action. Even more so, given that extensive use of offsets may discourage needed regulation and result in perverse rebound effects or otherwise unintended side effects (particularly related to forestry projects, e.g. land grabs, clearings of other forests, or the dry-up of water supplies) [u]. This latter problem of rebound and side effects may be amplified when carbon credits are of low quality, i.e. when GHG reductions/ removals are overestimated (the project removes less carbon than claimed), claimed by another entity (a problem called double-counting), associated with significant social or environmental harms, not additional (the offset project would have been realised without the market for carbon credits), or not permanent (e.g. forests burn down).

The pricing of carbon credits may raise further doubts about their integrity. Prices vary widely within and between offset programs, whereas they should converge in theory because credits are in principle fungible (an offset is still 1t CO2e). In addition, the prices of carbon credits hardly reflect the true cost of climate change impacts resulting from GHG emissions – for which estimates based on the so-called social cost of carbon methodology could be more suitable.

> […] our core ambition must be to cut anthropogenic GHG emissions by efficiency increases, lifestyle changes, and the restructuring of our economic system.

Lastly, with increasingly stronger commitments and according actions by countries to reduce their GHG emissions, there will be fewer opportunities for additional reductions through offset projects – also because needed emissions reductions will shrink when nearing global net-zero. To accelerate the push for net-zero, our core ambition must be to cut anthropogenic GHG emissions by efficiency increases, lifestyle changes, and the restructuring of our economic system. Carbon offsets may be a worthwhile interim solution, but their use will have to come to an end at one point.[v]

[u] These three articles by Yale Environment 360, The Guardian, and Pro Publica provide insights on these issues.
[v] For more details on pros and cons of offsets, we recommend consulting the Carbon Offset Guide.

4. Climate Compensation through Ownership

4.1. Yet Another Sustainable Finance Initiative?

Yes, but no! While we are certainly part of the gigantic sustainable finance landscape, we take a somewhat rebellious position: we want to democratise climate finance.

We have seen that carbon markets are important but not ideal, and that ESG topics are only slowly sprouting among financial market actors. More specifically, we embrace the availability of both compliance and voluntary carbon markets but see them rather as an interim, not-so successfully operationalised solution on the path towards a green economy. Real system change is needed instead – which means that also the system's entities need to change. Organisations scoring high on ESG metrics just because of offsetting emissions outside of their own supply chain is however not what we consider system change. The incentive for the necessary change, though, is low among all sorts of organisations, including financial actors.

If entities take their emission reduction targets serious, they reduce their carbon footprint as much as possible and compensate for the remainder. While this is certainly better than not doing anything, we believe more can be done, even towards system change. While we encourage organisations to mitigate their emissions through carbon offsets for the short-term (particularly because this also supports communities most at risk), our solution will provide the foundation for them to reach (net-)zero in the long-term while (or rather because of) contributing to system change. Because, essentially, we want to rather strive for realised zero emissions in the future than net-zero emissions today on paper.

Next-Level Impact Investing

A few financial market actors already push into this direction. The impact investing community is heavily invested in (pun intended) developing frameworks that assess the ESG performance of portfolio companies on a more granular level. Credits where credits are due: Notable examples in the private equity field (an alternative investment terrain many investment firms look into) include Summa Equity, ArcTern Capital, Lightrock, Norrsken, Pale Blue Dot, Closed Loop Partners, and Carn Capital. These examples and a few more sign up for commitments, draft their own ESG policies, and/ or encourage their investees to self-report their impacts according to their own frameworks.

While these approaches are impressive in comparison with what the vast majority of financial actors is doing (close to nothing?) and may be sufficient for the needs of the above organisations, the structural decarbonisation of the economy might need more than that. More than just commitments to the UN PRI, UN Global Compact, and TCFD recommendations, the writing of ESG policies, or (in the best case) the creation of ESG scorecards. Because, after all, commitments are exactly that: commitments. And internal policies are flexible and do not require benchmarks. And ESG metrics and data (often framed to fit the SDGs) are mainly self-reported and largely neglect measurable lifecycle, system-wide impacts.

> [The idea behind ClimatePoint:] A hybrid of impact investing and carbon compensation.

Compensating Investments

A hybrid of impact investing and carbon compensation, our ambition at ClimatePoint is to create a third carbon market: one that does not rely on attributional allowances or offset projects abroad, but instead transforms the economy here and now. We see ourselves as an extension of the Paris Agreement's Article 6.4 mechanism. We connect companies that want change with others that provide the means for doing so. And we want to assess the positive impact of this in an objective, holistic, and transparent manner.

4.2. The Idea Behind ClimatePoint

Now that the impacts of climate change have become ever more tangible; now that the promises of existing carbon markets were shown to not hold; now that there are massive capital flows on financial markets, but only little of it is useful for decarbonising our economy, the time is ripe for novel initiatives.

Our answer to this need is simple: compensation through ownership. What do we mean by that? Let us start at the beginning.

Positive is Negative

All organisations have positive carbon footprints.[w] While this may sound like a good thing, it is not – just like a positive covid test is not. Be it within their own operations or along their supply chains, or in most cases both, organisations emit GHG. While some emit more than others, and while the types of GHG emitted may differ, there is practically no business that has a carbon footprint of 0t CO2-eq. or lower. Of course, many organisations buy carbon offsets and thus achieve *net-zero* emissions (or perhaps even negative emissions). But zero emissions?[x] Given the seemingly endless web of supply chains, achieving zero emissions for one company's business activities requires the decarbonisation of the whole system, ranging from energy conversion to mobility to construction to agriculture etc. Carbon offsets will not bring us there[y], nor will exclusive private investments of some financial institutions or investment firms.

However, while currently virtually all organisations have positive carbon footprints, some provide solutions that are less impactful than others and may be used by third ones. Such low-carbon solutions (be they mitigating, adapting, or enabling) can be found across all sectors, e.g. hydrogen-powered aircraft, marketplaces for left-over construction materials, digital circuit breakers, low-temperature energy conversion systems, vertical farming solutions for cold climates, or curved-graphene ultracapacitors. If we progressively replace high-carbon technologies/ services with low-carbon ones, we would near the 1.5°C target bit by bit by changing the system. The faster we promote this change in the beginning, the easier it will be.

Some organisations have already begun to set up mechanisms for lowering their overall carbon footprint, with Amazon and its Climate Pledge Fund being a prime example. Through this venture capital fund, Amazon wants to support companies that provide low-carbon solutions that may replace existing ones across Amazon's supply chains. While not every company can afford to set up its own fund, the principal idea of supporting green innovation by simultaneously creating financial incentives is applicable across the board. What could this look like?

[w] To our knowledge, potentially only a handful of organisations that provide carbon dioxide removal solutions can achieve negative carbon footprints.

[x] If the distinction between net-zero and zero emissions is not clear, you are not alone. Have a go at this article on The Conversation as a starter on the policy level.

[y] Although we do acknowledge the noble intentions of an offsetting-related approach termed carbon insetting.

Climate Compensation Through Ownership

> We have this idea of pushing for the transformation of the economy via democratised impact investments, connecting curious clients with innovative investees.

Suppose you have a company called ACME that provides some service to its customers (B2C, B2B… does not matter; it may also be a physical product instead of a service). ACME is an SME that is not obligated to take part in any emissions trading scheme such as the EU ETS. However, ACME's C-suite has recently begun to read up on the impacts of climate change and decided to do something about it. The first step is to set up ACME's carbon accounts, preferably according to the GHG Protocol. With these accounts, ACME has now full overview of its direct and indirect (upstream and downstream) GHG emissions. Also because redundancies are often costly, ACME decides to implement emission reduction strategies to lower its carbon footprint and hopefully also its expenses. Although most of these strategies are successful, ACME does unfortunately not manage to cut its footprint to zero. There are still unavoidable emissions in ACME's supply chains further up- and downstream. The company's leadership decides against purchasing offsets for various reasons, arguing that it wants to rather restructure its supply chains. But setting up its own fund like Amazon did, is too expensive. So, what to do?

Now suppose there is a company called CP that offers a fund structure where all covered investee companies provide low-carbon solutions. These investees are unlisted, young ventures, working hard for their ideal of a green, decarbonised economy. They were carefully selected by CP through a multi-step process (sourcing, screening, assessment; cf. working paper) and arranged according to their main business, i.e. in the verticals agriculture, construction, energy, mobility etc. CP is not an investment firm that uses this fund structure only for itself nor does it offer it for lucrative conditions to big business. Instead, CP reaches out to companies like ACME and tries to connect them with the investee companies (Figure 2).

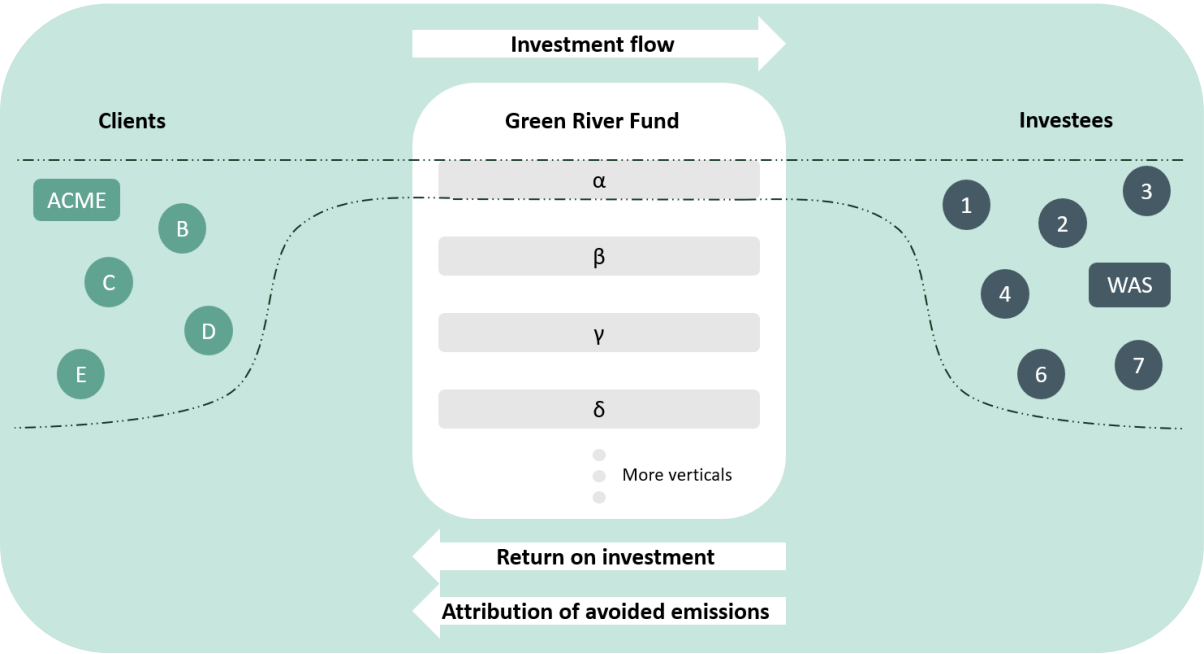

Figure 2: Conceptual sketch of ClimatePoint's Green River fund structure[z]

[z] We are aware that the fund verticals are represented horizontally 😊

Let us further assume that one of CP's investees (Wile E. Coyote AS, or WAS in short) is active in the same sector as ACME. ACME gets excited about the opportunity to invest via CP's fund into WAS and similar companies for two reasons: 1) WAS provides a solution that could help ACME to further reduce its carbon footprint[aa]; 2) since we are in the field of sustainable finance, ACME is also hopeful of receiving financial returns on its investment. So, ACME takes the chance and prepares for investing indirectly into its own future. But wait – not so fast.

CP believes that the impact of ACME's investment must be quantified in terms of avoided emissions and that the investment value must reflect the total of emissions saved. Therefore, CP assesses the system-wide avoided environmental impact of WAS's solution. This volume is then being monetised, representing the amount that can be invested into WAS. Similarly, ACME's unavoidable emissions (or a bigger chunk of its carbon footprint, if wanted) are being monetised. In principle, ACME could now invest the monetary equivalent of its to-be-abated emissions into multiple verticals of CP's fund structure; suppose it only chooses the sector itself and WAS are active in. When ACME eventually invests into CP's fund vertical containing WAS, the emissions avoided through WAS's solution are attributed to ACME's investment. Since ACME is not the only company investing into this vertical, the attributable emissions avoided through WAS's solution are split according to the respective investments' shares of the total investment into WAS.

Closing the loop, CP encourages its investees like WAS to swap sides at a later stage (once the investees are mature enough) and to invest the monetary equivalent of their very own remaining unavoidable emissions into relevant ventures. Thus, CP wants to promote recursive changes towards decarbonisation.

One could of course think that attributing avoided emissions to investments could be regarded as a compensation effort. So, let us call it that. And because the investment grants a share of ownership over the investee, we could add this to the description, too: **climate compensation through ownership**. Since CP plans to also account for other avoided impacts in the future, the scheme may be renamed to: impact compensation through ownership.

You may have guessed it: CP is us, ClimatePoint. And we have this idea of pushing for the transformation of the economy via democratised impact investments, connecting curious clients with innovative investees. We are partnering up with thought-leaders and pioneering businesses (in Norway and increasingly abroad) to provide the solution described above. This solution is by no means static. As we are in the early phase ourselves and since sustainability science progresses, so will our methodology for assessing the compensation. And while we leverage existing funds until the Green River fund is set up, we are already working hard for offering the latter as a standalone option. For details on our realisation of the above-described concept, please have a look at our continuously updated working paper. You may also find it interesting to read up on our ESG policy which will become increasingly ambitious as we progress in our work. In the following, we outline a few ideas for the direction we are heading.

[aa] Foreseeing that low environmental impacts may soon turn into crucial purchase criteria, this investment into WAS may in turn put pressure on WAS's competitors to reduce the environmental footprints of their solutions, too. Which gives an additional push for the decarbonisation of our economy.

4.3. A Castle in the Sky

Ameliorating Supply Chain Information

Supply chain information is hard to come by. It takes time and thus financial resources to put together everything that is needed for meaningful sustainability assessments. Since not everything can be accounted for (think of the excavator that was used for mining the material for a screw that holds together your car's navigation system), averages are often used for such analyses – if certain details are not even cut off entirely. With the inception of distributed ledger technologies like blockchain (e.g. via providers like TOPL), supply chain data sets may be ameliorated so as to allow organisations to trace back the origins and environmental dimensions of the products and services they use. Such data tracking may well contribute to setting the foundation for a circular economy. If in theory every organisation reports thus their direct and energy-related emissions, better and more complete data would be available. Amid all euphoria for the blockchain, we certainly do not want to miss pointing out the inherent problem of validation (one of many problems, in fact): who knows whether the information companies add to the blockchain are correct?

Another factor greatly improving the robustness of our envisioned sustainability assessments would be the availability of real-time data. While production process-specific data is often available, big lacks exist in other places. If real-time emissions data from projects like Climate TRACE could be allocated to individual companies, this would be a game changer. However, also here concerns prevail regarding, among others, data granularity, privacy issues, and methodological reasons.

Aiming Low

Businesses setting their own sustainability strategies is one thing. On an entirely other level is the validation of such strategies by third parties. Therefore, we will be encouraging our clients to aim as low as possible with their impact reduction plans and to let them be validated by the Science-Based Targets initiative (SBTi) or the Science-Based Targets Network (SBTN).

A Third Market

In addition to the existing voluntary and compliance carbon markets, we envision our solution as a third option for companies tackling emission cuts. In the best case-scenario, our proposed approach would be acknowledged by authoritative initiatives such as disclosure frameworks or the SBTi. This would openly entitle organisations making use of our concept to claim the avoided emissions as compensation in their non-financial balance sheets.

On that note, we do not want to stop with only accounting for climate impacts. Instead, we would like to create momentum for companies to engage in compensating for other environmental impacts such as land use, water stress, eco-toxicity, and biodiversity loss, too.

Also, the focus on technological solutions (as it is now) could potentially be expanded to also include social innovation efforts.

Doing Good for All

Lastly, we have the vision of completely democratising sustainable finance. That is, we do not want to limit our approach to businesses but also open up for individuals further down the road. Expanding our rationale from B2B to also include B2C operations, gives an additional push for transforming our economy.

Appendix

Chapter 2: Background

Sustainable finance volume

The main instruments of financial institutions with respect to sustainable finance are: green bonds, sustainability bonds, social bonds, green loans, and sustainability-linked loans. Standards, principles, and guidelines are available for some these, such as the sustainability bond guidelines and the green loan principles provided by the International Capital Market Association (ICMA) and the Loan Syndications & Trading Association (LSTA), respectively. Aside from these debt-based instruments, venture capital and private equity are two other classes of financial instruments that become increasingly prominent within sustainable finance. In terms of ESG coverage, the above instruments are often measured by their respective contribution to the SDGs.

The choice of sustainable finance instrument depends largely on the type of actor and their strategy. When it comes to sustainable investments, a range of seven activity/ strategy classes are available: As of 2018, according to the Global Sustainable Investment Alliance (GSIA) and measured in terms of assets under management, the weakest strategy, negative/exclusionary screening ($19.8 trillion), is the most common one, followed by ESG integration ($17.5 trillion) and corporate engagement/ shareholder action ($9.8 trillion).[17] Smallest by assets, impact investing ($444 billion) may well be the most powerful class where projects are only financed when the impact can be measured. Sustainability themed investing showed the largest growth between 2016 and 2018 ($1 trillion, +269%). The remaining strategy classes are positive/ best-in-class screening ($1.8 trillion) and norms-based screening ($4.7 trillion).

European sustainable finance

While it took a while, the EU has finally realised that it needs to include the financial sector for greening the economy – a rather obvious step, you might think. In relation to that, a range of directives were issued, including the Sustainable Finance Disclosure Regulation (SFDR), the Corporate Sustainability Reporting Directive (CSRD), previously called Non-Financial Reporting Directive (NFRD), and the EU Taxonomy for Sustainable Activities (hereafter: the EU taxonomy, Figure 3).

The SFDR makes ESG disclosure mandatory for financial market participants;[bb] the NFRD requires European listed and large public-interest companies to report on the ESG policies they implement;[cc] and the EU taxonomy is supposed to target greenwashing by setting out criteria for determining if an activity is environmentally sustainable (it requires companies under NFRD and financial actors under SFDR to report on their own and/or their portfolios' alignment with the EU taxonomy).[dd] Particularly the EU taxonomy is creating a huge upstir among the affected entities. Parties that fall under this regulation will have to report their activities' alignment with the following environmental objectives: climate change mitigation and adaptation (1&2); sustainable use and protection of water and marine resources (3); transition to a circular economy (4); pollution prevention and control (5); and protection and restoration of biodiversity and ecosystems (6). The respective company activities must meet the

[bb] Could this be a hint for making sustainable finance the norm? As of now, however, a few comply-or-explain clauses are included, allowing for instance smaller firms to opt for non-disclosure if transparent reasoning is provided.

[cc] The weak part of NFRD is that it contains comply-or-explain clauses.

[dd] While voluntary adoption of the EU taxonomy is encouraged for companies of all sizes, reporting will only be mandatory for companies under NFRD as well as financial market participants from January 2022 for climate change mitigation and adaptation objectives, and from January 2023 for the other categories. Besides, other standards/labels may be linked to the EU taxonomy in the future, such as the EU Ecolabel criteria, the EU Green Bond Standard, or the EU Climate Benchmarks Regulation. More info also in these FAQ.

following conditions to be recognised as taxonomy-aligned: making a substantial contribution to at least one environmental objective; doing no significant harm to any other environmental objective; complying with minimum social safeguards; and complying with the technical screening criteria. To further these ambitions, the EU launched together with authorities from China, Canada, and others (now also joined by Norway, UK, and more) the International Platform on Sustainable Finance (IPSF) with the aim of providing a forum for policymakers to share sustainable finance best practices, among other things.

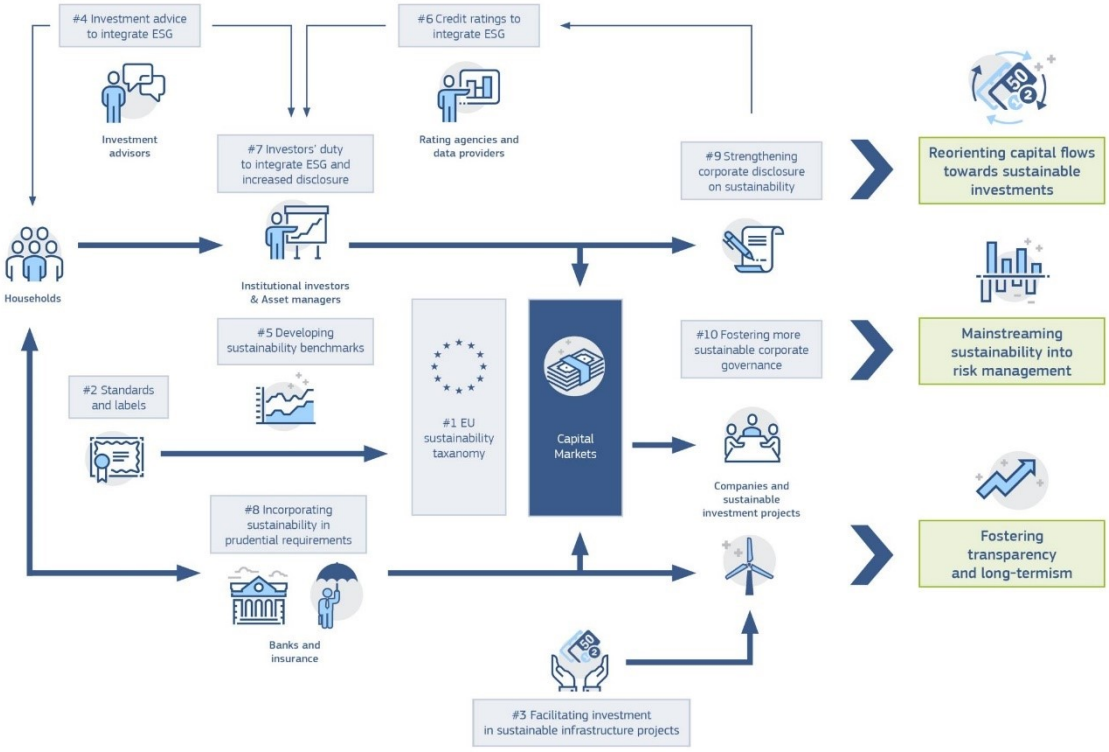

Figure 3: The EU action plan on sustainable finance. [24]

Organisations & commitments

Potentially the most impactful entity in the sustainable finance landscape, the United Nations Environment Programme Finance Initiative (UNEP FI) is a partnership between UNEP and the global financial sector. Created in 1992 following the Rio Earth Summit, UNEP FI and its 350 members seek to push the financial sector towards sustainable development, i.e. reaching the SDGs and the targets of the Paris Agreement. UNEP FI oversees and coordinates many activities in the insurance sector, e.g. the Principles for Sustainable Insurance (PSI; adopted by 140 organisations), and in the banking sector, e.g. the Principles for Responsible Banking (PRB; 220 banks involved), the Net-Zero Banking Alliance (43 banks with US$ 28.5 trillion in assets), and the Positive Impact Initiative's Principles for Positive Impact Finance. Most relevant for this white paper are, however, UNEP FI's activities regarding investments.

In addition to setting up the PSI and PRB, UNEP FI was instrumental in establishing the UN-backed Principles for Responsible Investment (UN PRI) together with the UN Global Compact, which are now applied by more than half of the world's institutional investors.[ee] UN PRI outlines six voluntary

[ee] At the time of writing, UN PRI states on its website that it has registered more than 3,900 signatories.

investment principles that provide various possible actions for incorporating ESG issues into investment practice. These principles are similar in spirit to the ten principles set out by the UN Global Compact, which target businesses and firms generally to align strategies and operations with universal sustainability goals and to report on them. UNEP FI has also been involved in organising the Sustainable Stock Exchanges Initiative (SSE initiative), a UN Partnership Programme launched in 2012 together with the UN Global Compact, the UN PRI, and the UN Conference on Trade and Development (UNCTAD); the SSE initiative is a global platform for exploring measures to improve ESG performance of exchanges.

Pushing for net-zero GHG emissions by 2050, UN PRI joined forces with the members of the Global Investor Coalition on Climate Change (GIC). The GIC was launched in 2012 and is a collaboration among four regional climate change investor networks: the Institutional Investors Group on Climate Change (IIGCC), a European membership body for investor collaboration on climate change with more than 300 members and €37 trillion in assets under management; the Investor Group on Climate Change (IGCC), a collaboration of Australian and New Zealand institutional investors with $2 trillion funds under management; the Asia Investor Group on Climate Change (AIGCC), an alliance of Asia-based asset owners and financial institutions;[ff] and Ceres (formerly known as the Coalition for Environmentally Responsible Economies), a US-based sustainability non-profit organisation that maintains various organisational networks such as the Ceres Investor Network (CIN) with more than $30 trillion in assets.

In 2020, the GIC members launched together with UN PRI and CDP the Net-Zero Asset Managers Initiative (NZAMI), an international alliance of asset managers with 87 signatories with $37 trillion assets under management. The NZAMI is not to be confused with the UN-Convened Net-Zero Asset Owner Alliance (NZAOA), consisting of 37 institutional investors with $5.7 trillion assets under management; the NZAOA was initiated in 2019 by, among others, Allianz and Swiss Re, and is convened by UNEP FI and UN PRI. Both the NZAMI and the NZAOA require the signatories of the respective commitments to align their investment portfolios with net-zero GHG emission targets by 2050. Another initiative that was established by the GIC members is the Paris Aligned Investment Initiative (PAII) from 2019, that provides a collaborative investor-led global forum; PAII has engaged 110 investors with $33 trillion in assets in the development of the Net Zero Investment Framework for which version 2 is planned to be published just before COP26. GIC's members were also instrumental in founding the Investor Agenda for Climate Change (also: The Investor Agenda) together with UNEP FI, UN PRI, and CDP. The Investor Agenda seeks to unify net-zero investor ambitions and coordinate financial sector initiatives on the climate crisis. For that matter, the Investor Agenda openly endorses the NZAMI, NZAOA, PAII, and the Science Based Targets initiative (SBTi). With 570 investors and $54 trillion in assets under management, however, the largest global investor engagement initiative on climate change is the 2017-launched Climate Action 100+ network; it is coordinated by the four GIC members and UN PRI and has the aim of engaging companies to reduce their negative climate impacts and report on their efforts.[gg]

With a broader focus on sustainability than purely on climate change, the previously mentioned GSIA unites and coordinates membership-based sustainable investment organizations around the world. These organisations include but are not limited to the European Sustainable Investment Forum (Eurosif; with 400 members and €8 trillion in total assets), the Responsible Investment Association Australasia (RIAA; with 350 members and $9 trillion in assets), and the US Forum for Sustainable & Responsible Investment (US SIF; with $5 trillion in assets under management). The goals of these organisations are primarily to promote sustainable finance and provide a platform for sharing best practices.

[ff] Interestingly, AIGCC is now a subsidiary of the IGCC, after it has been re-launched by it in 2016.
[gg] With so many networks for the same cause initiated by the same actors, is it permissible to ask whether these are only in existence for providing more labels to the respective signatories?!

Aside from all the above rather generalist sustainable finance initiatives, a few specialised ones emerged, too. The Green Digital Finance Alliance is a collaboration between UNEP and ANT Financial with the aim to leverage digital technologies and innovation for sustainable finance objectives. The Cities Climate Finance Leadership Alliance is a coalition of, among others, financial institutions, governments, and NGOs that provides a platform for convening and exchanging best-practices with regards to sustainable finance. The Green Finance Platform by the Green Growth Knowledge Partnership (GGKP) provides an overview of additional relevant actors within the field of sustainable finance. When it comes to initiatives targeted specifically at dealing with the climate crisis, the organisations partnering with the global Race To Zero campaign are worth to mention.

While not per se sustainable finance initiatives, a couple of other coalitions and alliances are noteworthy here. Although referring to it as CSR, the Responsible Business Alliance seeks to advance ESG topics among its industry members. Similar initiatives for other sectors exist, such as AIM-Progress for the fast-moving consumer goods sector. And a range of climate business networks try to push their members towards a green transformation; examples include the Norwegian Skift network, the Swedish Haga Initiative, and the Finnish Climate Leadership Coalition.

Disclosure & reporting frameworks

One cornerstone in the efforts of all above initiatives and networks is the encouragement to disclose the performance across various ESG categories. While organisations are obliged by law to report on their financial performance and position,[hh] the disclosure of non-financial performance is still largely voluntary. Among a plethora of sustainability reporting initiatives, the most important ones measured by their reach are: the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), CDP (formerly the Carbon Disclosure Project), the Climate Disclosure Standards Board (CDSB), and the International Integrated Reporting Council (IIRC).

GRI was founded in the late 1990s by Ceres and the Tellus Institute with support from UNEP. While the theme title has changed since then from CSR to ESG, GRI has since its inception provided a standards framework for sustainability reporting that applies to organisations of all sizes. Within this framework, entities can report to the public on their impact on the outside world. In addition, to align non-financial disclosure with the SDGs, GRI and UN Global Compact have joined forces to set out guidelines for how to integrate the SDGs into corporate reporting.

In contrast to GRI's outward view, the standards by 2011-founded SASB aim to connect businesses with investors on the financial impacts of ESG topics. Finer in their standards' granularity than most other frameworks, SASB offers 77 industry-specific standards for sustainability reporting with the focus on how sustainability issues may affect an organisation's financial performance from an investor's perspective; a helpful tool in relation to this are SASB's financial materiality maps.

Launched in 2000, the CDP does not provide guidelines as GRI and SASB do, but rather provides a platform where companies, cities, states, and regions can disclose their environmental impacts. For that matter, CDP sends out questionnaires to its clients on an annual basis, where they are asked to report on climate, water, and forest related topics linked to their own activities. Thus-collected self-reported data is collated in various CDP datasets; in that sense, the CDP is more like a registry than a standard-setter.

[hh] Depending on the geographical region, according to either national accounting standards like the US Generally Accepted Accounting Principle (US GAAP), or the International Financial Reporting Standards (IFRS). Interestingly, the IFRS considers setting up its own International Sustainability Standards Board (ISSB) to set IFRS sustainability standards.

The CDSB is a framework for reporting financially-material natural capital and environmental information. In contrast to SASB, it remains industry agnostic and focuses largely on climate disclosure. The CDSB was formed in 2007 and has the CDP acting as a secretariat. It is a harmonised environmental reporting framework that builds on the previously mentioned reporting approaches.

The Integrated Reporting Framework by the IIRC, in turn, provides guidelines to organisations for how to improve quality and increase adoption of integrated reporting, where integrated reporting designates the disclosure of relevant financial and non-financial information. More precisely, the IIRC guides companies in how to connect sustainability reporting to reporting on financial and other capitals.

The ignorant could assume that one framework for non-financial disclosure would be sufficient, but as we could see above the major disclosure initiatives do in fact have their subtleties and peculiarities. The assumption of the ignorant, however, is not too far from what these initiatives have found out by themselves: If there is not necessarily need for a unified approach, there is definitely need for better complementarity and clarity on their frameworks' alignment.

To this end, GRI and SASB have announced a collaborative workplan to increase clarity on complementarity, while SASB and IIRC have announced their intention to merge into a unified organisation called Value Reporting Foundation. This follows only weeks after GRI, SASB, and IIRC as well as CDP and CDSB have formulated in September 2020 a statement of intent to work together towards comprehensive corporate reporting. Affirming this intention of collaboration, the IIRC also convened the Corporate Reporting Dialogue (CRD), a platform "to promote greater coherence, consistency and comparability between corporate reporting frameworks, standards and related requirements." The CRD comprises the above reporting initiatives in addition to the International Organization for Standardization (ISO),[ii] the International Accounting Standards Board (IASB)[jj], and the Financial Accounting Standards Board (FASB). As part of CRD's Better Alignment Project, SASB, GRI, and CDP (together with IIRC and CDSB) have assessed the alignment of their frameworks with the recommendations set out by the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD).

A quick note on the apparently important TCFD: Established in 2015, the TCFD is a much-hailed initiative to increase the transparency on climate-related financial risks – for the financial sector's own sake (still remember the physical and transitional climate risks?). The TCFD published eleven recommendations for helping businesses disclose information in relation to such risks,[kk] as well as seven principles for effective disclosure. An interesting aspect is the TCFD's recommendation to businesses to adopt climate scenario-thinking. On a side note: through a range of pilot projects with financial market participants, UNEP FI supported the development of best-practices with regards to evaluating climate-related financial risks.

Building on the work of the TCFD, the Task Force on Nature-related Financial Disclosures (TNFD) seeks to extend the focus on climate-only financial risks to a wider perspective that acknowledges the potential (financial) risks of nature's decline as a whole. These risks would relate to, for instance, ocean plastics, soil fertility, and pathogens like the coronavirus. The TNFD was founded in September 2020 by the Global Canopy Programme (GCP), UNEP FI, WWF, and the UN Development Programme (UNDP), and is regarded as being complementary with the TCFD. The TNFD's Informal Working

[ii] The ISO recently published a new standard on the disclosure of investments and financing activities in relation to climate change: ISO 14097.

[jj] The IASB provides the IFRS and considers the ISSB roll-out – which makes their relationship with the described non-financial reporting initiatives particularly interesting.

[kk] According to the TCFD, the "core elements of recommended climate-related financial disclosures" are: governance, strategy, risk management, and metrics & targets.

Group consists already of 74 financial institutions, regulators, and others with $8 trillion under management.

Coming back to the topic of sustainability disclosure frameworks: what is interesting aside from all the further above described disclosure alignment efforts by the CRD's participants is that: 1) all CRD participants seek to incorporate the TCFD recommendations,[ll] and that 2) some of the frameworks rely on, or at least encourage the use of the Greenhouse Gas Protocol (GHGP).[mm] The GHGP is a widely applied standard for carbon accounting and results from a partnership between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). While the focus of the GHGP is clearly on carbon accounting, it does not provide standardised guidance on how to cover the resulting environmental impacts in sustainability reporting. This is where the Natural Capital Protocol (NCP) by the Capitals Coalition (CC) sets in. The CC is a coalition of multiple organisations, including the WBCSD, WRI, UNEP, World Wide Fund for Nature (WWF), and many others, that puts forth the NCP for accounting for environmental impacts and the Social & Human Capital Protocol (SHCP) for accounting for impacts within the S and G dimensions of ESG. CC's protocols are complementary with the disclosure frameworks described above. However, in contrast to the disclosure/ accounting idea followed by the frameworks of the CRD participants, the approaches by the CC aim ultimately at informing corporate decision-making – whether this is done for lowering financially material risks or also for the love of nature is supposedly up to the individual organisations.

Lastly, UNDP's SDG Impact was launched in 2018 and provides, among other services, a set of standards targeted at private equity funds, bonds, and enterprises. These standards serve to define what SDG investments are by providing a framework for how to account for impacts on SDGs in business and investment decision-making. Complementarity with existing other frameworks like the above mentioned is striven for, while also recommending the use of other third-party metrics and benchmarking tools, e.g. CC's protocols. SDG Impact collaborates with, among others, GRI, SASB, UNEP FI, UN PRI, and UN Global Compact.

Even more guidance & the role of metrics

With all these disclosure frameworks in place, one thing that cannot be overstated is the importance of defining metrics. While such are naturally included in the above frameworks, organisations might want to define ESG metrics even if they do not intend to publish full-scale sustainability reports. The reasons for this are diverse; when it comes to sustainable investments, however, the decision is clear: investors want to see how sustainable their portfolio companies are.[nn] Outside the bubble of above-described disclosure frameworks exists a growing body of initiatives that try to set ESG-metric recommendations and provide necessary guidance.

The perhaps most comprehensive set of ESG metrics (outside of the disclosure frameworks) is provided by the World Economic Forum (WEF). In their white paper "Measuring Stakeholder Capitalism", the WEF summarises a set of recommended ESG metrics that were developed in collaboration with Deloitte, EY, KPMG and PwC, and with support by 120 of the world's largest companies.[25] Recommended metrics include, for instance, metric tonnes of carbon dioxide equivalents (tCO2e) GHG Protocol Scope 1 and Scope 2 emissions, or the pay equality within an organisation.

[ll] It remains to be seen whether future TNFD recommendations would be followed as well, with the current focus in policy-making lying so strongly on climate change.
[mm] As does the Global GHG Accounting and Reporting Standard for the Financial Industry, issued by the Partnership for Carbon Accounting Financials (PCAF).
[nn] Within the scope of impact investing, ESG disclosure activities are commonly referred to as impact measurement and management (IMM).

The Impact Management Project (IMP) provides a forum for ESG best practice and consensus building for businesses and investors, and under whose support 16 organisations including UNEP FI, the CRD participants, and UN Global Compact form a structured network. The IMP also facilitated the conversations between the CRD participants when exploring better alignment and is partnering with SDG Impact. While the IMP does not provide ESG metrics as such (because it does not want to interfere with existing frameworks), it does provide guidance on how to measure, report, compare, and improve on ESG topics, with special weight on the SDGs. Similarly, the Operating Principles for Impact Management (OPIM) are a framework for investors for how to set up their impact management systems (with observers from the IMP and below-mentioned GIIN). Following practitioner consultations with over 2000 investors and enterprises, the IMP reached consensus to cover five dimensions when measuring impact; and no, it is not the five Ws you might have learned in school – close enough though.

In alignment with the IMP's five dimensions of impact, the Global Impact Investing Network (GIIN) offers a catalogue of metrics within its IRIS+ system. Another set of interesting metrics within the environmental dimension of ESG is, of course, also provided by the previously mentioned EU taxonomy. Instead of trying to cover as many individual metrics as possible, the Net Environmental Contribution Initiative (NECi) takes another approach and provides a tool that results in a single sector-specific indicator for assessing the environmental impacts of any activity within a portfolio. Narrowing down on climate aspects, the Impact Management System by the 2° Investing Initiative (2DII) does not provide specific metrics but instead a management system similar to the plan-do-check-act cycle for how financial institutions could manage and maximise their impact potential. A single-indicator metric within the climate topic is the temperature alignment of one's activities, i.e. taking the deviation from the 1.5° or 2°C targets as an impact metric. This approach has been realised in the temperature rating methodology developed by CDP and WWF.

While the value of defining and measuring one's progress for one or multiple ESG metrics is clear, investors may want to get third-party assessments of a corporation's overall ESG performance. For that, a horde of ESG rating agencies exists, with the by-far biggest ones being KLD (MSCI Stats), Sustainalytics, Vigeo Eiris (Moody's), RobecoSAM (S&P Global), Asset4 (Refinitiv), and MSCI. As with the various ESG disclosure frameworks, one could again doubt whether such a variety is necessary. In this case, the providers' aim is even the same: to rate the ESG performance of an organisation. However, these ratings disagree substantially across the different providers.[26] What does that mean? Well, for one that one should not simply rely on only one rating but consult others, too, for getting a better impression of a company's performance. Also, these ratings only compare the rated organisations, i.e. a relative approach is followed, and do not benchmark their ESG performance against absolute targets. In the spirit of this, other kinds of certification as well as benchmarking of individual ESG metrics may become of interest.

Benchmarking & certification

While certifications are necessarily based on third-party assessments, there exists a weaker form for being approved by external organisations: commitments. With that, organisations can sign their contribution to or alignment with various agendas, e.g. the UN Global Compact, UN PRI, or OPIM, and display the respective label as some sort of stamp of approval. Although important for gaining momentum in terms of ESG performance improvement, there are obviously better alternatives.

One of the most credible approvals in the ESG space one can get by a third-party is the check mark by the SBTi. The SBTi reviews and validates GHG emissions reduction targets of organisations and encourages the very same parties to set net-zero science-based targets (SBTs) that are consistent with

Paris-aligned pathways.[oo] The very basis for setting such targets is the existence of GHG accounts according to the GHGP. The SBTi is a partnership between CDP, WRI, WWF, and UN Global Compact, and has already close to 700 companies with approved SBTs listed. By the way, companies committing to the SBTi count automatically towards the We Mean Business coalition, a campaign that encourages the world's most influential businesses to take climate action; it is a partnership between, among others, CDP, Ceres, and WBCSD. While SBTs help businesses set the direction for emission reductions, the complementary ACT initiative helps them implement these strategies.

The SBTi relates to a bigger initiative, the Science-Based Targets Network (SBTN). Building on the momentum for climate related SBTs, the SBTN expands the idea around SBTs to other sections of the Earth System so as to cover also biodiversity, ocean, land, and water; respective methods are planned to be developed by 2022. The SBTN, in turn, is part of the Global Commons Alliance (together with the Earth Commission, Earth HQ, and Systems Change Lab) and is a network of more than 45 organisations including CC, CDP, Ceres, WRI, and WWF.

Not quite a standard or certification, the Benchmark self-assessment approach by Future-Fit Business provides companies with tools to manage and improve their environmental and social performance while loosely benchmarking themselves against qualitative goals. Quite different from that, the B Corp Certification by B Lab actually certifies businesses that demonstrate high social and environmental performance within and outside the corporate boundaries.

Through its B Impact Assessment platform, companies can then also benchmark themselves against others. The World Benchmarking Alliance (WBA) follows a rather unconventional approach to comparing companies' performance in relation to the SDGs: instead of having clients that are being benchmarked, the WBA pro-actively identifies ESG under-performers: first, it selects industries that are crucial for the necessary global system transformation; then, it identifies keystone companies (that is, companies that are critical for achieving the SDGs) which are in a third step being ranked according to publicly available information on their ESG performance. Through this rather aggressive approach, the WBA wants to push for system change by drawing the public's attention to low-performing businesses. Similar in the approach, the asset owner-led Transition Pathway Initiative (TPI) assesses and openly ranks the preparedness of large companies for the sector-specific transition to a low-carbon economy.

Tools & databases

For supporting organisations on their journey towards a better ESG performance, a plethora of tools and databases has (intentionally or not) been developed. What follows is a quick run-down of some interesting ones.

When it comes to ESG data, the most comprehensive databases are the ones by rating agencies, e.g. Refinitiv's ESG database, and of disclosure frameworks, such as GRI's Sustainability Disclosure Database and the aforementioned CDP datasets. The earlier mentioned Green Finance Platform serves as a knowledge hub and provides overviews of, among others, research insights, regulatory measures, and tools & platforms. In part similar to the latter, UNEP's Climate Initiatives Platform provides an overview of exactly that.

As for tools, a wide variety exists, ranging from computational environmental assessment tools to strategy platforms: UNEP FI's Portfolio Impact Analysis Tool for Banks; UNDP's SDG Investor Platform for identifying investment opportunity areas; the ESG management tool IRIS+ for impact investments by GIIN; the SEC Sustainability Disclosure Search Tool by Ceres; WWF's Water Risk Filter; the

[oo] The SBTi works in addition on drafting a corporate net-zero target standard. "Yet another emissions standard!" we hear you calling.

Transparency for Sustainable Economies tool (trase) with a focus on deforestation; the Integrated Biodiversity Assessment Tool (IBAT) and Platform BEE's BioScope with a focus on biodiversity loss; the Natural Capital Finance Alliance's (NCFA) tool for exploring natural capital opportunities, risks, and exposure (ENCORE); the ClimINVEST platform, Climate Analytics' tools, and the climate scenarios provided by the Network for Greening the Financial System (NGFS) for assessing physical and transitional climate risks for investors and financial institutions; impact-cubed's Portfolio Impact Report; KPMG's Sustainable Investment Framework Navigator (SIFN); FTSE Russell's Green Revenues 2.0 data model; the Carbon Yield methodology for assessing avoided emissions of green bonds; the Net Environmental Contribution Initiative (NECi); the Climate Impact Forecast tool for start-ups to assess their avoided emissions; the portfolio temperature alignment tool provided by the SBTi and based on the CDP-WWF temperature scoring method – similar low-carbon trajectory or temperature alignment tools exist such as the Paris Agreement Capital Transition Assessment (PACTA) by the 2° Investing Initiative with backing from the UN PRI, Urgentem's Element6 Climate Risk Platform, or Carbon Impact Analytics by carbon 4 finance;[27]

Chapter 3: Traditional carbon markets and offsetting

Kyoto's mechanisms go to Paris

In grossly simplified terms, the flexibility mechanisms allow for the following (provided the participating parties fulfil a range of requirements): Annex B parties may implement emission-reduction projects like rural electrification projects in developing countries which creates tradeable certified emission reduction (CER) credits (clean development mechanism (CDM); Article 12 of Kyoto Protocol); Annex B countries may earn emission reduction units (ERUs) from emission-reduction or -removal projects in another Annex B country (joint implementation; Article 6 of Kyoto Protocol); the allowed emissions of Annex B countries, under their respective emission targets, are divided into assigned amount units (AAUs; or simply allowances) of which the unused ones may be traded with countries that are exceeding their targets (emissions trading; Article 17 of Kyoto Protocol). Through this last mechanism, a market was created that treats emissions as commodities which are being tracked and recorded in registry systems. On this market, CERs, ERUs, and AAUs may be traded, as well as RMUs: removal units, which are emission allowances for carbon absorption activities by land use, land use change, and forestry in an Annex I country (Annex I and Annex B are two different but similar lists; Annex B countries are Annex I parties with Kyoto emission targets). While both carbon allowances and credits (together also called (Kyoto) units) are measured in metric tonnes of carbon dioxide equivalents (1t CO2e),[pp] a credit is 1t CO2 that was either removed from the atmosphere or whose release was prevented, whereas an allowance is the permit to emit 1t CO2 into the atmosphere.

Put differently, the emissions trading mechanism provides a level-playing field where monetarised emission allowances and carbon credits, also called carbon offsets, resulting from emission reduction and removal projects can be exchanged. In countries with an emission target under the Kyoto Protocol, this project mechanism is termed joint implementation, whereas it is called clean development mechanism in developing countries. CDM and JI then effectively feed the carbon market with carbon credits. With all these nice mechanisms, it is, however, to be noted that signatories of the Kyoto Protocol are to meet their emission reduction targets primarily through national measures; the flexibility mechanisms are supposed to only aid these countries in achieving their targets (while certainly also reducing their financial burden).

Similar to the Kyoto Protocol, the Paris Agreement defines a range of mechanisms, in Article 6: the first mechanism would allow countries with overachievements on their Paris climate pledges (e.g. emission cuts, renewables capacity, forest expansion)[qq] to transfer/ sell them to other countries in need (Article 6.2);[rr] the second mechanism, also referred to as "Sustainable Development Mechanism" (SDM), would create a new UN-governed international carbon market, hence replacing the CDM (Article 6.4); and the third mechanism contains non-market approaches (i.e. no trade) which would provide a framework for climate cooperation between countries (Article 6.8), e.g. climate policies on carbon taxes. Now, the main problem is that countries do have different interpretations of these mechanisms and the remainder of Article 6 which they would like to see pinned down in the actual text. The most contentious issues are: The question of whether (and, if so, how) Kyoto-era credits will be carried over to its

[pp] GHG can be made comparable by a range of metrics. The most common one and used in climate politics is the global warming potential, according to which the warming effect of, for example, 1 kg of CH4 is equivalent to the warming effect of 28 kg of CO2. Different studies yield different values for this conversion factor, though.

[qq] These climate pledges are called nationally determined contributions (NDCs), represent national climate plans, and form the basis of the Paris Agreement.

[rr] In that context, one also speaks of internationally transferred mitigation outcomes, or ITMOs. Japan's pre-existing Joint Crediting Mechanism (JCM) can be seen as an early pilot project, where Japan cooperates with partner countries to reduce emissions by transferring decarbonisation technologies.

successor; the efficacy of the SDM regarding the overall mitigation of global emissions; the problem of double counting; and the difficulty of ensuring environmental integrity.[28,29]

Carbon market 101

The principal idea behind carbon markets (or: GHG emission trading systems) is the pricing of emissions.[ss] That is, monetary values are assigned to the carbon emissions based on supply and demand dynamics, for which the groundwork was laid through the adoption of the Kyoto flexibility mechanisms. Carbon credits created by projects that have been verified outside of the Kyoto Protocol are referred to as Voluntary Emission Reductions (also: Verified Emission Reductions; VERs). These are primarily being traded in voluntary carbon markets. When carbon credits in general are bought by end-users, the credits are being retired (also called cancelled), i.e. they cannot be used again and are marked as such in respective registries.

Carbon credits can be generated through various carbon offset projects, e.g. renewable energy development, avoided deforestation, or the capture and destruction of methane emissions from, for instance, livestock. Such carbon offset projects are being run by project owners in alignment with the criteria of carbon offset programs. The latter may describe themselves also as standards (e.g. Gold Standard) or registries (e.g. American Carbon Registry). The functions of such offset programs include: Development and approval of criteria sets (aka standards) for carbon offset credit quality; review of offset projects against these sets of criteria; operation of registry systems that issue, transfer, and retire offset credits. The procedures for calculating the GHG benefits of projects are called methodologies and are provided by the respective programs.

Regardless the market form or the credit types, the quality criteria for credits being traded and the respective projects that generate the credits are largely the same, with some important ones being: additionality, i.e. projects would not have occurred without the market for carbon credits; realistic baseline, i.e. plausible GHG emission scenarios without the project to ensure realistic estimates of the credits' reduction, avoidance, and/ or removal impact; accurate quantification and monitoring as well as independent validation and verification (self-explanatory, is it not?). In addition, it is always welcomed if credits bring about co-benefits, such as positively impact biodiversity.

Caps and trade in the EU ETS

Since the EU Emissions Trading System (EU ETS) was the first and still is one of the biggest emissions markets, we will explain the functioning of cap-and-trade using the EU ETS as an example.

Launched in 2005, the EU ETS is the prime example for a cap-and-trade system. As the name cap-and-trade suggests, a cap is set, below which units can be traded. The cap in this case is an annual emissions cap, i.e. a finite carbon budget; considered GHG are carbon dioxide (CO2), nitrous oxide (N2O), and perfluorocarbon (PFC). This cap in the EU ETS creates artificial scarcity and is controlled via market stability instruments. Formerly, the EU's member states defined decentralised in so-called national allocation plans which entities that are subject to the EU ETS may emit how much per year; such allowances are now determined at the EU level. That is, each year, organisations are allocated an allowance (also called emission permit; formally: EU allowance (EUA)) proportionate to their historical emissions which can be traded on a secondary market. This means that excess polluters (i.e. those who require additional allowances) can buy allowances from clean operators (i.e. those that sell surplus allowances). While the market works under the principles of supply and demand and effectively sets the price (see Figure 4 for a comparison of allowance prices in different ETSs), it must be noted that the supply is

[ss] Mind at this point that other highly effective carbon pricing mechanisms in multiple variations exist, such as carbon taxes.[30]

fixed. The tradeable EU allowances are fungible, i.e. identical, with Kyoto's AAUs. Following the flooding of the market with allowances during the 2008 financial crisis, a regulatory organ was introduced: The market stability reserve, which can tighten or loosen the supply of carbon units. Under normal conditions, however, only the cancelling of an allowance tightens the cap. As for international trade, the EU ETS allowed until 2020 for carbon offsets, i.e. entities could, in addition to the trading of allowances under the specified cap, also offset their emissions by buying CERs and ERUs. This practice is as of 2021 not permitted anymore. For the sake of completeness, CERs and ERUs are issued by the UNFCCC's CDM and JI respectively and validated and/ or verified by a designated operational entity, i.e. a company accredited by the CDM's Executive Board, such as TÜV SÜD and the Colombian Institute for Technical Standards and Certification.

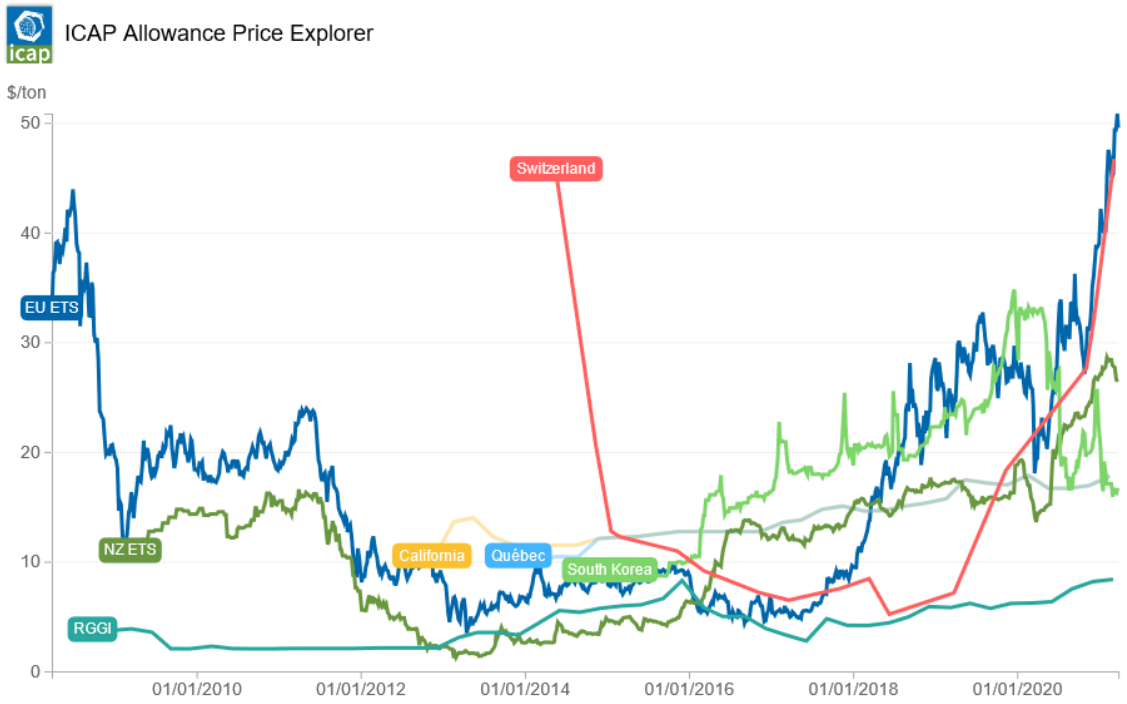

Figure 4: Emission allowance prices in different ETSs. Source: ICAP allowance price explorer.[31]

While auctioning is the default method for allocating emission allowances in the EU ETS, selected installations/ organisations receive them for free. Internationally competing industry is supposed to be shielded (one could also say incentivised away) from carbon leakage through the use of such free allocations. Allowances are auctioned on the EU ETS's common auction platform, which is currently the European Energy Exchange.[tt] According to the ETS directive, at least 50% of auctioning revenues[uu] should be used by the EU member states for climate and energy-related purposes. Information on allowance transactions, national implementation measures, and others is stored in the Union Registry, an online database operated by the European Commission. When an installation/ organisation does not cover all its emissions with allowances, heavy fines are imposed. As for the scope of compliance markets, large portions of the economy are simply kept out of them. In the EU ETS, for example, only

[tt] The common auction platform is nominated for up to five years and may change after that. Another auctioning platform in use is the ICE Futures Europe. Other exchanges existed before that such as the European Climate Exchange. Don't get us started on how some of the exchanges for carbon allowances and credits are interlinked!

[uu] Auction revenues in the first half of 2020 reached €7.9 billion.

around 45% of the EU's GHG emissions (or ~5% of global emissions) are accounted for, where participation is mandatory for around 10,000 installations in the power sector[vv] and manufacturing industry as well as airlines operating between these countries – taken together this makes up only a fraction of the more than 20 million businesses in the EU. Sticking with the EU ETS example, a compliance market is not necessarily limited to trading allowances only: Up until this year the trading of carbon offsets was permitted on the EU ETS.

Aside from the EU ETS, a few other cap-and-trade systems exist, such as the Regional Greenhouse Gas Initiative (RGGI) in the US, the Mexican ETS pilot, and the New Zealand ETS, and more are expected to be started given the demand for it. That means, there is effectively not only one compliance market, but instead many different ones where the same and other credits may be traded. In almost all these ETSs, only a specific portion of organisations is obliged to participate in these markets. That is, a huge chunk of entities is left out of these compliance schemes.

Also, in case you are wondering: What about including private households in emissions trading schemes? This is an idea known as personal carbon trading, a policy concept that has been explored under various names in the literature, e.g. tradable energy quotas (TEQ) and personal carbon allowances (PCA). So far, however, this concept is nothing more than an idea. Yet, individuals can become active in buying credits through voluntary offsetting.

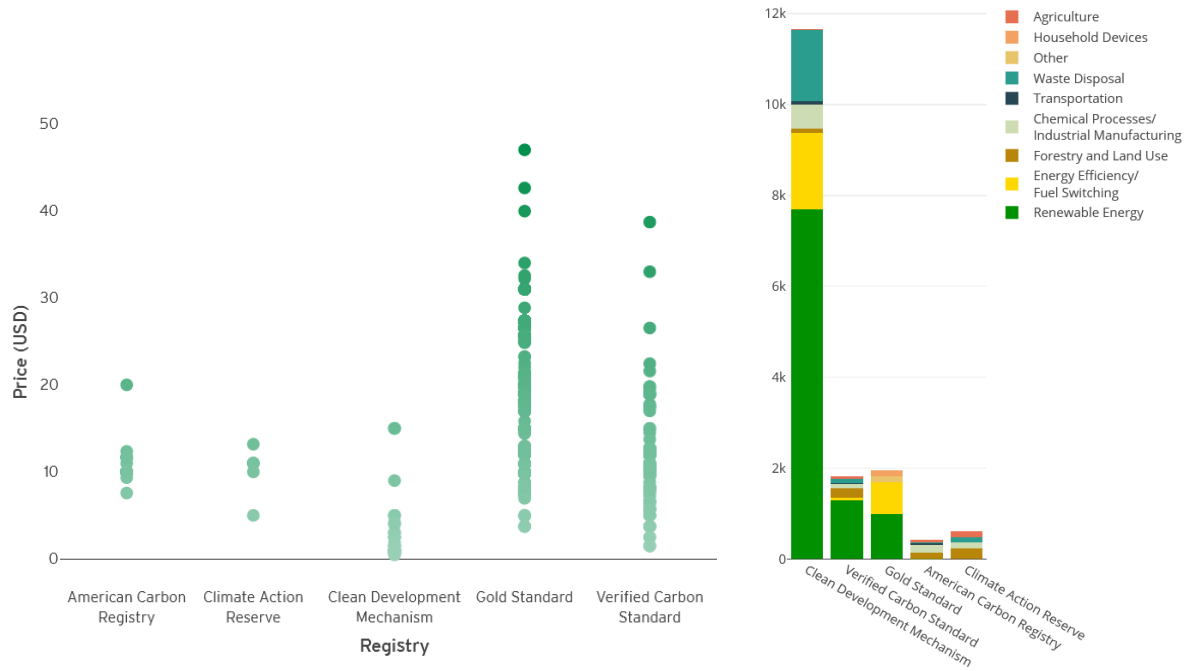

Figure 5: Carbon offsets by registry. Left: Price (per ton of carbon) variation among carbon offsetting projects by registry; right: Realised projects by type and registry. Source: Cheekily taken from AlliedOffsets[33,34]

Offsets, offsets, offsets

In addition to carbon credits resulting from carbon offset programs like the Gold Standard, those from under the CDM and JI are traded on the voluntary market, too. A non-exhaustive overview of tradable carbon units is shown in table 1. In theory, the price of carbon credits on the market should vary primarily according to the project's carbon sequestration potential; other factors such as additional socio-economic or biodiversity benefits can influence the price, too. In reality, however, there are large price

[vv] Combustion installations make up around 60% of EU ETS emissions.[32]

variations depending on verifier, project type, and project location (Figure 5). On a sidenote, most projects are realised in China, India, and Brazil. Improvements of the voluntary carbon market are expected. The Task Force on Scaling Voluntary Carbon Markets (TSVCM) is working on that and recently published a blueprint.[35]

Table 1: Overview of selected unit types. Source: GHG Protocol[36]

Program	Unit
Emissions allowances	
California Cap-and-Trade Program	California Cap-and-Trade Program allowance
European Union Emission Trading System (EU ETS)	European Union allowance (EUA)
Kyoto Protocol International Emissions Trading	AAU (Assigned Amount unit)
New Zealand ETS	NZU (New Zealand units)
Quebec Cap and Trade System	Quebec Cap and Trade System allowance
Regional Greenhouse Gas Initiative (RGGI)	RGGI CO2 allowance
Offset credits	
Clean Development Mechanism (CDM)	certified emission reduction (CER)
Gold standard	Gold Standard voluntary emission reductions (VERs)
Joint Implementation (JI)	emission reduction units (ERU)
Verified carbon standard	verified emission reduction (VER)

The credits are offered for sale by various providers, not all of which offer all types of credits. That is, multiple carbon offset programs generate carbon credits according to their respective standards and methodologies, which are then distributed by different sellers, from whom organisations and individuals can buy them. For instance, atmosfair offers only credits generated through projects according to CDM and/ or the Gold Standard and focuses on the offsetting of emissions resulting from flights only. Effectively, all this happens on one market where different, although in its essence similar commodities are being supplied and demanded.

While all standards have their own rules, each follow a similar structure for starting and running a carbon project: 1) Project idea design (may include stakeholder consultations), 2) validation, i.e. the project gets reviewed (and approved if standard's requirements are met) by an external organisation (a so-called Designated Operational Entity), 3) project registration, 4) project implementation (stakeholders can still complain through so-called grievance mechanisms), 5) project monitoring (how many emissions are saved?), 6) verification by an independent auditor (if confirmed that emissions can be reduced, carbon credits can be created), 7) credit issuance (the project developer receives the carbon credits which are created by the standard certifying the project), 8) commercialisation (the credits are offered and sold).[ww]

Throughout this process, a long line of different actors steps in. Project developers design the carbon emission reduction/ removal project, e.g. a project producing clean cooking stoves in India. While the developers are in some cases also the project owners, this is not always the case. In any case, however, the project is financed by some entity, be it private investors, non-profit organisations, banks, or someone else. Third party auditors can be employed for either project validation or project verification (e.g. SCS Global Services), but usually not both. These verifications are executed in accordance with standards provided by a standard organisation, e.g. Gold Standard. Technically speaking, these are not standards but rather project protocols or project programs. Carbon credit transaction may be facilitated by

[ww] This process description follows this one by the Carbon Market Watch.

brokers or exchanges. In addition, you can also find emission traders that buy and re-sell carbon credits. Another frequent term on the voluntary carbon market is offset provider (e.g. South Pole, firstclimate, or UNFCCC's Climate Neutral Now platform), who connect project developers and buyers. And lastly, final buyers/ end-users are those individuals and organisations who purchase carbon credits, upon which the credits are being cancelled/ retired.

References

1. Lewis, S. L. & Maslin, M. A. Defining the Anthropocene. *Nature* **519**, 171–180 (2015).
2. Crutzen, P. J. The "anthropocene". *J. Phys. IV Proc.* **12**, 1–5 (2002).
3. IPCC. *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. (2014).
4. IPBES. *Summary for policymakers of the global assessment report on biodiversity and ecosystem services*. https://zenodo.org/record/3553579 (2019) doi:10.5281/zenodo.3553579.
5. IPCC. *Climate Change: The IPCC 1990 and 1992 Assessments*. (1992).
6. Weart, S. R. *The Discovery of Global Warming*. (Harvard University Press, 2009).
7. Hausfather, Z. & Peters, G. P. Emissions – the 'business as usual' story is misleading. *Nature* **577**, 618–620 (2020).
8. Climate Action Tracker. Temperatures. https://climateactiontracker.org/global/temperatures/.
9. IPCC. Summary for Policymakers — Global Warming of 1.5 ºC. https://www.ipcc.ch/sr15/chapter/spm/ (2018).
10. Carbon Brief. UNEP: 1.5C climate target 'slipping out of reach'. *Carbon Brief* https://www.carbonbrief.org/unep-1-5c-climate-target-slipping-out-of-reach (2019).
11. Seefried, E. Rethinking Progress. On the Origin of the Modern Sustainability Discourse, 1970–2000. *J. Mod. Eur. Hist.* **13**, 377–400 (2015).
12. World Commission on Environment and Development. *Our Common Future*. (Oxford University Press, 1987).
13. Rockström, J. *et al.* A safe operating space for humanity. *Nature* **461**, 472–475 (2009).
14. Raworth, K. *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*. (Chelsea Green Publishing, 2017).
15. Sullivan, R. Fiduciary Duty in the 21st Century. *SSRN Electron. J.* (2015) doi:10.2139/ssrn.2724866.

16. Clapp, C., Francke Lund, H., Aamaas, B. & Lannoo, E. *Shades of Climate Risk. Categorizing climate risk for investors*. https://cicero.oslo.no/en/CF-transitional-risk (2017).

17. GSIA. 2018 global sustainable investment review. (2018).

18. Overview of sustainable finance. *European Commission - European Commission* https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance_en.

19. UNCTAD. Investing in the SDGs: An action plan for promoting private sector contributions. in *World investment report 2014* 135–194 (UN, 2014). doi:10.18356/ca95f7ed-en.

20. UNCTAD. *International production beyond the pandemic*. (2020).

21. Renewed sustainable finance strategy and implementation of the action plan on financing sustainable growth. *European Commission - European Commission* https://ec.europa.eu/info/publications/sustainable-finance-renewed-strategy_en.

22. Measuring progress towards the Sustainable Development Goals - SDG Tracker. *Our World in Data* https://sdg-tracker.org/.

23. UNFCCC. Mechanisms under the Kyoto Protocol. https://unfccc.int/process/the-kyoto-protocol/mechanisms.

24. European Commission. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN CENTRAL BANK, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Action Plan: Financing Sustainable Growth. (2018).

25. World Economic Forum. Measuring Stakeholder Capitalism: Towards Common Metrics and Consistent Reporting of Sustainable Value Creation. (2020).

26. Berg, F., Kölbel, J. F. & Rigobon, R. *Aggregate Confusion: The Divergence of ESG Ratings*. https://papers.ssrn.com/abstract=3438533 (2020) doi:10.2139/ssrn.3438533.

27. Institut Louis Bachelier *et al.* The alignment cookbook: A Technical Review of Methodologies Assessing a Portfolio's Alignment with Low-Carbon Trajectories or Temperature Goal.

28. IISD. Policy Brief: Delivering Climate Ambition Through Market Mechanisms: Capitalizing on Article 6 Piloting Activities | SDG Knowledge Hub | IISD.

https://sdg.iisd.org:443/commentary/policy-briefs/delivering-climate-ambition-through-market-mechanisms-capitalizing-on-article-6-piloting-activities/.

29. Carbon Brief. In-depth Q&A: How 'Article 6' carbon markets could 'make or break' the Paris Agreement. *Carbon Brief* https://www.carbonbrief.org/in-depth-q-and-a-how-article-6-carbon-markets-could-make-or-break-the-paris-agreement (2019).

30. World Bank. State and Trends of Carbon Pricing 2020.

31. International Carbon Action Partnership. Allowance Price Explorer. *International Carbon Action Partnership* https://icapcarbonaction.com.

32. European Environment Agency. The EU Emissions Trading System in 2020: trends and projections. https://www.eea.europa.eu/themes/climate/the-eu-emissions-trading-system/the-eu-emissions-trading-system/#footnotes.

33. AlliedOffsets. Price variation among carbon offsetting projects in different countries and project types. *World's First Database for Carbon Offset Projects* https://alliedoffsets.com/ (2021).

34. AlliedOffsets. Data dashboard. *World's First Database for Carbon Offset Projects* https://alliedoffsets.com/.

35. TSVCM. Task Force on Scaling voluntary Carbon Markets: Final Report. (2021).

36. Greenhouse Gas Protocol. *Mitigation goal standard: an accounting and reporting standard for national and subnational greenhouse gas reduction goals*. (2014).

About ClimatePoint

ClimatePoint is a privately owned investment company, based in Oslo and founded in 2019. We offer the next generation of climate compensation, which is based on ownership. We believe that innovative technology and solutions will be a decisive factor in the green shift.

Our ambition is to give businesses the means for climbing the path of a green transformation. The basis for this is portfolios of meaningful ventures as well as scientifically sound sustainability assessments of the activities of both our clients and our investees.