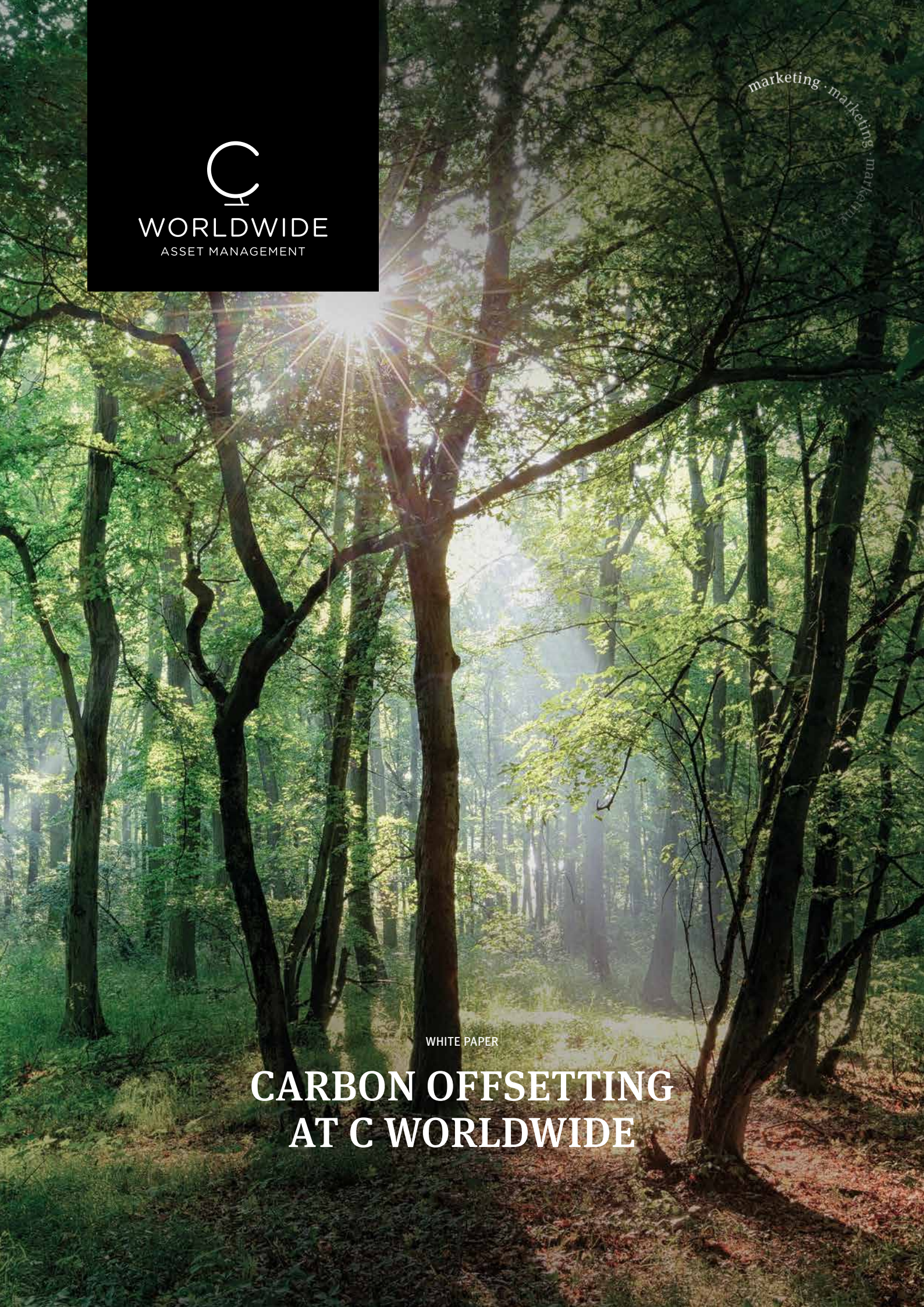
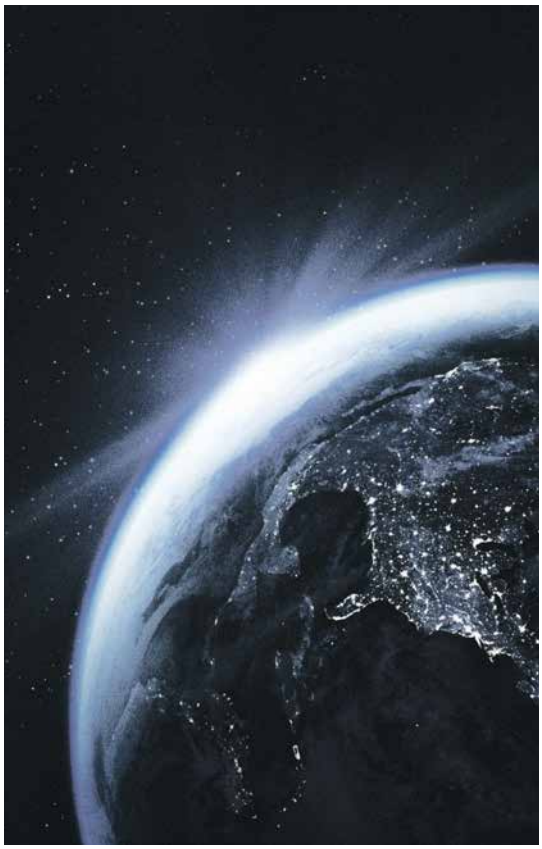


WHITE PAPER

CARBON OFFSETTING AT C WORLDWIDE

Carbon Offsetting at C WorldWide



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C WorldWide Asset Management

Introduction

As mortal investment professionals, we need to be vigilant when discussing complex issues like the biosphere, carbon emissions, carbon sinks, and climate change. For decades, scientists and other experts have considered and debated the complexities of these issues and the frequent unknown feedback loops in ecosystems. However, as an active equity investment firm, we have fiduciary responsibility for the long-term investment returns of our clients, where all material aspects of sustainability are carefully considered. In addition, we have a corporate responsibility as an organization, to both consider and address our role in society as well as our climate footprint and the NetZero agenda.

This paper will describe our efforts to compensate CO_2 emissions for our organization. We will focus on describing the different nature-based carbon compensation mechanisms one can invest in and the considerations that have led to the choices taken for compensating our CO_2 footprint in 2022 and going forward.

"Historically more than half of the anthropogenic CO2 emissions have been removed, for free, by the biosphere every year."

Climate Change and Nature Based Solutions

One of the biggest, if not the biggest, sustainability question is the effect of humans on the delicate balances in nature, not least how human-caused rising CO2 emissions are driving climate change.

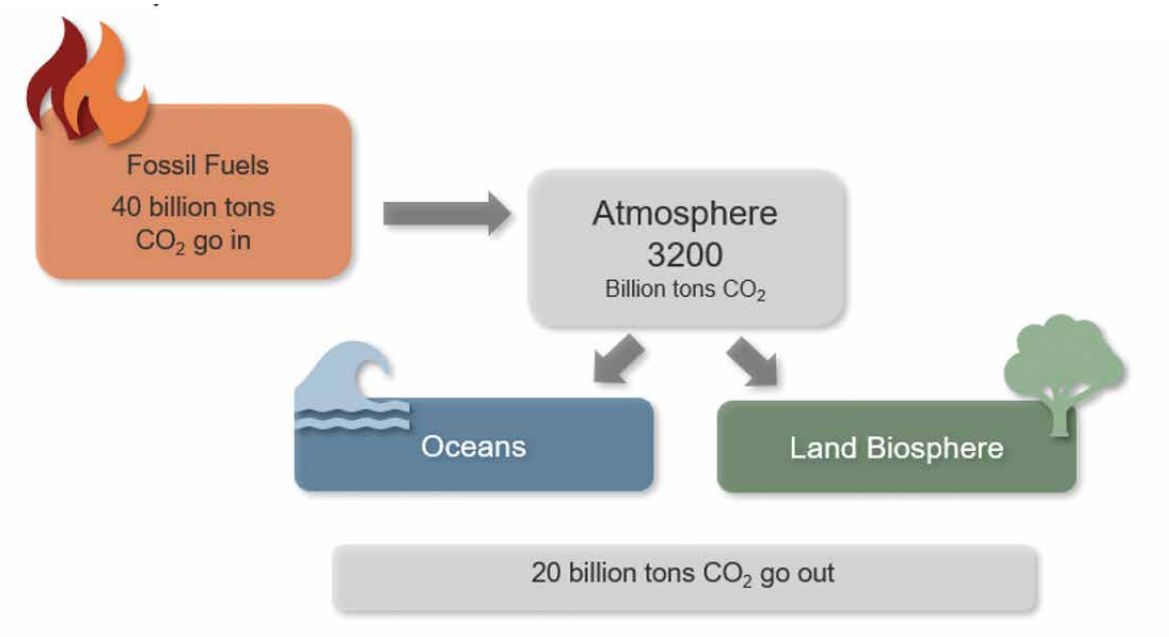
In 2022, we humans emitted approximately 40 Gt (billion tons) of fossil CO2 into the atmosphere. This is a big number. But we must also recognize that the biosphere is one extensive CO2 recycling system. The 40 Gt of CO2 pales into insignificance when compared to the 3200 Gt of CO2 already in the atmosphere and the almost four times larger amount of CO2 in carbon sinks on land; not to mention the even bigger carbon sink represented by the oceans.

According to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) from 2021, during the period 1850–2019, the land and ocean sinks absorbed 1430 Gt of CO2 or 59% of the total amount of anthropogenic (human-related) CO2 emissions. Put another way, historically more than half of the anthropogenic CO2 emissions have been removed, for free, by the biosphere every year. Furthermore, according to a recent study[1], terrestrial ecosystems (carbon sinks like soil and forests) have reduced warm-

[1] We need biosphere stewardship that protects carbon sinks and builds resilience, Johan Rockström, Tim Beringer, David Hole, Bronson Griscom, Michael B. Mascia, Carl Folke, Felix Creutzig, sep 2021

Figure 1

Half of the CO_2 we emit into the atmosphere doesn't stay there



Source: CWW, Professor Robert Socolow, Princeton University, May 2021.

"Protecting intact ecosystems, improving the management of working lands, and restoring degraded ecosystems can save around 10 Gt of CO2 per year, more than the emissions from the entire global transportation sector."

ing by at least 0.4 °C since 1900 —indicating the substantial potential nudging of the natural ecosystems can deliver in terms of addressing climate change. A recent analysis published in Nature shows that nature-based solutions can play a decisive role in reducing temperatures in the long term[2]. It estimates that protecting intact ecosystems, improving the management of working lands, and restoring degraded ecosystems can save around 10 Gt of CO2 per year, more than the emissions from the entire global transportation sector. Other recent peer-reviewed journal articles have similarly estimated that nature-based solutions could contribute around 30% of the global mitigation required by 2030/2050 to achieve the 1.5/2°C temperature rise goal agreed to under the Paris Agreement[3 & 4].

The World is on a Wrong Path

In early 2021, we published a White Paper entitled "Net Zero Emission – Mission Impossible?" on the energy transition. We concluded that 1)

[2] Nature-based solutions can help cool the planet — if we act now
[3] Natural climate solutions, PNAS
[4] Contribution of the land sector to a 1.5 °C world, Nature Climate Change

the current policy pathway would not get us to the net zero target. Solely focusing on renewable energy and "electrifying everything" was bound to fail because renewables alone can't power a sustainable economy. 2) the world needed to recognize that (cleaner) fossil fuels – primarily natural gas - would continue to be part of the energy mix for the rest of this century and that the world needed more – not less - fossil investments to deliver sustainable development for all people on earth. The world will continue to emit CO_2 into the atmosphere for a long time.

More recently, we have written extensively about the consequences of an ill-thought-through energy transition that has resulted in under-investments in primary energy and an energy crisis which will likely drag out for at least this decade. In 2021, for example, oil and gas companies replaced a mere 6% of the year's consumption through new discoveries – the lowest level since 1952. This may appear sensible, given that we want to reduce carbon emissions. The problem is, however, that the world economy is run on fossil fuels, as these still account for more than 80% of the world's primary energy supply.

We need to recognize that the planet's climate doesn't care how we get to net zero, only that we do get there. We must understand that the global economy needs more primary energy as we strive to meet climate targets to avoid a repetition of 2022, when we witnessed supply deficiencies. This led to a situation where there, unfortunately, was a transition back to burning more coal and unsustainable biomass, leading to more – not less – CO_2 emissions and degradation of nature.

Possible Solutions

In broad terms, we believe the solutions to the combined challenge of the energy transition, energy crisis, and sustainable development are:

- Massive investments in energy efficiency and electrification
- A 3-5 times increase in the yearly deployment of solar and wind capacities up to 2050
- Almost complete substitution of coal by natural gas over the next 50 years
- Acceleration of nuclear investments, both conventional as well as small modular reactors (SMR)
- Massive investments in industrial (Carbon Capture and Storage) and nature-based carbon capture.

What are Nature-Based Carbon Sinks?

They are nature-based solutions that involve conserving, restoring, or better-manage ecosystems to remove CO_2 from the atmosphere. These ecosystems address the NetZero agenda by capturing CO_2 from the air and sequester it in plants, soils, and sediments. They also provide many other essential benefits, such as cleaner air and water, economic benefits, and increased biodiversity.

Nature-based carbon sinks are essential in meeting net zero targets because of the previously mentioned continued need for fossil fuels. The reason is that they can accelerate the removal of CO_2 from the atmosphere. Therefore, much more broad-based activation of nature-based carbon

"Much more broad-based activation of nature-based carbon sinks in oceans, forests, and the soil is required to realize the ambitions of the NetZero agenda."

sinks in oceans, forests, and the soil is required to realize the ambitions of the NetZero agenda.

Types of Nature-Based Solutions

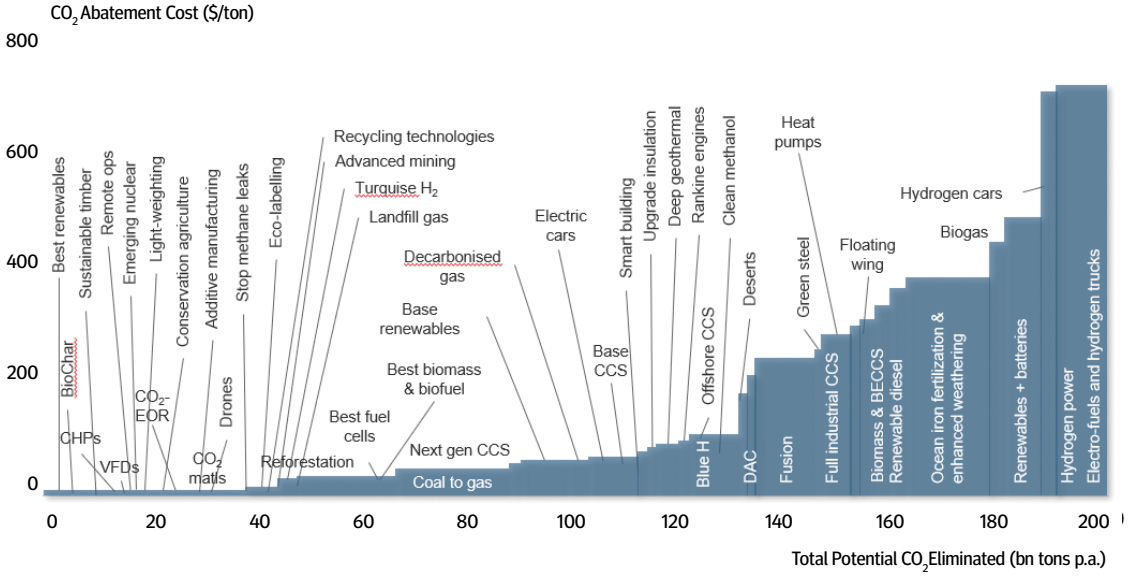
Broadly speaking, nature-based solutions fall into four categories: forestry practices, wetland-related practices, restorative agriculture, and ocean-based practices.

1) Forestry practices include planting new forests, allowing forests to regrow naturally where they have been cut down, and improving forest management. It is said that the world has lost 1/3 of its pre-industrial forest cover, which has been responsible for 1/3 of the rise in atmospheric CO_2 over the last 200 years[5].
2) Wetland-related practices focus on conserving and restoring peatlands and coastal wetlands, such as mangroves. Mangroves, tidal marshes, and seagrass meadows accumulate organic-rich soils that can provide long-term storage of organic carbon. These habitats occupy a relatively small global ocean area but significantly contribute to marine sediment organic carbon burial. Mangroves store up to five times as much organic carbon as tropical forests. As a result, mangroves have received much scientific interest as natural systems for offsetting greenhouse gas (GHG) emissions[6].
3) Restorative agriculture includes practices that build soil carbon, such as biochar, no-till agriculture, and cover crop rotation. The organic carbon content of agricultural soils has fallen from approximately 4% in pre-industrial times to around 1-2% today, due to mechanized agriculture, across the world's 3bn acres of croplands[7]. It is said to have been one of the most significant contributors to the

[5] Simple global climate model - Thunder Said Energy
[6] Frontiers | Future Mangrove Carbon Storage Under Climate Change and Deforestation (frontiersin.org)

Figure 2

Cost curve of technologies that can decarbonize the global energy system



Source: Thunder Said Energy, December 2022

"If we do the right thing, we are in a favorable position to deal cost-effectively with climate change, as the analysis behind the chart indicates the most cost-effective solutions tend to be nature-based costing in the range of $10-50 / ton of CO2 removed. "

rise in CO2 in the atmosphere over the same period.

4) Ocean-based practices include restoring sea-grass meadows or growing kelp or shellfish to restore or expand marine ecosystems.

Whilst the focus of this paper is on nature's ability to help address climate change, it should not be forgotten that not only do trees, plants, and healthy soil do a great job of removing and storing carbon dioxide from the atmosphere, they are also home to insects, birds, animals, and a world of microscopic organisms that help to underpin biodiversity. And this is done at a very competitive cost to society, as shown in the figure above.

On the x-axis is the total potential CO2 elimination per different method, while the y-axis shows the associated cost. Note that the chart depicts ways to remove five times the current fossil CO2 emissions into the atmosphere. Accordingly, if we do the right thing, we are in a favorable position to deal cost-effectively with climate change, as the analysis behind the chart indicates the most cost-effective solutions tend to be nature-based costing in the range of $10-50 / ton of CO2 removed. This is in stark contrast to many

[7] Farming carbon into soils: a case study? - Thunder Said Energy

of the currently favored but much more expensive solutions to take us to net zero depicted further to the right side of the chart. According to this research from Thunder Said Energy, abating an expected 80 Gtpa of potential emissions by 2050 is achievable: of which 21 Gtpa is renewables and nuclear, 21 Gtpa is efficiency gains, 15 Gtpa is coal-to-gas switching, 6 Gtpa is Carbon Capture, Usage and Storage (CCUS) and 18 Gtpa is nature-based CO2 removals. While we must

"For organizations operating outside the compliance markets, which is our case, the Voluntary Carbon Markets (VCM) exist, where companies can buy carbon offsets."

recognize that this is far from an exact science, the conclusion is aligned with other research mentioned above, highlighting that nature-based solutions are essential in meeting the objective of net zero.

Introduction to Carbon Markets

Mandatory Carbon Markets (MCM) were introduced after the Kyoto Protocol in 1997 to incentivize organizations to reduce emissions by turning carbon credits[8] into a commodity. MCMs are regulated through carbon reduction schemes, such as the EU's Emission Trading Scheme (ETS), where a limit is set on emissions, and participants are allocated carbon credits that can be freely traded within the market.

For organizations operating outside the compliance markets, which is our case, the Voluntary Carbon Markets (VCM) exist, where companies can buy carbon offsets. Carbon offsets are equivalent to carbon credits but issued by independent organizations instead of public authorities. Independent organizations (typically NGOs) act as regulators and facilitate carbon standards to certify carbon offsets. The main carbon standards[9] are the Verified Carbon Standard and the Gold Standard.

What is carbon offsetting?

Carbon offset projects are split into avoidance projects and removal projects. Avoidance projects aim to avoid future emissions, such as renewable energy projects. Removal projects, either

[8] "Carbon Credits represent a tonne of Co2 removed or reduced from the atmosphere"
[9] Based on data on volume of credits issued in 2022 from Climate Focus

"When buying carbon offsets, it is advised to approach projects with a healthy amount of skepticism."

industrial, such as carbon capture storage, or nature-based, remove carbon from the air and store it.

When buying carbon offsets, it is advised to approach projects with a healthy amount of skepticism. The major Carbon Standards are generally good indicators for decent projects; however, carbon offsets have received criticism. Some see offsetting as greenwashing as it removes the incentives for companies to reduce emissions. In our opinion, offsetting is an essential tool to combat climate change, but it needs to be combined with active efforts to reduce emissions. Furthermore, a few concepts are important to assess carbon offset projects. "Additionality" informs whether the project contributes with additional offsetting based on the contribution from the offsetter. An example is buying offsets from existing forests. In that case, no additional CO_2 will be offset from buying offset from this project, while buying offset from a project that expands the forest will secure an additional reduction in future emissions. The "permanence" of a project ensures emissions are kept out of the atmosphere for a reasonable length of time. " Measurability" is the question of whether carbon offsets are verifiable. At the same time, the question of whether the project is "real" can be checked with photo evidence, independent audits, and institutional partner engagement. Some projects are criticized for having adverse social and biodiversity impacts on the local communities or other aspects of the environment. Therefore, biodiversity and broader ESG aspects of the projects are of course also important.

Carbon Accounting

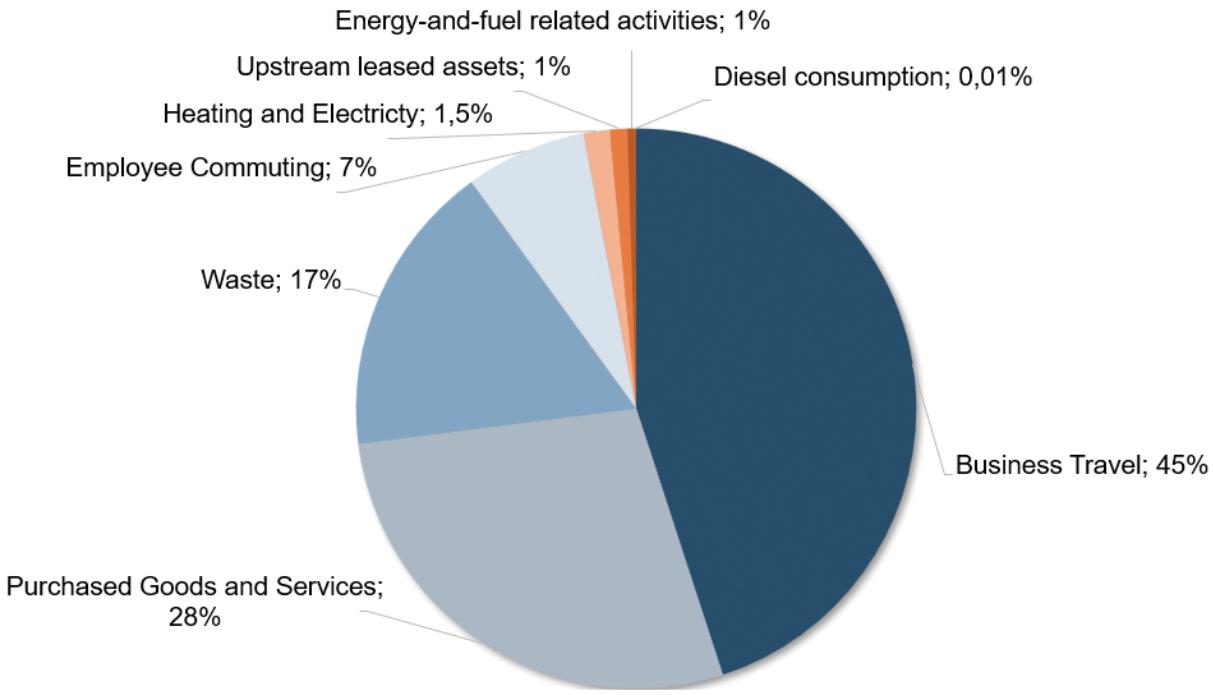
The first step towards carbon compensation is to undertake carbon accounting, which is the process of making a quantified list of an organization's GHG emissions for a given period. To compare carbon emissions across organizations, all GHG emissions are converted to "Carbon Dioxide Equivalents" (CO_2e) based on their impact on climate change relative to CO_2. The result is the organization's carbon footprint and generates insights on where to focus on reducing emissions.

At our organization, we have initiated a process whereby we started doing carbon accounting for 2021 and are currently working on our second carbon accounting for 2022. Our approach is based on the Greenhouse Gas Protocol (ghgprotocol.org), the most internationally acknowledged standard for carbon accounting developed by the World Resource Institute and the World Business Council for Sustainable development.

In figure 3, on the following page, we present an overview of our emissions. The overview is based on a mix of data from 2022 and estimations based on previous years, as some of our external data providers have not delivered data for 2022 yet.

"At our organization, we have initiated a process whereby we started doing carbon accounting for 2021 and are currently working on our second carbon accounting for 2022."

Figure 3
Overview of C WorldWide Carbon Footprint



Source: C WorldWide Asset Management, December 2022

"It is a challenge that the current VCM landscape is undersupplied with high-quality offsetting projects."

As a financial services company, our emissions are small compared to manufacturing companies, as we do not have production or energy-intensive activities. Therefore, our emissions are concentrated in our value chain consisting of upstream emissions related to the production of our product, and downstream emissions related to the usage of our product. Our downstream emissions are minimal, and most of our emissions stem from upstream emissions in the form of business travel, purchased goods and services, and waste generation. It is worth mentioning that emissions from our value chain involve a degree of uncertainty as they are dependent on third-party data and difficult to verify. We have not included the emissions from our portfolio investments in our carbon footprint, as we do not have full control of these emissions. More information on the carbon footprint of our investments can be found here.

How do we compensate?

As highlighted previously, we are on a journey with our carbon compensation, and our approach will evolve as we learn. In the long term, we would prefer to invest in several different pro-

"Eden states it has "produced, planted and protected" 977 million trees, across 280 project sites in 10 countries while paying fair wages to 14,800+ employees. Madagascar is its largest country of operation and constitutes up to 80% of its global footprint."

jects to benefit from some diversification. Today, it is a challenge that the current VCM landscape is undersupplied with high-quality offsetting projects. The rapidly increasing demand drives up prices on certified offsets without additional emissions reductions. Therefore, we have initially chosen a project without certification and will overcompensate to reduce uncertainty about our offsetting.

Eden Reforestation Projects

We have chosen to allocate funds to Eden Reforestation Projects edenprojects.org. Eden is a non-profit organization founded in California in 2004, aiming to counteract deforestation and extreme poverty. Eden hires local villagers to plant trees (and protect animal habitats) in some of the least-developed countries in the world (Madagascar, Nepal, East Africa, Haiti, Indonesia). Planting costs are said to be as low as $0.3 per tree, while tree survival rates of 80% are achieved. 75% of contribution costs go to planting trees, while 25% are administrative. This makes Eden the lowest-cost option for CO2 offsetting we have assessed.

Eden states it has "produced, planted and protected" 977 million trees, across 280 project sites in 10 countries while paying fair wages to 14,800+ employees. Madagascar is its largest country of operation and constitutes up to 80% of its global footprint.

Madagascar's mangrove plantation is also where we have decided to focus our donation. Reforestation in Madagascar is important because the destruction of the mangrove estuaries along the coastline has caused mudflats to wash into the ocean, destroying once-productive fisheries and increasing the vulnerability of coastal communities to hurricanes, tsunamis, and floods.

Our selection analysis of Eden

We are confident that Eden's activities are real and incremental. However, we do not get a guaranteed carbon offset with Eden, as certification agencies do not verify their carbon offsets. We don't view this as a significant problem. In our view, you ultimately get less bang for your buck if you purchase certified carbon credits than if you contribute to trustworthy uncertified tree-planting charities. As we do not require certified certificates, we believe it is more sensible to avoid these costs and get around the uncertainties of measurability by understanding what we donate to and by overcompensating through a more significant donation, reducing the risk of us not covering our emissions in any given year.

Since Eden is a charity that plants trees in return for donations and does not issue verified CO2 credits, the organization scores poorly on our assessment's 'measurability' component.

"Permanence" is usually the most challenging dimension in nature-based solutions. Ideally, you want to see plans for long-term sustainable forestry and land titles in a stable country, with strong rule of law, long-term alignment of incentives, and guarantees that the land will not be sold immediately after the project crediting period. To mitigate these risks, Eden has developed relationships at community and government department levels in its operating regions.

"Nature-based solutions can be viewed as a sort of "Kinder egg" in that not only do they address climate change through CO2 absorption, but they also offer the prospects of a "surprise" – namely sustainable economic and social development."

Eden makes concerted efforts to form and secure written agreements with a clause leading to a perpetual forest. Furthermore, the funding strategy includes salaries for guards to protect the restored forests to ensure protection in perpetuity. Therefore, we assess 'permanence' positively.

We also assess the social and biodiversity angles of the project positively; Eden plants native tree species, which vary from country to country. A certain percentage of agroforestry species are planted for sustainable community use. This prevents the community from entering newly restored forests and provides more significant community benefits and involvement in the project. As mentioned earlier, Eden engages almost 15,000 people and is becoming a significant agent for economic and social development for the local communities.

Conclusion

With this initiative, we hope to contribute to a higher recognition of the importance of nature-based carbon solutions in facing the challenge of climate change and sustainable development in poor regions of the world. In many ways, nature-based solutions can be viewed as a sort of "Kinder egg" in that not only do they address climate change through CO2 absorption, but they also offer the prospects of a "surprise" – namely sustainable economic and social development in regions of the world that really need support in restoring nature and building the foundations for sustainable local economies. In the years to come, we will continue our allocation back to nature and hopefully expand our reach and understanding of the complexities around nature-based solutions.

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