CLIMATE CHANGE BACKGROUND

An explanation of key climate change concepts and terminology to accompany Shift's report ***Just Transition & Just Resilience: How the UN Guiding Principles can help companies to respect human rights when taking climate action***

FEBRUARY 2023

Shift

CLIMATE CHANGE BACKGROUND

INTRODUCTION

This document is designed to accompany Shift's report *"Just Transition and Just Resilience: How the UN Guiding Principles can help companies to respect human rights when taking climate action."* It provides an overview of some key climate change concepts and explains how climate change could affect businesses. It is intended as a non-technical introduction for readers who are less familiar with climate change and is structured as follows:

Part 1 provides an overview of the causes and main drivers of climate change, explains why the 1.5°C and 2°C targets are important and why limiting climate change cannot be postponed.

Part 2 explains the relevance of the Paris Accord targets and highlights the scenarios used in the most recent IPCC reports and their relevance

Part 3 explains the impact that climate change may have on businesses, the concept and relevance of net zero targets and greenhouse gas accounting.

PART 1: The causes and main drivers of cimate change

1. What is meant by "climate change"?

Climate change refers to altered climate and weather patterns across the earth, resulting from global warming of the atmosphere – which is caused by greenhouse gases. The effects of climate change are not felt equally across the globe and include extreme temperatures, violent storms, droughts and floods. This is due in part to inequalities and variations in the vulnerabilities and adaptive capacities of the people affected.

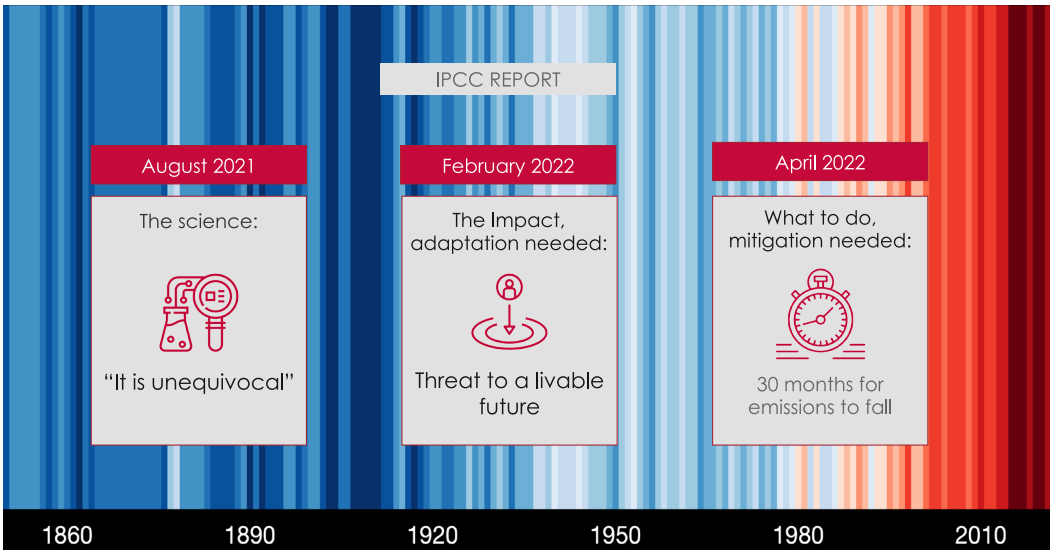
2. Is there scientific consensus around climate change?

According to NASA, 97% of actively publishing climate scientists agree that humans are causing global warming and climate change.[1]

In 1988 the United Nations established the Intergovernmental Panel on Climate Change (IPCC) to provide a clear scientific view of the state of knowledge on climate change and its potential environmental and socio-economic impacts. Since its establishment, the IPCC have issued a wide range of reports and technical papers with the support of scientists around the world. IPCC reports have become increasingly clear over the years about the anthropogenic causes of climate change. In a special report entitled "Global Warming of 1.5°C", issued in 2018, it confirmed that human activities have caused around 1°C of warming above pre-industrial levels – and that if the world continues business as usual, global warming is likely to reach 1.5°C between 2030 and 2052. The report was written by 91 lead authors and 133 contributing authors, from 40 countries, who assessed 30,000 scientific papers and made over 42,000 comments during the review process. In an earlier report, the IPCC warned that warming beyond 2°C could lead to catastrophic results.

The IPCC also prepares comprehensive Assessment Reports on the state of scientific, technical and socio-economic knowledge on climate change, including its risks and impacts, and options for reducing the rate at which climate change is occurring.

The IPCC's most recent assessment report issued in 2021/2022:



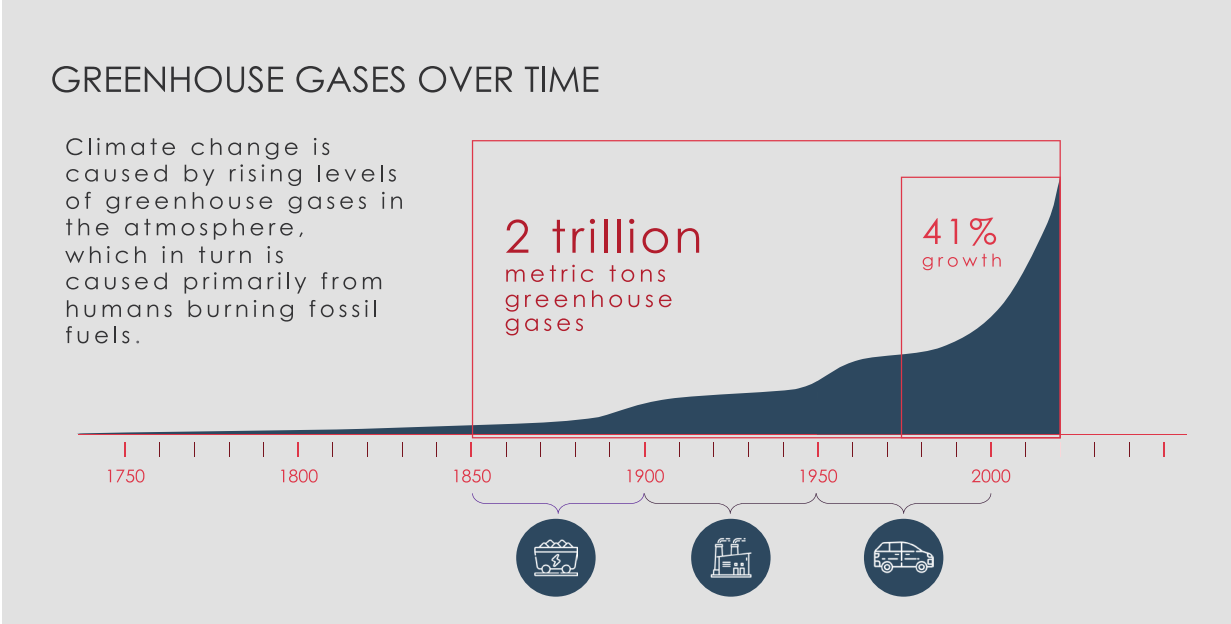
a. confirmed that "It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred "(See: Climate Change 2021: The Physical Science Basis)

b. documented the "widespread and pervasive" impacts on people and the natural world from increasingly frequent and intense heatwaves, droughts, wildfires, storms and floods. Some impacts are now irreversible. Without action, worse is coming, and faster than scientists had thought and more climate adaptation will be needed." (See: Climate Change 2022: Impacts, Adaptation and Vulnerability)

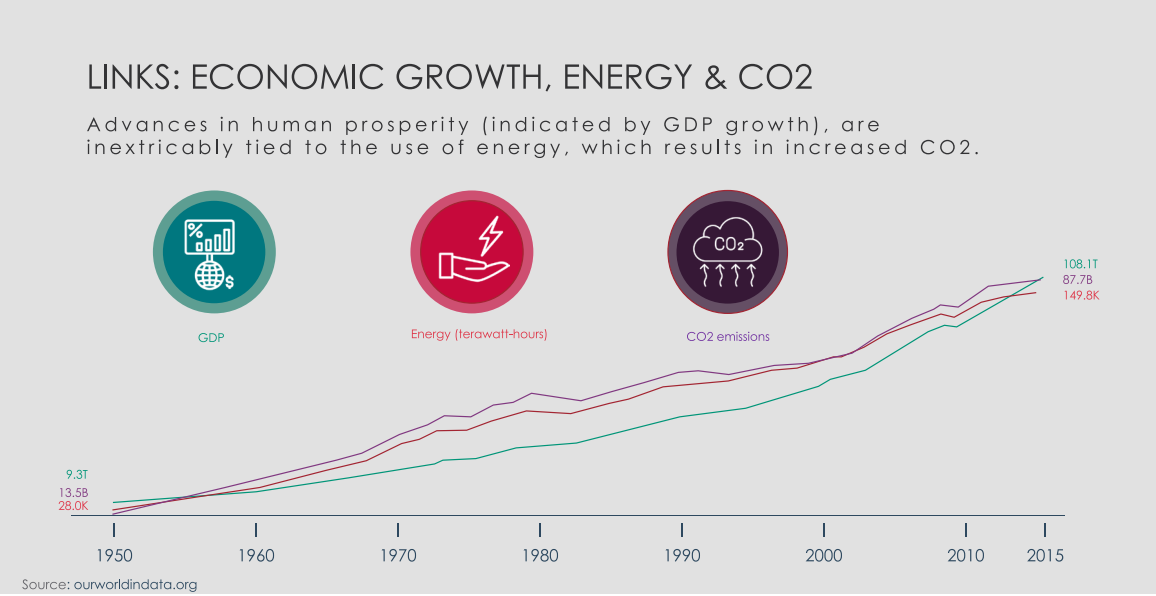
c. reviewed progress to date and confirmed that a century of rising emissions must end before 2025 to keep global heating below 1.5 °C and that this reversal requires "immediate and deep" cuts in emissions everywhere. (See: Climate Change 2022: Mitigation of Climate Change)

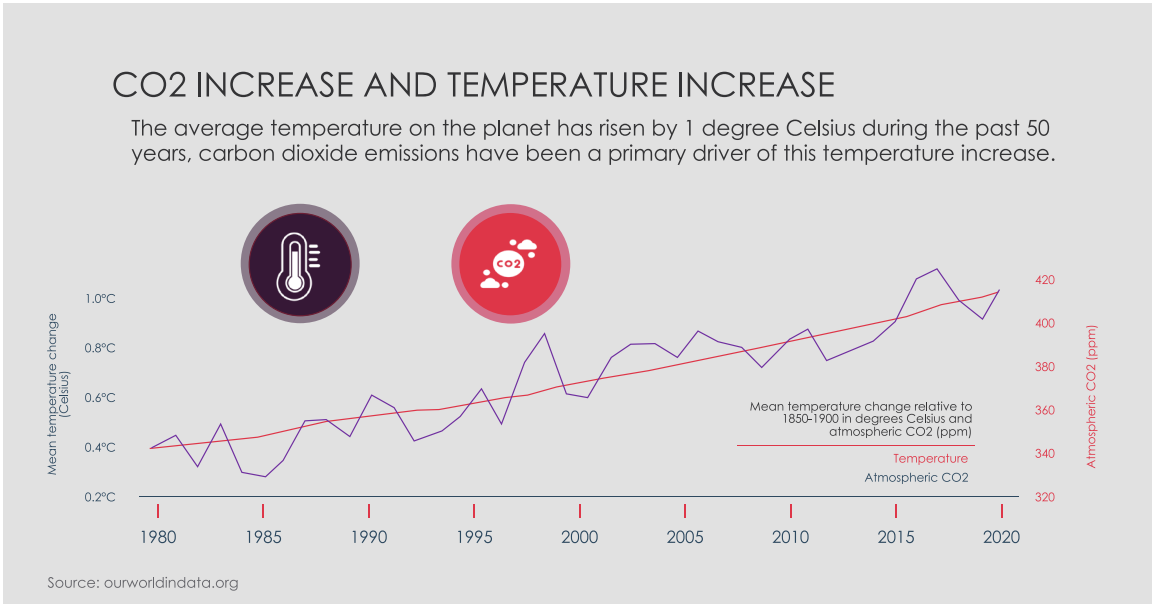
3. What causes climate change?[2]

Climate change is caused by rising levels of greenhouse gases in the atmosphere, which in turn are caused primarily by humans burning fossil fuels. Carbon dioxide is the chief culprit, but other gases like methane also play a dangerous role (see the next section for a breakdown of the sources of gases). These gases upset the natural systems that regulate our climate and lead to more extreme weather. For more than two centuries, and especially since the 1950s, economic development has resulted in an ever-increasing amount of carbon emissions. Since the start of the first industrial revolution, humans have emitted 2 trillion metric tons of greenhouse gases into the atmosphere. Global annual greenhouse gas emissions have grown 41% since 1990, and they are still climbing.



In some respects, the situation is straightforward. Advances in human prosperity, as measured by GDP growth, are inextricably tied to the use of energy. As shown below, as prosperity/GDP increases, energy consumption increases, which results in increased CO2.





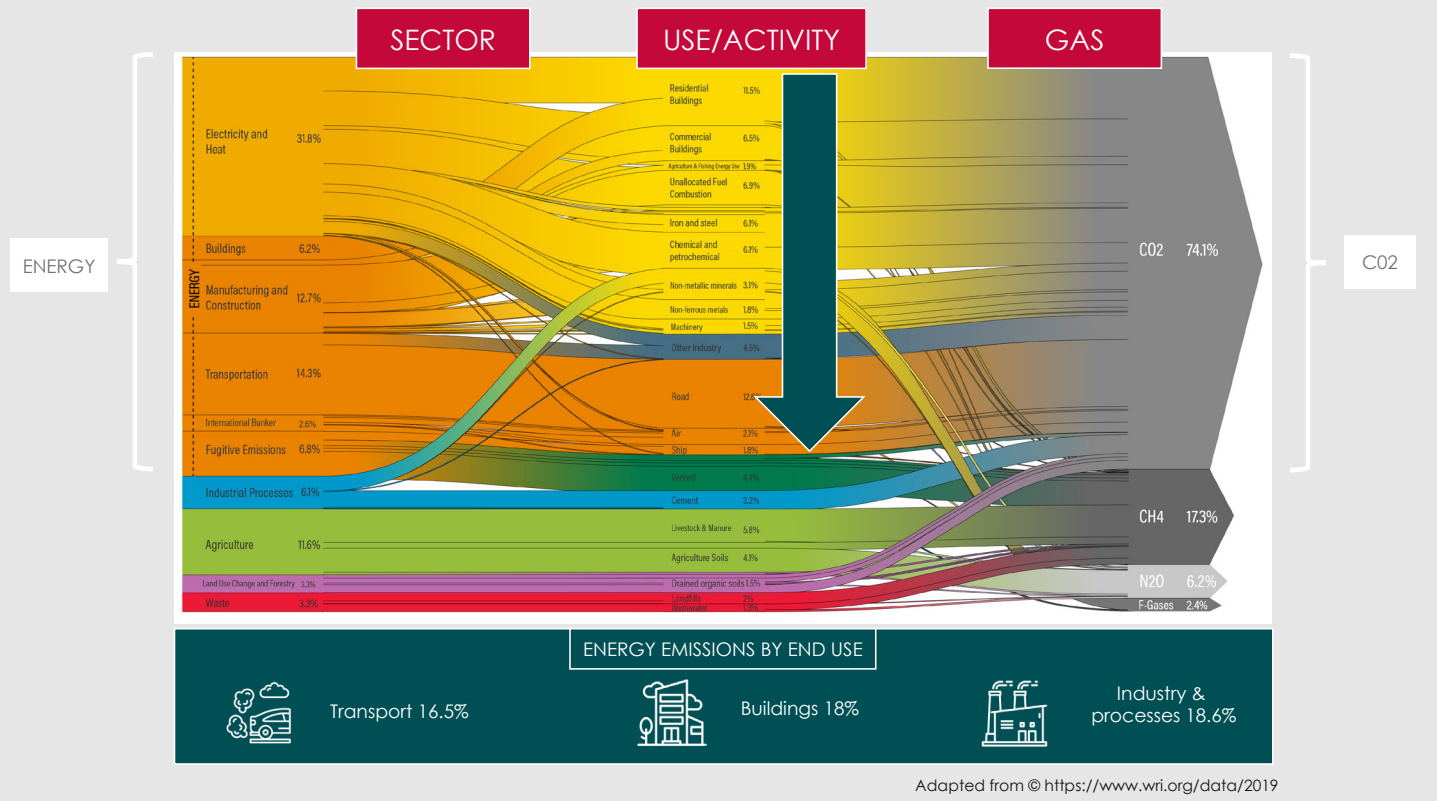
As CO2 emissions increase, so do average temperatures. As shown, the average temperature on the planet has risen by 1°C during the past 50 years. Carbon dioxide emissions have been one of the primary drivers of this temperature increase.

4. Which gases are causing climate change and where are they coming from?

Carbon dioxide (CO2) makes up 74% of greenhouse gas emissions. Two of the other main gases are methane (17%) and nitrous oxide (6.2%), which are generated mostly from gas flaring, agriculture and waste treatment. Methane and nitrous oxide are more potent in their global warming potential than CO2 so present additional opportunities to combat climate change if they were to be reduced.[3] CO2 is less powerful than gases like methane, but takes a particularly long time to disappear from the atmosphere and keeps building up over time as more is generated.

Historically, the energy sector has produced the most greenhouse gas emissions, and is currently responsible for around 76% of emissions worldwide. Other sectors and activities that produce a significant amount of greenhouse gases are: agriculture (12%), industry (6.1%), land-use change (3.3%) and waste (3.3%).[4]

Since energy is such a large contributor to CO2 emissions, it is also important to understand which sectors are the most energy-intensive. Looking at CO2 produced by the *use* of energy, it is clear that transport, heating and cooling buildings and industry consume significant energy – therefore it's important to consider measures that will reduce their energy consumption or provide clean energy alternatives,[5] such as wind, hydro, geothermal, or solar.



Adapted from © https://www.wri.org/data/2019

According to data produced by the World Resources Institute (WRI), the top 10 emitting countries generate more than two-thirds of annual emissions worldwide.[6] These top emitters account for more than half of the global population and more than three quarters of world GDP.

5. 1.5°C compared to 2°C – what's the difference?

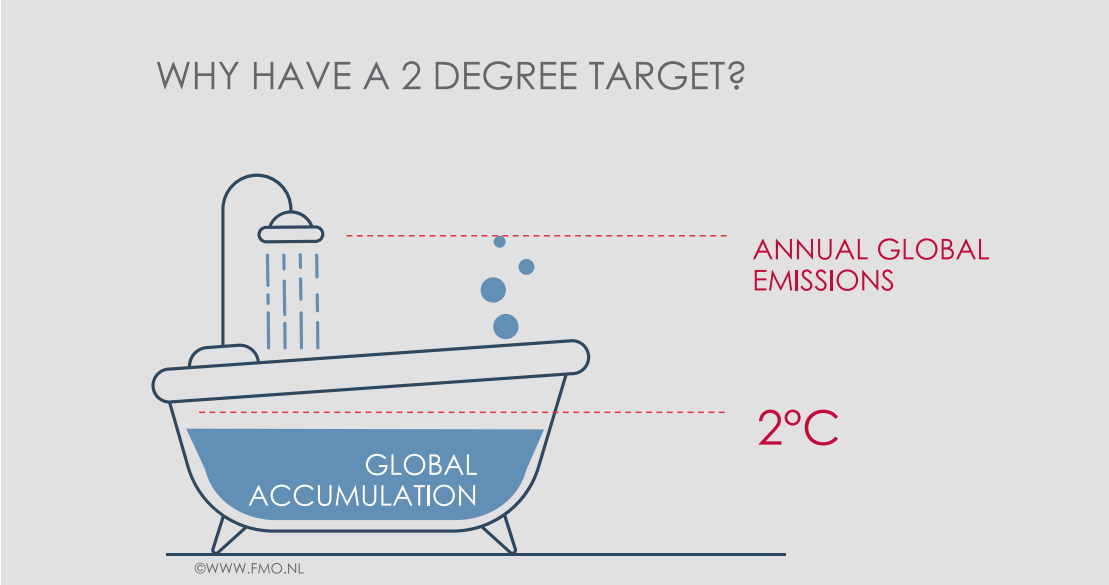
To avoid the most severe economic, social, and environmental consequences, climate experts warn that the temperature rise must be limited to 1.5°C. This equates to a remaining carbon budget of less than 10 years of emissions at their current level. Under the world's first comprehensive climate agreement, the "Paris Climate Accord", a long-term temperature goal was set to keep the increase in global average temperature to well below 2°C above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 °C. (See below for more on the Paris Agreement). While it is only half a degree difference, models indicate that it could be a world apart when considering the impacts at these different levels.[7] For example, at 2 °C:

- the global population exposed to severe heat at least once every five years could double to 37%;
- the number of ice-free summers in the Arctic could multiply 10-fold;
- 18% of insects, 16% of plants and 8% of vertebrates are projected to lose more than half their habitat. If warming is limited to 1.5°C, this loss is reduced by two-thirds for insects, and halved for plants and vertebrates.
- 13% of the Earth's land area is projected to witness biome shifts (for example from tundra to forest), or transformation. With 1.5°C of warming, this risk is lowered to 4% of Earth's land area.

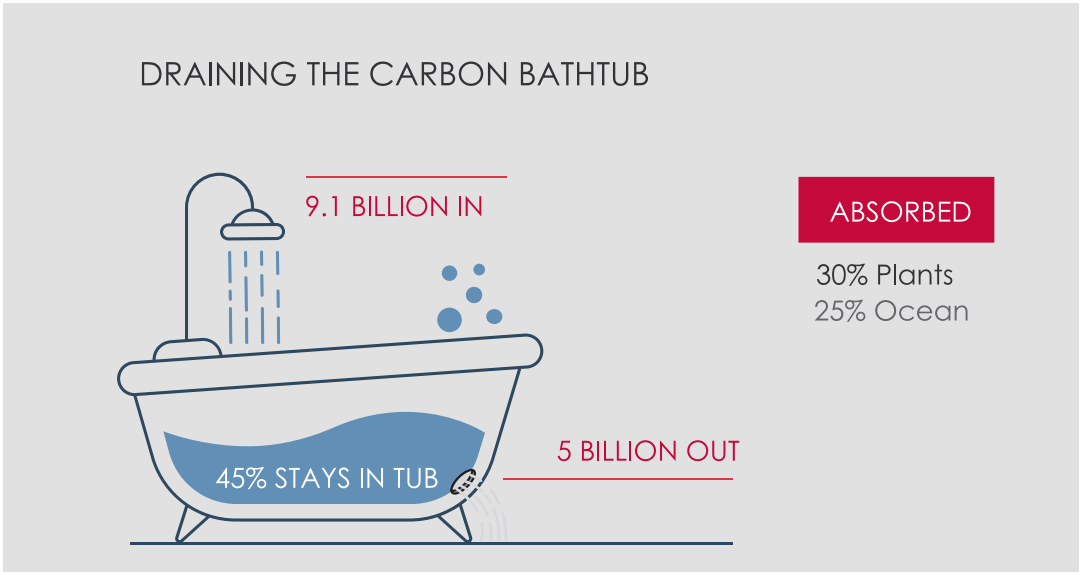
6. Why is it urgent to take action to combat climate change?

Some people believe that if we stop the growth of emissions, we will stop global warming – and that if we cut emissions, we will quickly return to a cooler climate. This is because we tend to think that the output of a process should be correlated with its input: i.e., if greenhouse gas emissions are causing climate change and global warming, the climate will cool again as soon as greenhouse gases are reduced. However, in systems with significant accumulations, such correlational reasoning does not hold. Rather, it's more like filling a bathtub.[8]

The amount of carbon dioxide in the atmosphere is like the level of water in a bathtub. The level grows as long as you pour more water in through the faucet than drains out. Right now, we pour about twice as much CO2 into the atmospheric tub as is removed by natural processes, so the bathtub will continue to fill.



Worldwide, about 9 billion metric tons of new emissions are added into the atmosphere each year. Only about 5 billion can be absorbed by plants, soil and the ocean. The remaining 4 billion metric tons stay in the atmosphere and accumulate. Also, once CO2 enters the atmosphere, it can take thousands of years to disappear again. This means that even if there is a total stop on CO2 emissions today, the effect will not be felt for a very long time.



In its most recent report, the IPPC states that 2,400bn tonnes of CO2 have been emitted by humanity since 1850, and that we can only release another 400bn tonnes to have a 66% chance of keeping to 1.5°C. This means that 86% of our carbon budget has already been spent.

The report says the science is clear – if emissions are slashed then temperatures will stop rising in a decade or two and increases in deadly extreme events will be strongly limited. However, many changes resulting from past and future greenhouse gas emissions will be irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level.

PART 2: THE INTERNATIONAL RESPONSE TO CLIMATE CHANGE AND SCENARIO MODELLING

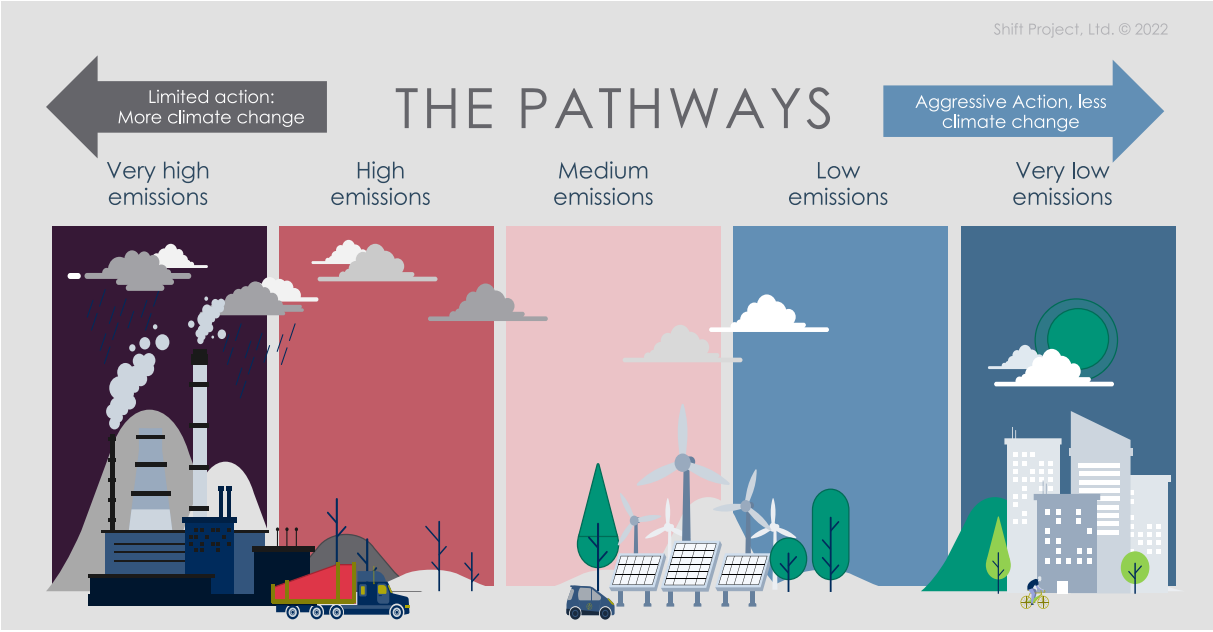
7. What has the response to climate change been?

At the UN Climate Conference in Paris in 2015 (COP 21), an international agreement was reached to:

- reduce greenhouse gas emissions to limit the average global temperature rise by the end of this century to below 2°C and to strive for 1.5°C (i.e., mitigation, or limiting the causes of climate change);
- increase the ability to adapt to the adverse impacts of climate change and to foster climate resilience (i.e., adaptation, or reacting to the effects of climate change); and
- make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Since countries have different resources and circumstances, the agreement was designed so that each country would define its own targets and plan to contribute to the overall goals of the Paris agreement. These country plans are called NDCs (Nationally Defined Contributions) and every five years, countries are required to update their commitments with increasingly ambitious targets. Almost all NDCs have targets to reduce CO2 emissions by a certain amount over a given time. Most NDCs also indicate how climate change will affect the country and what actions will be taken to build resilience to adapt to the effects of climate change. Many countries have also started National Adaptation Plans (NAPs).[9]

A UN report in 2021 showed that current national climate pledges put the world on track for a global temperature rise of 2.7°C by the end of the century, which would lead to catastrophic changes in the Earth's climate.[10] To keep global warming below 1.5°C, the world needs to halve annual greenhouse gas emissions by 2030, as compared to 2022 levels.



8. How do scientists know how climate change will develop?

Scientists develop scenarios to do climate modeling. In its 2021 report, the IPCC used five new scenarios to present possible evolutions of the climate throughout the 21st century as a function of greenhouse gas (GHG) emissions and of the development of human societies.

- These five scenarios cover **a wide range of plausible futures** for GHG emissions – from a scenario in which CO2 emissions decline drastically to carbon neutrality by 2050, and are negative in the second half of the century (SSP1-1.9), to a scenario in which CO2 emissions continue to rise sharply to twice current levels in 2050 and more than three times current levels in 2100 (SSP5-8.5).

- The world is likely to temporarily reach 1.5°C of warming within 20 years even in a best-case scenario of deep cuts in greenhouse gas emissions. **Even with rapid emissions cuts, temperatures would continue to rise until "at least" 2050 and lead to further extreme weather events.** Without "immediate, rapid and large-scale reductions" in emissions, curbing global warming to either 1.5°C or even 2°C above pre-industrial levels by 2100 would be "beyond reach".
- Living in a world that is 1.5°C warmer in 20 years than it was 200 years ago, means a heatwave that would previously have occurred once in 50 years is likely to occur nine times in the same timespan. In the more serious instance of 2°C warming, it goes up to 14 times (averaging every three-and-a-half years).
- In all the scenarios considered, warming exceeds the 1.5°C limit in the next 20 years.

The most recent IPCC reports show:

- some climate change has become unavoidable and **there is an immediate need for adaptation action**.
- despite the fact that more climate change has become unavoidable, **the long-term objective of limiting warming to 1.5°C in the long term is not lost, and drastic mitigation action remains essential.**[11]

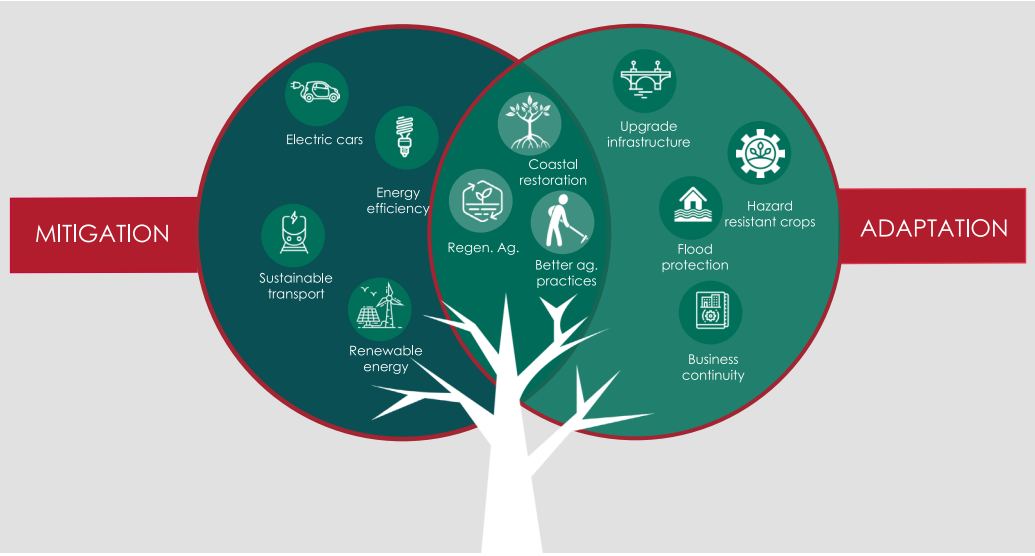
PART 3: THE BUSINESS RESPONSE TO CLIMATE CHANGE

9. Mitigation and adaptation action by businesses

Because some climate change is already happening, and since some impacts are now unavoidable, business responses to climate change involve a two-pronged approach, similar to the approach taken by national governments under the Paris Accord (as explained above):

- **Mitigation** – reducing future climate change – involves reducing the flow of heat-trapping greenhouse gases into the atmosphere, either by reducing sources of these gases (for example, the burning of fossil fuels for electricity, heat or transport) or enhancing the "sinks" that accumulate and store these gases (such as the oceans, forests and soil). The goal of mitigation is to avoid further significant human interference with the climate.
- **Adaptation** – adapting to, and preparing for, a life in a changing climate – involves adjusting to actual or expected shifts in future climate. The goal is to reduce vulnerability to the harmful effects of climate change (like sea-level encroachment, more intense extreme weather events or food insecurity) and to increase resilience to climate impacts.[12]

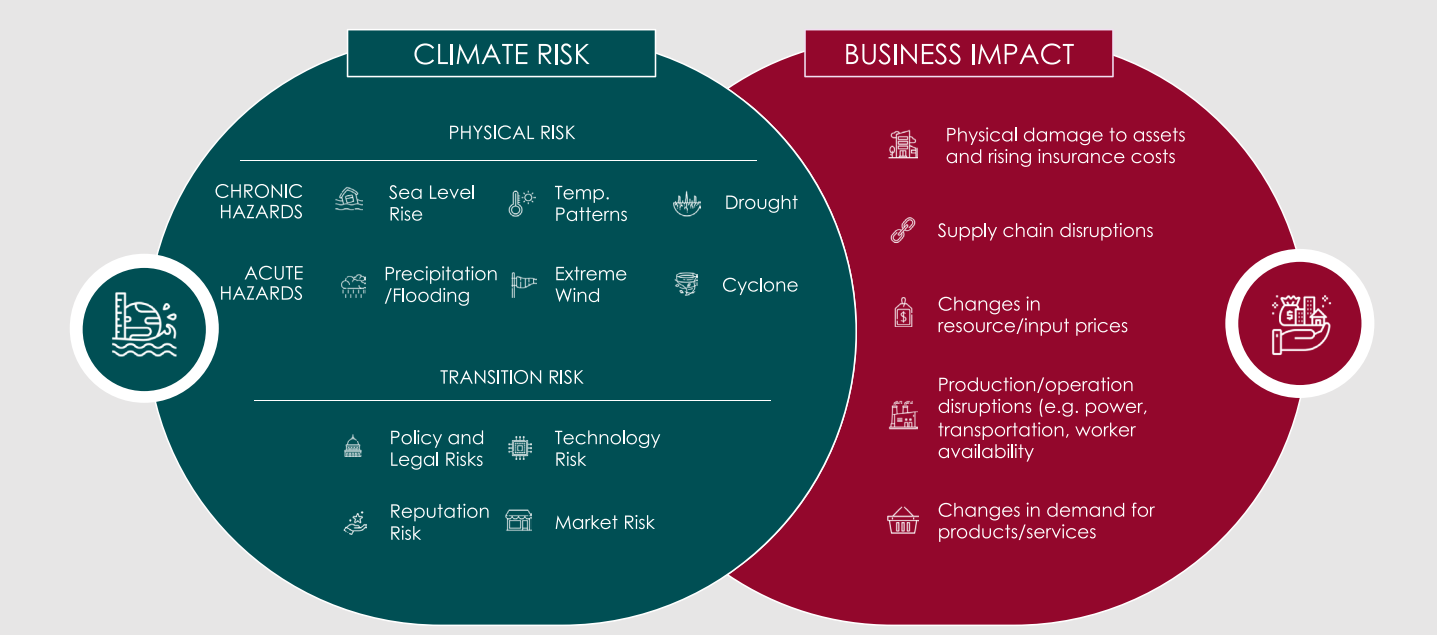
In the diagram, some actions taken by companies are highlighted. Some interventions give both mitigation and adaptation benefits (see the overlap of the two green circles). Natural climate solutions (NCS) such as reforestation, avoided deforestation, coastal restoration & improved agricultural management can provide more than a third of the mitigation needed by 2030 to keep warming below 2°C. If NCS is effectively implemented it offers resilience benefits too, such as flood buffering, improved soil health & enhanced crop productivity.



10. How may climate change impact businesses?

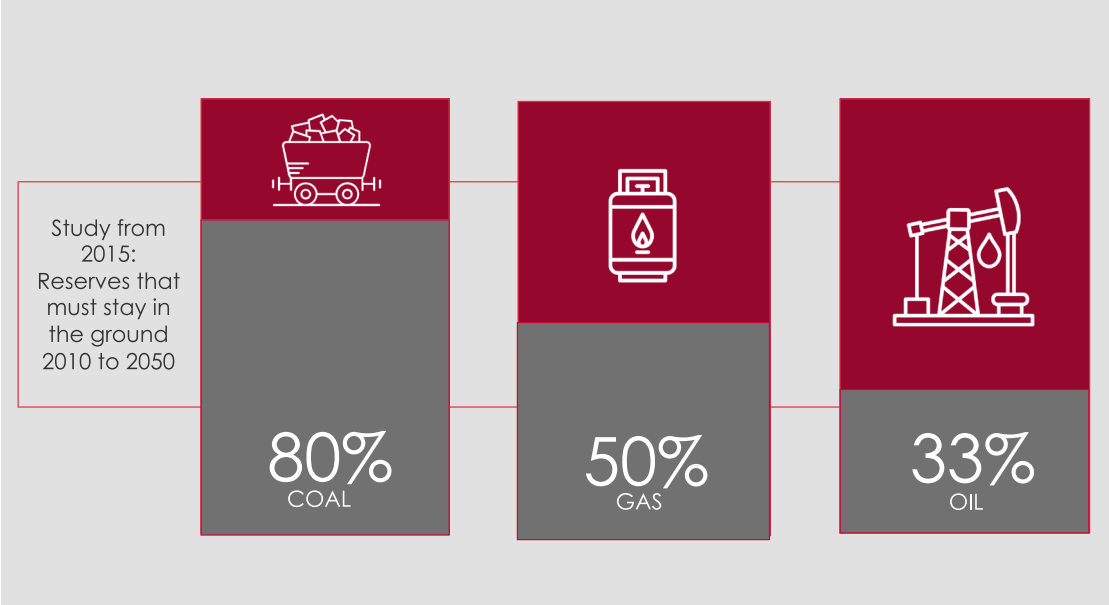
There are two main drivers of climate-related risks to business:

- **Physical risk:** this is typically understood as the financial impact of the physical effects of a changing climate. This includes **more frequent extreme weather events** and gradual changes in climate, as well as environmental degradation, such as air, water and land pollution, water stress, biodiversity loss and deforestation. Physical risk is classified as **"acute"** when it arises from extreme events, such as **droughts, floods and storms**, and **"chronic"** when it arises from progressive shifts, such as increasing temperatures, sea-level rises, water stress, biodiversity loss and resource scarcity. Physical risk can be **direct,** for example, damage to property or reduced productivity, or **indirect** by causing subsequent events, such as the disruption of supply chains.
- **Transition risk:** this is typically understood as the financial impacts that result, **directly or indirectly,** from the process of adjustment towards a lower-carbon and more environmentally sustainable economy. This could be triggered, for example, by a relatively abrupt adoption of **climate and environmental policies,** technological progress or changes in **market sentiment** and preferences. The risk of litigation, is sometimes included as a transition risk.



Transition Risk

All scenarios limiting warming to 2°C or below include "greatly reduced" fossil fuel use. In 2015 a modeling study proposed that one-third of oil reserves, half of gas reserves and more than four-fifths of coal reserves would have to stay underground in order to keep global warming below 2°C, relative to pre-industrial temperatures.[13]



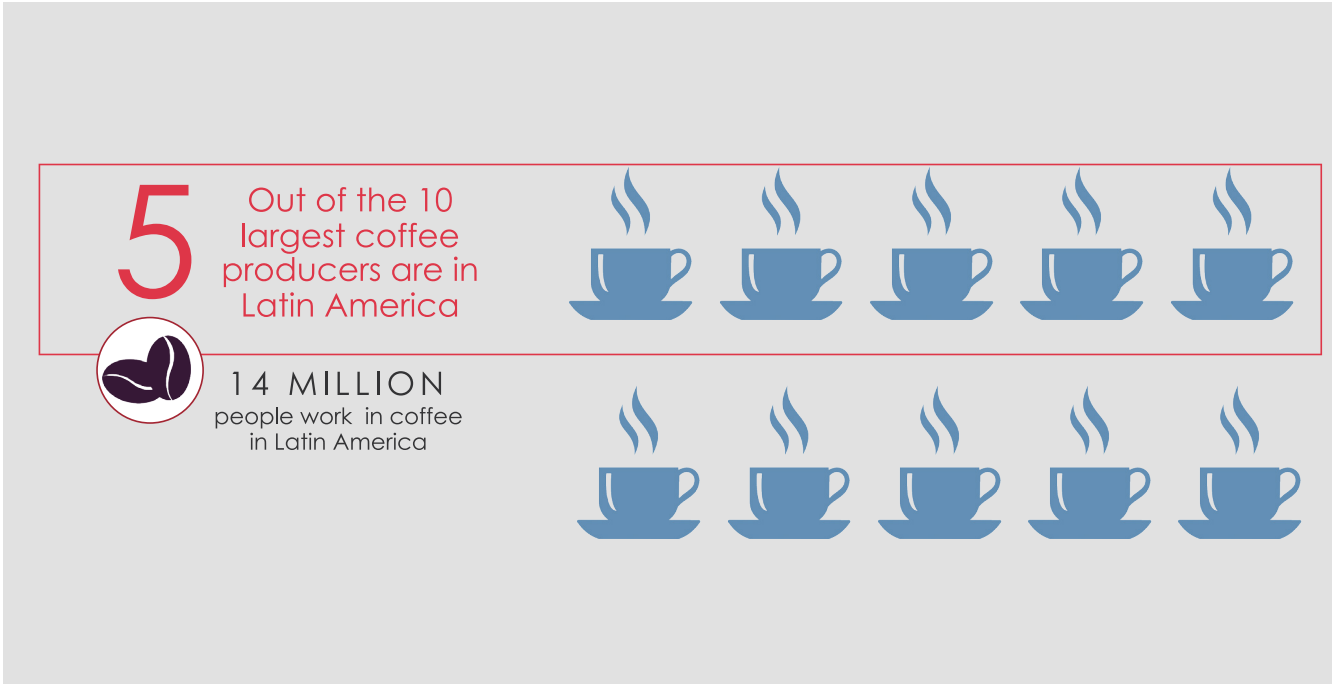
In a road map to net zero published by the International Energy Agency in 2021, it was proposed that to reach net zero by 2050 there should be no investment in new fossil fuel supply projects and no coal-fired power stations unless they are fitted with equipment to stop their carbon emissions. The road map also proposed that there be no sales of new internal combustion engine passenger cars by 2035, and that the global electricity sector reach net-zero emissions by 2040.[14]

In addition to damage caused by the physical impacts of climate change and the risk of fossil fuel-linked assets losing value in the transition of the world economy to a low carbon future, business performance could also be affected by indirect impacts of climate change, such as risks to specific crops, general biodiversity loss and water scarcity.

Risks to Crops: Coffee is an example of a crop that could be affected by climate change. Coffee is highly sensitive to weather variations. Increasing temperatures, more extreme weather events and unpredictable rainfall patterns have disrupted growing cycles and promoted the spread of pests and diseases attacking coffee plants. More than half of coffee varieties worldwide are at risk of extinction due to a combination of climate change, disease and deforestation.

Worldwide revenue in coffee was around US$434 bn in 2022[15] and this market could be significantly destabilized by the impacts of climate change and affect the livelihoods of many smallholder farmers.[16]

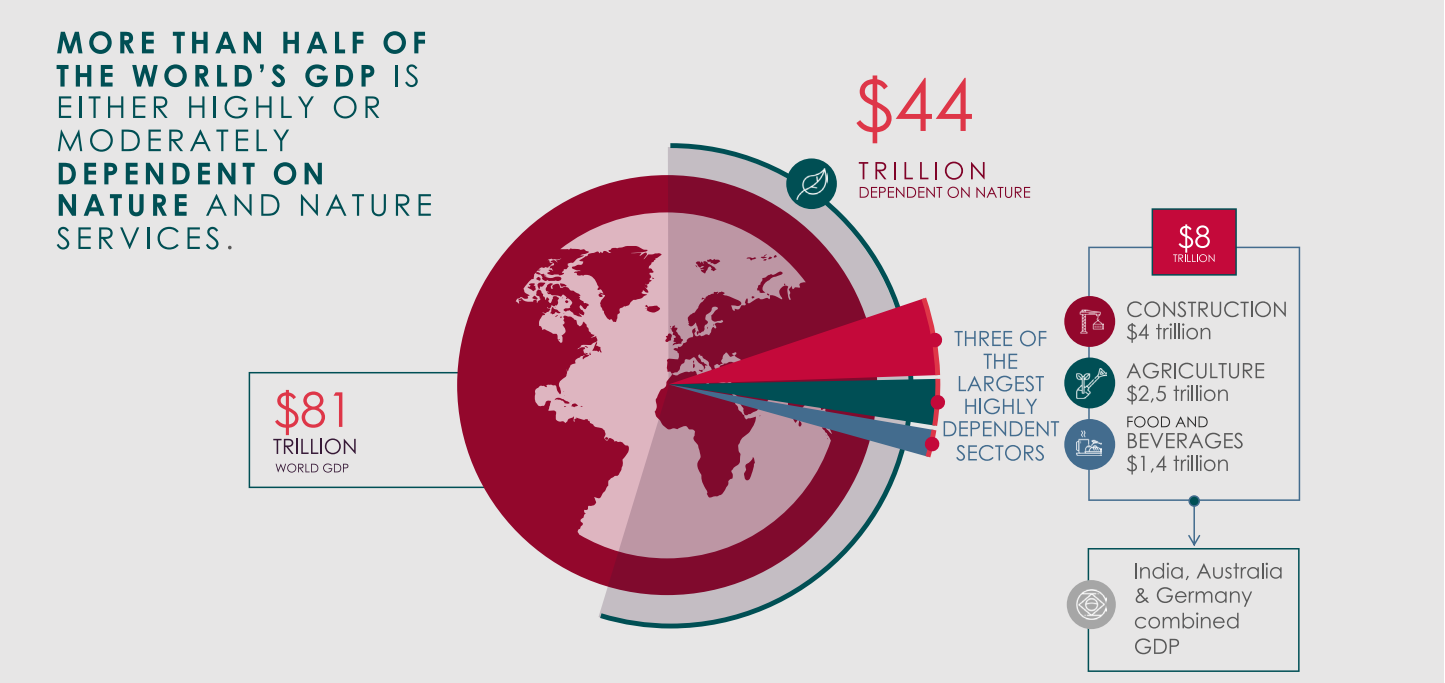
Five of the world's largest ten coffee producers are in Latin America (Brazil, Colombia, Honduras, Peru and Mexico). Across the region, the industry employs more than 14 million people.[17] Average temperatures have started to increase in Central America over the past several decades, making the cultivation of coffee difficult at lower altitudes that were once suitable. Rising temperatures may reduce the area suitable for growing coffee in Latin America by up to 50% by 2050.[18]



Coffee farmers are forced to search for land at higher altitudes, switch to other crops, change professions or move away from their farms. Overall, climate related migration is set to increase significantly in the future. A recent report by the World Bank, estimates that internal migration will increase to 17 million by 2050 in the absence of development and climate action.[19]

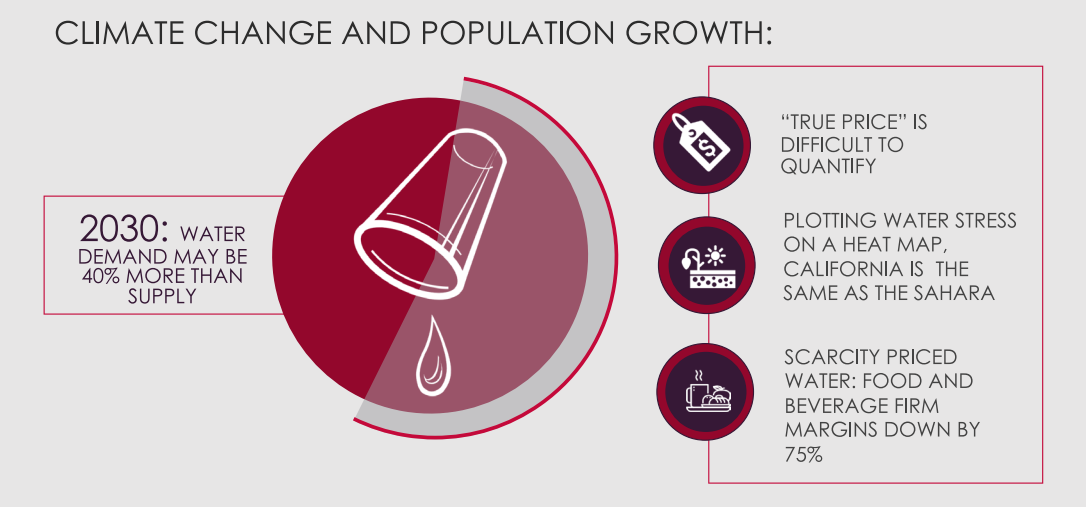
Biodiversity loss: Climate change increases biodiversity loss, which could result in economic loss. Human societies and economies rely on biodiversity in fundamental ways. Nature loss matters for most businesses – through impacts on operations, supply chains, and markets. One report from the World Economic Forum,[20] shows that more than half of the world's GDP is either highly or moderately dependent on nature and nature services. That is $44 trillion of economic value generation.

The three largest sectors that are highly dependent on nature generate value greater than USD 8 trillion – or more than four times the size of the Brazilian economy.[21] The three sectors are: construction ($4 trillion), agriculture ($2,5 trillion) and food and beverages ($1,4 trillion).



Water scarcity: Climate change and population growth will affect availability of water and this could impact the cost of doing business. For example, the market price of water does not reflect the environmental and social costs of using it. Government subsidies mean that companies often do not pay for its true cost. As water becomes more scarce, subsidies could become more costly and unpopular, forcing governments to retract them and resulting in a significantly higher cost of water use. S&P Global Trucost, estimated that if Fortune 500 companies were to pay the true cost of water based on estimates of scarcity, rather than current prices, their profit margins would shrink by a tenth. Margins for food, drink and tobacco firms would fall by three-quarters.[22]

More efficient water allocation and use will be vital to economic growth in the face of climate change: without such approaches, the GDPs of India, China and Central Asia would be between 7 and 12 percent lower, and those of much of Africa would be about 6% lower by 2050. The number of people who may lack sufficient water, at least one month per year, will soar from 3.6 billion today to more than 5 billion by 2050.[23]



11. Why are governments and companies committing to "net zero"?

In scenarios that limit warming to 1.5°C, CO2 reaches net zero on average by 2050. The term "net zero" came from a 2013 IPCC report, which discussed the need to eliminate net greenhouse gas (GHG) emissions to stop global warming. The "net" relates to the balance between emissions generated by human activities and those removed either naturally or artificially through carbon-capture technologies (i.e., the carbon bathtub referred to earlier). The report paved the way for the Paris Agreement in 2015, with each signatory pledging to meet the targeted equilibrium – "net zero" – by 2050 at the latest.

The world will achieve net-zero emissions when any remaining human-caused GHG emissions are balanced out by removing GHGs from the atmosphere in a process known as carbon removal. In a business-as-usual scenario, GHG emissions will continue as shown in Figure A. In taking climate action, human-caused emissions — like those from fossil-fueled vehicles and factories — should be reduced as close to zero as possible, as shown in Figure B. Any remaining GHGs would be balanced with an equivalent amount of carbon removal, for example by restoring forests or through direct air capture and storage (DACS) technology, as shown in figure C. In scenarios that limit warming to 1.5°C, CO2 reaches net zero on average by 2050 as shown in figure D.

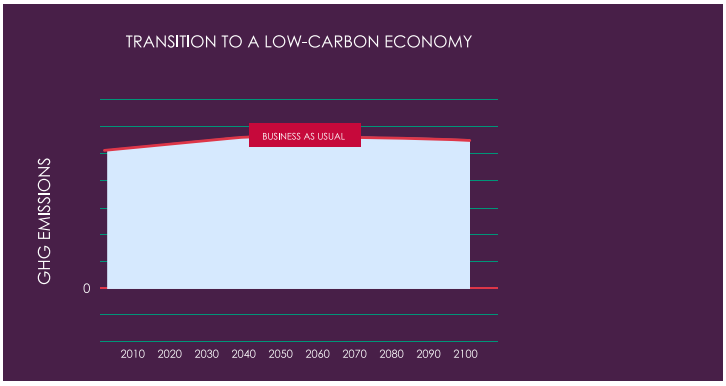


Figure A

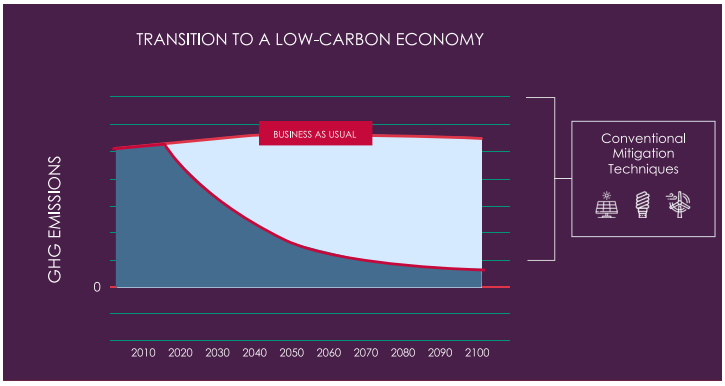


Figure B

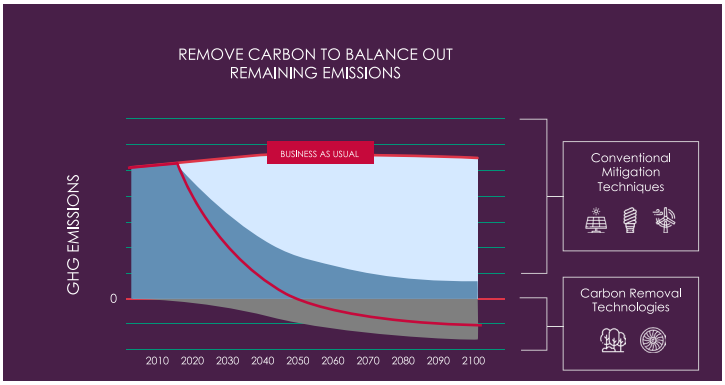


Figure C

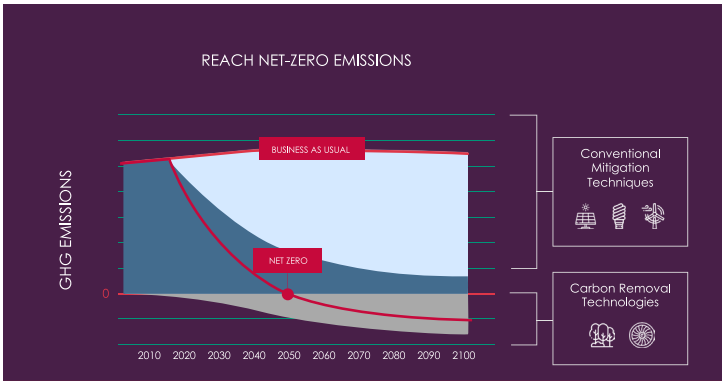
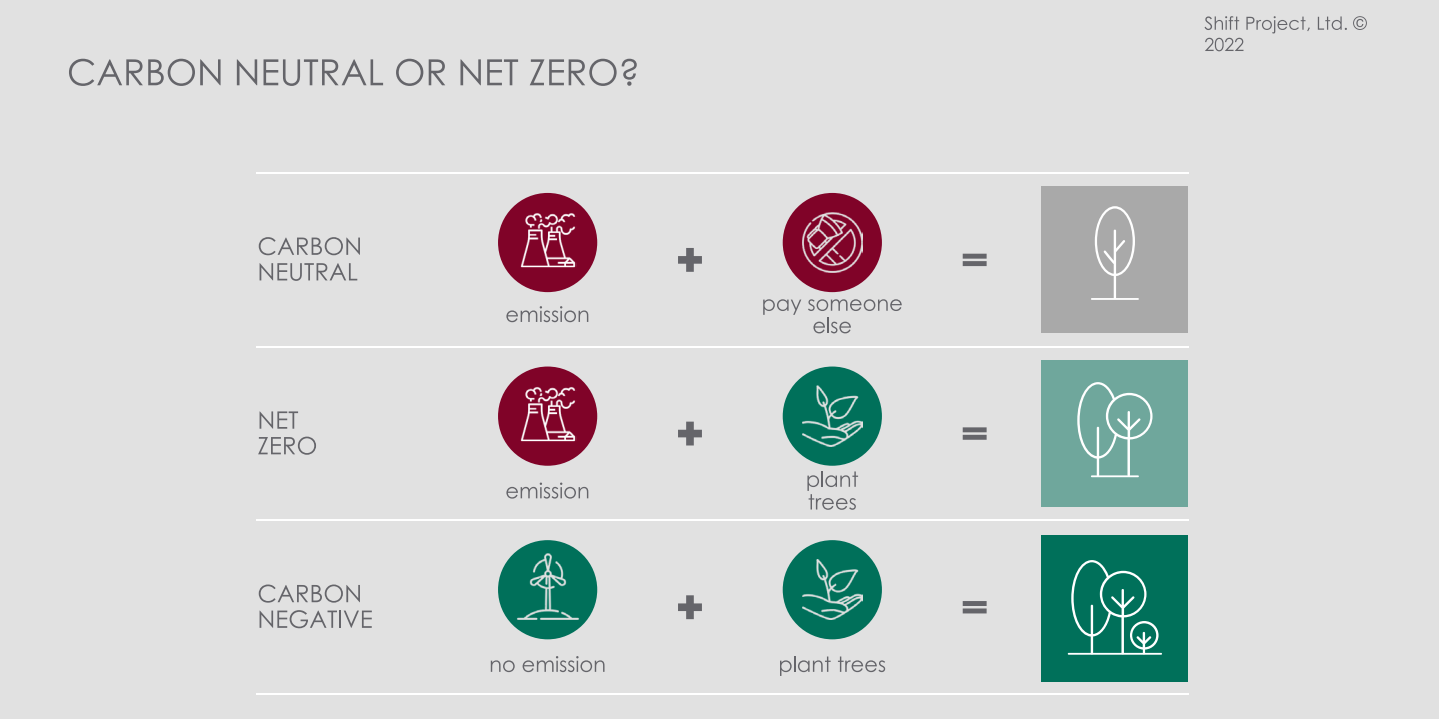


Figure D

Target setting by companies: It has become common for companies to set targets to reach net zero or carbon neutrality for their businesses. The difference between the terms can be understood as shown in the following graphic:[24]

- Carbon neutral is, for example, if you use coal for your business and you pay someone not to cut down trees on their property. You are avoiding a negative, not creating a positive – you do not add to the world's ability to cope with greenhouse gases.
- Net zero is when you add to the world's ability to cope, for example by planting more trees. So you still emit, but the sum adds up to zero because you add to the world's ability to absorb greenhouse gases.
- Carbon negative is when you take more out of the system than you put in – i.e., in the prior example, you plant trees, and you also use wind power.

Some experts, for example the French environmental agency, have argued that setting net zero targets only makes sense at national and international levels. The argument is that the IPCC defined "net zero" as a balance between CO2 emissions and absorptions on a global scale and it does not imply a sum of "net zero" at all sub-scales of municipalities and companies in a country. The argument is that some municipalities or companies – for example rural municipalities or companies active in the food and agriculture sector – have a higher potential to contribute as carbon sinks, so they should have an ambition to become carbon negative.[25]

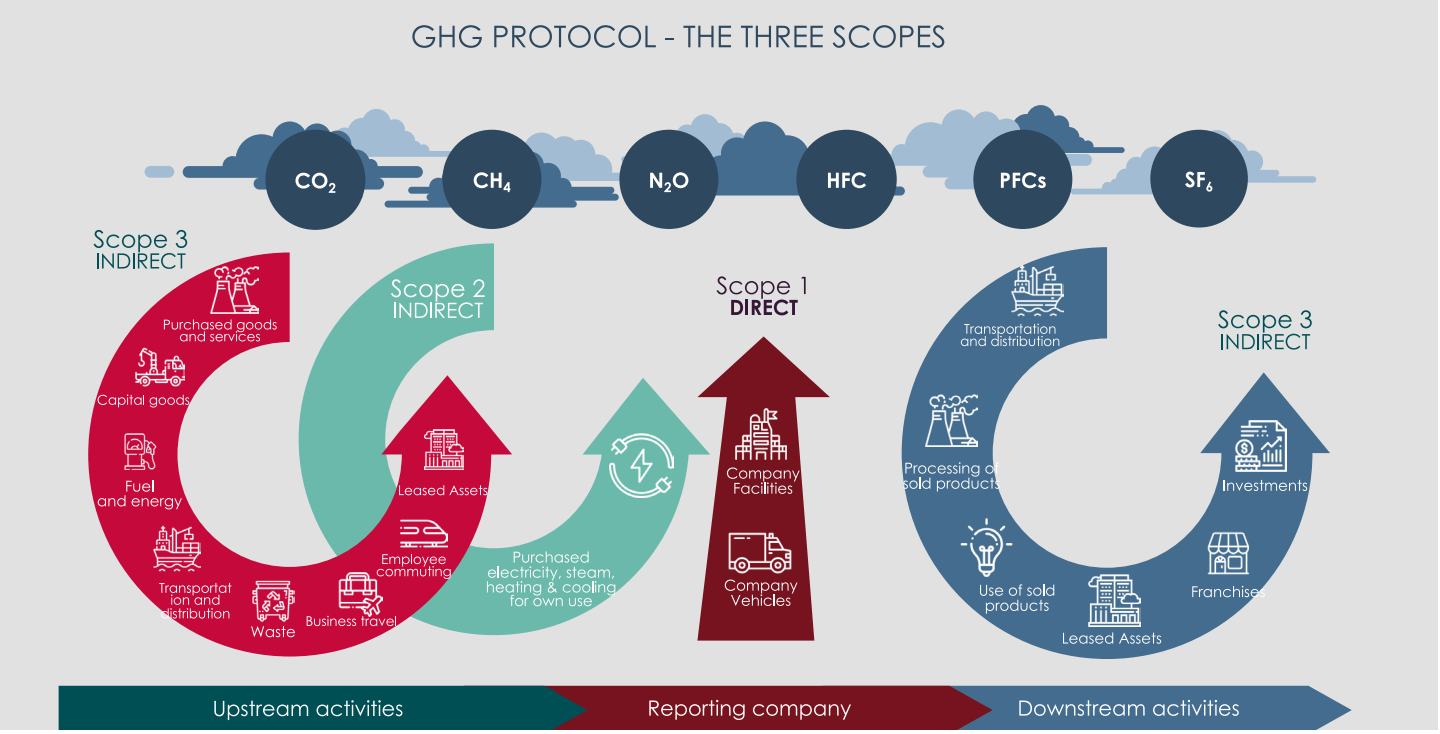


12. How do companies account for their greenhouse gas emissions?

The common standard for greenhouse gas accounting, is the Greenhouse Gas Protocol[26] which classifies an entity's emissions into three categories, or "scopes."

- Scope 1 emissions are the **direct emissions** that the **activities of a business create**, for example the trucks it uses to transport its products. Scope 1 emissions are particularly important in sectors such as mining, aviation and the chemical industry.
- Scope 2 emissions are **indirect emissions** that come from the production of the **electricity or heat** a **business buys**, for example to light its buildings or power its factories. Scope 2 emissions are significant in energy intensive industries such as iron and steel manufacturing.
- **Scope 3** emissions are the **indirect emissions** that **all the other activities of a business create**. These emission sources can be extensive, and must be accounted for across its entire value chain, the materials in its buildings, the business travel of its employees, and the full life cycle of its products, including the electricity customers

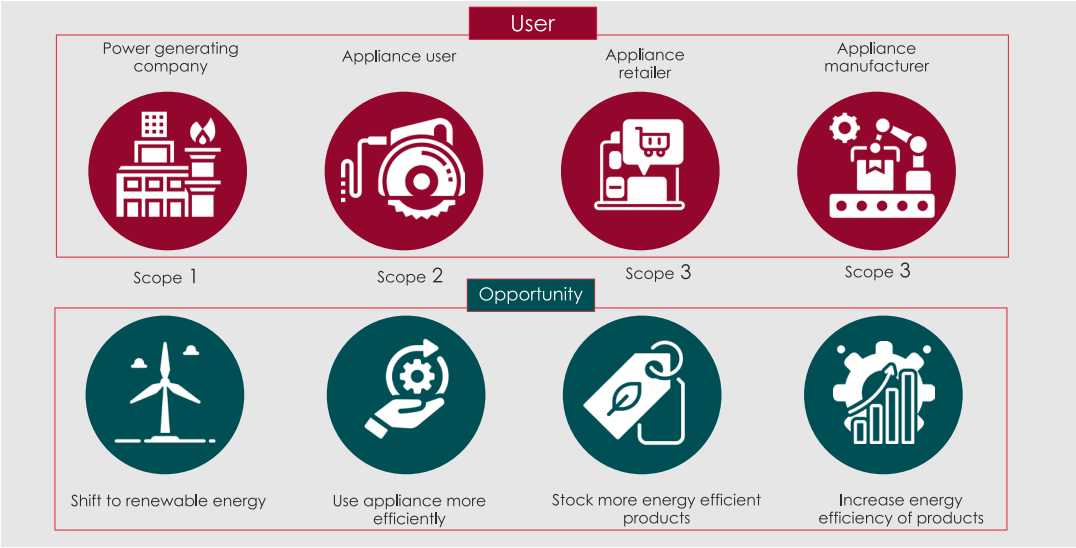
may consume when using the product. Given this broad range, a company's scope 3 emissions are often far larger than its scope 1 and 2 emissions put together. A good example is the automotive industry, where the main exposure lies not so much with the sector's own emissions in manufacturing vehicles (scope 1) or the energy sources it uses to produce vehicles (scope 2), but with carbon combustion by end users of the vehicles (scope 3).



Graphic adapted from https://ghgprotocol.org/scope-3-technical-calculation-guidance

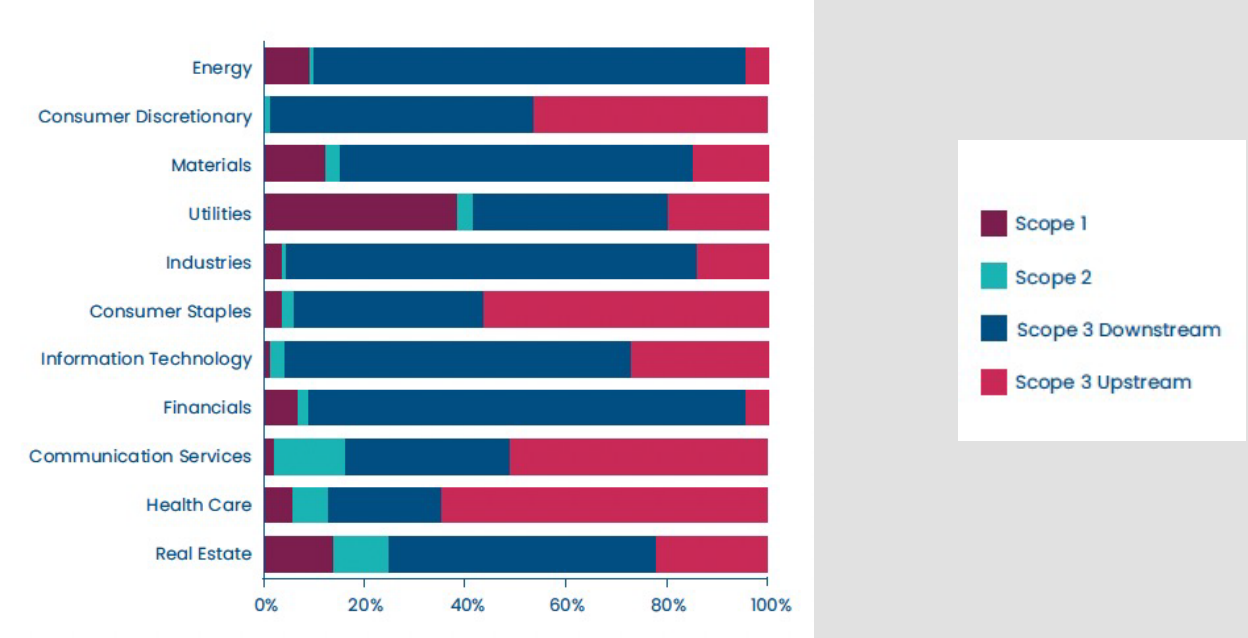
For a single reporting company, its Scope 1, 2 and 3 emissions are mutually exclusive, so there cannot be any double counting between the categories. The three scopes are also defined in a way to ensure that two or more companies do not account for the same Scope 1 and Scope 2 emissions.[27] However, Scope 3 emissions are defined in a way that does allow double counting between multiple companies.

For example, the Scope 1 emissions of a power generating company, are the Scope 2 emissions of an electrical appliance user. The emissions generated by the electrical appliance user are Scope 3 emissions for the manufacturer of the appliance and the retailer of the appliance. The scopes have been designed like this because companies at different points in the chain have different and mutually exclusive opportunities to reduce emissions. For example, as shown below, the power generating company can switch to renewable energy, the appliance user can use the product more efficiently, the retailer can stock more energy efficient products and the appliance manufacturer can design products to be more efficient.[28]



As shown in the diagram below, there is a wide range in the size of the scopes of emissions between different industries and it is therefore important to understand which scopes are covered in a company's net zero commitments.

PROPORTIONS OF THE THREE SCOPES IN DIFFERENT SECTORS



Source: "Greenhouse Gas Reporting and Accounting" by ICI and ERM

13. What is next on the climate change agenda?

In 2023, the IPCC will close out its sixth assessment cycle (AR6) by issuing a synthesis report that will integrate the three working group reports mentioned in section 2 above. The next assessment cycle (AR7) will likely conclude around 2030, by which time the decisions that determine if warming can be limited to 1.5°C – or if it will be surpassed and by how much – will have been made. Countries will continue to be brought together by the UN for annual global climate summits (Conference of the Parties or "COP") to review progress made to limit change under the United Nations Framework Convention on Climate Change (the UNFCCC). Businesses will play a crucial role in meeting the targets set to limit climate change and as shown in **[link to main report]** the UN Guiding Principles on Business and Human Rights can help companies to respect human rights when taking climate action.

ENDNOTES

1 https://climate.nasa.gov/faq/17/do-scientists-agree-on-climate-change/
2 https://ourworldindata.org/explorers/climate-change
3 https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors
4 https://www.climatewatchdata.org/ghg-emissions?breakBy=sector&chartType=percentage&end_year=2019&start_year=1990
5 https://www.wri.org/data/world-greenhouse-gas-emissions-2016
6 https://www.wri.org/data/world-greenhouse-gas-emissions-2016
7 https://www.wri.org/insights/half-degree-and-world-apart-difference-climate-impacts-between-15c-and-2c-warming
8 "Understanding Public Complacency About Climate Change: Adults' mental models of climate change violate conservation of matter" (2007) by John D. Sterman and L. Booth Sweeney. Climatic Change, 80, 213-238.
9 https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans
10 https://www.unep.org/resources/emissions-gap-report-202111 One scenario limits warming to 1.4°C at the end of the century after temporarily exceeding 1.5°C. This scenario requires immediate and drastic mitigation action.
12 https://ag.umass.edu/news-events/highlights/responding-to-climate-change
13 https://www.nature.com/articles/nature14016
14 https://www.iea.org/reports/net-zero-by-2050
15 https://www.statista.com/outlook/cmo/hot-drinks/coffee/worldwide
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23 https://gca.org/global-commission-on-adaptation/report
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25 https://www.carbone4.com/en/decoding-ademe-carbon-neutrality
26 https://ghgprotocol.org/
28 See more GHG frequently asked questions here

Climate Background
Shift, New York. February 2023

ABOUT SHIFT

Shift is the leading center of expertise on the UN Guiding Principles on Business and Human Rights. Shift's global team of experts works across all continents and sectors to challenge assumptions, push boundaries, and redefine corporate practice, in order to build a world where business gets done with respect for people's dignity.

Shift was established following the 2011 unanimous endorsement of the Guiding Principles by the UN Human Rights Council, which marked the successful conclusion of the mandate of the Special Representative of the UN Secretary-General for Business and Human Rights, Professor John Ruggie. Shift's founders were part of Professor Ruggie's core advisory team that helped develop the Guiding Principles.

Shift is a non-profit, mission driven organization headquartered in New York City.

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