

Climate Transition

The biggest transition since the Industrial Revolution

2023



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The transition that is needed to address the impacts of climate change will require changes to the global economy on a scale not seen since the Industrial Revolution. This transformation will also call for massive capital spending of around USD 275 trillion over the next 30 years, which corresponds to around 7.5% of global gross domestic product annually. Melanie Beyeler, Senior Portfolio Manager, provides an introduction to the Climate Transition.

Ecological overshoot

Our planet is out of balance and we are overshooting its ecological boundaries: The demands we are placing on its resources exceed our planet's regenerative capacity. Earth Overshoot Day marks the date when humanity has used all the biological resources that Earth regenerates in a single year. Each year, Earth Overshoot Day happens earlier as we consume our planet's resources at a faster and faster pace over time. In 2022, Earth Overshoot Day fell on 28 July. That means that in just seven months, we had consumed the annual resources budget of our planet.

The impacts of this ecological overshoot are already visible in the form of rising temperatures and changes in rainfall patterns. Ocean temperatures, sea levels and acidity are increasing. Glaciers and sea ice are melting. The frequency, intensity and duration of extreme weather events is also changing. And ecosystem characteristics such as the length of the growing season and bird migration patterns are shifting.

Emissions are the culprit

Atmospheric concentrations of greenhouse gases (GHG) reflect a combination of emissions from human activities and carbon sources on the one hand, and carbon sinks on the other. As GHG concentrations rise, so does the global average surface temperature of the Earth.¹ According to the Intergovernmental Panel on Climate Change (IPCC) – which is considered the world's most authoritative scientific body

on climate change – human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming.² As a result, the Earth is now about 1.1°C warmer than it was in the late 1800s. In fact, the last decade was the warmest on record.³

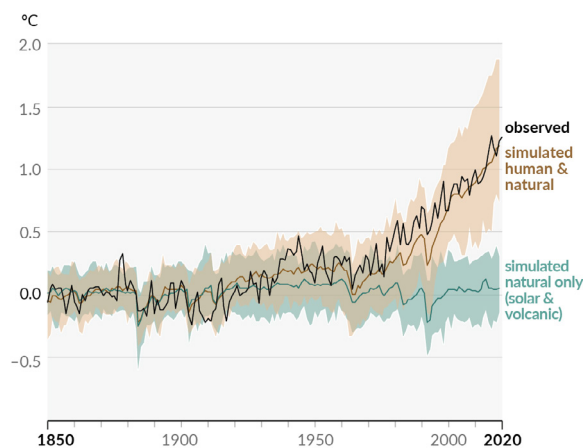
The Big 3

Carbon dioxide (CO₂) is the most important GHG, accounting for around 76% of total GHG emissions. CO₂ enters the atmosphere as a result of the combustion of fossil fuels (coal, natural gas and oil), solid waste, trees and other biological materials. CO₂ is also generated as a result of certain chemical reactions (e.g. cement production).

Methane (CH₄) is the second most abundant GHG after CO₂, accounting for about 16% of global emissions. One pound of methane warms the atmosphere 25 times more than a pound of CO₂ over a 100-year period. Methane is emitted during the production and transportation of coal, natural gas and oil. Methane emissions also result from the rearing of livestock and other agricultural practices, various forms of land use and the decomposition of organic waste in municipal solid waste landfills.

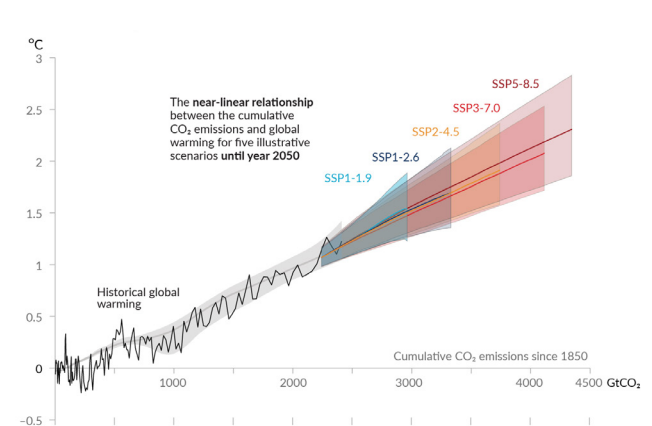
Nitrous oxide (N₂O) accounts for 6% of GHG emissions. One pound of nitrous oxide warms the atmosphere 300 times more than a pound of CO₂ over a 100-year period. Nitrous oxide is emitted as a result of agricultural practices, various forms of land use, and industrial activities, as well as through the combustion of fossil fuels and solid waste and during the treatment of wastewater.⁴

Figure 1. Change in global surface temperature (annual average)



Source: IPCC, Climate Change 2021, Summary for Policymakers

Figure 2. Global surface temperature increase since 1850-1900 (°C) as a function of cumulative CO₂ emissions



¹ <https://storymaps.arcgis.com/stories/5417cd9148c248c0985a5b6d028b0277/print>

² https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf

³ <https://www.un.org/en/climatechange/what-is-climate-change>

⁴ <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>

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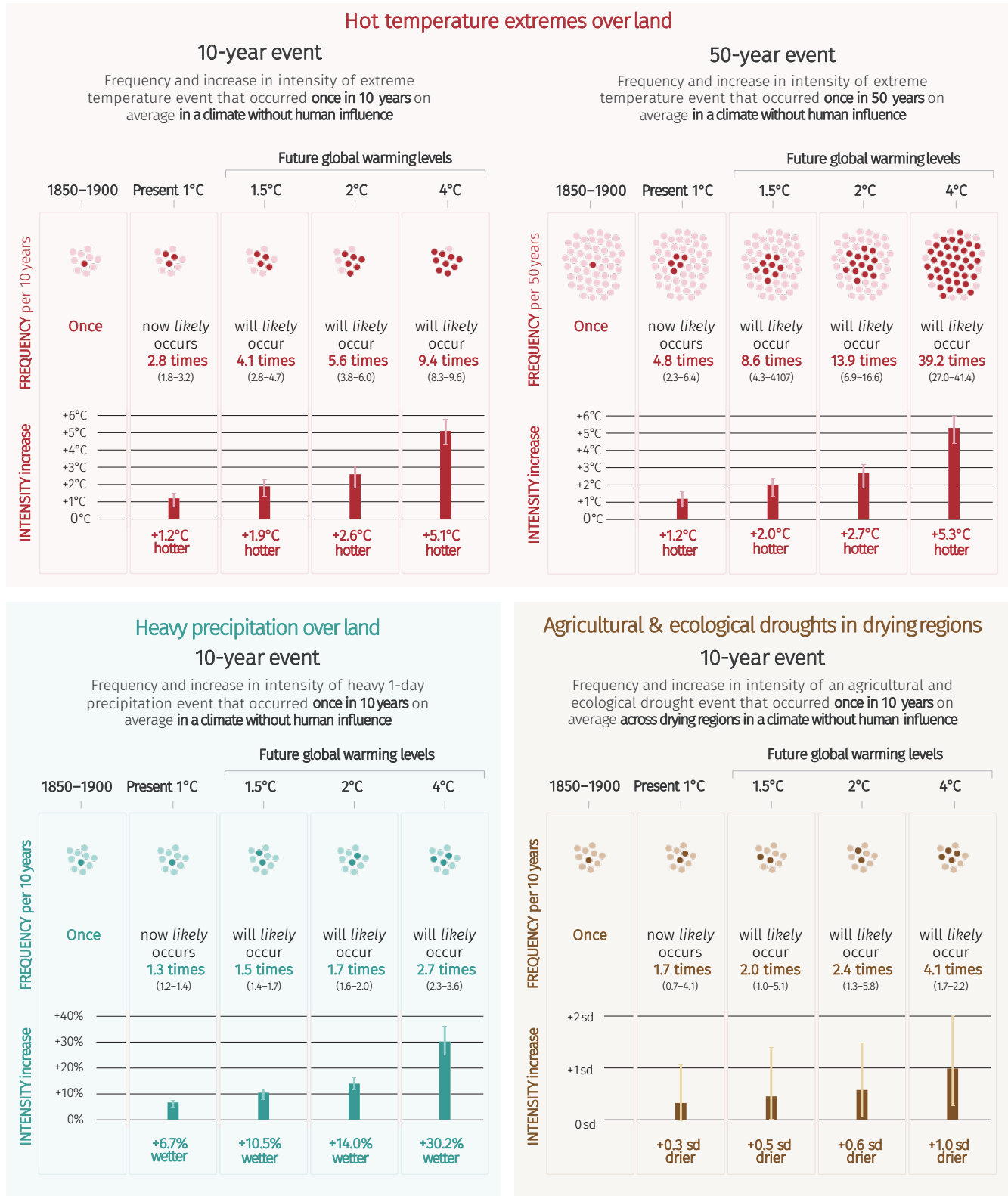
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The impact of rising temperatures

Many people believe that the main consequence of climate change is warmer temperatures. However, rising temperatures

are only the beginning of the story. In short: Since the Earth is a system where everything is interconnected, changes in one area can influence and lead to changes in all other parts of that system.⁵

Figure 3. Projected changes in extremes are larger in frequency and intensity with every additional increment of global warming



Source: IPCC, Climate Change 2021, Summary for Policymakers

⁵ <https://www.un.org/en/climatechange/what-is-climate-change>

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According to the latest predictions by the IPCC, climate change will intensify in the future, with hot extremes, heavy precipitation and droughts becoming more frequent and severe. The changing climate also has an impact on our food system: With the ocean becoming more acidic, marine resources that feed billions of people are at risk. Changes in snow and ice cover in many Arctic regions are disrupting food supplies from herding, hunting and fishing. Heat stress can diminish water and grasslands for grazing, causing declining crop yields and affecting livestock.⁶

The single biggest health threat to humanity

Changes in the climate not only affect the natural environment but also society. Climate impacts are already harming public health through air pollution, disease, extreme weather events, forced displacement, and increased hunger and poor nutrition in places where people cannot grow or find sufficient food – not to mention the widespread pressures on mental health. Climate change increases the factors that push people into poverty and keep them there: Floods may sweep away urban slums, destroying homes and livelihoods. High temperatures can make it difficult to work outdoors in agriculture and other sectors. Water scarcity may adversely affect crops. It is estimated that in the period from 2010 to 2019, weather-related events caused the displacement of an average of 23 million people each year and left many more vulnerable to poverty. Today, the majority of refugees come from the countries that are most vulnerable and least ready to adapt to the impacts of climate change.⁷

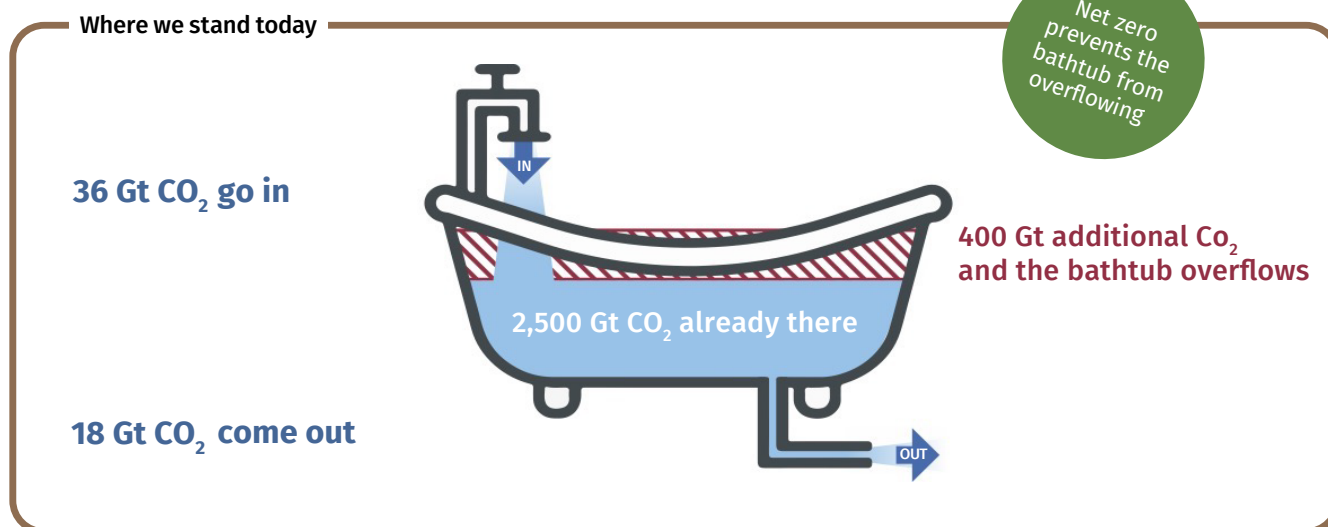
Net zero is the goal

There is strong scientific consensus that to stabilise the

climate, the global population needs to achieve the goal of net zero by the year 2050. This means that by this target date, the volume of GHG emissions needs to be reduced to as close to zero as possible, with remaining emissions being reabsorbed from the atmosphere. The Paris Agreement is the most important initiative in international efforts to reach net zero by 2050. It is the only truly global accord that almost all nations have committed to. The agreement also has strong support from thousands of companies, investors, universities and regional governments. Its core aim is to limit the rise in global average temperatures to well below 2°C above pre-industrial levels by 2100 and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. To achieve this goal, the world must reach net zero by 2050.

Currently, more CO₂ emissions are entering the atmosphere each year than are being removed – primarily through the absorption of CO₂ by the oceans and forests – and time is running out. The analogy of an overflowing bathtub illustrates the urgent need to reach net zero: The water in the bathtub represents the CO₂ that is already in the atmosphere, while the bath tap that is still running represents the additional CO₂ entering the atmosphere as a result of continued emissions. In order to reach net zero, we have to balance the amount of new emissions with net removals. In other words the volume of water flowing into the bathtub has to equal the amount of water flowing out of it, otherwise the bathtub will overflow. In climate terms, the overflow corresponds to a rise in global temperatures of more than 1.5°C above pre-industrial levels.

Figure 4. If the bathtub overflows, global warming increases above 1.5°C



Source: Stocks and flows of CO₂ refer to 2021 estimates based on Global Carbon Project and IPCC 2021 Report. The bathtub concept is from John Sterman and Linda Booth Sweeney (MIT Sloan School of Management) "Understanding Public Complacency about Climate Change" Rotman magazine Spring 2007. If the stocks and flows would consider not only CO₂ emissions, but all greenhouse gas emissions, things would look even worse. 1 GtCO₂ = 1bn tonnes of CO₂.

⁶ <https://www.un.org/en/climatechange/science/causes-effects-climate-change>

⁷ <https://www.un.org/en/climatechange/science/causes-effects-climate-change>

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The transition is underway

Many nations are already actively embracing the goal of net zero by issuing new climate-specific policies as well as broader policies and measures on energy, industrial, infrastructure and land use. For example, the Inflation Reduction Act (IRA) in the US includes more than USD 400 billion of climate-related spending and aims to achieve a 40% reduction in economy-wide GHG emissions within the US compared to 2005 levels by 2030.

In the meantime, consumers around the world are demanding more sustainable products and services. According to one survey, 89% of consumers are personally committed to protecting the planet, 79% of consumers are increasingly conscious of their personal impact on the planet, and 90% feel that companies have a responsibility to take care of the planet and its people.⁸

Investors are realising that climate change has a material impact on the performance of companies. Today, investors with USD 72 trillion of assets under management are incorporating net zero-related criteria into their portfolio management. Further, 86% of investors believe climate change will be a key theme in their portfolios by 2023.

Companies are increasingly adapting their operations, products and services to a net zero business model in the knowledge that this approach makes sense not only from an environmental perspective but also in economic terms.

Capital spending in the trillions

Targeted efforts to decarbonise the global economy over the next 30 years in the transition to net zero will require a massive structural reallocation of capital similar to the shift seen at the time of the Industrial Revolution. Transformative innovations and new products and services will need to be developed to provide alternative energy sources. Tremendous advances in technology will be essential to resolve food and water shortages.

This transformation will also call for massive capital spending of around USD 275 trillion over the next 30 years, which corresponds to around 7.5% of global gross domestic product (GDP) annually. All countries and sectors will be affected by climate change and must contribute to this transition.

⁸ <https://www.wundermanthompson.com/insight/the-future-100-2018>

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