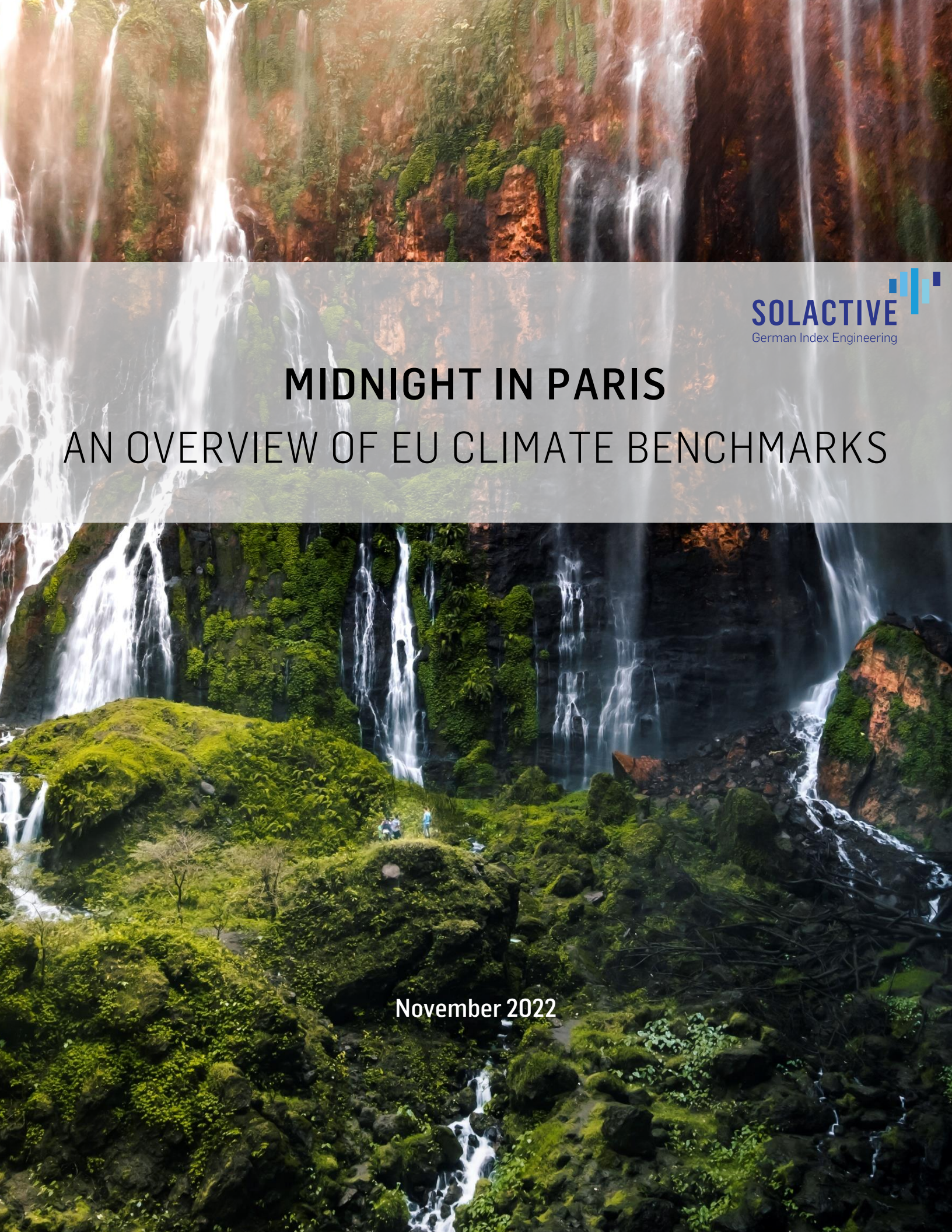


SOLACTIVE
German Index Engineering

MIDNIGHT IN PARIS

AN OVERVIEW OF EU CLIMATE BENCHMARKS

November 2022

Table of Contents

Do you know what **EU Climate Benchmarks** are? If you are an index investor chances are you do. Nevertheless, you may still be wondering what exactly their purpose is and how they can help investors systematically generate impact without necessarily having to compromise on investment performance.

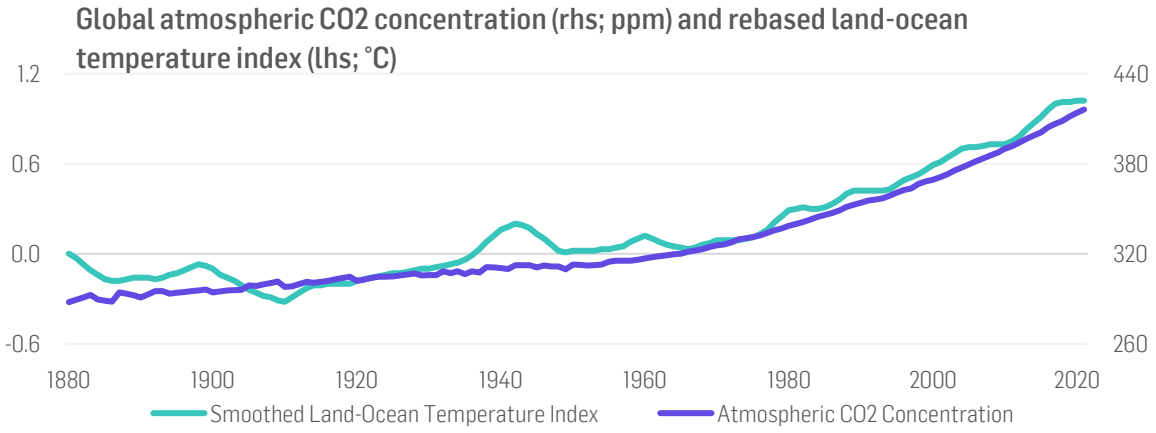
However, taking a step back, the biggest question you may have is "how did we get to a point in which such benchmarks are needed?".

The slippery slope from global prosperity to climate emergency

The industrial revolution brought a significant degree of prosperity to the world. This fact is reflected by global GDP per capita (adjusted for cost of living across different countries and inflation) increasing from little over a thousand international dollars in 1820 to over 15,000 in 2018. [1]

Furthermore, the fruits of this economic transformation were not just reaped by a limited group of people. According to Nobel Laureate Robert Lucas Jr., this revolution generated a sustained growth in the living standards of the masses for the first time in history. [2] However, industrialization also brought along one of today's greatest challenges in the form of climate change.

Even though the prospect of rising global temperatures due to increasing CO2 emissions was already reported over a century ago, few could have imagined the magnitude and scale of this problem in advance. [3] Emissions of greenhouse gases (GHG) from human activities and their average lifetime in the atmosphere (which spans from a few weeks to thousands of years, depending on the type of GHG) have led to a degree of GHG atmospheric concentration responsible for approximately 1.1°C of warming since the second half of the 19th century. [4, 5, 6]



Source: NASA, NOAA

This phenomenon is occurring at an increasingly accelerated pace, which poses potentially catastrophic consequences for life on earth due to a myriad of interconnected factors stemming from a heating globe.

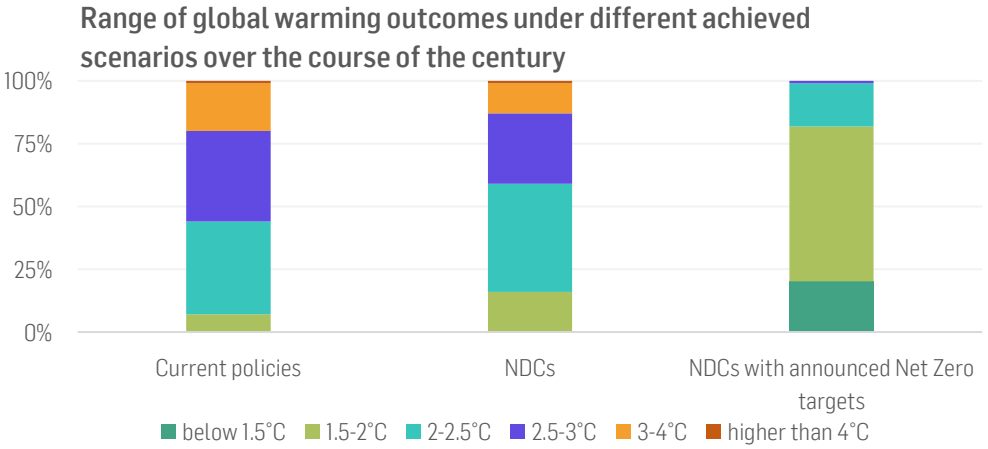
Introducing the Paris Agreement

In light of this pressing issue, 196 countries settled on the groundbreaking **Paris Agreement** at the 2015 United Nations Climate Change Conference (COP 21). The goal of this legally binding international treaty is to limit global warming to well below 2°C, preferably 1.5°C, compared to pre-industrial levels. Signatories have pledged to work on 5-year cycles of increasingly ambitious climate action in order to achieve this goal and communicate their intended climate reduction actions through their nationally determined contributions (NDCs). [7]

Given the causal relationship between higher GHG atmospheric concentration and a heating globe, the implicit goal of the Paris Agreement is to reach a global peaking of GHG emissions as soon as possible and to undertake rapid reductions thereafter, in order to achieve a balance between human made emissions and those absorbed by GHG sinks (such as forests) by 2050 or earlier – thereby minimizing the potential harm climate change might generate. In other words, the treaty's overarching goal is for the world to get to point in which there are **net-zero** emissions sooner rather than later. [8]

All roads must lead to net-zero

The remaining space for action to achieve net-zero is significant and must be tackled urgently. According to the UN Environment Programme's 2022 Emissions Gap Report, unchanged current policies would lead to global warming of 2.8°C over this century – which would only be reduced by between 0.2 and 0.4°C through the implementation of current nationally determined contributions. The same report specified that in order to limit global warming to 1.5°C, global annual greenhouse gas emissions must be reduced by 45% relative to projections under current policies in just eight years, and must continue to decline rapidly after 2030 to avoid exhausting our limited remaining atmospheric carbon budget. [9]



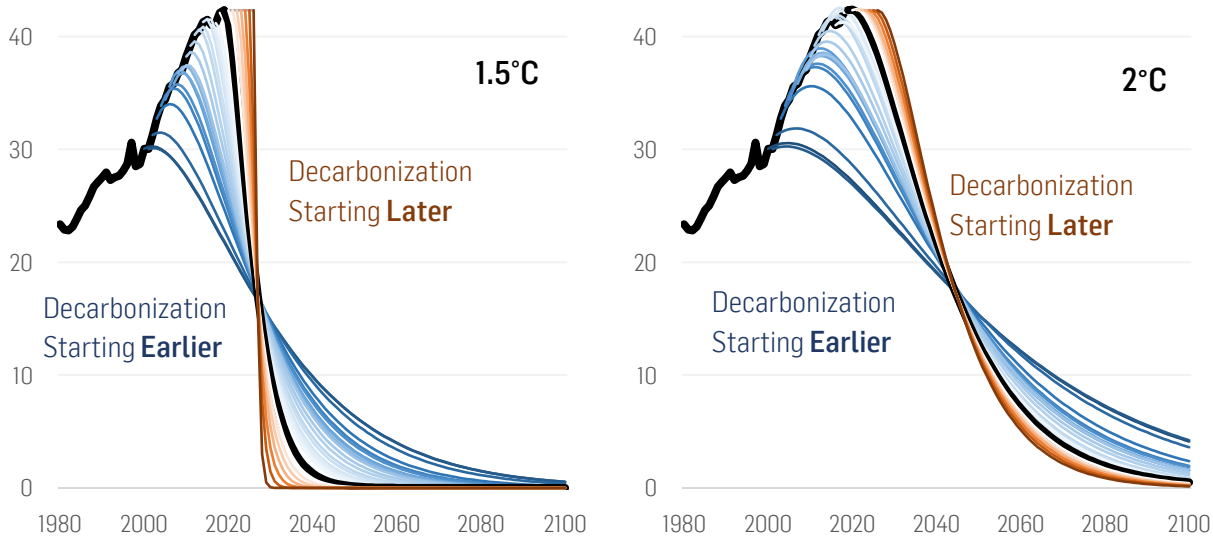
Source: the United Nations

This sentiment is similar to that transmitted by the Center for International Climate Research (CICERO). Based on their modeling and our current carbon budget, a path to limit global warming to 1.5°C starting in 2023 (assuming constant yearly emissions from 2019 until 2022 and no net-negative yearly emissions) would entail that emissions decline at an annual rate of just over 25% until 2040 – whereas that figure could've been much lower, at around 4%, if our decarbonization path had begun at the start of the century. [10]

Moreover, the longer a serious path to net-zero takes to arrive, the more radical our rates of decarbonization must be. Assuming that this process starts in 5 years from now (constant yearly emissions from 2019 until 2026), annual decarbonization rates of almost 80% must be achieved between 2027 and 2030 due to an even tighter carbon budget – taking yearly emissions from an estimated 42 billion tons to slightly over 70 million tons of CO2 in just four years' time.

Although more attainable, the research from CICERO implies that limiting global warming to 2°C would also be an extremely complex endeavor given our perilous starting point. In words of the institute, "the road to 2°C is steep; the road to 1.5°C is a cliff". [10]

Modeled decarbonization path needed to limit global temperatures to 1.5 and 2°C by start date (billion tons of CO2)



Source: CICERO

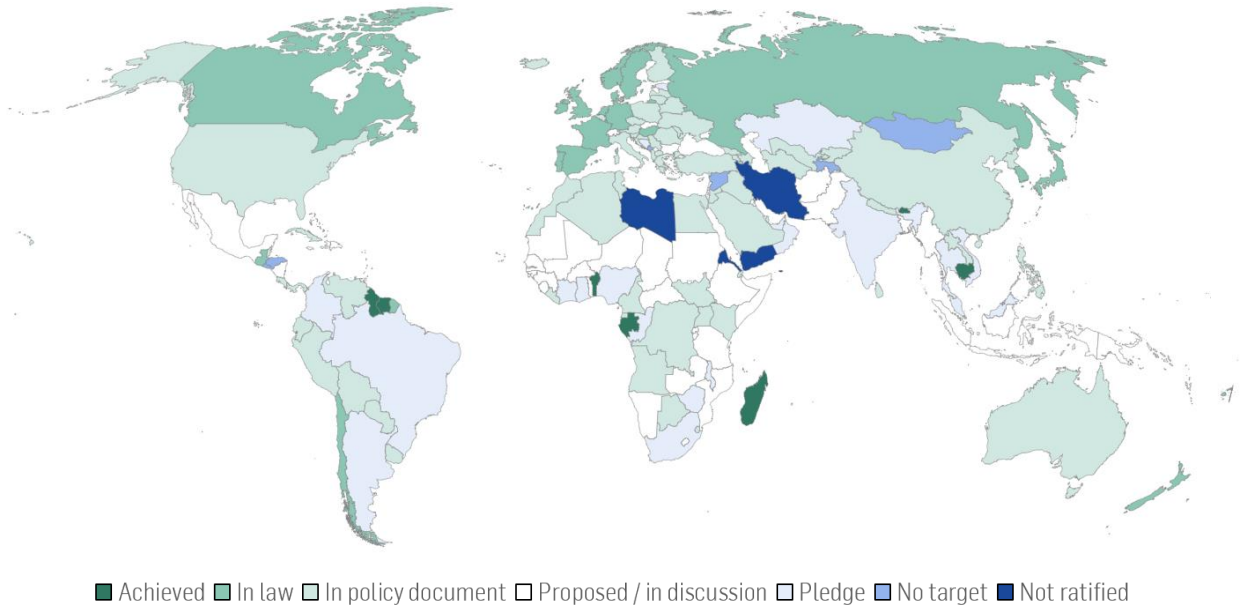
In a similar fashion, the International Energy Agency's 2022 World Energy Outlook highlighted that even though global clean energy investments would reach USD 2 trillion by 2030 (a rise of more than 50% from today's investment levels), more than double that amount will be needed by the same date in order for the world to get in track to net-zero emissions by 2050 – despite the fact that natural gas demand

will plateau by the end of the decade and that rising sales of electric vehicles will impair oil demand under a Stated Policies Scenario. [11]

How are different countries contributing to net-zero?

However, all is not lost. With the exception of Eritrea, Iran, Libya, and Yemen, as of 2022, all signatories have ratified their commitment to the agreement (including the United States, who withdrew from it in 2020 but rejoined in 2021). [12] Moreover, Benin, Bhutan, Cambodia, Guinea-Bissau, Guyana, Liberia, and Madagascar are leading the fight against rising temperatures – having already achieved their net-zero targets, according to Net Zero Tracker. [13]

Net-zero target status by country

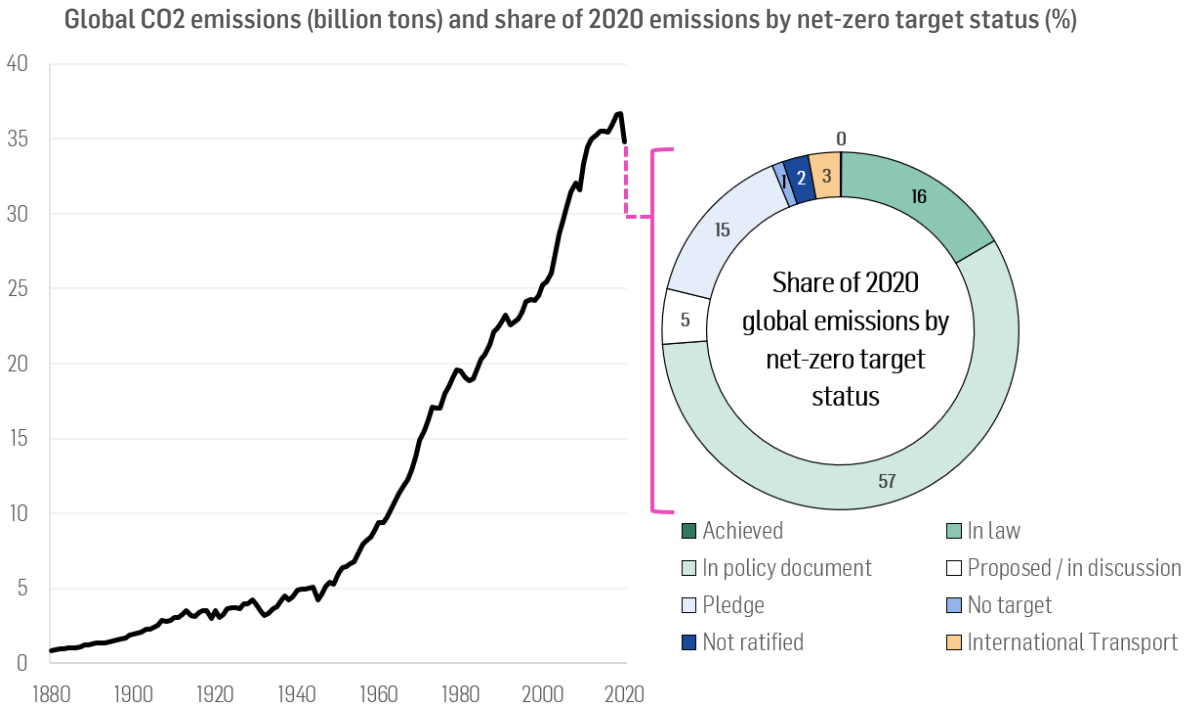


Source: Net Zero Tracker, the United Nations, Solactive

Nonetheless, more must be done if the world is to limit rising temperatures on a timely manner. The seven countries that have achieved their targets already only produced around 0.1% of the world's total CO2 emissions in 2020, on aggregate – a smaller share than that of countries that haven't ratified their commitment to the agreement (2.3%) and those that don't have a net-zero target yet (0.5%). [13, 14]

Even though reducing emissions is a global endeavor, the greatest potential for impact lies on the world's two largest emitting economies: China and the United States. These two countries emitted 30.6 and 13.5 percent of the world's carbon in 2020, respectively (the latter being the largest emitter in the world per capita, whilst the former is the third largest behind Russia). [9, 14] Despite them having published their long-term decarbonization strategies in 2021 and having committed a significant amount of

investments to meet their targets (for instance, the Inflation Reduction Act is projected to reduce US emissions by over 20% relative to 2020 levels), their legislatures have yet to enact net-zero laws as multiple European economies, as well as Canada, Japan, New Zealand, and other countries, have already done. [9, 13]



Source: Net Zero Tracker, the United Nations, Global Carbon Project, Solactive

EU Climate Benchmarks as investment of choice to support net-zero

EU Climate Benchmarks, which can be broken down into EU Paris-Aligned and Climate Transition Benchmarks (PABs and CTBs, respectively), are indices that allow investors to invest in global equity and corporate bond markets while at the same time ensuring that their investment does not contradict the goals of Paris Agreement. On the contrary, these benchmarks' objective is to allocate capital to securities aligned with a low-carbon and climate resilient economy. Further, the comparability and transparency climate benchmark regulation enables allow investors to meet their climate objectives whilst preventing greenwashing. [15]

Albeit there are a series of similarities between PABs and CTBs, such as the fact that they use a broad benchmark as reference security universe, follow a 1.5°C reference climate scenario and seek to follow an annual 7% decarbonization path, they differ in one key aspect: their required minimum relative decarbonization. Whilst CTBs must exhibit a GHG emission intensity (GHG emissions divided by

enterprise value including cash) at least 30% lower than that of their reference market index, PABs' one must at least be half that of their broad benchmark. Additionally, PABs must exclude companies that generate at least a share of their revenues from a series of non-sustainable activities. There are further differences between PABs and CTBs which are either mandatory or voluntary. [15]

As founding member of the Net Zero Financial Service Providers Alliance (NZFSPA), Solactive is committed to the goal of net-zero by 2050, or sooner, by supporting the design of our clients' Paris-aligned product offering. As such, we recognize the significant risks associated with climate change and delaying the transition to a net-zero economy, and aim at consistently raising the importance and implications of setting net-zero targets and strategies with our clients. [16]

Against this backdrop, we have been able to tailor-make a diverse suite of EU Climate Benchmarks that meet our clients' needs when it comes to both investability and sustainability, which is possible due to our flexibility and open architecture approach when it comes to incorporating ESG datapoints into our index construction processes.

Consequently, Solactive's multi-asset EU Climate Benchmark offering is among the broadest ones in the industry. These cost-efficient index solutions can serve an ever-growing number of investment use cases. For instance, they may underlie sustainable financial products or become an elemental part of asset allocators' decision making processes.

Likewise, PABs and CTBs are more accurate benchmarks for both climate-oriented and carbon reduction funds. Their embedded self-decarbonization characteristics hold fund managers accountable for aggregate portfolio GHG emissions reduction, being the reason why funds disclosing under EU Sustainable Finance Disclosure Regulation's (SFDR) Article 9 must benchmark against EU Climate Benchmarks. [17]

For example, in the listed equities space we have developed the Solactive ISS ESG Paris-Aligned Benchmark Index Series, which aims to track stocks in such a manner that the resulting benchmark portfolio's greenhouse gas emissions are aligned with the long-term global warming target of the Paris Agreement – in line with regulations laid out for EU Paris-Aligned Benchmarks (EU PAB). Additionally, we have also produced the Solactive ISS ESG Net Zero Pathway Index Series – which aims to tilt the weight of index constituents in accordance with recommendations published by the Institutional Investors Group on Climate Change (IIGCC) in their Net Zero investment Framework, in addition to complying with EU PAB regulation and having aggregate emissions aligned with the Paris Agreement.

Furthermore, the indices composing both of these index series aim to track their reference benchmark as closely as possible through weight deviation caps.

On the corporate bond space, the Solactive Paris Aligned Global Corporate Index Series provides exposure to a portfolio in line with a temperature increase target of 1.5°C through 2050 while simultaneously displaying a very similar currency distribution compared to the Solactive Global Corporate Index. In order to achieve its decarbonization target, the index's aggregate GHG emissions and intensity decrease at a yearly rate of at least 7%. This index series is composed of broad, investment grade and high-yield indices calculated in EUR, GBP and USD.

Finally, even though current climate benchmark regulation doesn't cover government debt, we have developed the Solactive Paris Aware Global Government Index, the overall aim of which is to provide a minimum reduction in carbon intensity relative to the Solactive Global Government Bond Index. The index does this by having a CO2 emissions target given by the minimum between a 14% reduction versus its benchmark and an annual decarbonization rate of 7%.

Contact

Solactive AG
German Index Engineering
Platz der Einheit 1
60327 Frankfurt am Main
Germany

Tel.: +49 (0) 69 719 160 00
Fax: +49 (0) 69 719 160 25
Email: info@solactive.com
Website: www.solactive.com

Timo Pfeiffer
Chief Markets Officer
Tel.: +49 (0) 69 719 160 320
Email: timo.pfeiffer@solactive.com

Fabian Colin
Head of Sales
Tel.: +49 (0) 69 719 160 220
Email: fabian.colin@solactive.com

Konrad Sippel
Head of Research
Tel.: +49 (0) 69 719 160 321
Email: konrad.sippel@solactive.com

Javier Almeida
ESG Research
Tel.: +49 (0) 69 719 160 325
Email: javier.almeida@solactive.com

SOLACTIVE
German Index Engineering

References

[1] Groningen Growth and Development Centre, "Maddison Project Database 2020".

[2] Robert Lucas Jr., "Lectures on Economic Growth".

[3] Popular Mechanics, "Page 341 March, 1912".

[4] Intergovernmental Panel on Climate Change, "Climate change widespread, rapid, and intensifying".

[5] National Aeronautics and Space Administration, "Global Temperature".

[6] United States Enviromental Protection Agency, "Climate Change Indicators: Greenhouse Gases".

[7] United Nations Framework Convention on Climate Change, "The Paris Agreement".

[8] United Nations Framework Convention on Climate Change, "Nationally Determined Contributions (NDCs)".

[9] United Nations Environment Programme, "Emissions Gap Report 2022 ".

[10] Center for International Climate Research, "It's getting harder and harder to limit ourselves to 2°C".

[11] International Energy Agency, "World Energy Outlook 2022".

[12] United Nations, "7. d Paris Agreement".

[13] Net Zero Tracker, "Global Net Zero Coverage".

[14] Global Carbon Project, "Data supplement to the Global Carbon Budget 2021 ".

[15] European Comission, "Commission Delegated Regulation (EU) 2020/1818".

[16] Net Zero Financial Service Providers Alliance, "Commitment".

[17] European Parliament, "Regulation on sustainability-related disclosures in the financial services sector".

SOLACTIVE
German Index Engineering

Disclaimer

Solactive AG does not offer any explicit or implicit guarantee or assurance either with regard to the results of using an Index and/or the concepts presented in this paper or in any other respect. There is no obligation for Solactive AG – irrespective of possible obligations to issuers – to advise third parties, including investors and/or financial intermediaries, of any errors in an Index. This publication by Solactive AG is no recommendation for capital investment and does not contain any assurance or opinion of Solactive AG regarding a possible investment in a financial instrument based on any Index or the Index concept contained herein. The information in this document does not constitute tax, legal or investment advice and is not intended as a recommendation for buying or selling securities. The information and opinions contained in this document have been obtained from public sources believed to be reliable, but no representation or warranty, express or implied, is made that such information is accurate or complete and it should not be relied upon as such. Solactive AG and all other companies mentioned in this document will not be responsible for the consequences of reliance upon any opinion or statement contained