

## Financing Sustainable Development in Ireland Symposium

### Climate Change and the Financial System

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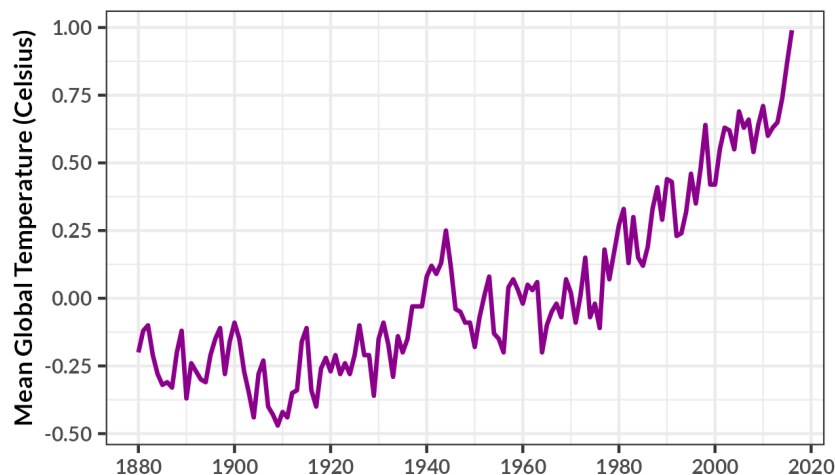
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#### 1. INTRODUCTION

The global climate has experienced unprecedented changes since the start of the 20<sup>th</sup> Century. The years 2015–2022 were the eight warmest on record (Figure 1), and temperatures are expected to continue to reach new peaks in the coming years, as atmospheric greenhouse gas emissions rise (WMO, 2023a). With the Paris Agreement of 2015, the international community agreed to limit global warming to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C. Yet the latest projections from the Intergovernmental Panel on Climate Change (IPCC) are stark. They show that “*in the near term, global warming is more likely than not to reach 1.5°C*” even in a scenario where greenhouse gas emissions are very low, and “*likely or very likely to exceed 1.5°C under higher emissions scenarios*” (IPCC, 2023).<sup>2</sup> Indeed, in its most severe climate change scenario, where greenhouse gas emissions continue to grow at a fast pace, global temperatures could reach as high as 4.4°C above pre-industrial levels.

Figure 1: Global temperature change



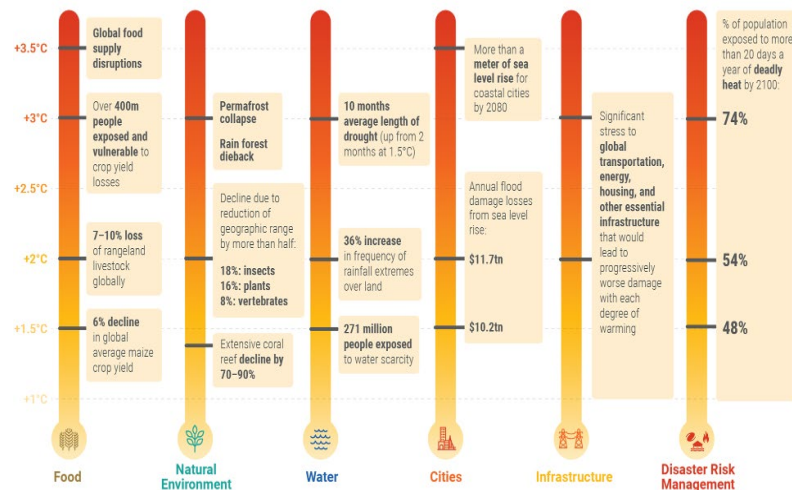
Source: Global Temperature Time Series (2023) via <https://datahub.io/core/global-temp>

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<sup>2</sup> Current projections show that the 1.5°C limit is likely to be breached as early as 2035 (Global Temperature Trend Monitor, 2023).

As climate change continues, extreme weather events will become ever more frequent and variable, the sea level will continue to rise, and ocean acidification and deoxygenation will increase further (IPCC, 2023). As this happens, the world will look a very different place. Figure 2 depicts some of the changes that could occur at different global temperatures. At 3°C, for example, according to the Global Commission on Adaptation, almost three quarters of the world’s population could be exposed to more than 20 days of deadly heat by 2100, while over 400 million people could be exposed and vulnerable to crop yield losses.

**Figure 2: Climate change impacts**



**Source:** From Global Commission on Adaptation (2019), pg.10

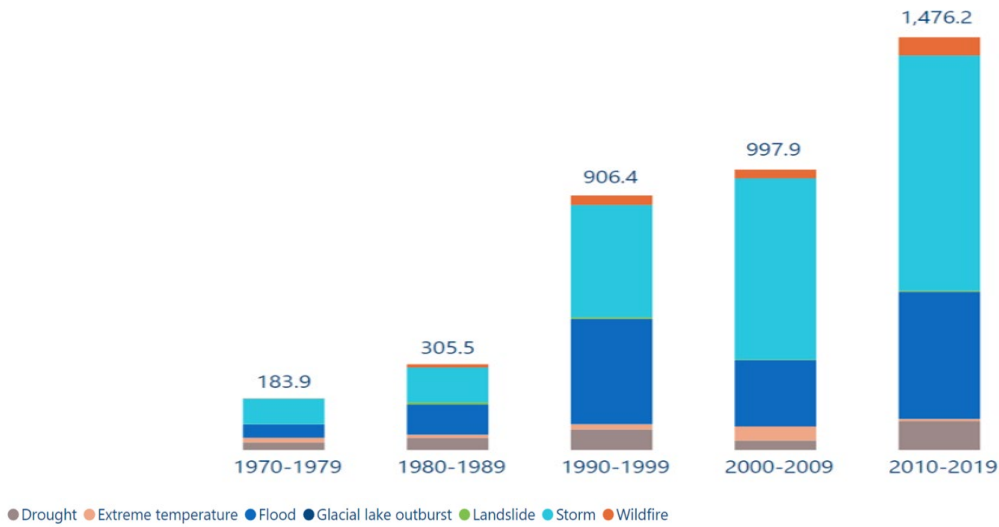
Many countries across the globe have set ambitious targets to reduce their greenhouse gas emissions and to address the challenge of climate change. The EU, based on the European Green Deal, for example, has committed to being the first climate-neutral continent by 2050, and to reducing its greenhouse gas emissions by at least 55 per cent by 2030 (compared to 1990 levels). In Ireland, the government has committed to a 51 per cent reduction in overall greenhouse gas emissions by the end of the current decade (relative to 2018), and to achieving net zero emissions no later than 2050, both of which are legally binding commitments enshrined in the Climate Action and Low Carbon Development (Amendment) Act 2021 (DECC, 2023). The pace of progress in meeting these targets has been slow, and more concerted efforts will be needed over the remainder of the current decade to address climate change (CCAC, 2022). National governments have the main tools at their disposal to drive the level of climate action and behavioural change that will be required to meet these targets, but addressing climate change to the scale that is needed requires action by all and cooperation across borders and institutions.

Reaching these targets and supporting sustainable development will also require significant new investment and a mobilisation of finance towards sustainable activities, in order to reduce greenhouse gas emissions into the atmosphere (climate mitigation) and to support advances in technology and infrastructure to prevent or minimise the effect of climate change (climate adaptation). This is where the financial system has a pivotal role to play – in channelling savings to those investments that facilitate this green transition. Doing so, however, requires a financial system that is itself resilient to the risks that climate change poses. Indeed, these risks, should they materialise, could have significant implications for the stability of the financial system, which is just one of several reasons why global central banks and regulators are increasingly integrating climate change considerations into their own work. In the remainder of this paper, the interplay between the financial system and climate change is discussed in detail, first in terms of climate change risks and transmission to the financial system (Section 2), and second, in terms of the role that the financial system will play in funding the transition to a sustainable world (Section 3). Section 4 concludes.

## 2. OVERVIEW OF CLIMATE CHANGE RISKS

It is now well understood that climate change poses risks to economic and financial stability. In broad terms, these risks are described as physical and transition risks. Physical risks arise from the costs of extreme weather events, such as floods, storms and heatwaves, and long-term structural shifts in our environment, such as growing weather variability and rising sea levels. The physical effects (and costs) of climate change have been increasing in frequency and intensity in recent years (Figure 3).

**Figure 3: Reported economic losses by decade, US\$bn**

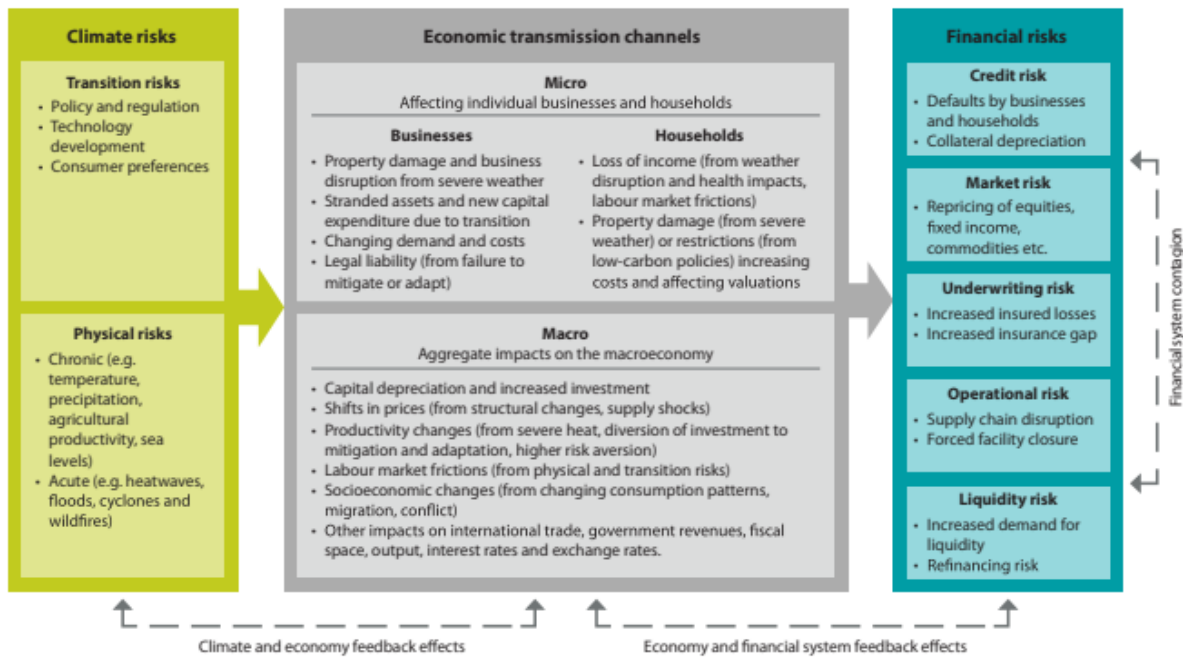


**Source:** World Meteorological Organisation (WMO), 2023b

Transition risks, on the other hand, arise from changes in climate policy, technology and consumer and investor sentiment that occur because of the adjustment to a lower carbon and more circular economy, and the costs that may arise because of the pace at which that happens. This transition could mean that certain parts of the economy will face a repricing in asset values (as investor and consumer sentiment towards more polluting sectors changes), changes in the cost of doing business (as the cost of carbon intensive inputs increases) or changes in funding costs (as risk premia rise). These costs could be particularly high if transition takes place in a disorderly or unexpected way.

Figure 4 depicts the ways in which these climate-related risks can transmit to the financial system. Financial institutions can be directly exposed to borrowers that experience climate shocks (resulting in credit risk or underwriting risk for example), or they can be indirectly exposed through the impact of climate shocks on the wider economy, with feedback to borrowers and/or the financial system (market risk, liquidity risk and credit risk). The operation of financial institutions can also be affected by climate change, leading to own institution operational risk.

**Figure 4: Transmission channels – climate risks to financial risks**



**Source:** NGFS, 2022a

When it comes to managing the risks from climate change, there is a paradox – if the transition to a sustainable world takes too long, the physical effects of climate change will increase in frequency and severity, as the world continues to warm. On the other hand, if the transition is too abrupt or unpredictable, asset values could adjust too rapidly, creating risks for economic and financial stability. To protect against this, it is important that risks are identified early and managed in an orderly and effective manner. Against this backdrop, central banks and regulators across the globe have been working to understand and measure the extent to which their financial systems are exposed to climate change, while supervisory frameworks and expectations have been updated to account for climate-related risks.<sup>3</sup>

The climate change paradox is particularly evident in Figure 5, which shows the potential global costs in GDP terms from climate events under various transition scenarios. If the world reaches a net zero target by 2050 in an orderly way (shown on the left side of the chart), GDP could be about 5 per cent lower than its baseline. In this case, there are still costs attached to physical climate events that are already ‘baked in’ due to previous greenhouse gas emissions, but these are much less than those depicted on the right side of the chart. In the ‘current policies’ scenario, it is assumed that governments maintain policies they have already implemented in response to climate change, but make no further advances. Globally, the efforts are insufficient to halt significant warming of the planet and severe physical risks ensue including irreversible impacts like sea-level rise. The benefits of an immediate coordinated transition towards a greener economy are clear. The long-term implications of a failure to address climate change would be severe.

**Figure 5: GDP deviation due to transition and physical risks**



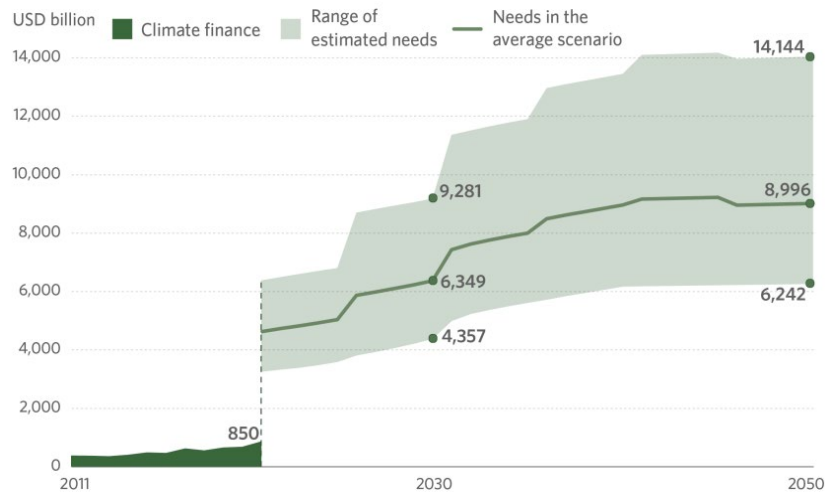
**Notes:** The chart is sourced directly from NGFS (2022a), where the estimates were compiled using the NiGEM model. \*The NiGEM baseline is a hypothetical scenario with no transition or physical risks.

### 3. FUNDING THE TRANSITION

While the scale of adjustment required to ‘green’ our economies and minimise climate risks will be substantial, estimating the monetary costs involved is challenging for a number of reasons. Sources of uncertainty relate to the pace of technological innovation that could alter future requirements and costs, future input costs (e.g. battery prices), the pace of transition itself, as well as data gaps. Notwithstanding that, in an Irish context, the Government’s Climate Action Plan (2023) estimates that an additional investment of €119 billion could be required from 2022 to 2030 to support transition across key sectors of the economy, while European estimates point to a need for annual investment of €1.25 trillion over the 2021-2030 period to achieve the European Commission’s climate goal of a 55 per cent reduction in emissions by 2030. In a global context, the Climate Policy Initiative estimates that at least \$4.3 trillion in annual finance flows will be required by 2030 to avoid the worst impacts of climate change (CPI, 2022).

<sup>3</sup> See for example, the European Central Bank (ECB) climate risk stress test results (2022) and ECB Guide on Climate-Related and Environmental Risks (2020).

**Figure 6: Global tracked climate finance flows and the average estimated annual climate investment need through 2050**

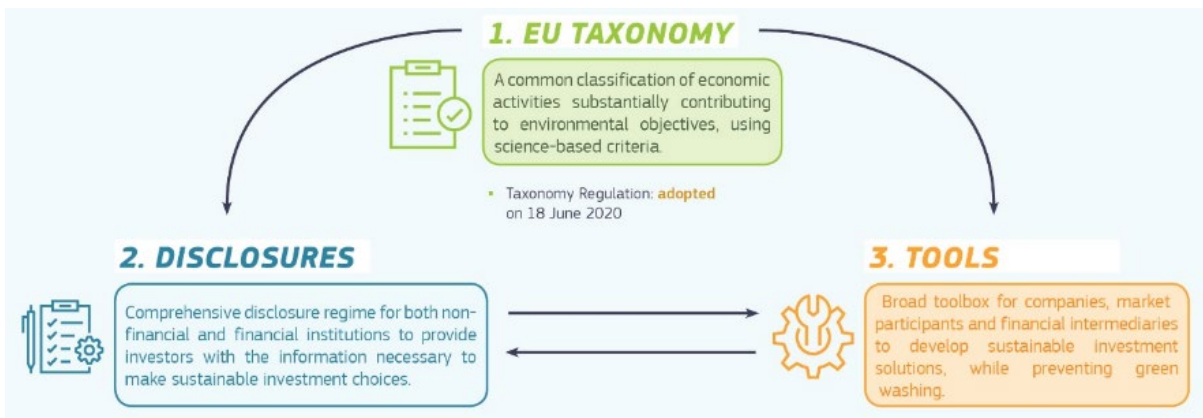


Source: Climate Policy Initiative (2022)

Despite the uncertainty over the exact amounts required, it is clear that the costs will be significant. Already we have seen some progress – with financial flows reported as ‘green’ or sustainable increasing over the last decade (Belloni et al., 2020; NGFS, 2022b). However, the financial flows are far from estimated needs, and will have to increase markedly in coming years to achieve the ambitions of the Paris Agreement. Figure 6 illustrates the significant gap between estimated current global climate finance flows and the projected requirements by 2050.

For sustainable finance to reach the scale required, investors need the right information and tools to effectively assess risks and opportunities, and they need to have trust in financial products that are marketed as ‘green’ or sustainable. In a European setting, the EU sustainable finance framework has been developed to play that role. The foundations of this framework, first set out in the European Commission’s 2018 Action Plan on Financing Sustainable Growth, includes three core elements, which continue to evolve (shown in Figure 7).

**Figure 7: The Foundations of the EU Sustainable Finance Framework (2018)**



Source: European Commission (2021)

The first building block, and the cornerstone of the whole framework, is the EU Taxonomy. This is a science-based classification system that provides clarity on which economic activities are considered to be environmentally sustainable and under what circumstances. It assists investors, companies and policy makers in identifying the activities that contribute significantly to the EU’s environmental goals. It is considered a ‘live’ classification system that can evolve over time (for example, nuclear and gas energy activities have recently been added to the list of environmentally sustainable economic activities covered by the Taxonomy – on a time limited basis and under specific conditions). While there are several green taxonomies globally, the EU taxonomy was the first of its kind to be included in financial regulation (Alessi et al., 2021).

The second building block is a mandatory disclosure regime for both financial and non-financial companies, which requires them to disclose information on the risks that they face due to sustainability exposures and the impact of their operations on the environment and society (the ‘double materiality’ concept). This is designed to equip investors with the right information to make informed sustainable investment decisions. The disclosure obligations applying to corporates under this building block are being phased in over time. For example, in January 2023 the Corporate Sustainability Reporting Directive (CSRD) entered into force, which places obligations on large companies, as well as listed SMEs, to report on sustainability from 2025.<sup>4</sup> The Sustainable Finance Disclosure Regulation (SFDR) came into force in March 2021 (with additional obligations applying from January 2023). This Regulation requires financial market participants and financial advisors to inform investors about how they consider the sustainability risks that can affect the value of and return on their investments (‘outside-in’ effect) and the adverse impact that such investments have on the environment and society (‘inside-out’). Financial market participants have to make this information available with regard to specific products, but also relating to their respective firm as a whole. These rules apply to financial market participants managing money on behalf of end investors (asset managers, insurance undertakings, occupations and other pension providers), as well as investment firms.

The third building block is a set of investment tools, including benchmarks, standards and labels, designed to make it easier for financial market participants to align their investment strategies with the EU’s climate and environmental goals. In February 2023, for example, political agreement was reached on the EU Green Bond Standard, which will establish an EU voluntary high-quality standard for green bonds. It will be available to companies and public entities that seek funding on capital markets to finance their green investments, while meeting stringent sustainability requirements. It will allow investors to more easily assess, compare and trust that their investments are sustainable.

While the sustainable finance framework in Europe will continue to grow and evolve, much needed progress is being made, and similarly, in several other jurisdictions around the world. Meeting global investment needs, however, will require ongoing international cooperation to protect against unnecessary regulatory fragmentation, to promote comparability and global standards, and to protect against greenwashing. In this context, work by the International Sustainability Standards Board should see a global baseline of sustainability-related disclosure standards emerge. Ongoing effort will be needed to promote convergence on a broader scale, however, and to ensure that barriers to sustainable finance growth can be identified and removed.

#### 4. CONCLUSION

In recent years and even months, the devastating impact of climate change on our societies and economies has become ever more visible and frequent. Much progress has been made to understand the scale of transition that is required to alter the path of warming and to limit the impact of climate change. This transition presents both risks and opportunities for investors and for the financial system, as the mobilisation of private finance will be crucial to achieving net zero goals. The pace of climate investment must now accelerate rapidly to align with climate and sustainability goals, but it must do so while supported by a sustainable finance architecture that ensures that sustainability is indeed at the heart of sustainable investing. Building on the efforts already made, public and private actors must work closer together to drive behavioural change and to scale up investment in green activities.

#### References

- Alessi, Lucia, Battiston, Stefano and Ana Sofia Melo, 2021. "Travelling down the green brick road: a status quo assessment of the EU taxonomy," *Macroeprudential Bulletin*, European Central Bank, Vol. 15. Online: [https://www.ecb.europa.eu/pub/financial-stability/macroeprudential-bulletin/html/ecb.mpbu202110\\_2~ea64c9692d.en.html](https://www.ecb.europa.eu/pub/financial-stability/macroeprudential-bulletin/html/ecb.mpbu202110_2~ea64c9692d.en.html)
- Belloni, Marco, Giuzio, Margherita, Kördel, Simon, Radulova, Petya, Salakhova, Dilyara and Florian Wicknig, 2020. "Box 7: The performance and resilience of green finance instruments: ESG funds and green bonds," *Financial Stability Review*, European Central Bank, November. Online:- [https://www.ecb.europa.eu/pub/financial-stability/fsr/focus/2020/html/ecb.fsrbox202011\\_07~12b8ddd530.en.html](https://www.ecb.europa.eu/pub/financial-stability/fsr/focus/2020/html/ecb.fsrbox202011_07~12b8ddd530.en.html)
- Climate Change Advisory Council (CCAC), 2022. "Climate Change Advisory Council Annual Review 2022". Online: <https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/contentassets/documents/Final%20Copy%20edited%20version%20for%20website%20publication.pdf>

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<sup>4</sup> The rules introduced by the Non-Financial Reporting Directive (NFRD) will remain in force until companies have to apply the new rules of CSRD. Under the NFRD, public companies have to publish information related to environmental and social matters. The reporting obligations apply to large public-interest companies with more than 500 employees, which covers a much smaller suite of companies relative to those in scope of CSRD (approximately 12,000 versus 50,000 respectively).

- Climate Policy Initiative (CPI) [B.Naran, J.Connolly, P.Rosane, D.Wignarajah, E.Wakaba, B.Buchner], 2022. “Global landscape of climate finance: a decade of data 2011-2020”. Online: <http://www.climatepolicyinitiative.org/wp-content/uploads/2022/10/Global-Landscape-of-Climate-Finance-A-Decade-of-Data.pdf>
- Department of the Environment, Climate and Communications (DECC), 2022. ‘Climate Action Plan 2023’. Online: <https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023>
- European Commission, 2021. Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions Empty: Strategy for financing the transition to a sustainable economy. Online: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021DC0390&from=BG>
- Global Commission on Adaptation, 2019. ‘Adapt Now: A Global Call for Leadership on Climate Resilience’ Online: <https://gca.org/reports/adapt-now-a-global-call-for-leadership-on-climate-resilience/>
- Global Temperature Time Series (2023) Online: <https://datahub.io/core/global-temp>
- Global Temperature Trend Monitor (2023) Online: <https://cds.climate.copernicus.eu/apps/c3s/app-c3s-global-temperature-trend-monitor?month:float=3&year:float=2023>
- Intergovernmental Panel on Climate Change (IPCC), 2023. “Summary for policymakers”. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.00
- Network for Greening the Financial System (NGFS), 2022a. “NGFS climate scenarios for central banks and supervisors”, (September), Paris, France. Online: [https://www.ngfs.net/sites/default/files/medias/documents/ngfs\\_climate\\_scenarios\\_for\\_central\\_banks\\_and\\_supervisors\\_.pdf.pdf](https://www.ngfs.net/sites/default/files/medias/documents/ngfs_climate_scenarios_for_central_banks_and_supervisors_.pdf.pdf)
- Network for Greening the Financial System (NGFS), 2022b. “Dashboard on scaling up green finance”, (October), Paris, France. Online: [https://www.ngfs.net/sites/default/files/medias/documents/ngfs\\_dashboard\\_scaling\\_up\\_green\\_finance\\_october\\_2022.pdf](https://www.ngfs.net/sites/default/files/medias/documents/ngfs_dashboard_scaling_up_green_finance_october_2022.pdf)
- World Meteorological Organisation (WMO), 2023a. “State of the Global Climate 2022”, WMO No-1316. Online: [https://library.wmo.int/doc\\_num.php?explnum\\_id=11593](https://library.wmo.int/doc_num.php?explnum_id=11593)
- World Meteorological Organisation (WMO), 2023b. State of Mortality and Economic Losses due to weather, climate and water extremes (1970-2021). Online: [https://public.wmo.int/en/resources/atlas-of-mortality#:~:text=The%20World%20Meteorological%20Organization%20has%20updated%20data%20in,Reported%20economic%20losses%20are%20US\\$244.3%20trillion%20and%20rising](https://public.wmo.int/en/resources/atlas-of-mortality#:~:text=The%20World%20Meteorological%20Organization%20has%20updated%20data%20in,Reported%20economic%20losses%20are%20US$244.3%20trillion%20and%20rising)