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**“GREEN FINANCE INSTRUMENTS:
CHALLENGES AND OPPORTUNITIES”**

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Signature 

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Introduction

"The dogmas of a peaceful past are inadequate for the stormy present. The situation is fraught with difficulties, and we must rise to the occasion. Since our case is new, we must think in a new way and act in a new way. We must emancipate ourselves."

Abraham Lincoln

The historic quotation from Abraham Lincoln (Lincoln, 1862) , one of America's most loved and hated presidents, not surprisingly assassinated during a play, still seems to echo today among the streets, seas and mountains of the entire globe – a seemingly obvious truth, so much to be taken for granted if not ignored. We are familiar with the history of the fight against slavery. In those times littered with deep racial discrimination and the misery of a fratricidal war, most politicians thought it right and good to enact a law abolishing slavery. But even the President-in-Chief was afraid that he might lose the support of states crucial to the fate of the war. So, he put the emancipation process on hold for a period, until the time came when he resumed it.

The Emancipation Proclamation of 22 September 1862 marked the end of an era filled with light and shadow. Since then, millions of people have been freed from their chains, and even greater is the number of those freed from a future with the same dramatic fate. Freedom, justice and equality were the guiding principles pursued, and thanks to this emancipation, today we live in a better world, the result of a determined political will.

Abraham Lincoln's words convey concepts such as the need to act with determination, to change one's thinking in the face of new challenges, and to face up to change, although the path ahead is arduous and not without dangers—perennially topical topics. The intention to approach a sensitive subject, such as the environmental emergency, through such a quotation lies in the effective comparison between the two. The ways and dynamics by which the 13th Amendment was passed in the United States of America mirror the climate crisis we are experiencing today in an almost symmetrical manner. In both cases, action is taken under the democratic principles of equality and human dignity against a widespread and accepted practice, the eradication of which would benefit the present of a million people and the future of billions. In other words, the common goal is to steer individuals towards a future peaceful coexistence. If in the 19th century such coexistence referred to the relationship between people, today it refers to the

relationship between man and the environment in which the distinction of peoples and cultures becomes irrelevant in the face of a possible world collapse.

Yet, at the time, the efforts seem to be failing, and the consequences are increasingly evident, sudden, and catastrophic. The climate emergency has generated new social hardships, economic crises, and imbalances in wildlife populations. Data in hand, first and foremost, Overshoot Day is very explanatory, i.e. the date on which the depletion of the resources the planet can offer within a year occurs. In 2023, August 2nd marked a significant milestone, indicating that we are consuming the equivalent of 1.7 planets per year. And Italy is among the first countries to have run out of resources. The world has been ecologically overshooting for 50 years and has accumulated a 19-year debt. Living beyond the physical limits of our planet is not sustainable over time, and we risk ecological collapse (World Wide Fund for Nature [WWF], 2023) .

Looking at the most recent data, to date, we have reached +1°C of the two sets by the Paris Agreement. According to the ESOTC (European State of the Climate [ESOTC], 2023)¹ 2022 was the second warmest year in Europe with 0.9°C above average compared to 1999-2020. Carbon dioxide and methane concentrations peaked, despite the temporary halt due to COVID-19, and many countries recorded record temperatures 10°C above average (e.g. the UK reached 40°C for the first time). The same applies to the average sea surface temperature, and the same applies to the loss of ice in the glaciers of the Alps. All this also leads to a greater intensification of fires, confirming 2022 as the second most destructive year for all EU countries. Rainfall is lower and more intense, undermining the fertility of crops and the fragile economy of many nations.

Looking at the broader numbers from the UN (Intergovernmental Panel of Climate Change [IPCC], 2023)² , on the other hand, shows that 12% more tonnes of CO₂ were emitted in 2019 than in 2010, which is 54% more than in 1990. The most at-risk people in underdeveloped or poorly developed areas are about 3.5 billion, and coincidentally, they are the ones who have the least impact on the climate crisis. Finally, another major critical issue arises from current policy initiatives that will only become apparent in 20 years. This means less public opinion, which is more focused on short-term effects and needs.

¹ ESOTC: The European State of the Climate is an annual report compiled by the Copernicus Climate Change Service (C3S), implemented by the European Centre for Medium-Range Weather Forecasts (ECMWF) on behalf of the European Commission. The report provides an analysis of climate conditions and the future of key climate indicators (Copernicus , s.d.) .

² IPCC: The Intergovernmental Panel on Climate Change is the UN body in charge of assessing climate change science. The body is responsible for creating reports to assess the state of climate change and its dynamics (IPCC, s.d.) .

All these events brought the world's leading leaders together to ensure efficient international cooperation in the face of a very topical emergency. The literature concerning possible solutions has been enriched over time thanks to the numerous studies and research in the field. Studies that have seen their representation in the emblematic date of 5 October 2016, seemingly meaningless, but which in fact marked a huge step forward in the environmental fight. It, in fact, refers to the entry into force of the Paris Agreement, quite different and more significant than many other agreements that have been concluded. There are two main reasons for this: the almost unanimous commitment of the various world leaders to active participation in the fight against global warming with 195 signatory states and, above all, the exceptional novelty of establishing a close link between finance and the environment (Palgrave Studies in Impact Finance [PSIF], 2020) .

Thus, even in the eyes of the most sceptical, the possibility of safeguarding the environment while ensuring financial stability is realised. Investing large amounts of money in green activities without regard for a country's economic stability could be as damaging as, or even more harmful than, an environmental disaster. It could anticipate that same catastrophic ending that is so much fought against. Thus, finance is exposed in a different light and put on the same level as climate risk, also acquiring priority importance. In this sense, possible directions capable of marking a turning point include Green Finance Instruments, the main subject of the paper, with which to adapt the financial system to the environmental challenge. For example, Green Bonds can play a key role and represent a valid means of creating value by financing green projects while generating economic value useful for the long-term development of sustainable societies (International Capital Market Association [ICMA], 2021). A financial instrument that will be discussed at length.

Putting an end to this introductory phase, it is then necessary to understand the gravity of the situation we and the next generations are facing by assuming a priori the real and tangible existence of climate instability. By many, we are seen as the last great hope for humanity. Others still deny the existence of global warming. However, what is truly worth listening to is the planet and the people who are suffering from the devastating consequences of human impact on it, and this will be the guiding thought behind the entire piece. The ultimate goal is to identify and present a viable solution to mitigate the environmental emergency and address the accumulated ecological debt. A process that I think needs to be pursued with imperative determination, with a renewed mindset that is up to today's problems and with preparation for the difficulties that will inevitably arise, since the positive effects will not be immediate. A

secular school of thought was proposed by A. Lincoln some time ago, and today there seems to be a first step. The institutions of the European Union are pursuing the same political determination to create a green and sustainable economy. They are achieving the goals set by the Agreement and promoting new guidelines to encourage investment in green projects. In fact, according to the President of the European Council, Charles Michel, "the EU is and will continue to be a leader in climate finance and the fight against climate change". He also argued that 'the next decade is critical and we (the EU countries) are fully mobilised to work with each and every one of you (addressed to the COP 28 participating countries, some 198) to protect humanity' (Council of the European Union, 2023) . Thinking that finds support in the New Climate Economy report of the Global Commission on the Economy and Climate³ according to which "2030 is the year when we will pass the point of no return" and adding that "taking ambitious climate action could generate 65 million new jobs (...), as well as prevent 700 thousand premature deaths due to air pollution" (Global Commission on the Economy and Climate [GCEC], 2018). In essence, the data so far warns us of an impending ecological disaster and time is no longer our friend.

Following these criteria, the current work is thus set out, charged with two main activities: the informative one, with which it attempts to provide clarification on the world of Green Finance, in particular its instruments, understanding their opportunities and challenges, and the evaluative one, with which I attempt to conclude the validity of these instruments, also and especially with the help of more authoritative sources than my voice, and on their effectiveness in providing a financial commitment to the realisation of sustainable projects.

The thesis is structured in the following way: [Chapter 1](#) will focus on the definition of Green Finance and the distinction with other similar definitions that sometimes overlap with each other, and will continue with an explanation of the different types of Green Finance Instruments. [Chapter 2](#) will cover the various steps taken at the international level, discussing the conferences and meetings, as well as the establishment of climate institutes and their objectives. An overview of the current state of Green Finance and its instruments will be presented, along with an explanation of the nature and characteristics of the leading actors, both private and public. [Chapter 3](#) will address the regulation of these instruments, particularly the EU taxonomy, which

³ Global Commission on the Economy and Climate: a new global commission headed by Felipe Calderón (former President of Mexico) and including several world leaders from politics and finance. The aim is to implement the New Climate Economy project to continuously examine the combination of sound economies and good climate policies (The New Climate Economy, s.d.) .

is considered the most developed and applicable, and is often drawn upon by third countries for their national taxonomies. Of course, the global taxonomy will also be exposed, along with a comparison between the leading European climate change partnership and the work in the rest of the world. Finally, [Chapter 4](#) will present the opportunities offered by these instruments, current and future challenges, and potential solutions. This analysis will lead to the Conclusion, in which I will provide a personal opinion on Green Finance Instruments and, more generally, on Green Finance, assessing their effectiveness and suitability, while contextualising these issues in relation to the progress achieved so far and its timing.

1. Definition of Green Finance

1.1 The contest of global sustainability

We live in a historical period in which the climate emergency has triggered a growing series of global actions involving every stratum of society, from private consumers to businesses, from national institutions to global organisations, from individual country governments to international bodies. Climate change and its sustainability counterpart have been widely echoed by political leaders across the planet. They, as stated in the introduction, entered into an unprecedented agreement called the Paris Agreement. The primary focus lies in the need for substantial financial resources to fund green investments and address the environmental crisis of our era. Giornong Zhang himself reminds us of the birth of the Green Climate Fund (GCF) in 2010 and set up by 194 countries, with the aim of financially supporting developing countries and achieving through international cooperation the goals of the Agreement. This caused the term 'Green Finance' to appear more frequently in reports in the following years (Giornong Zhang, 2019) .

In this chapter, we will try to provide multiple definitions that belong to the world of sustainability. First, by defining Green Finance and then its instruments, categorising them according to their economic nature and their technical accounting characteristics. At this point, premised on the fact that the European Commission itself has reminded us that time and resources are becoming increasingly scarce and therefore the need to focus studies on selected questions is greater (European Commission, 2017) , we will try to answer the following questions:

Is there a definition of Green Finance?

What role does it play in combating the climate crisis?

And why is Green Finance treated and not other forms of sustainable finance?

Primarily to the definition of green finance, it is consistent and useful to define the various other aspects surrounding the theatre of environmental sustainability, as well as the basis for an unambiguous understanding of the path towards which the world must and is heading.

There will be many occasions when the terms 'adaptation' and 'mitigation' will be read between these pages as they are often at the centre of the many political agendas aimed at ecological transition. Well, they are two climate change mitigation measures whose difference lies in the timing of action.

According to the European Environment Agency, 'adaptation' refers to anticipating the adverse effects of climate change by adopting appropriate measures to prevent or minimise the risk of possible environmental damage. Examples include large-scale infrastructural changes, such as building defences to protect against rising sea levels, or behavioural changes, such as reducing food waste by individuals.

'Mitigation', on the other hand, refers to reducing the impacts of climate change by predicting or decreasing the emission of greenhouse gases into the atmosphere. This is achieved by reducing the sources of these gases (perhaps by increasing renewable sources, making them a viable substitute for fossil fuels) or by enhancing storage (such as increasing forest areas on our planet) (European Environment Agency, 2023).

Put simply, the first is that set of measures aimed at the *consequences* of the environmental crisis, where the goal is to minimise the impacts of climate change by making societies more resilient. The second is that set of measures that acts directly on the *causes* of climate change, where the goal is to reduce the future impacts of climate change. What emerges is a strong link that unites the two aspects as one. In fact, a temporal interdependence coexists, whereby implementing less mitigation today means implementing stronger adaptation measures tomorrow, risking their success. It is no coincidence that 'mitigation' was considered by the Paris Agreement as a key aspect for achieving the goal of limiting the rise in global average temperatures by 1.5°C compared to the pre-industrial era (Ecco, 2022) .

But to fully understand the importance of the two measures, it is necessary to quote the words of the United Nations Convention on Climate Change (UNFCCC), which begins by citing the surprising results of a scientific report published by thirteen US federal agencies in November 2018. It predicted that the climate emergency would reduce the size of the US economy by up to 10% by the end of the century. A rough figure on the potential risks to businesses, households, markets, capital, governments and institutions, it puts the spotlight on the immediate course of action to avoid such an environmental and economic disaster. The Convention goes on to define *climate* finance as "local, national, or transnational funding from public, private, and alternative sources that aim to support mitigation and adaptation actions that will address climate change" (Hong, Scheinkman, & Karolyi, 2020) . Here comes another terminology: climate finance, not to be confused with green finance. Although in this chapter

we will try to find a definition of it, it is possible to anticipate how the latter encompasses a broader and broader scope of activities, including all initiatives that contribute to a healthier and more sustainable environment in general, such as natural resource management or biodiversity protection, and under which mitigation and adaptation measures fall. In contrast, local financing refers exclusively to activities that concern the environment and is focused on climate change. It does not include all financial flows directed at the macro-area of environmental sustainability, but only those investments aimed at reducing greenhouse gas concentration levels and strengthening the resilience of countries and societies to the ecological emergency. Therefore, mitigation and adaptation play a crucial role in the development of green finance and especially in the fight against global warming.

This clarifies the first distinction that is fundamental for the continuation of the paper. The second addresses the difference between Green Finance and Green Economy. The latter, quoting the Department for European Affairs, is a theoretical model of economic development that, with respect to a given productive activity, evaluates both the benefits of growth and the environmental impact caused by the transformation of raw materials. More precisely, the green economy is an economic form in which public and private investments aim to reduce carbon emissions and pollution, increase energy and resource efficiency, avoid biodiversity loss and preserve the ecosystem. Investments that must be supported by public spending, policy reforms and rule changes to make natural capital a critical economic asset. Above all, knowing that the growth of the economy, traditionally measured by the increase in gross domestic product (GDP), suffers the consequences of environmental damage caused during the production process and may decline due to the resulting drop in productivity of economic activities.

The green economy is not only focused on the production and creation of wealth, but above all on the environmental and social impact that this wealth creation has on the world around it. Furthermore, no economic model is based on unlimited growth since the planet's resources are limited. This does not imply a choice, but rather the need to trigger a virtuous economic mechanism for the economy based on sustainability. In these terms, one would replace the concept of 'sustainable growth' with 'sustainable development', the latter achieved through a continuous, not unlimited, consumption of natural capital without bringing it to a state of degradation. Moreover, the green economy is linked to numerous other aspects, such as social equity or the creation of new types of jobs (green jobs) in a wide range of sectors such as organic farming, bio-architecture, ecological public transport, the reclamation, redevelopment and development of brown-fields sites, or even recycling and processing of waste or building sites

for energy efficiency. In essence, the main objective of the model is to consider the environment as a determining factor in economic production, influencing its value, stability and long-term prosperity, as well as a possible source of growth and stimulus to innovation. However, this requires appropriate social, environmental, and economic policies, investment in new skills, appropriate policy instruments, and behavioural changes in society (Treccani, s.d.) .

Furthermore, as we shall also see for Green Finance, several definitions of the Green Economy have spread over the past decades, all of which have stemmed from a progressive enhancement of the environmental dimension in economic analysis:

- The first is provided by UNEP (2010), which defines 'green' as an economy capable of improving human well-being and social equity while reducing environmental risks and ecological scarcities.
- The second is given by the European Commission through *Communication COM (2011) 363*, in which the green economy is defined as an economy that generates growth, creates jobs and eliminates poverty by investing in and safeguarding the natural capital resources on which the survival of our planet depends.
- Another definition is presented by the OECD (Organisation for Economic Co-operation and Development), which in turn has produced documents and strategies in favour of the green economy and green growth in particular, referring to the promotion of economic growth that reduces pollution, greenhouse gas emissions and waste, while ensuring that the natural heritage continues to provide the environmental resources and services on which our well-being is based.

(Department for European Affairs, 2019)

Definitions that have a common theme: our planet. The organisations just mentioned are fully aware of what our future will be if we continue on one path rather than another. They seek to promote sustainable actions to create a sustainable economy that can guarantee a perfect balance between man and the environment because if there is one but not the other we will lose in any case. Hence, a worldwide race for economic development has begun by spotlighting the spotlight on green innovation. Green innovation refers to the use of new production technologies that help reduce environmental risks and create an environment in which resources

can be used effectively. In addition to being one of the key factors in achieving the Sustainable Development Goals (SDGs), it plays a crucial role in the sustainable turnaround as it is one of the tools with which to make the transition to a Green Economy (Danish Ahmed, 2024) . In short, it enables the creation of new business models and sustainable solutions, addressing environmental challenges and supporting economic development.

This is why our focus now falls on how to achieve green innovation, and green finance comes to our aid in doing so. This is an aspect of recent study that has brought with it many implications, but once again, before embarking on the search for answers at the beginning of this chapter, it is necessary to have the big picture in mind. Figure 1, proposed by the United Nations Environment Programme offices, helps to visualise the correct distinction of the different economic-environmental dimensions: climate finance, green finance and sustainable finance.

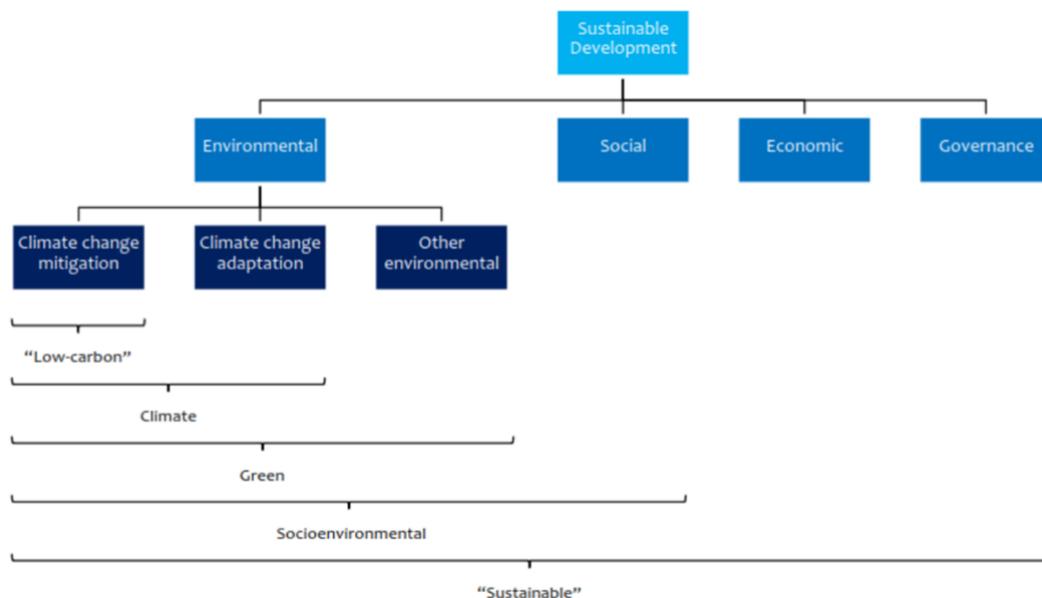


Figure 1: Definitions and Concepts - Background Note (UNEP Inquiry, 2016)

This image offers a simple and clear representation, as close as possible to the difficult political waters that international institutions, bodies and governments try to navigate. The European Union itself has described the drawing of a 'dividing line between green and sustainable finance' as impervious. In this regard, again, the European Union provides us with a clear definition of sustainable finance. It refers to that process in which environmental, social and governance aspects are simultaneously considered, as well as compliance with ESG criteria and so-called

ESG ratings⁴. The environmental dimension covers all those activities directly related to the impact on the environment. Concrete examples are the circular economy⁵ or less energy-intensive industrial production lines. The social dimension refers to those factors concerning inclusiveness, equality in the working environment, and the wellbeing of the community. More generally, respect for human rights. Finally, the governance dimension embodies the means by which environmental and social aspects are guaranteed and ensured. Therefore, the composition of corporate administrative bodies, the relationship with employees and the remuneration of managers seemed equally important in the eyes of organisations.

In this perspective, sustainable finance takes shape as a huge long-term investment programme with the aim of supporting economic growth, while keeping in mind the pillars on which it is based. A finance that, in addition to meeting ESG criteria, embraces both green finance, for the environmental dimension, and transition finance, for the transition from an economic model with a high environmental impact to a more sustainable one. (European Commission, 2024).

Returning to Figure 1 and summarising, one could say that *sustainable finance* is synonymous with *sustainable development*, a strategy defined briefly, but with great foresight, by the World Commission on Environment and Development in 1987 as "that development which enables the present generation to meet its own needs without compromising the ability of future generations to meet their needs" (United Nations, 1987). Similarly, the United Nations defines green finance as that set of activities linked to the two-way interaction between environment, finance and investment, also developing thanks to an increasingly widespread green bond market. Finally, by 'climate finance', looking again at Figure 1, one could mean the same definition as previously provided for 'climate finance' which, put another way, is a subset of green finance, but unlike the latter, focused exclusively on combating climate change (International Organisation for Standardisation [ISO], 2022). A simple example to better understand the distinction is the set of reforestation projects that aim to preserve biodiversity, perhaps through a green fund. In this case, although such a project has a clearly positive impact on the environment, it would not fit under the label of climate finance as it is not directly related to climate change mitigation.

⁴ "They express a summary judgement on the level of sustainability of issuers (companies, states, supranational organisations), financial securities and collective investment instruments (UCITS and ETFs) that define themselves as *sustainable* or *ESG* precisely on the basis of the scores obtained" (Bank of Italy, 2022).

⁵ "The *Circular Economy* refers to a production and consumption model that involves the reuse, reconditioning and recycling of existing materials and products. A system that contrasts with the traditional *Linear Economy* model, in which products have a life cycle at the end of which they become waste to be disposed of" (Bank of Italy).

Having reached this point, after having clarified the definitions of mitigation and adaptation, after having explained the distinction between green finance and green economy, and after having shown the various dimensions of sustainable development, there remains one last, brief intermediate step before being able to answer the questions set out. That is, it must be made clear why the search for a definition of it can play a key role in the fight against global warming. Well, there are several reasons for this. Firstly, identifying what is green implies a decision on which sectors or activities are considered to contribute to environmental goals. In this regard, only green sectors or activities will benefit from the flow of resources. Secondly, based on a specific definition of what is green and what remains excluded, specific policy measures could be taken to encourage environmentally friendly investments, such as lower capital requirements for financial intermediaries holding green securities or ad hoc tax incentives. This would have the effect of the first point, i.e. only certain sectors and specific activities would enjoy the expected benefits, such as an increase in the amount of resources available or a decrease in financing costs. Finally, uncertainty about the meaning of green could damage the credibility of the nascent market and represent in the medium term a substantial obstacle to its development. In fact, economic agents would only agree to enter the market if there was a guarantee that their investment decisions are aligned with the use of their money for which it is intended (PSIF, 2020) .

1.2 The role played on the international scene

Having shed light on this series of intermediate steps, we now attempt to finally answer the main question. According to Babic Milano, a researcher at the University of Roskilde, Denmark, there is little agreement on what constitutes this type of finance and how energy research can incorporate this concept into the analysis and critical evaluation of green transactions. He argues that green finance is simply a 'time-varying entity' that originally consisted mainly of international climate funds for mitigation and adaptation activities. Now, however, he believes it has developed into a broad ecosystem, contested by multiple actors, instruments and high volumes of capital flowing into it.

The only seemingly clear aspect concerns the need for numerous and massive investments of several trillion USD per year in every aspect of the global energy transition and therefore, the researcher concludes, the question is not what falls under green finance, but *how to* mobilise the volumes within it (Babic, 2024).

Statements that seek to draw attention not so much to what the true structure of green finance is or what the labelling methodology of green assets is, but rather to how it works and what process it dresses for the development of a more sustainable economy. Put another way, it is not pertinent to understand in detail the characteristics of certain mechanisms, but rather it is useful to know the process of how certain gears must be set and operated in order for the machine, which green finance is, to deliver the desired results.

And continuing with the citation of further studies, it is impossible not to come across the research conducted by two scholars (Manosur & Chenguel, 2023) according to which the concept of 'green' would cover 'any investment aimed at reducing pollution'. A simplistic view similar to the previous one. The examples given are projects and innovations in the field of electric urban transport, waste treatment, wastewater treatment and renewable energy. However, following this parameter a clear criticality becomes apparent: not all 'green' funding is always green. Just think of urban electric transport itself where the electricity needed may come from polluting and high-emission energy sources. In short, the absence of parameters means that companies present their own definition of 'green'. Conversely, as is pointed out, green finance can be considered to include unlabelled securities, bonds, financial services or products even if the financial flows generated actually contribute to financing environmentally sustainable activities and projects (PSIF, 2020).

One solution brought forward could be to focus on concrete indicators such as the 'social and responsible investment' (SRI) label, which should ensure that social environmental governance (ESG) criteria are properly taken into account. However, according to the non-governmental organisation 'Reclaim Finance', 94% of ISR funds are allocated to companies with dubious environmental and social practices. There are even polluting companies with a good ESG rating since a small part of the financial assets dedicated to renewable energy is sufficient. And this would bring us back to the path of the original problem.

But there would be more authoritative and effective labels in the market, such as the GreenFin Label, which excludes fossil fuel and nuclear operators, or the Finasol, the label of solidarity savings funds, in which money is redirected to actors whose social and environmental utility is recognised by an independent committee composed of civil society. In the eyes of the public, this intermediate step of labelling would be seen as a first step towards self-regulation in the financial world. The research concludes by describing such labels as instruments with real potential, but that at the same time continued pressure is needed for actors to tighten the rules and make them more transparent.

This path would present itself as a first step towards the identification of standard parameters by which to define "what" falls under green finance and subsequently towards the clarification of the reality of green finance. Definitely a step forward from the first comment. But to the initial question, will we now be able to give a clear and precise definition of green finance?

According to the content of the academic work 'The Rise of Green Finance in Europe', to date there is no single, universal and commonly accepted definition of green finance. Numerous definitions have been proposed by the industry and international organisations for specific green securities and products, as well as for the different components of the sustainable finance sector. The same applies to different families of green securities, products or financial services. In the best cases, industry guidelines have emerged and consolidated over time for only a few key categories of securities (e.g. green bonds) and are considered effective but non-binding market references (PSIF, 2020) . So...NO. There is no single, consolidated definition of green finance.

Several attempts have been made to guide international actors towards a common path, but so far without luck. These include the international forum, or more commonly referred to as the G20, which has tried to narrow the boundaries by contributing its own opinion on the issue. Conceptually, the G20 clarifies, 'green finance' can be understood as the financing of investments that provide environmental benefits in the broader context of environmentally

sustainable development. These environmental benefits include, for example, the reduction of air, water and soil pollution, the reduction of greenhouse gas emissions, the improvement of energy efficiency using natural resources, as well as climate change mitigation and adaptation and their co-benefits. In addition to financing green investments, green finance also involves efforts to internalise environmental externalities and adjust risk perceptions in order to stimulate environmentally friendly investments and reduce environmentally harmful ones. With regard to the functioning of financial markets, green finance also means a better understanding and assessment of financial risks related to environmental factors (G20 Green Finance Study Group, 2016) .

Similarly, the Bank of Italy has tried to define green finance as part of sustainable finance and concerning financial instruments that can facilitate environmentally sustainable development, energy transition and the fight against global warming. It also explains and reconfirms our assumption about the absence of a harmonised regulatory framework and criteria to define what is green and what is not (Bank of Italy, 2019) .

Drawing conclusions and also answering the second question, namely what function green finance plays in the fight against climate change, one could say that green economy is the end, green finance the means. According to a recent study, green finance would favour the optimisation of the industrial structure, one of the accelerators of green economic development. (Donglan Liu, 2023) .

There we have finally explained the definition and function of green finance, the first two questions. Now it would be natural to ask why, among the various instruments and approaches of sustainable finance, green finance, the third and final question, was chosen. In fact, it would encapsulate all those efforts against environmental emergencies that in past years were represented by other approaches such as simple waste recycling, rather than the fight against deforestation or melting glaciers or even the energy transition that led to the construction of numerous renewable energy plants. Today, the baton has passed to green finance with the realistic union of finance and the environment and the utopian goal of achieving a harmonious balance between the two in a short period of time, addressing the global challenges of climate change and promoting sustainable economic development that can guarantee a prosperous and healthy future for future generations.

Well, further reasons why green finance would appear to be, or at least appear to possess the potential to be, the optimal action to pursue are provided by further studies.

The first to be mentioned is the one conducted on finding a way to achieve sustainable development goals. It reiterates how finance is the driving force behind the development of infrastructure projects, including energy projects, and that global investment in renewables and energy efficiency fell by 3% in 2017. Several developed and developing economies are still following pro-coal energy policies so the extra CO₂ generated by new coal-fired power plants could cancel out or outweigh any emission reductions made by other nations. This happens, the article explains, because there are still many risks associated with new technologies, as well as a lower rate of return. Therefore, the proposed solution is to increase financing to invest in environmental benefits. This is possible through new financial instruments and policies, including green bonds, green central banks, financial technologies, EU green funds, tax policy, and others. All of these solutions fall under the collective definition of 'green finance' (Jeffrey D. , Woo, & Yoshino, 2019) .

The second study to be taken up comes directly from the G20, or rather the G20 Green Finance Study Group (GFSG). A body set up to explore options for increasing green finance that will require tens of trillions of dollars over the next decade. The study group, in the strategic sphere of strong, sustainable and balanced growth, believes that 'green finance' can be understood as the financing of investments that bring environmental benefits in the broader context of sustainable environmental development. This clearly underlines the strategic relevance of green finance at the international level, as well as the importance of adopting coherent and coordinated policies to promote sustainable investments that can significantly contribute to climate change mitigation and adaptation and the transition to a low-carbon economy.

The study goes on to outline a number of difficulties that will have to be addressed such as differences in local conditions whereby some options considered good practice in one country may not be suitable for another country, or the internalisation of environmental externalities, information asymmetry, inadequate analytical capacity or the lack of clarity in green definitions, which of course recur.

Thus, the mandate of the GFSG is to identify institutional and market barriers to green finance and, based on country experiences, develop options on how to improve the capacity of the financial system in mobilising private capital for green investments. And in examining the experiences of various countries and their market practices, the GFSG was able to interact with participants by working closely with other international initiatives, in particular the Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures and the Climate Financial Study Group (CFSG). Through this system of international collaboration based on

the mutual and rapid exchange of information, the applicability of green finance was unquestionably made more viable. (G20 Green Finance Study Group, 2016) .

Finally, it is worth mentioning the interesting research conducted by Ozili who set out to explore the world of green finance in an academic and political discourse. Initially, he provides his own idea of green finance as 'the acquisition and utilisation of funds for activities that protect the environment and offer a fair return to investors or lenders', the aim of which is 'to increase the level of financial flows from financial institutions to economic agents involved in projects and activities that preserve the environment'. In doing so, he unwittingly answered the first two questions regarding the clarity and functionality of green finance. But it only takes a little while to receive the third answer as well: the reason why green finance is preferred over other forms of sustainability lies in the need to meet a growing demand for investment in environmentally sustainable realities. The progressive divestment from activities mainly related to fossil fuels has led the leaders of nations and international institutions to urgently shift investments towards low-carbon activities. Thus, at the heart of the discourse is the desire to build and even promote a 'small but growing' green economy. This not only has implications for the sphere of green finance, but also for example on the increase of innovative financing⁶ or the implementation of digital finance⁷, facilitators of green finance. In other words, the researcher of the paper, similar to previous scholars, is demonstrating how green finance is a viable alternative to meet sustainability criteria and to help accelerate the creation of a green economy. It is an innovative tool for individuals, corporations, governments, organisations, institutions, and anyone who has special financial needs with an ecological footprint and plans to invest in green assets (Ozili, 2022) .

To conclude this extensive and necessary first part of the paper, the words used by Höhne⁸, an internationally renowned expert in climate policy, are perfect. He defines green finance as ""a

⁶ According to the United Nations Economist Network: innovative finance is anything that includes mechanisms and solutions that increase the volume, efficiency and effectiveness of financial flows. It also specifies how innovative finance has taken many forms and continues to evolve both as a tool and in its application to development objectives (Stuart Davies).

⁷ Digital finance: is the application of digital technologies to financial activities; Europe's digital transition is a top EU priority for the next decade with the aim of creating a competitive and stable financial sector, as well as regulations that protect consumers (European Council, 2024) .

⁸ Prof. Dr. Niklas Höhne: Co-founder of the NewClimate Institute, creator of the Climate Action Tracker, with chair at Wageningen University and co-writer of more than 300 studies related to international and national climate policies, contributing to the IPCC's 4th, 5th and 6th assessment reports of all UNEP Emissions Gap Reports since 2010, he has 20 years of experience participating in international climate negotiations since 1995, including as an expert at European and German parliamentary hearings on several occasions (New Climate Institute) .

broad term that can refer to financial investments that flow into sustainable development projects and initiatives, environmental products and policies that encourage the development of a more sustainable economy. Green finance includes but is not limited to climate finance. It also refers to a broader range of other environmental objectives, such as industrial pollution control, water purification or biodiversity protection' (PSIF, 2020) .

In a nutshell, green finance is the ideal bridge with which to unite the financial dimension with the environmental dimension, ensuring sustainable satisfaction of needs for current and future generations. Described by many authoritative scholars and prestigious organisations as the ideal tool for achieving many sustainable development goals, it encompasses the possibility of taking a step in the right direction. The direction in which policy-makers are attempting to steer their national economies. But trying is no longer enough. The former president of the Istituto Superiore di Sanità (ISS), Walter Ricciardi, stated that we have two generations, or 20 years, to go. To add insult to injury, the UN stated in the IPCC 2021 report that 'the worst is yet to come and it is our children and grandchildren, more than ourselves, who will pay the price'. Therefore, the time has come to take those steps and to do so, green finance comes to our aid along with its tools, the subject of the next sub-chapter.

1.3 Types of Green Finance Instruments

Having taken an in-depth look at the green financial dimension, its natural definition, and the promising features that can contribute to the transition from a linear to a circular economy, it is now time to delve into the technical aspects that financial instruments bring. The growth of the green investment market has shifted the terrain of opportunity by taking on roles that go far beyond the simple flow of capital to green projects. It is about creating finance for long-term, sustainable, and smart development that encompasses both ESG criteria and those of the UN Sustainable Development Goals (SDGs), while constantly encouraging transparency in financial transactions. It should also be remembered that cash flows are not only determined by the actors (which we will see in the next chapter), but also by the type of instruments that mobilise them. Therefore, green finance covers a wide range of instruments that do not end with the list of financial products and services such as green bonds or sustainability bonds. But in an indirect way, they also incorporate fiscal measures, although the contribution is more difficult to measure than market-based instruments. (Babic, 2024)

To conclude this premise, the instruments we are going to analyse are debt and equity, predominant in green finance and representing a risk management product. Obviously, there are further possible classifications if we focus on different dependent variables such as the level of priority (common or preferred shares), the channel of disbursement, the terms of the agreement, the origin of the flows or the main actors (types of investor). The overall objective remains and has been reiterated many times, namely to finance the preservation of the world's ecosystems and to ensure a sustainable economy over time that can enable consumers to meet the needs of the present. Although this is the right way to go, it will require immense effort and sacrifice, both economic and political, as well as billions of dollars especially in the private sector as the main source of investment. And having clarified the goal once again, we can then begin to discuss the means by which to achieve it. (Global Environmental Facility, 2017)

But before proceeding, one last detail needs to be explained. The main data, the most significant results and the conclusions we are going to discuss will mostly come from the articles reported by ICMA. ICMA refers to the International Capital Market Association, which is a not-for-profit association based in Zurich, but which plays a role, to say the least little within its borders. For more than 50 years, it has worked with regulators globally, promoting the complementarity and interoperability of their initiatives with the Principles. As such, it plays a leading internationally recognised role in supporting the development of sustainable finance in the

broader bond and debt capital markets. ICMA provides the Secretariat for the Green Bond Principles (GBP), the Social Bond Principles (SBP), the Sustainability Bond Guidelines (SGB) and the Sustainability-Linked Bond Principles (SLBP), collectively known as 'The Principles'. These represent the de facto global issuance standard for the sustainable bond market, referred to by 97% of issuers in 2023, and with which regulatory and policy debates on key topics such as greenwashing and transition finance are addressed. In short, ICMA embodies that hitherto missing thrust that embraces sustainable economic development in a responsible and active manner, making it credible and viable. (ICMA, 2024)

Returning to the central theme, the two most common types of capital, in terms of green finance, are **equity** and **debt capital**.

Equity financing is particularly common in the initial stages of a business or project, including those with sustainable objectives. It consists of direct and active participation in the company through the acquisition of company stakes or shares. This provides the start-up with the essential economic resources with which to progress, grow and develop its business strategies. In addition to this, it is useful to clarify the type of shares, which are divided into two main distinctions: ordinary shares and preference shares. Firstly, in the event of the company's liquidation, preference shareholders would be paid before ordinary shareholders. Secondly, dividends of preference shares are usually higher than dividends of ordinary shares.

The principal equity instruments are:

- **Green Funds:** collective investment funds that direct capital exclusively or predominantly towards economic activities with a positive impact on the environment, in line with sustainable finance. They integrate ESG criteria and, often, allocating resources to climate mitigation and adaptation projects, renewable energy or resource efficiency.
- **Green Indices:** baskets of securities (equities or bonds) selected on the basis of their environmental impact or contribution to sustainability. These indices become benchmarks for constructing index-linked financial instruments, providing investors with transparent references for measuring the performance of green portfolios against the general market. Their direct involvement in “green finance” makes them a key component in steering demand towards sustainable instruments.

- ***Index-Linked Products:*** are structured financial products, such as bonds or funds, whose return is linked to the performance of an environmental index (a green index). In this way, the capital invested reflects not only market dynamics, but also the evolution of assets selected for their sustainability, offering a direct link between return and environmental impact.

The second main type of financing is through debt capital. This is particularly adopted in later business stages, during the middle life of the company and often in combination with equity capital. It consists of lending money (investor) to the company (debtor), which will repay the amount (principal) with interest at the end of the specified period and according to precise conditions.

The principal debt instruments are:

- ***Green Bonds:*** are bonds issued to finance or refinance projects that promote environmental benefits. These bonds must use 100% of the proceeds for activities aligned with the national taxonomy, comply with transparency standards and undergo independent pre- and post-issuance verification (see [Green Bonds Standard](#)).
- ***Green Asset-Backed Securities:*** are securities backed by a portfolio of loans linked to green projects, such as energy-efficient mortgages, electric cars or solar installations. They allow originators to refinance and expand these green activities by transferring the risk to institutional investors.
- ***Green Loans:*** are loans intended to finance initiatives with positive environmental impacts, in accordance with the EU Taxonomy. They includes various instruments, such as: Green Project Financing, loans structured for specific environmental projects, repaid through the cash flows generated by the initiative itself; Revolving Credit Facilities, renewable credit lines for operational needs or green investments, linked to ESG criteria or Taxonomy; and Sustainability-Linked Loans, loans whose rate is linked to the achievement of ESG KPIs, aimed at improving environmental performance ([see Green Indicators](#)).

Debt financing can take place in two ways: from a loan or from the sale of bonds to the public. The loan consists of the simple transfer of money from a bank to a legal entity, the so-called bank debt. Thus, the bank enters into an agreement with the company and, according to the agreed contractual terms, temporarily cedes part of its cash, which will be returned according to the maturity and interest rates negotiated on the spot. The sale of bonds to the public, on the

other hand, could be likened to the form of debt capital with the only difference being that instead of acquiring shares or units, bonds are bought. There goes a kind of variant of the shareholder, the bondholder.

They are still investors, but hold different rights with which they are treated differently. In fact, they acquire securities in the same way as shareholders, but with the aim of grabbing a safer position, with a different risk profile and rate of return. If the objective of shareholders is to maximise return, that of bondholders is to minimise risk. In fact, the latter are generally intent on securing a safer position within the company by preferring to acquire financial products with a low rate of return, but compensating with an equally low risk profile. What is more, in the event of liquidation, they will be in the category of 'creditors' and thus the first to be repaid, with priority even over preferred shareholders. In short, the company must fulfil its obligations to its creditors, i.e. it must first turn to those who lent capital to the company (bondholders) and then to those who demanded capital (shareholders).

In terms of sustainability, it is premature to come to conclusions on the management of debt repayment schedules and rules. Depending on the green project to be pursued and realised, the amounts of debt and equity change. There are high-growth sectors with high potential returns, which makes these sectors the most attractive to investors (such as software or IT). But in these cases, companies often have intangible assets or uncertain cash flows, making it difficult to analyse future forecasts. Certainly, bonds, unlike bank debt, are able to raise more public capital for possible investments in green projects. But they still remain complex and structured securities that should be made accessible to all categories of investors who are willing to invest less capital initially.

Of course, in addition to traditional financial instruments, there are alternatives that are just as good, if not more fruitful. These include both debt and equity funds capable of channelling many different investment flows into a single pot. This implies a high degree of financial heterogeneity in terms of sector, risk profile, risk mitigation measures and other aspects. As a result, the structure is extremely diversified, reducing idiosyncratic risk. The only commonality of projects belonging to a fund is the so-called maturity, i.e. having the same maturity period. In fact, funds are the vehicle of excellence for environmental finance and it is not surprising that many green projects have similar maturity terms. On the other hand, urgency and tight deadlines are common in many green initiatives, especially within the European landscape, which is more careful and strict than others. Moreover, funds are generally more familiar to traditional investors, making them more confident and secure in placing their money.

These turn out to be the three macro-categories of green financial instruments with which to begin the breakdown of the main items in each of them, always bearing in mind the need for large amounts of money and the role these cover, i.e. means to a common end that goes beyond mere risk diversification or profit maximisation, but attempts to represent not *a* but a channel through which to safeguard the planet and the human species itself.

First and foremost, according to ICMA, the Green, Social and Sustainability (GSS) bonds cannot but be cited as the main promoters of this bold undertaking, as well as the main traditional investment assets that are able to flow funds into sustainable infrastructures. In fact, if we briefly look at the SDGs, the link to the GSSs is obvious. Bringing them together makes the connection between the objectives of the different programmes clearer, despite the fact that the ends are similar and the means (the bond market) as well. In this sense, the SPGs offer the opportunity to attract traditional, footprint-conscious investors with which to finance projects with a low environmental impact. Projects that sometimes intersect with those of the SDGs, and it sometimes happens that there are conflicting actions between Goals of the same programme. ICMA mentions some of them, such as SDG 2 (Zero Hunger), which on the other hand could have conflicting impacts on progress towards SDG 14 (Life Under Water) and SDG 15 (Life on Earth). Or, the vast amount of money allocated to reducing global pollution and thus referring to SDG 7 (Affordable and Clean Energy), SDG 9 (Industry, Innovation and Infrastructure) and/or SDG 13 (Combating Climate Change) could have a contradictory impact on communities that base their economic livelihoods on polluting fossil-fuel industries and thus on SDG 8 (Decent Work and Economic Growth).

We will shortly outline the meaning of Green, Social and Sustainability bonds, but from the outset it is clear that benefits from green projects can also extend and produce benefits at a social level and vice versa. The mapping of bonds is done by considering a number of factors on the part of the issuer, but the decisive one turns out to be the objective(s) that the project financed by the bond aims to achieve.

The SDGs, on the other hand, have been mapped by the United Nations which lends itself as a simple addendum to the already mapped components of a SDG bond. Therefore, it has been recommended by the Social Bonds Working Group (SBWG) that SDG frameworks also incorporate the possible methodology to contribute to the realisation of one or more of the projects pursued by the SDGs. This, as will be argued in more detail in the following chapters and especially in the sections on *Greenwashing*, implies the use of correlated indicators and above all a greater and substantial transparency in detailing how the bond is linked to specific

SDGs, avoiding being superficial or fertile ground for possible misunderstandings between investors and issuers. (ICMA, 2023) .

A final necessary aside concerns the definition given of a Green Bond or Sustainability Bond. There are a number of byes that influence the way we learn the meaning of the object, in this case the financial product. We will not rely exclusively on the literal meaning, i.e. a banal profit-making instrument that is demanded and offered in the bond market. Rather, we will also try to guess at the other meanings, the moral, the anagogical and the allegorical. Green Finance encompasses any green financial instrument that can even minimally contribute to the sustainability of the society in which we live, and although the economic and, above all, cultural obstacle may repeatedly induce us to abandon our courageous intention to fight for the preservation of the planet, it represents more than that. A hope for the most hopeful, an opportunity for the most realistic, another failure for the most sceptical. Everyone, as with everything, sees what they want or are able to see. The thesis, to reiterate once again, aims to expand these boundaries and direct the human eye to broader horizons, to spaces and roads that would otherwise not be travelled without a guiding hand. Here Green Finance begins to take on more meanings and have more fringes of interpretation with which to address an issue as delicate as that of the custody of the world.

The first product to which significance can be attached is undoubtedly the Green Bond, the instrument par excellence if one looks at the volumes shown in Figure 4. The first was issued by the European Investment Bank in 2007 and was called the Climate Awareness Bond. Further confirmation of European leadership in the ecological transition and the realisation of a sustainable society. In fact, the following year it was taken as an example by the World Bank, which issued the first real 'Green Bond'. Although it did not take the lead, it was still able to raise awareness among new investors by providing an economic push towards these new sustainable financial instruments. Since then, to open a brief historical parenthesis, there was a rapid and steady increase in issuance until, in the same year that Italy launched its first Green Bond through the holding company Hera, the ICMA launched the Green Bond Principles (GBP). Subsequently, in 2016 Poland issued its first sovereign Green Bond and in 2021, the year in which the Italian state launched its first Green BTP, the EU launched the European Green Standard (GBS) in which the first contours of the EU taxonomy and aspects of regulation related to transparency and external review were outlined (Forum for Sustainable Finance, s.d.) .

Closing the time parenthesis and returning to the definition, we take it for granted that ICMA provides the most valid of those proposed so far and therefore Green Bond means

"...any type of bond instrument where the proceeds or an equivalent amount will be used exclusively to finance or refinance, in part or in full, new and/or existing eligible green projects and which are aligned with the four main components of the GBP⁹ ."

A definition with a broad spectrum of interpretation. There are some good alternatives, such as the one offered by the Climate Bond Initiative (CBI), which reworks the ICMA guiding principles by putting a more ecological transition and climate change-focused twist on them. Or, that provided by the EU itself, which has published and continues to publish complex regulations (which will be addressed in the next chapter) on green bond standards. These regulations are similar to the existing ones, but with certain differences such as, for example, the fact that the certification of green projects must be provided by companies belonging to a list signed by the European Securities and Markets Authority (ESMA).

Possible activities that fall under the definition of Green Bonds are renewable energy projects, energy efficiency, clean transport, green manufacturing, pollution management and many others. In fact, there is no single type of Green Bond. Examples are, as ICMA mentions, the Standard Green Use of Proceeds Bond or the Green Revenue Bond. The former is an unsecured debt bond with full recourse to the issuer, as well as aligned with the GBP, while the latter, which is still a debt bond, is without recourse to the issuer and whose revenue streams from revenues, fees, taxes or otherwise are directed to related or unrelated green projects. Others are the Green Project Bond, a bond designed to finance one or more green projects where the investor has direct risk exposure with or without recourse to the issuer, and the Secured Green Bond, a bond designed to finance or refinance green projects.¹⁰

⁹ The four pillars are: I) Describing in a detailed and transparent manner the projects to which the funds raised are allocated, indicating their environmental benefits; II) Communicating according to which criteria and classifications green projects and their benefits are evaluated; III) Through monitoring and allocation operations, managing the proceeds for individual bonds (bond by bond approach); IV) The Reporting process by which information is collected and made available.

¹⁰ The Secured Green Bond is aimed either at green projects that exclusively guarantee the bond (Secured Green Collateral Bond) or at green projects that are less certain to guarantee the bond, but which must be understood as a specific class or tranche of a broader transition (Secured Green Standard Bond).

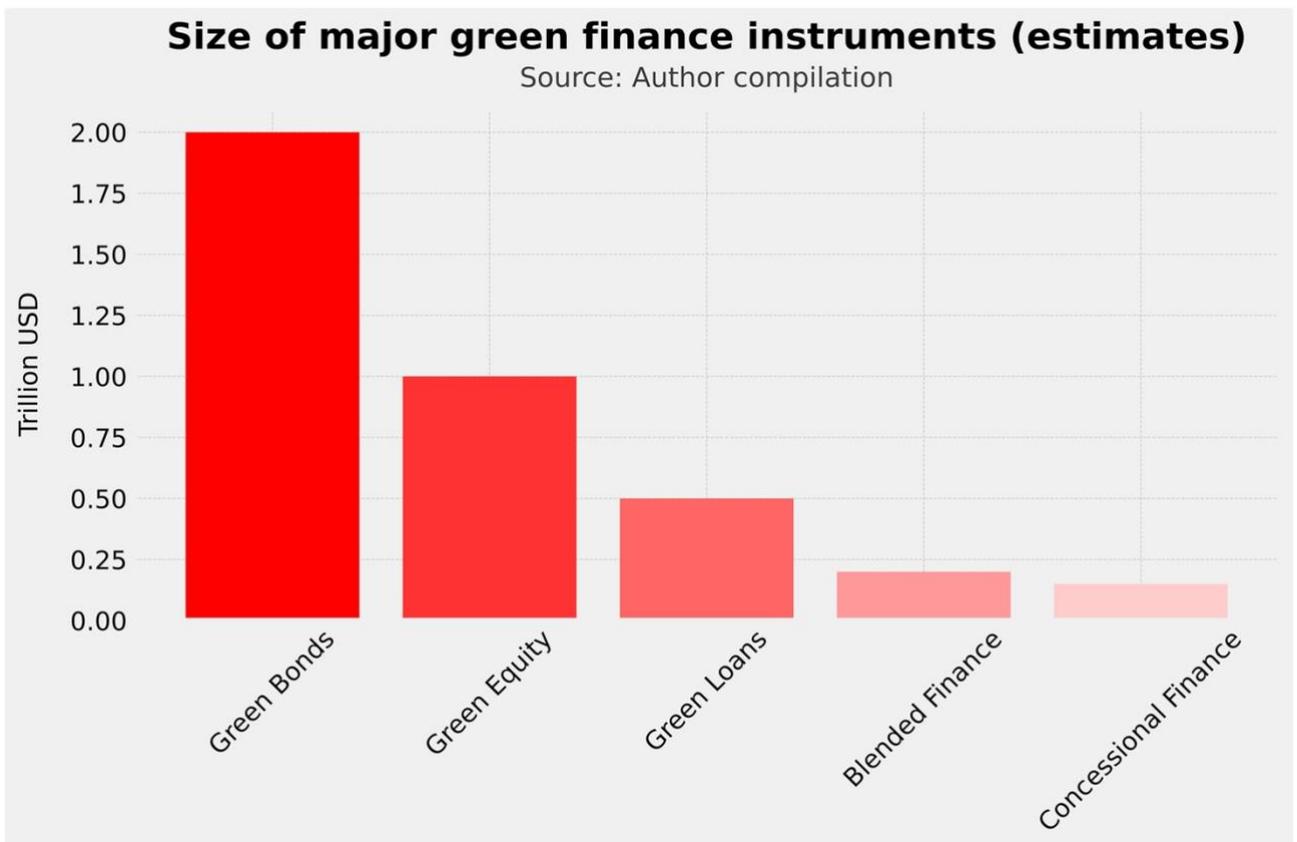


Figure 2: Comparison of different green finance instruments in 2024 (Babic, 2024)

Figure 2 shows the estimated size of major financial instruments in trillions of USD. A bar chart effectively reflects the current state of the market. Green Bonds are clearly the most traded instrument (approximately USD 2 trillion), followed by Green Equity instruments (approximately USD 1 trillion), Green Loans (approximately USD 0.50 trillion), Blend Finance (approximately USD 0.20 trillion) and Concessional Finance (approximately USD 0.15 trillion). To conclude the paragraph on Green Bonds, this instrument has over time become the backbone of the green transition, giving rise to a two trillion dollar market that incorporates governments, institutions, international organisations and private companies such as Alphabet and Apple, pioneers of sustainability through policies focused on carbon neutrality and new climate tech solutions. Instruments that can sometimes be more 'mature' than traditional bonds, as the goal of profit coexists hand in hand with that of long-term sustainability. And various are the critical issues they face, such as the satisfactory progress in developed countries, but with the equal failures in the South. The exponential search that has taken place in the financial sector for a socially and economically sustainable society, but with a lack of necessary regulatory legislation to clarify and promote Green Finance investments. Aspects that we will see in the next chapter, illustrating more clearly the volumes and importance played by Green

Bonds. For the time being, it is sufficient to dwell on what its definition encompasses, a fundamental step in understanding how it works.

Looking further, Social and Sustainability Bonds behave more or less similarly to Green Bonds. The former are defined similarly:

"...any type of bond instrument in which the proceeds, or an equivalent amount, will be used exclusively to finance or refinance part or all of eligible new and/or existing social projects and which are aligned with the four main components of the SBP¹¹ ."

Like Green Bonds, Social Bonds can also have environmental co-benefits by incorporating projects aimed at access to essential services, food provision, infrastructure or services in education, housing and health. The common goal is to generate positive social externalities through both outcome- and time-efficient use of available resources. The standard social project addresses the wellbeing of the community by dressing up objectives with sustainable connotations, or at least attempting to do so, with the ultimate aim of concretely impacting the community by mitigating or solving social problems such as, among the most widespread, poverty and health.

Last but not least, there are Sustainability Bonds defined as:

"...any type of bond instrument whose proceeds will be applied exclusively to finance or refinance a combination of green and social projects and which are aligned with the four main components of the GBP and/or SBP".

It includes both types of bonds described above and encompasses both green and social projects. The issuer labels the project on the basis of its primary objectives, so if it pursues both social and environmental goals, it will be placed in the latter category of Bonds (ICMA, 2023) .

Following with about half of the previous volumes represented by Green Bonds in the Green Finance market is Green Equity, consisting mainly of funds and managers. Investing in sustainable activities or projects can be done in two ways in the equity market: through the responsibility inherent in the shareholders or through the divestment transaction

¹¹ Again, the four lines of the Social Bond Principles consist of I) Use of Proceeds; II) Process for project Evaluation and Selection; III) Management of Proceeds; IV) Reporting.

whereby one sells one's shares and terminates the economic-financial link with the company or fund.

To facilitate understanding, two examples from the opposite pole are given. In the first case we deal with the Norwegian Sovereign Wealth Fund, the world's largest sovereign wealth fund owning about 1.5% of all global equities, not to say 1.5% of the global stock market. It was established in 1990 with the aim of reinvesting surplus revenues from the Norwegian oil industry, which is why many ethically committed companies have divested from the fund, and in the second half of 2024 it held about USD 1.7 trillion in assets. These companies include Equinor, formerly Statoil, currently the world's largest offshore oil and gas company. Well, the Scandinavian fund that has now become an international economic giant has recently moved in directions that are sustainable and ethically aligned with the wishes of its investors. Until a few years ago it was still investing in oil exploration and has now committed to only holding net zero companies in its equity portfolio by 2050. The goal, equivalent to the broader EU spectrum, is to become an exclusively green financier. The idea undertaken, however, is not disinvestment from companies with a low ecological footprint or a high level of fossils used. Rather, it is to call for a change within corporate assemblies, initiating a dialogue and valuing shareholder engagement at the same time.

On the contrary, there are investment vehicles such as the Dutch pension fund (EUR 500 billion in assets) and the British Nest that have made albeit temporary divestments sending significant signals to the market on which investments to prefer. Or, a more striking example is shown by the three largest asset managers, namely BlackRock, Vanguard and State Street, which control around USD 20 trillion in Assets Under Management (AuM), which would be the market value of funds under management. Figure 3 shows the ratio of the amount invested in ESG assets to total funds in AuM.

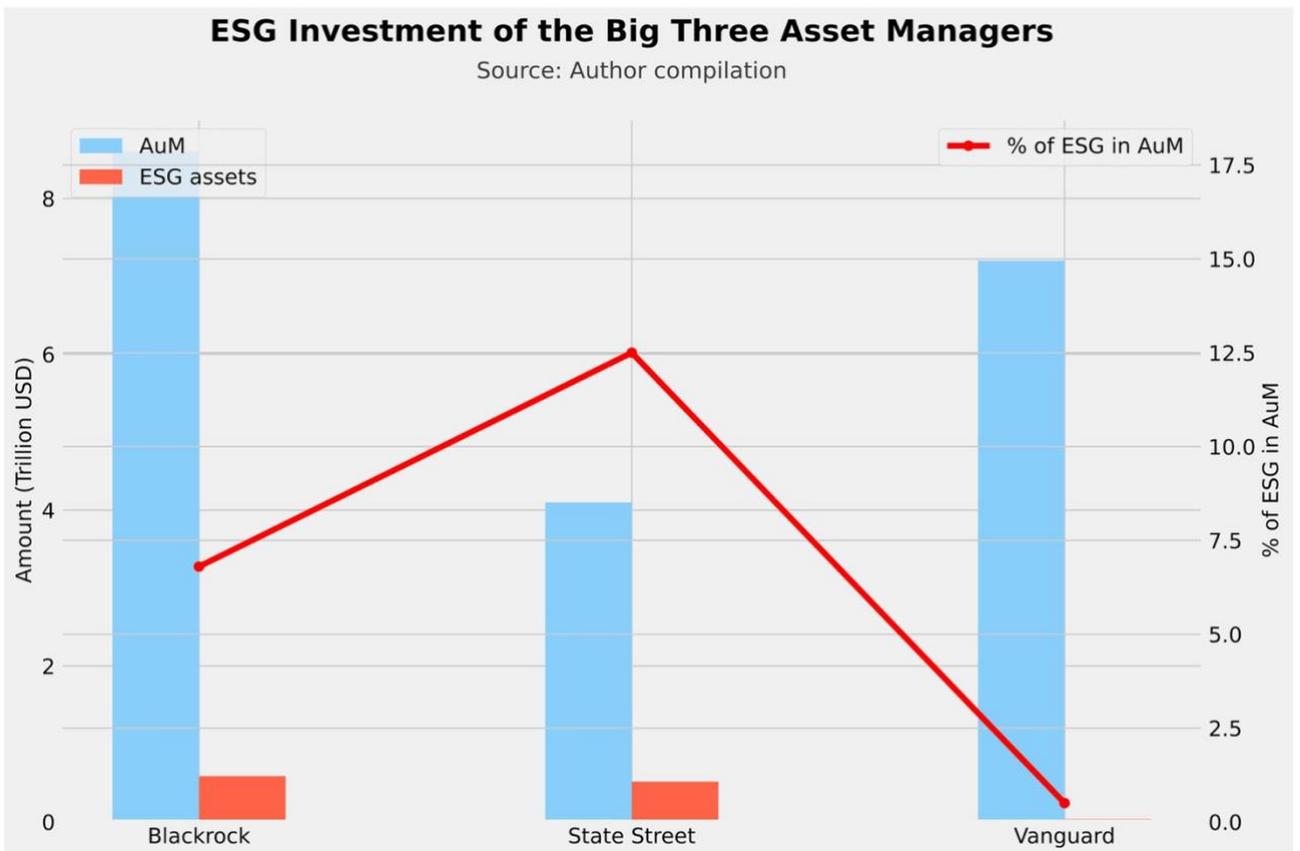


Fig. 3: Large Asset Managers and their ESG portfolios in 2024 (Babic, 2024)

Looking more specifically at Fig. 3, with data estimated on the basis of more or less recent statements, the manager BlackRock states that it invests USD 586 billion in "dedicated sustainable strategies" compared to a total of USD 8.6 trillion in AuM, or almost 7.5%. State Street, on the other hand, invests about USD 516 billion compared to a total of about USD 4 trillion, or 12.5%. Finally, the Vanguard fund invests less than 0.5 per cent because it is more aligned with the income interests of retail investors, unlike the other two which reflect more the wishes of institutional investors by increasing ESG holdings.

The main promoters of sustainable financial instruments are asset managers and large ETFs¹², which are able to attract and raise large volumes of capital. Equity investment usually involves long-term goals, thus differentiating it from green bonds. In conclusion, investors can decide whether to cut flows to fossil or low-sustainability companies in preference to companies

¹² ETFs (Exchange Traded Funds) are funds with low management fees traded on the stock exchange like normal shares. They are characterised by the fact that their sole objective is to faithfully replicate the performance and thus the return of stock, bond or commodity indices (Borsa Italiana).

ethically committed to environmental protection; or to take the uphill route and green their brown portfolios (Babic, 2024) .

Besides the bond market together with the stock market, there are actually other forms of financial products. These include green loans and credits. According to data provided by the International Monetary Fund (IMF), the total volume of green loans issued in the market at the end of 2020 was estimated to be around USD 500 billion. This is significantly less than the first two categories, as can also be seen in Fig. 2, equalling 50% of equity volumes and 25% of bond volumes. A figure that, although daunting, is expected to see rapid growth in the near future based on forecasts that it will even surpass the current value of green bonds of around USD 2 trillion. It would become the largest green financial debt instrument.

Once again, ICMA has identified the definition of Green Loan as:

"any type of loan instrument made available exclusively to finance or refinance, in whole or in part, new and/or existing eligible green projects".

Within the Green Loan Principles, the four standard criteria from the GBPs, i.e. Use of Proceeds, Evaluation and Selection, Management of Proceeds and Reporting, reappear. Apart from that, they are to be considered as a separate category and distinct from the increasingly well-known Sustainability-Linked Loans. The difference between the two types of financial product lies in the nature of the investment: while Green Loans are linked to specific projects and activities characterised by a direct environmental impact, SLLs are focused on the broad spectrum of sustainability, expanding their field of operation beyond the technically narrower environmental one. Guidelines are established not only to facilitate transparency and disclosure, but also to facilitate insurers to preserve market integrity and carry out external auditing (ICMA, 2024) .

The last few lines deal with the substantial features of the product. First, the reliability of the loan is enshrined in a more direct link between issuer and borrower, thus allowing better control of the funds issued. Moreover, being mostly held to maturity and linked to certain assets, green loans are aligned with investors who are patient in their thinking and focused on long-term projects. This decision was also taken because of the financial needs of, for example, small and medium-sized companies that cannot issue bonds and raise green funds in any other way.

Finally, it is necessary to bring to the fore a critical issue that will stay with us for the entire elaboration, namely the geographical development of the market. As with bond and equity

instruments, green credits also move financial flows mainly from the Western hemisphere, with the Global South on the margins of the financial and sustainable development arena. This is not a minor issue if we consider the assertions of the International Finance Corporation, the World Bank's development body, that Green Loans represent an optimal and viable route to green growth (Babic, 2024) .

Ultimately, the remaining instruments are nothing more than sub-types or recombinations of the three types discussed above (Green Bond, Green Equity and Green Loan). Of these, the most widespread and well-known are 'Concessional Finance' and 'Blended Finance'. Alternative green finance mechanisms. By 'Concessional Finance', if we were to adopt the style of the International Association, we would mean any type of instrument made available at a lower market rate. Obviously, the ultimate goal is both economic and sustainable stimulation, without neglecting the technological aspect, aimed above all at private companies and public funds. In this case, the concept of concessionality is prepared on the basis of conditions for borrowers, which vary from instrument to instrument, and may be harder or softer. Thus, this financial categorisation is positively interesting for countries of the South. Concessional finance represents the largest source of green investment for the entire Sub-Saharan African region along with other low-income areas. The only real and existing criticality is reflected in the volatility. Concessional Finance, since it is applied especially in Third World countries, would appear to be particularly volatile: concessionality would fluctuate from pole to pole if based on a classification scheme for low-income countries subject to sudden changes.

However, moving on to the second, Blended Finance refers to a logic of reducing risk by using private finance to bridge the gap of green finance, especially in those countries with a low ratio of public and private finance. According to some research, since 2015 the OECD has been trying to promote the flow of private capital through public capital by trying to establish regulations that are as transparent and understandable as possible. As with the macro-category of Green Finance and its instruments, global principles on the mobilisation of Blended Finance have been established. In the meantime, the total capital employed has tripled in the last decade, although between the global pandemic crisis and the crisis caused by the Ukrainian-Russian war, there has been an easing of revenues, which are now more directed towards the provision of relief measures. In recent years, in fact, there has been a halving of new mobilisation, due both to a lack of investment opportunities and to a greater concentration of private individuals elsewhere. This, as has already been mentioned several times, creates difficulties in developing a sustainable system especially in countries in the global South where 'relocation' of capital

provider operations would be needed to mitigate the problem of barriers of private capital in large volumes. And these are only part of the challenges to be faced in creating an optimal system of Blended Finance in the Green Finance landscape.

Table 1 below provides an overview of the main types of green financial instruments adopted internationally.

Instrument	Type	Size	Possibilities	Problems
Green bonds	Debt-based	Cumulative issuance until 2023: over USD 2 tn. globally	Pushing of green projects; disinvestment	Most capital raised in Global North; missing/competing standards and certification schemes
Green equity	Equity-based	Difficult to say; probably in the trillions of USD as the green AuM by large asset managers surpasses USD 1 tn	Participating in green projects/firms; disinvestment; shareholder engagement	Investors need to be committed to decarbonisation (and have the possibility to engage)
Green loans	Debt-based	Around USD 33 bn. outstanding in 2021; Around USD 500 bn. issued until 2020	Direct financing of green projects; direct 'creation' of green finance	Standardisation and certification are problematic; Global South receives only a fraction of these loans
Concessional Finance	Mixed	Around USD 150 bn. in 2022 (or: 16 % of total green finance), but difficult to estimate due to overlap with other categories	Below-market-rates access to green finance, especially for low- income countries and projects	Concessionalism can be volatile or changing and hence represent re-financing challenges for borrowers that are dependent on concessional loans, grants etc.
Blended Finance	Mostly debt-based	Around USD 200 bn. mobilised until 2023	De-risking and drawing in of private finance to fund the green finance gap	Projects/countries where green finance is most needed have low public-private funding ratios

Table 1: The main actors within the landscape of global green finance (Babic, 2024)

To conclude, the table above includes all the financial products most frequently used in the sustainability sector to address the environmental threats of our time. But they are not the only ones. In addition to the aforementioned Green, Social and Sustainability Bonds, the vast mantle of financial sustainability also includes Blue Bonds with the objective of financing marine and

ocean projects; Green Asset-Backed Securities (ABS) whose process, known to many as 'securitisation', is based on future cash flows; Transition Bonds with the aim of helping companies that are inadequate to issue green bonds, but with the will to reduce their carbon footprint; and Impact Bonds that attempt to generate a positive impact on environmental issues, but not exclusively.

Speaking of Green Equity, there are various forms of funds: ESG funds that base their choices on the Environmental, Social and Governance criteria of a company; Ethical funds whose aim is to avoid investing in companies whose activities are considered harmful or unethical; ESG ETFs, i.e. a fund that tries to replicate an index composed of companies selected through ESG criteria; Ethical Banking Funds, Green Real Estate Funds or Clean Energy Funds.

The same principle can also be applied to alternative modes such as ESG Crowdfunding, Green Fintech or Green Insurance. In short, there are numerous channels for implementing and promoting environmentally aware and low-impact development. And although we will devote an entire chapter to looking at the opportunities that green financial instruments bring and, therefore, also at possible solutions to the many challenges that govern the green finance ecosystem, it is first necessary to anticipate some critical issues. In fact, it is very often forgotten that behind every financial entry and exit, every instrument requested and offered, lies a person with a certain degree of awareness, limited most of the time, of how much the financial system through its personal request can in some way affect the environmental and social progress of our planet. Making investors, or rather people, aware of how crucial their small action is for a change in the right direction is, more now than ever, a duty, a responsibility, and no longer a choice. As we have already repeated, using every opportunity to make known the real gravity of the situation in which we find ourselves, our planet, our home, is heading towards a destination with no return, which day after day is getting closer and closer, like when at the twilight of a summer sunset we await the imminent setting of the sun and the following rising of darkness.

1.4 The main players

Having looked schematically at the main instruments of green finance, we now move on to define the main players, private and public. Some of them have already been named in the previous pages, but in the following pages we will emphasise the role and level of importance they actually play in the current market. But before proceeding, a couple of clarifications should be noted. First, actors and instruments are not separate elements. They are two sides of the same coin; their union constitutes the manual on which green finance is based. The instruments are there, they are there to achieve the end for which they were created. But without an authoritative and efficient system capable of exploiting the potential that these means reflect, the instrument itself would decay along with its challenger. For example, in European law, an attempt is made to correctly apply the existing legal framework and to ensure that the law is the same for everyone. In this case, EU law is the means, but if there were no competent and qualified body behind it as the European Court of Justice is, the legal system would fail even before it was established. Similarly, if there were no institutions, bodies, state bodies, private funds and other actors capable of handling green financial products appropriately, green finance would not exist and with it a viable alternative for the ecological transition.

The second clarification is intended to emphasise that the key role of individual actors cannot be measured solely by the volumes of capital or the size of the investments they hold, but rather by the investments they mobilise. The GSIA (Global Sustainable Investment Alliance) itself states that it is questionable to adopt only dimensional measures in determining their relevance. We will observe how many actors are indirectly involved in the mobilisation and provision of green finance rather than in the direct management of portfolios. Understanding their function is also essential to better define green finance itself and what constitutes it. Furthermore, Fig. 4 shows the equal importance of the private and public sectors within the provision of green finance. A consideration that precedes an equally pre-eminent prerogative: to act with cohesion and coordination of the parties, otherwise no goal can be achieved.

Therefore, these observations aside, we can proceed to learn about the main players of green finance in the global political economy.

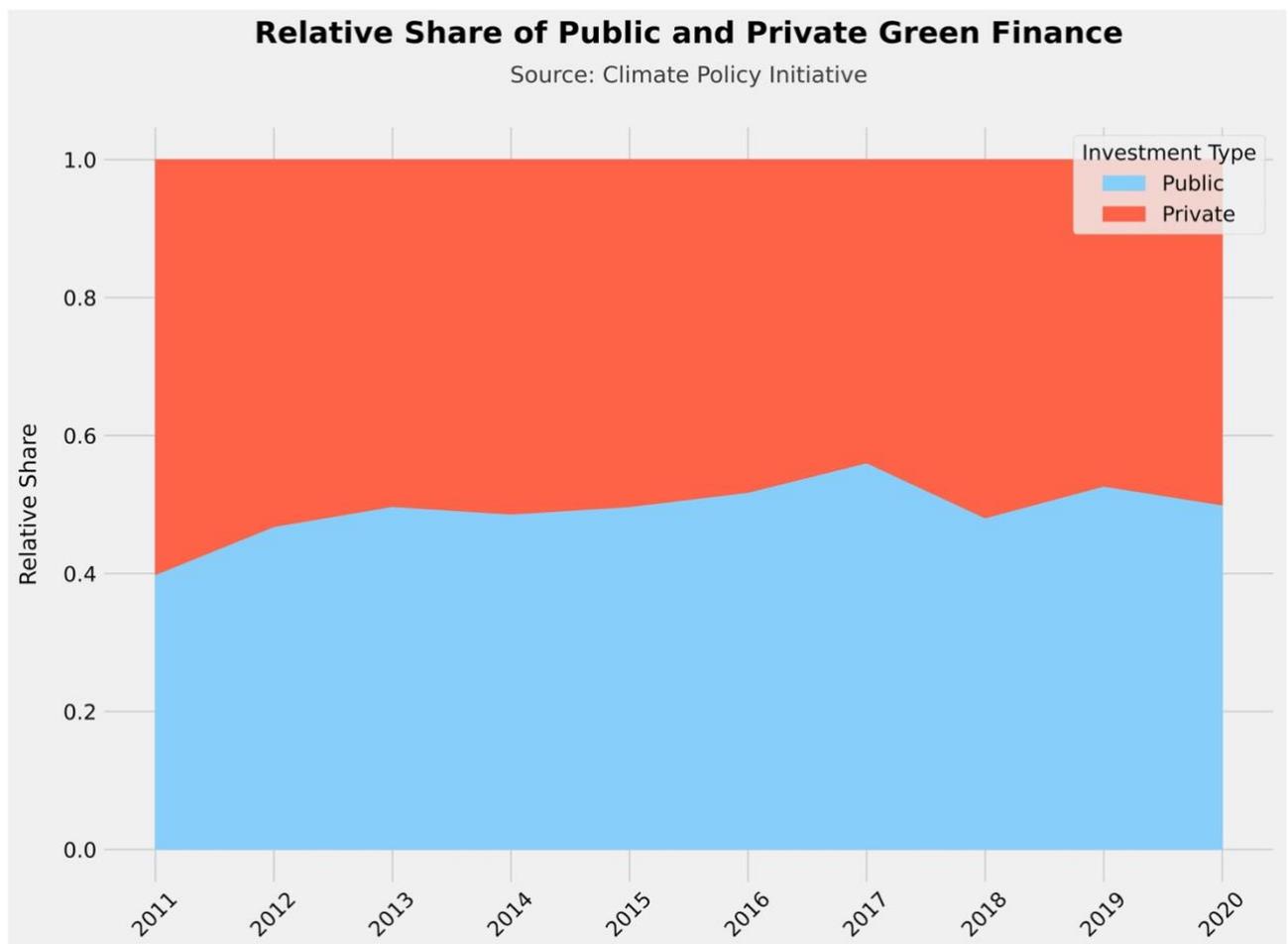


Fig. 4: Relative share of public and private green finance (Babic, 2024)

In the law of the market, there is a fundamental relationship: risk and return. Investors can act in minimising the former or maximising the latter, regardless of whether they are risk-averse or risk-loving and without regard to information asymmetry. Starting from this economic statement, it is easy to see how public actors play a vital role. Green investments, although growing exponentially in today's literature, are still perceived as a risky, volatile and unprofitable activity. State institutions are able to reduce risk through their own market insertion through consortia or state investments or through state-owned and state-controlled entities such as public banks, another actor we will see in the following lines. For this reason, national state apparatuses are one of the most significant providers of green finance today.

The various forms of facilitation include subsidies and grants with a particular focus on ministries of finance, political institutions that can mobilise large volumes of capital through regulation. In general, state apparatuses are able to increase investment in sustainable activities

and projects by launching numerous initiatives such as the 'Coalition of Finance Ministers for Climate Action' (CFMCA), which was founded in 2019 with 26 signatory states and with which they drafted the six principles, known as the 'Helsinki Principles', by which they promote national climate action through fiscal policy and public finance. Currently, the number of signatory states has risen to 90 with the potential, according to the Coalition, to unlock \$26 trillion in investment globally and create 65 million new jobs by 2030. The most interesting objective is number 5, which envisages developing instruments for mobilising private sector finance by including central banks and market regulators in the process (CFMCA, 2024).

This is just one of many examples of how the state apparatus can guide and steer the climate response towards a resilient low-carbon economy by actively transforming 'brown' investments into 'green' ones. A proactive role that goes beyond the simple idea of a governing body and asserts the importance of public institutions in the green financial ecosystem. Indeed, while large amounts of privately held capital are needed to be sustained in the long run, a public starting point is indispensable to kick-start the demobilisation of these sums.

Continuing in the public development wave are also Public Development Banks (PDBs) and in particular Multilateral Development Banks (MDBs). PDBs are defined in a communiqué issued by the European Council in 2015 as 'legal persons carrying out financial activities in a professional capacity and mandated by a state or state body at central, regional or local level to carry out development activities or promotion' (Martina Colombo, 2023). They, like state apparatuses, are excellent financial catalysts in the long run and not only for the environment, but also for social and innovation. According to the EU, they are the best means to achieve the Paris and Agenda 2030 goals since, unlike traditional commercial banks, they are able to offer accessibility to capital even in high-risk geographical and sectoral areas. According to some estimates, in fact, PDBs hold about USD 12 trillion, equal to the amount of the two largest global funds, BlackRock and State Street, combined (which amounts to about USD 12.6 trillion).

Returning to the MDBs, these are defined by the EIB as "supranational institutions established by sovereign states, which are their shareholders; their mandates reflect the cooperation and development aid policies established by these states". In practice, they are public banks acting on international soil, thus, they possess a broader economic-operational scope than the previous PDBs. The objective remains, namely to promote sustainable development through social and environmental investment projects. Their 'shareholders' can be both advanced and developing countries, generating a virtuous economic circle whereby countries such as the United States or

EU members finance projects that are then implemented in emerging or underdeveloped countries. In fact, they claim to have allocated around USD 50 billion to climate projects, e.g. aimed at adaptation or mitigation measures, for low-to-middle income countries and over USD 31 billion for high-income countries. In addition to direct investments, they can also co-finance or even function as implementing agencies for third-party financing. For example, the Climate Investment Funds (CIF), after approving \$7.5 billion, expects public actors to co-finance the project. Or, the Global Environmental Facility (GEF) mobilises funds in green projects later implemented by its own agencies, half of which are MDBs. Or, the Green Climate Fund (GCF), which employs MDBs and PDBs as implementing partners.

A list of them has been compiled by the European Union and includes the European Investment Bank itself, which would appear to be the largest MDB with investments in over 100 non-EU countries that partly or fully support EU development objectives; the European Bank for Reconstruction and Development (EBRD) founded in 1991 to "foster the transition to open market economies and promote private and entrepreneurial initiative", a leader in climate finance (European Bank, 2024) ; the World Bank which works with numerous multilateral institutions and the private sector; and many others such as the African Development Bank, the Council of Europe Development Bank or the Inter-American Development Bank. All the banks just mentioned, although they sometimes have smaller volumes of assets under management than PDBs, suffice it to say that the China Development Bank is the largest green financial institution in the world and is a PDB, this does not reflect the real international influence that MDBs play in reducing risk and mobilising capital. In addition to these, there are, as a last resort, bilateral loans, loans granted by one country to another for the purpose of helping or supporting economic development, possibly also financing the sustainability side. In fact, an example of an implemented programme is the Official Development Assistance (ODA), a government aid that promotes the welfare of developing countries adopted by the OECD as the 'gold standard' for international support since 1969 (OECD, 2024) . A part of the funds is devoted to green finance purposes including initiatives such as the British International Climate Finance amounting to £6 billion, or the German International Climate Initiative amounting to €5 billion, or the Japanese Joint Crediting Mechanism. A final piece of public finance to reiterate and emphasise the importance that economic actors such as state bodies and government institutions play in the realisation of green finance, a role that is necessary but unfortunately not sufficient to achieve the ultimate goal enshrined in the green economy.

Continuing down the path of the various economic actors, we certainly find the central banks, a crucial junction between the design of a green economy and its feasibility. There are two points on which we must dwell: the influence that central banks exert on the global financial system and the function that they constantly perform. Regarding the former, suffice it to say that central banks saw their importance increase considerably following the 2008 financial crisis. One implementing manoeuvre was the so-called 'Quantitative Easing', the massive purchase of government bonds with the aim of stabilising countries' economies. A similar if not identical role is being played these days in the post-pandemic whose economic effects the world is still experiencing. Over time, central banks have been actively involved in issues such as financial stability and market regulation, assuming an equal voice in the global economic dialogue. And this is where the second aspect comes in, namely the extent of their powers, the limits within which they can exercise their power, if they have any at all. To explain this point, the European Central Bank and the Federal Reserve will be considered.

Let us start with the assumption that a central bank's primary task is price stability and market regulation. It acts within an outline delineated by rules and principles derived from an efficient combination of treaties and fundamental charters enshrining rights and obligations within the established legal system. This implies, in other words, an impartiality to the demands that the global financial market makes with consequent neutrality when acquiring financial assets, without favouring certain categories. In this context, only the Bank of England has communicated the integration of the fight against climate change into its *policy*. According to data collected by the Central Bank Legislation Database, only 12% of central banks have officially declared sustainable development as an objective. A discouraging figure that heralds a twofold challenge: on the one hand, adapting monetary policies to counter the risks and consequences of the resulting climate emergency, and on the other hand, ensuring market stability. And in the light of this new awareness, a new phase of integrating climate risks into investment decisions is making its way through the bank's bureaucratic paperwork. Choices that have given rise to a heated international debate, putting the spotlight on the action taken by the Central Banks. Action considered increasingly necessary, not only for environmental or human purposes, but also for a proper financial balance, rather than of a political nature (Chabert, 2022).

To understand the situation, let us consider the ECB. It has been recognised as having an obligation to 'support general economic policies in the European Union'. A fulfilment that has almost gone by the wayside, but which in fact, in the words of ECB Executive Board member

Frank Elderson, establishes "a duty, not an option" (ECB, 2021) . Speech that appears almost as a warning. In fact, as much as the European refinancing structure is committed to the systematic integration of climate change issues, the truth is that current ratings do not sufficiently estimate financial vulnerabilities related to environmental degradation and this creates a high probability that the ECB will buy assets that are not particularly green. In this regard, so-called Targeted-Long-Term Refinancing Operations (TLTROs) were devised, instruments that are able to lend to economic categories whose access to the market is restricted. They represent the mechanism through which the ECB can directly contribute to the green transition while prioritising sustainable growth issues (Chabert, 2022) .

Looking overseas, however, one can glimpse a Federal Reserve with its hands tied. It should be recalled that the Fed was established back in 1913 by Congress through the enactment of the Federal Reserve Act and consists of a chairman and vice-chairman chosen by the President and approved by the Senate, making it a de facto governmental institution independent of the government. But although monetary policy decisions are made autonomously, Congress itself exercises monitoring and control over its actions, preventing any possible extension of its powers (FTA, 2014) . The Fed remains and must remain an impartial government institution without preferring certain asset classes over others. This reflects the US legal system in which there is a clear separation between legislative and executive power. Obviously, should a climatic event occur that threatens the stability of prices, or of the financial system more generally, it is obliged, according to the powers vested in it, to intervene to restore a new economic equilibrium. In light of these considerations, it is difficult for the Fed to embrace sustainable and environmental goals as part of its mandate.

In conclusion, whether it is central banks, such as the ECB, with an obligation to pursue sustainability goals or banks, like the Fed, with stricter legislative limits, they play a key role in the proliferation of green financing in any case. The focal point is the trade-off between economic and political neutrality and market efficiency. An efficiency is challenged by the environmental risks that relentlessly undermine global financial stability. Therefore, it is imperative to balance and reconcile the support of the economy with the reduction of environmental impact, e.g. through monetary policies aligned with green finance principles or by considering environmental factors such as the energy or transport system (Chabert, 2022) .

Looking even further ahead, we also note the presence of other private economic actors, some smaller in size but with high potential. First of all, let us mention the aforementioned asset managers, who are now considered the 'environmental stewards' of our time, having sufficient

capital wealth in their coffers to contribute actively and significantly to the fight against climate change. Recall that the three leading asset managers, namely BlackRock, Vanguard and State Street, together control over USD 20 trillion. This makes these players non-negligible long-term pillars invested with a heavy responsibility to mobilise private investments towards sustainable project activities.

And just as central banks possess significant leverage with which they attempt to channel capital flows towards green monetary policies by altering the composition of their portfolios, so do index providers enjoy a very high gearing ratio through which the composition of funds is determined. They determine which assets should be labelled as green and which should not, determining the composition of ESG funds.

Indices play a key role in the financial system.. Among other, we can identify:

- MSCI World, which includes the stocks of 23 developed countries;
- FTSE All World, which includes over 3,000 stocks from 49 countries, both developed and emerging; S&P 1200, which includes 7 other indices at regional level;
- Dow Jones Global Index, which structurally resembles the FTSE All World by comprising about 11,000 companies, thus dictating greater diversification;
- MSCI World ESG Leaders Index, which includes companies aligned with ESG practices and with high ESG scores;

First and foremost, they are a tool for analysing the performance of equity markets and, often used as the basis for numerous passive funds, they allow a large number of investors easy access to a wide range of inter-regional markets with a single investment solution. The entry or exit of a country against an index generates a general demobilisation of capital, also impacting the liquidity of the market in question. Basically, indices act as a barometer for the confidence and, hence, capital allocation of various financial players who are more inclined to portfolio diversification and risk mitigation.

Secondly, they represent an indicator of financial health for a given country, assuming relevance in monetary policy decisions. In fact, indices allow for a preliminary assessment of economic conditions and sectoral trends, and as for investors, for institutions, central banks and governments they contain an important tool for risk analysis and economic-fiscal policy formulation. A shining example may be that of a company that, as a result of inclusion in a certain index, may see its reputation and visibility improve, as well as attract new investment and shareholders.

And to conclude the list of economic actors within the green financial system and the first part of this paper, let us recall private banks. These do not act in terms of large sums or huge amounts of capital, but rather perform a simpler mediation function between investors and targets. Despite the small flows of money that private banks channel, they actually play a key role within the economy, especially the European one, where the vast majority of carbon-producing activities come from small and medium-sized enterprises. It is particularly difficult for these groups both to enter the market and, once in, to obtain enough funds to pursue projects related to sustainability or ecological transition. It would mean changing their core business rather than their internal operational or logistical structure. So, in this context, private banks are the best solution for small companies with the intention of contributing to the creation of a green economy. A role that is, unfortunately, underestimated. Indeed, while they have the potential to bridge the green finance gap, they continue, in the absence of incentives, to finance activities with a high environmental impact. Ultimately, the bank, whether private or public, possesses proportionately more financial leverage than the sums mobilised. Essentially, they can be defined as green finance investment multipliers by extending their main economic activity. Indeed, if the core function of a bank is the transfer of money from wealth-holders to non-wealth-holders, the same concept could be applied in sustainable finance, transferring capital from brown to green projects through a progressive and strategic allocation of resources (Babic, 2024) .

Below, Table 2 gives an overview of the main international financial players contributing most in green finance.

Actor Type	Characteristics	Instruments	Geographies	Relevance for global green finance
Finance ministries/treasuries	Mobilisation <i>and</i> provision of green finance, regulatory power, increasing international coordination	Taxes and tax breaks, subsidies and grants, technical and political support for cleantech	National/International	Moderate through regulation, high through active provision of green finance
PDBs	Long-term developmental projects, climate finance, policy-driven	Direct loans, equity investments, grants	National	Moderate-High: Significant national impact
MDBs	Developmental and climate projects, collective action, international focus	Concessional loans, grants, technical assistance	International	High: Broad international impact
State-controlled programmes	Bilateral lending, targeted climate initiatives, flexible and specialised	Grants, low-interest loans, technical cooperation	International	Moderate: Targeted, specialised impact
Central Banks	Monetary policy, 'greening' operations, both public and private capital-facing, regulatory influence	Monetary policy, bond purchases, reserve requirements	National/Transnational	High: Pervasive influence on (global) financial system
Large Asset Managers	Large volume of green assets, market discourse shaping, varying commitment to ESG	Equity funds, bond funds, ETFs	Transnational	High: Significant assets under management
Private Banks	Mediating function, underwriting green bonds, potential for multiplying existing green finance flows	Loans, green bonds, depository receipts	National/International	Moderate-Low: Conditional influence

Table 2: The main actors within the landscape of global green finance (Babic, 2024)

2. International Framework

2.1 The path of sustainable policies over time

Continuing with the next step aimed at rediscovering the role of green finance and its application possibilities, the paper now finds itself having to encapsulate in a few lines the entire research and development process surrounding the world of green finance. The aim would then be to reach the current legislative situation in Europe, a world leader in the promotion and financing of sustainable projects, and then touch upon the regulatory map of the world, from the USA to Australia to emerging countries. Thus, shedding light on the evolutionary history of the relationship between money and ethics seems to be the right step. Rediscovering the inescapable and perpetual link can be extremely useful to better understand the connection between power and legitimacy, between economic culture and social culture, between sustainability and capital money. All relationships encapsulated in just two words: green finance.

Here we see the dawn of an indissoluble union in the ancient world. In the time of Ancient Egypt and other past and future civilisations, wealth was considered as a gift from the gods and therefore it was up to them, to human beings, to make proper use of that gift through the payment of tribute in such a way as to earn the favour of the gods. Moving on through the centuries, the classical age set the stage for a temple of deep reflection and philosophical views concerning the nature of money and the ethics of trade. Later, catapulted into the Middle Ages, spiritual power had to reckon with temporal power and in this sense came the encounter between Christian ethics and the emerging economy. From there on, in the Renaissance age, merchants began to adopt money not only for purely lucrative purposes, but also with a view to uplifting society and contributing to human progress. This was a crucial point, investing money with a value far beyond itself, becoming a vehicle for what can be called innovation.

The time came for the theory of the 'invisible hand' intuited by economist Adam Smith, according to which the individual pursuit of profit is capable, even in the absence of intentionality, of creating a natural economic and social equilibrium. This theorem is only valid within a perfectly competitive economic system. In fact, this concept preceded the industrial revolutions that were triggered throughout Europe, bringing poverty and exploitation of labour.

This gave rise to a long series of ethical thoughts that culminated in social and ideological movements such as socialism and communism. After the great drama of the Second World War that saw all certainty of human understanding swept away, capitalism and the expansion of consumerism took over. Money and wealth more generally also became an instrument of status and personal success. In these years, ethics were based on individualistic decisions whereby each person had the right to seek his or her own financial well-being. Spending and accumulating money soon became indicators of personal fulfilment. This started an intricate succession of questions that placed the economic system and the social system on two separate sides. This was the time of manifestation groups, then the advent of globalisation, economic openness and finally, in today's times, criticism of economic decisions arising from an increasing awareness of ethical and environmental impact. The latter is now considered one of the pillars of ESG practices, since without the planet no living being is able to survive. As a result, numerous questions have been raised as to whether economic growth is synonymous with progress. While there has been a significant increase in world wealth in recent years, the gap between developed and developing countries has also increased, amplifying the already well-known financial disparities. Capitalism, the current economic system adopted in advanced countries, applied without control, risks generating unbridled consumption and fuelling new forms and dimensions of injustice and social inequality.

Ergo, at the end of this brief but fundamental aside with which to investigate the real function of green finance, the following question arises spontaneously:

Can money support or shake hands with ethics in moving towards the same destination or will they be perpetually in conflict?

This question is intended to put the spotlight on the true scope of green finance. Identifying the nature of this sometimes inscrutable link is the starting point of the second chapter of the paper. And part of the answer can be found in the middle of the jungle, during the Vietnam War. It was 1971, the US iron fist was unable to dominate the skilful and fleeting Vietnamese resistance. The US military intensified the implementation of operations that shared the vice of immorality and ineffectiveness. These included the massive spraying of Agent Orange, a toxic gas including dioxin that originated as a herbicide and was later used for military purposes. About 70 million litres of herbicides were dropped during Operation Ranch Hand in 1962. Of this, about 60 per cent was Orange Agent, over an area of between 1.5 and 2.4 million hectares. According to some more disheartening sources, about a quarter of Vietnam's entire national territory was affected by the gas (Hardenberg, 2009) . Of course, the collateral damage of the

war did not leave humans unscathed. Thousands of civilian villages were part of the operation, willingly or unwillingly, damaging the health of millions of people, including innocent children, who still inherit diseases from the poisoning of seas, rivers and land that took place some 50 years ago.

This painful affair is one of the many shadows behind the disastrous wartime expedition that the United States launched. And in that year, as a result of pressure from the nascent civil rights movements, the Pax World Balanced Fund was established, considered the *first socially responsible fund* in history. The intention was to guarantee investors a portfolio of companies not directly involved in the production of toxic gas.

In the same year, the United Nations Conference on the Human Environment set up the United Nations Environmental Programme (UNEP), which, however, did not see its next conference, known as the Rio Summit, until 1992 due to the geopolitical situation resulting from the Cold War and the still subordinate role of the United Nations at the international level. At that time, UNEP was already trying to link the various ESG aspects together with the general aim of scaling down the analysis of investments, which were more focused on the environmental framework. And in 1988, UNEP together with the World Meteorological Organisation (WMO) gave birth to the aforementioned IPCC, an international body that analyses climate change by publishing the various researches concerning technical, scientific and socio-economic information (ISPRA, s.d.) .

Among other events, we could witness the composition of a veritable green vocabulary including new definitions such as "sustainable development"¹³ and "ecocide"¹⁴ . Expressions that encapsulated not only a precise political and economic direction aimed at an early and acerbic regulation of man's impact on the environment, but also the time of a global awareness, a different and more sustainable way of thinking. A point of maturation due not only to an inner drive, but perhaps also an outer drive. The most iconic examples of environmental disasters that

¹³ The most widely accepted definition of *sustainable development* can be found in the Brundtland Report drawn up in 1987 by the World Commission on Environment and Development. It was the then Norwegian Prime Minister Gro Harlem Brundtland who provided the idea: 'sustainable development, far from being a definitive state of harmony, is rather a process of change such that the exploitation of resources, the direction of investments, the orientation of technological development and institutional changes are made consistent with future needs as well as current ones' (Treccani, s.d.)

¹⁴ The term ecocide was coined in 1970 by biologist Arthur Galston in connection with the use of the Orange Agent in the Vietnam War. In 2021, the Stop Ecocide Foundation is pushing for the inclusion of ecocide in the Rome Statute, understanding it as any 'unlawful or reckless act committed with knowledge that there is a substantial likelihood of serious, widespread or long-term damage to the environment caused by that act'. In February 2024, with the approval of the new European Directive on 'Restoration of Nature', the term ecocide was included, defining it as a '*qualified criminal offence*' (Vanoncini, 2024) .

shook the world include the Three Mile Island accident (1979), the Chernobyl disaster (1986) and the terrible sinking of the Exxon Valdez supertanker (1989). There were other similar episodes, but these certainly remain among those that have contributed most to a cultural development in the green sphere. It is no coincidence that the first official conference on Socially Responsible Investing (SRI) was held in 1989, shortly before the fall of the Berlin Wall and the beginning of a world with a multipolar geopolitical order (PSIF, 2020) .

From this point onwards, there have been regular international conferences and meetings between the various leaders of governments and institutions. The goal remains to promote environmental sustainability that was previously guaranteed by economic sustainability. During the industrial era, we witnessed the union of the economic system and the social system. Now we are experiencing and continuing with the joining of the environmental system with the first two. In other words, political steering is enacting reforms to support ESG practices in both public and private activities, seeking to release capital to finance sustainable development projects.

Of the various congresses held since 1989, let us review the main milestones. Agenda 2021 certainly marked an important step, officially sanctioning the international community's commitment to implementing sustainable development policies. The document signed by over 170 states in 1992 consists of 40 chapters divided into 4 sections containing objectives and resolutions to be pursued over time. It is no coincidence that the number 21 hides the century within which to operate and achieve the set goals. Among the various objectives, the document particularly emphasised the need to consider local communities with a very relevant role. Currently, about 80% of the world's wealth is generated by cities and over half of the world's population lives in urban areas, a number destined to exceed 70% by 2050 (Italian Government, s.d.) .

In the same year, an international environmental treaty known as the UNFCCC (United Nation Framework Convention Climate Change) was concluded, already mentioned in the first pages of the first chapter, but without shining the light it deserves. A pact still in force with the aim of mitigating and limiting the emission of greenhouse gases, believed to be the main cause of global warming. This was also the start for the establishment of the first and subsequent 29 COPs (Conferences of the Parties), the Convention's supreme decision-making body to which progress is reported, the effects of measures taken are analysed and decisions to effectively implement the Convention are discussed. The first COP was held in Bonn, Germany, and since then, unless otherwise specified, it has been held annually, changing the location of the meeting

from time to time. The most recent one held in November 2024 was held in Baku, Azerbaijan, focusing on two issues: "enhancing ambition" and "enabling action" (Italian Government, s.d.) . Specific emphasis was laid on the search for new financial solutions and market mechanisms, configuring a new 'global financial architecture and taking a step towards providing the means' to enable the Paris objective to be realised. These were the words adopted by the President of COP 29, Mukhtar Babayev (Mazzuca, 2024) .

Two years later was the occasion to welcome the Kyoto Protocol, which took place precisely during COP 3. And if through the UNFCCC the legal foundations were laid for defining the global framework in the fight against climate change and through Agenda 21 the guidelines for triggering sustainable development were proposed, through the Kyoto Protocol the commitments hitherto only debated were finally made coercive in nature. In fact, it is regarded as the first international agreement to commit industrialised countries to reduce greenhouse gas emissions and support developing countries through the creation of financial support mechanisms called 'Flexible Mechanisms'¹⁵ . What most differentiates the Protocol from other agreements is the inclusion of targets that are not only binding, but also quantified, making the countries' effort and distance to the final goal measurable (ISPRA, s.d.) . In a nutshell, COP 3 laid the foundations for the foundation of a global legal structure that allowed the international community to recognise the real gravity of the climate crisis, giving rise to a practice that was subsequently consolidated into a customary norm in international law. With it, all participating states were invested with a common, albeit differentiated responsibility (with greater weight for industrialised countries, being the main emitters of greenhouse gases).

Subsequently, as we entered the new and long-awaited millennium, the United Nations Millennium Declaration was signed, which set 8 goals to be achieved by 2015, each in relation to the figures reported in its field in 1990, and they were mainly related to extreme poverty and health. The results obtained were satisfactory, some were even achieved (WHO, 2018) . As a result, the 2030 Agenda with its 17 Sustainable Development Goals to be achieved within the next 15 years was drafted and adopted. The Agenda represents an evolution from the previous goals, touching not only on the eradication of world hunger and poverty, education and global health, but integrating these with broader aspects related to sustainable and inclusive economic growth, social development and environmental protection, i.e. the ESG principles. They are

¹⁵ By 'Flexible Mechanisms' he is referring to the International Emissions Trading (ET), which allows emissions credits to be traded, and the Clean Development Mechanism (CDM), which together with Joint Implementation (JI) allows investment in projects located in developing countries using the resulting credits (ISPRA, s.d.) .

defined as 'common goals', more interconnected, integrated and indivisible than the previous ones, which concern all individuals and all countries, developed and developing. The commitment of all is required and no one among the 193 unanimously committed countries is to be left behind (United Nations, s.d.) . This inclusiveness synonymous with global partnership is necessary to lead the world towards the path of sustainability in which everyone is a participant and determinant in the efficiency of vital as well as amendable international cooperation.

Ideally realised a few months later in December 2015 at the Big Apple, one of the two cities ranked *Alpha ++*¹⁶ , an indisputable symbol of modern globalisation and constant innovation. The object in question is the well-known Paris Agreement, an international treaty that is legally binding for the 196 signatories and entered into force on 4 November 2016, after the condition of ratification by at least 55 countries representing at least 55% of global greenhouse gas emissions was met. The main objective is to limit the global temperature increase to 1.5°C by developing operations and policies to reduce emissions by 43% by 2030. This plan to limit the effects of warming is a milestone on the international negotiating table by bringing all nations together in the same room for the first time in history and designing a climate finance programme capable of tackling the environmental crisis and its alarming effects.

And before proceeding to the next stage of the chronicle so far, it is useful for a better understanding to dwell on what is happening again in the United States. Following the new presidential election in America that saw Trump as the outgoing winner, the spotlight has fallen on the Paris Agreement. Already during his first presidency, one of the initial steps was the rapid exit of the US from the Paris Agreement, basing its economic policy on increased use of fossil fuels. Subsequently, Democratic President Joe Biden ratified the Agreement. And now it seems to be on the verge of being cancelled again for the second time in less than five years. It is nothing new that the last Democratic president promoted the creation of funding by initiating new sustainable environmental policies and a more efficient national health policy. An example of such a contribution came to light in 2022 when Congress passed the *Inflation Reduction Act* bill with which some USD 740 billion was earmarked not only for the ecological transition and healthcare, but also for taxation and reducing the country's deficit. At the environmental level, the goal is to allocate parts of the collected funds, about 370 billion, to the reduction of

¹⁶ In 2016, the Globalization and World Cities (GaWC), an independent body based at Loughborough University in the UK, devised a global ranking of Global Cities through precise analysis parameters and considering a number of relevant factors. Among the cities to fall as Alpha ++ are only London and New York, the main headquarters of the global financial industry and considered the metropolis of the world economy, the most attractive destinations for international entrepreneurship (Cingolani, 2018) .

greenhouse gas emissions by about 40 per cent compared to 2005 levels by the end of the decade (Tomorrow, 2022) .

This premise is not intended to provide any biased opinion on US policy, but rather to guess what the consequences of a possible US withdrawal from the Agreement might be. According to the Emissions Database for Global Atmospheric Research (EDGAR), the US produces about 12.5% of global emissions, ranking second behind China, which produces about 33%. Thus, we see that the country currently under President Donald Trump plays a leading role in the overall reduction of greenhouse gases, and not just an insignificant presence. Fig. 4 shows the results of the research metrically.

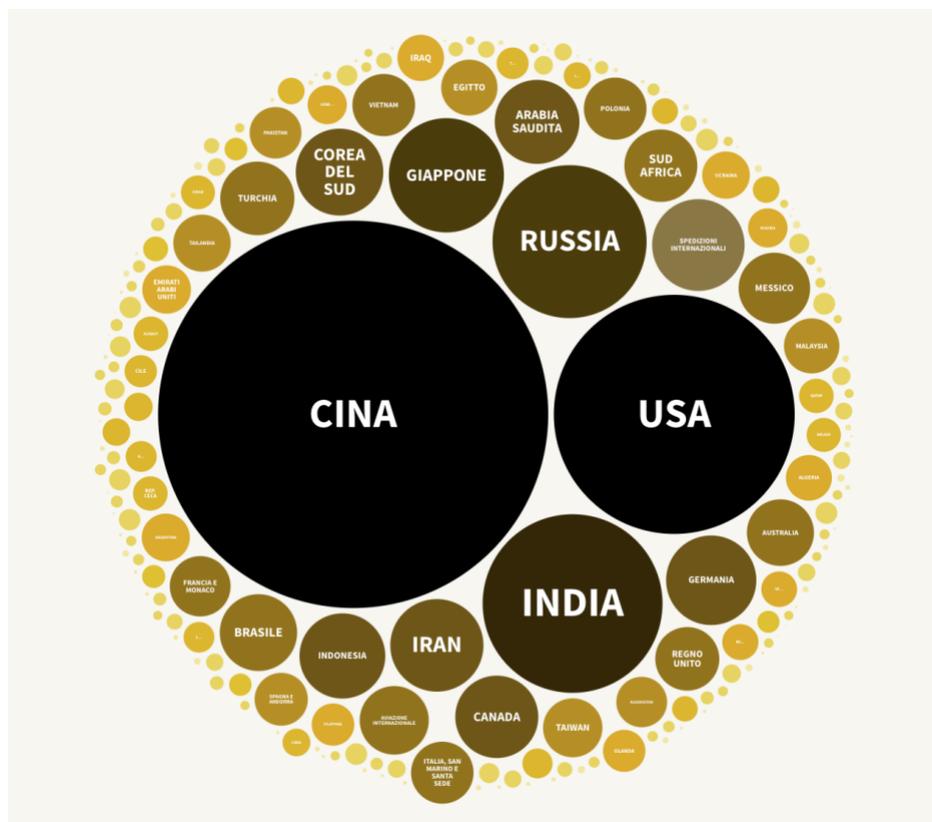


Fig. 4: Data in mega metric tonnes of CO2 per country in 2022 (Donfrancesco, 2022)

China, the USA and India produce more than 50 per cent of CO2 globally. But the second largest producing country has been given another record: with reference to the annual measurement of greenhouse gas emissions, the US is claimed to be the largest emitter of CO2 in history with some 422 billion tonnes released into the atmosphere since the industrial era (Gonzalez, 2023)

. Although China emits almost three times as many greenhouse gases, it has experienced a relatively recent economic boom and considering that in recent years its GDP has risen from 10% in 2010 to 5.2% in 2023, also signalling an unexpected demographic decline, it is easy to understand why it emits far more than other advanced and developed countries (Economic Observer, 2024) . In fact, if China is the recurring emblem of the emerging countries with huge untapped resources that can guarantee significant economic growth, the United States for its part personifies the industrialised world where the quest for stable and sustainable economic growth is at the heart of political reforms.

Recalling that the Paris Agreement, unlike its predecessors, required total commitment, i.e. not only from economically developed countries, but also from emerging and developing countries, a premature disengagement in climate finance by the United States could trigger a domino effect. This threatens the integrity of the Agreement by prompting other Parties to deviate from it and revise their list of priorities both domestically and internationally. The crux of the matter, also presented by Matteo Villa as a researcher of geo-economic and geopolitical phenomena at ISPI, is the economic nonsense or ignorance that the political will to continue investing in the fossil fuel market brings with it. The process of ecological transition is now underway and Trump's decision would only slow down, but not stop the inevitable sustainable development now more than ever. China itself invested in 2023 in the creation of wind and solar power plants, outnumbering those built by the US and EU combined. Specifying that of these only a minor part was financed through subsidies, the remaining 90% or so were based on laws and market trends, emphasising that such investment operations derive from real economic expediency rather than from obligations enshrined in long-term political commitments (Gasbarrone, 2024) . As proof of this assumption, the results of a study conducted on the economic and sustainable impacts of renewable energy in different regions of the world are reported. The article suggests that the adoption of renewable energy promotes the creation of new jobs, contributes to price stabilisation, improved market dynamics and climate change mitigation. On the one hand, it confirms the resulting economic growth that would result from their implementation, and on the other hand, it predicts greater social inclusiveness and environmental protection (Adanma & Ogunbiyi, 2024) . In other words, the potential contained in renewable energies is extendable to many other forms and auxiliary tools through which sustainable development is made possible that not only includes the identification of parameters or the setting of targets of environmental significance, but also on the socio-economic level.

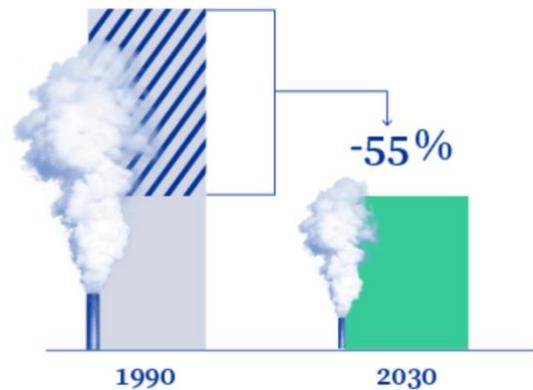
2.2 The creation of a sustainable financial system

Technological progress and legislative developments over the decades have given voice and prominence to the pursuit of sustainable development as a top international priority. The Paris Agreement encapsulates every stage achieved so far and with a clear end goal, but still far from being realised. Time is against us, but it was precisely the pressure of an imminent environmental catastrophe that prompted the international community to take the next steps more quickly, forcefully and effectively. And in this climate of tension and determination have been numerous action plans to facilitate the realisation of a climate-neutral circular economy. And among the various forms of implementation is the main subject of this paper, the Green Financial Instruments. These, as we will see shortly, represent in absolute terms the most viable path and the one with the best expected results. And in the contemplation of what has been written so far in chapter two, from the ambiguous ethical-money constraint to the historical milestones achieved over time, from the Bidenian climate investment decisions to the opposing Trumpian political exit decisions, all the way to the longed-for feat of an emission-free world, the concept of a process already underway, irreversible and continually accelerating, which has passed the point of no return, is taken up and reaffirmed. Despite political resistance, such as that exemplified by Trumpian choices, the flow of change towards a sustainable future can no longer be halted. We are now part and parcel of a new evolution, protagonists of a world that, though marked by difficulties, is gradually adapting and embracing green as an indispensable element for our very existence, a foundation without which our future would be unsustainable.

For these reasons, the European Union was ahead of everyone on environmental prevention, automatically acquiring the title of leader in the fight against climate change. The European Community has financed numerous projects with the coveted objectives. The Next Generation EU, Fit for Fit 55 and the Green Deal are among the best known. And the order is not random. The Next Generation EU is a recovery plan developed in the face of the pandemic crisis that bent the world economy. The funds amount to around EUR 750 billion, are distributed according to the specific needs of individual countries and deployed through the different National Recovery and Resilience Plans (NRPs) or through the Recovery and Resilience Facilities (RRFs). The rationale for this initiative lies in the transition to a greener, more sustainable Europe with better functioning public and social infrastructure, more efficient health services, and research and development higher on the list of national priorities (European Union, 2024) .

Fit for Fit 55, on the other hand, is defined as a set of proposals to revise EU regulations so that they are in line with the climate targets agreed by the Council and the European Parliament. The goal is to reduce emissions by 55 per cent by 2030 compared to 1990 levels. This has now become a legal obligation (European Council, 2024) .

Moreover, it represents a first step towards the more arduous peak of climate neutrality by 2050. A goal that can only be reached through a functional link between finance and sustainability while allowing, in addition to the implementation of the Paris Agreement of keeping the global temperature within safe limits, a modern, competitive economic growth decoupled from



resource use. Obviously, also in this case the project with a European imprint required a huge financial capital that came from a response unparalleled in history: about 1,800 billion euro divided one third into Next Generation EU funds (750 billion euro), thus falling under the broader Green Deal, and the remainder in the long-term seven-year budget 21-27 (1,074 billion euro)¹⁷ (European Union, 2021) .

At this point, one could cite an almost endless series of further steps that various international institutions and national governments have taken over the past decades in the area of sustainability and resilience, and also in the integration of ESG practices within economies. But we will limit ourselves to one last interesting case: the Green Climate Fund. Indeed, this is the world's largest climate fund, which was created to support the realisation of the Paris Agreement and has so far invested an amount of around USD 40 billion in over 100 countries, with the obligation to allocate 50% of the resources to mitigation and the other 50% to adaptation policies. The fund lends itself to be a conduit for the capital pledged by the Nationally Determined Contributions¹⁸ , to be allocated in support of developing countries and their ambitions towards low-emission and climate-resilient pathways (Green Climate Fund, 2024) .

¹⁷ The value is expressed in 2018 prices. The value of the Green Deal currently amounts to approximately EUR 2,018 billion, maintaining the current proportion, i.e. one third coming from the Next Generation EU (EUR 806.9 billion) and the remainder from the seven-year budget (EUR 1,210.9 billion) (European Commission, 2021) .

¹⁸ Nationally Determined Contributions (NDCs) are nationwide plans that individual countries voluntarily commit to follow in order to reduce their greenhouse gas emissions and limit the global temperature increase (Marioni, 2024) , as well as the main goals of the Paris Agreement.

A timeline so far written on the blank pages of an unfinished book, but filled with firm intentions and an ardent political will, at times of a preceptual nature, on the part of heads of state and international institutions, revealed as the true guide to a path aimed at safeguarding the planet and making it a better landscape. A vessel, this, on which the fate of the entire world sails, built by reforms and measures, and steered by sovereigns, supranational entities and private actors, heading towards the ambitious goal of economic and environmental sustainability. A well-known destination, but one that lies beyond rough seas and surrounded by pitfalls, making the success of the voyage uncertain. However, the course is clearer if one looks back to its beginnings in 2007, when the first green bond in history was issued, a Climate Awareness Bond by the European Investment Bank. A pioneering initiative followed by other major market players, such as the World Bank, and a springboard for other financial products such as the subsequent issuance of the Sustainability Awareness Bond.

All the way to today's situation, encapsulated in Fig. 5, where one can see a remarkable increase in climate investment flows (including green bonds, social bonds, sustainability bonds), peaking at USD 632 billion in 2019/2020. Analysing the graph, one immediately notices the almost 75% increase in the total sum recorded over the last decade. A very significant figure and considered positive at first glance. But if we narrow the field, we can also see that the growth reported in the two-year period 2019/2020 compared to the two-year period 2017/2018 is 10%, a relatively low figure compared to the two previous periods in which growth of around 25% was observed. Recall that the pandemic crisis started in 2020 and this could be the main reason for this slowdown.

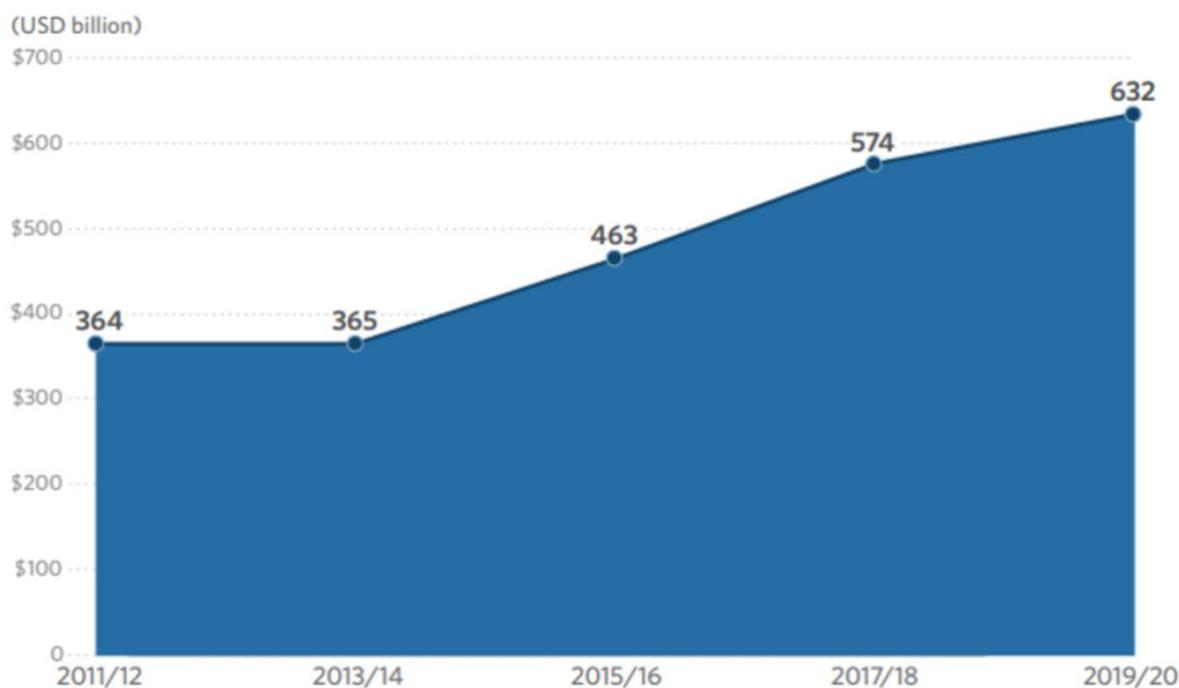


Fig. 5: Two-year averages of global climate finance flows 2011-2020 (Green Finance Platform, 2022)

Regarding more recent data, however, these have not yet been made available as both the economic impact and the financial repercussions of the global pandemic on market trends are still under careful evaluation. Nonetheless, the World Economic Forum reported S&P Global's estimates that some USD 575 billion in green bonds will be issued in 2023, noting considerable expansion among European and US issuers. Also according to S&P Global Ratings, total flows would exceed USD 1 trillion in 2021, declining slightly in 2022 and 2023, but expected to reach and exceed the trillion USD mark again in 2024¹⁹ (Henry & North, 2024) . This is also in line with Bloomberg Green's statement that 2021 would be a turning point for banks with a greater financial commitment to sustainable and climate-friendly projects. The main players are US banks of the calibre of JP Morgan, Citigroup and Bank of America, which have taken the reins of a broader US banking group committed to investing a total amount of around USD 4 trillion over the next decade. Despite the fact that bank fees associated with energy bond lending are far higher than those from green debt, investment bankers are preferring green projects. A preference, as we will see in more detail shortly, that is necessary to ensure the realisation of adequate and timely sustainable development.

¹⁹ The exact forecast is USD 1.05 trillion. Furthermore, let us remember that the year 2024 has just ended and it takes time for analysis and measurement to publish the correct estimate.

In fact, another interesting aspect to look at is the overall green bond issuance by region. Fig. 6 shows the amount of green bonds per region and year. Graph A shows the absolute value and Graph B the relative value. What immediately stands out in the first graph is the light blue space, which has always dominated over the other colours in all years, representing Europe's continued commitment and reconfirming its global leadership in green finance. This position is followed by the Asia-Pacific and North America regions, mainly due to the recent environmental policies approved by China, currently the largest market for green bonds, and Joe Biden's infrastructure package for the United States, whose future is uncertain at present as a result of Donald Trump's new presidency, which is keen to exit the Paris Agreement once again and thus reduce the US contribution to the fight against climate change.

Graph B, on the other hand, shows the proportion of green bonds each region has issued out of the total in circulation. Needless to say, with about 40% of the total green bonds issued worldwide, Europe reaffirms its leadership in the global landscape. This is followed by a strong increase in the Asia-Pacific region, around 25%, and North America, around 10%. This graph clearly highlights the obvious sustainable policy strategies adopted by individual countries and the intensity of their environmental commitment, automatically establishing their global influence. For example, both Europe and the United States suffered a 10% reduction from 2014 levels, but this was not due to a net change in the direction of their governmental strategies, even though the previous Trumpian presidency may have affected the shares to some extent (it should be noted that in 2021, the final year, a figure of 15% was recorded compared to the 30% observed during the White House inauguration in 2016), but was rather the result of the intervention of new political players who recognised the issue of climate change as an issue of first concern. China, in this sense, through its intervention generated a political push that could attract other new interventions in the Asian region. This could extend to the global level, making China appear as the frontrunner among the emerging countries, capable of unleashing the necessary impetus for other developing countries to take the same path. A role that China should urgently and currently play if the intention is to mitigate the effects of the environmental crisis.

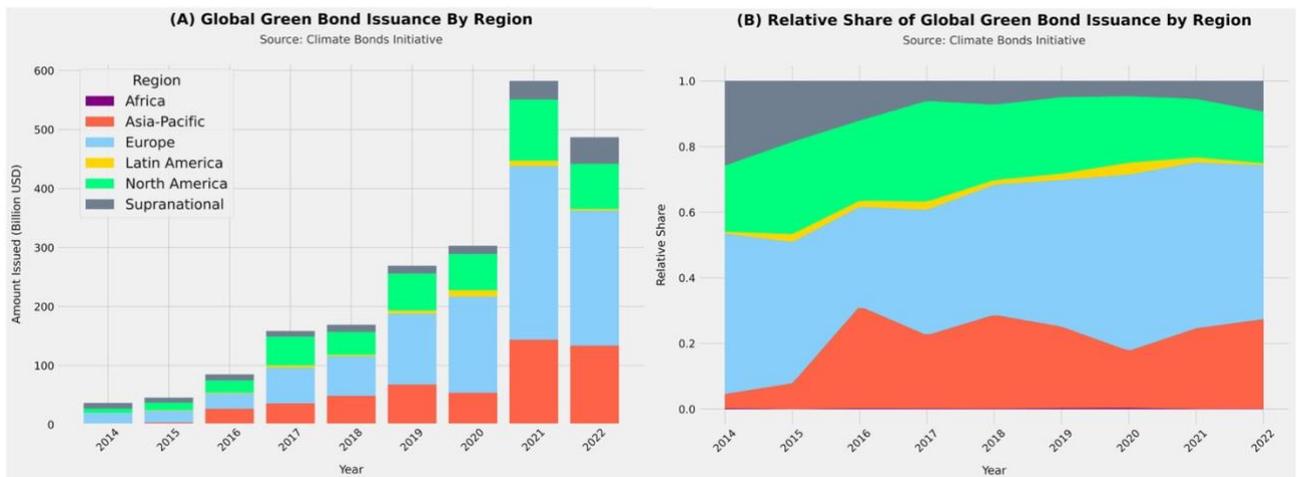


Fig. 6: Global and relative share of Green Bond issuance by region and over time (Babic, 2024)

At this point in time, it is natural to ask oneself whether, despite the positive steps taken so far and despite the receipt of a considerable amount of data and their analysis, we are actually at a good point or not on the ladder to climate neutrality. So whether or not the clock in the world's most famous square, the Big Apple's Times Square, can be stopped²⁰. Whether it is somehow possible to block the longed-for passing of the point of no return, a line drawn in agreement by many experts, beyond which neither sunrise nor sunset will yet be visible.

Fig. 7 encapsulates the economic effort sustained up to the present day. In 2021, the market value of climate finance equalled about USD 600 billion. This growing amount touched the USD trillion mark in 2022 and then experienced the economic recession generated by the pandemic crisis. A very impressive result when one considers the starting situation. But in comparisons and real market inflows, the outcome represents only a small portion of global financial movements. According to the S&P Global Report 2024, although the issuance of GSSSBs (Green, Social, Sustainability and Sustainability-linked Bonds) exceeds the issuance of conventional bonds, the former are estimated at 14% of the global bond share (S&P Global, 2024). To further emphasise the concept, studies conducted by the Climate Policy Initiative (CPI)²¹ are also examined: the amount of resources currently needed to ensure compliance with

²⁰ This refers to the Climate Clock located in Times Square, New York. It is a clock installed in 2020 considering the IPCC's calculations of the time remaining to reverse course and avoid a 1.5°C global temperature rise. Next to it is another display depicting the amount of renewable energy produced in the world. There are currently five clocks in the world. The one in New York is the first and best known, but there is also one in Rome, inaugurated in 2021, placed in front of the MITE (Ministry of Environment and Energy Security). The aim is to make people aware of how close we are to a bitter end.

²¹ The ICC is an analysis and advisory organisation with the objective of helping governments, companies and financial institutions achieve economic growth while addressing climate change (Climate Policy Initiative, 2024).

the Paris Agreement is approximately USD 3.4 trillion. A sum far short of that, and destined to grow further to the peak of USD 6 trillion to achieve climate neutrality by 2050. An amount of money to be injected into the world energy system that is extremely and dangerously far from being realised. Only an unprecedented cohesion between the private and public sectors would ensure success, placing common goals in front of a united and adherent organicity that cares about implementing effective strategies and sustainable policies for the collective good.

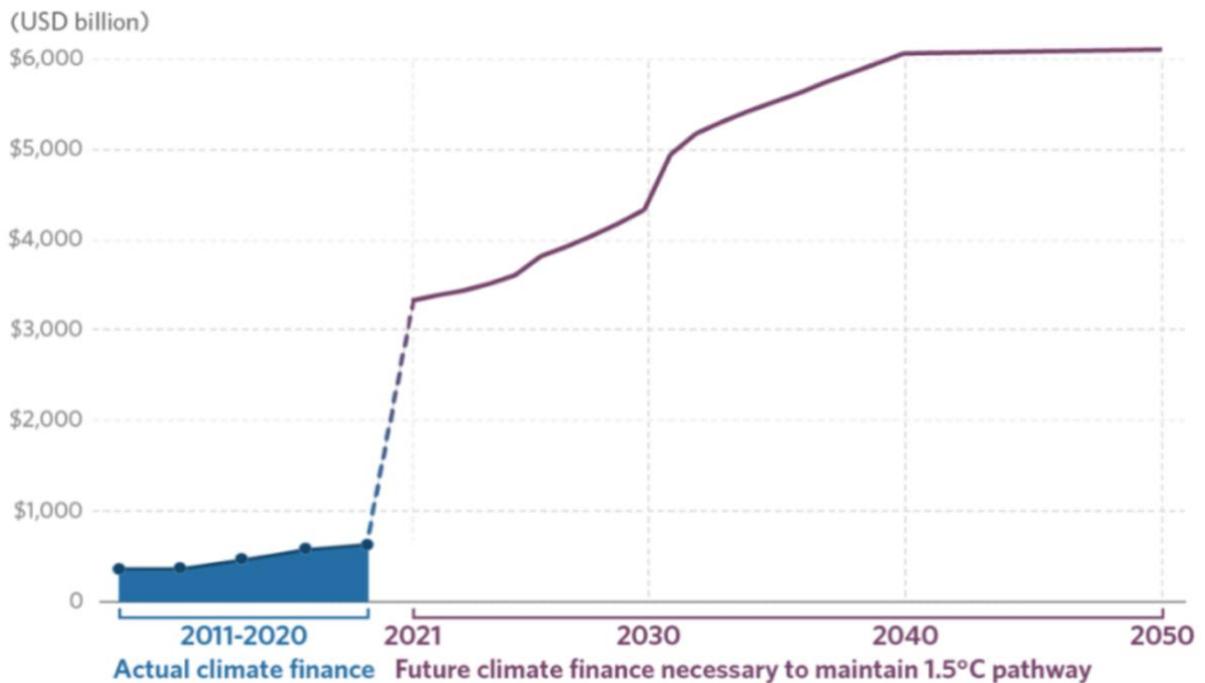


Fig. 7: Estimates about the climate finance (Green Finance Platform, 2021)

In order to take another step towards an authentic understanding of the current state of the global ecological crisis, and for the collective consciousness to consider and process the present and factual condition of the circumstances, it is intellectually necessary to take up a graph that exaggerates the intent to radiate some minimal form of concern. The reference is to the study conducted by scientists at the Goddard Institute for Spaces Studies (GISS) from the NASA observatory. The data illustrated in Fig. 8 encapsulate the essence of the study. Since 1880, the year the measurements began, the earth's temperature has gradually risen, increasing by at least 1.1°C overall. An advance that has mainly occurred in recent decades, in particular since the

second half of the 1970s with a rate of 0.15 - 0.20°C per decade compared to the average levels of 1951-1980. A frightening figure synonymous with environmental unsustainability and collapse. A figure that many readers still fear, supporting at first glance and legitimately the thesis that the world is going through an interglacial period, part of a constant natural cycle interspersed with glacial periods²², a recurring phenomenon since the formation of planet Earth. And the current interglacial phase is said to have begun around twelve thousand years ago; since then, the global average temperature has been rising steadily until the present day (NASA, 2021).

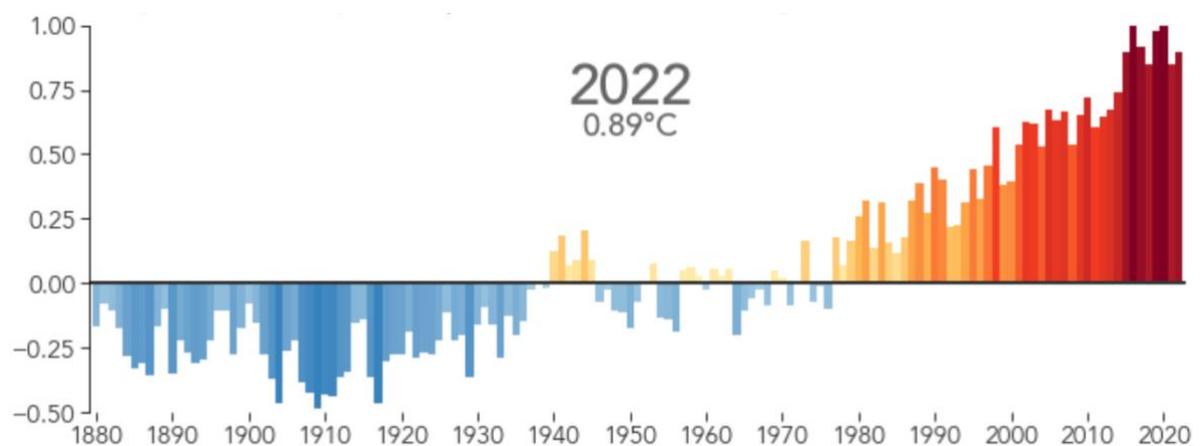


Fig. 8: Annual average global temperature values from 1880 to 2020 (NASA, 2021).

So, if current global warming appears to be part of a self-regulating mechanism that planet Earth implements periodically, based on the solar energy radiated on Earth and how it is able to disperse it into space, how come there is a collective fear that the world is inexorably moving towards the end of its days?

A rather common question that is answered by numerous studies, but one aspect that is often ignored must be clarified. If the temperature were to hypothetically rise and reach 5 or 10°C above average, a temperature already reached millions of years ago, this would not imply the end of the world. It possesses a remarkable adaptive capacity and would not face any significant obstacles in implementing this process. Therefore, the only real implication would be the end

²² Within the global climate cycle there are alternating periods of ice ages (a drop in temperatures above average) and interglacials (an increase in temperatures above average). In the last 800,000 years, there have been eight ice ages followed by interglacial eras, the last of which began about twelve thousand years ago and is still ongoing (NASA, 2021).

of the human species and its civilisation, where environmental protection would mean the set of actions aimed at preventing the temporarily natural habitat for humans from becoming inhospitable. A new and more exact definition of environmental protection adapted to the physical limits of mankind. Suffice it to say that around 14,000 years ago there was the last ice age and the next one, although yet to be designated, will also take its toll. Consequently, the Paris Agreement has as its one and only true purpose the survival of the human species inextricably linked to the ecological context, which, however, lends itself to being a one-sided bond and not one of mutual need (IPCC, 2021) .

Having clarified the previous point, the formulation of the answer requires the help of some studies carried out by the IPCC concerning the degree of correlation between the current interglacial era and human activity and, therefore, whether human activities have had and can have an impact on the stability of the earth's temperature. What is apparent is the high level of CO₂ in the atmosphere, at around 410 ppm (parts per million), a value that was only equalled two million years ago. Furthermore, the timing with which the current interglacial period progresses compared to previous ones is extremely anomalous. Usually thousands of years elapse before the standard CO₂ ppm ceiling is reached, not decades. Fig. 9 expresses precisely the following estimates by the Intergovernmental Panel covering a vast time span of 3.5 million years.

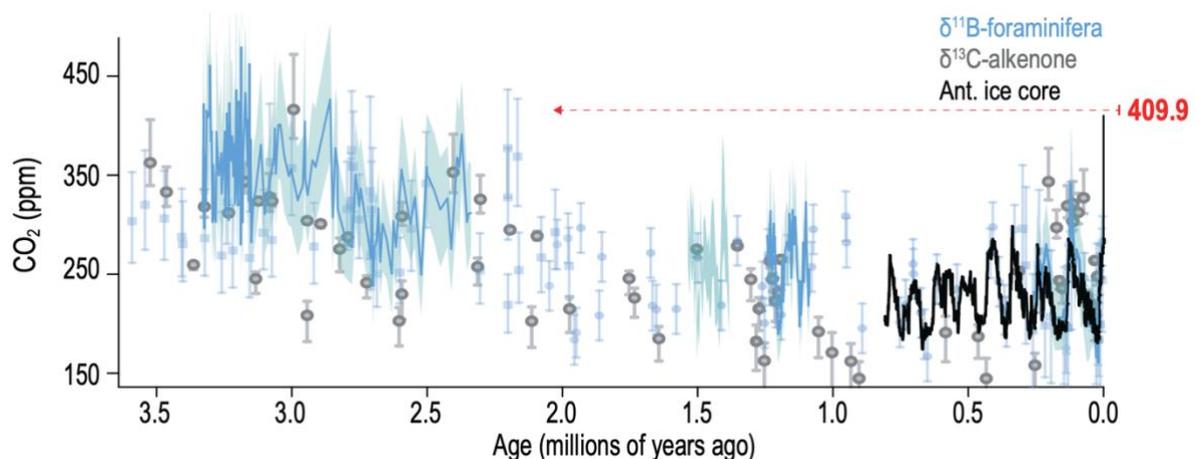


Fig. 9: ppm level of CO₂ over time to date (IPCC, 2021)

With the previous illustrations on the historical data of global warming, with the emphasis on the environmental impact of human activities, the question was raised as to what the real threat of the climate crisis actually is. How much time can elapse between the theoretical planning of a project and its practical implementation. UNEP Executive Director Inger Andersen herself

reiterated that the window for mitigating global warming is rapidly closing and that, at the same speed, the climate crisis is escalating into a climate disaster. She stated how 'stronger action must start this year, not next year; this month, not next month; and indeed today, not tomorrow'. An overwhelming speech, also supported by the UN Secretary who stated that 'the report (referring to the IPCC Report 2022 focused on climate change mitigation) is a litany of broken promises on climate, empty commitments that will deliver us an unlivable world; we are travelling at high speed towards a climate disaster'. Similar words with an identical ending. Going back to the previous IPCC study, in the best case scenario the global temperature will remain below 2.6°C. In the worst case scenario, the temperature will be between 5 and 8.5°C. Instead, in the most likely scenario, it will be between 2 and 4.5°C. Scenarios that make it absolutely clear that rapid and timely action is the only way to truly mitigate the otherwise irreversible effects of global warming and the greatest threat to the survival of humanity.

And it is at this hidden juncture that green financial instruments present themselves, like a glimmer of light in a darkened room, as the best option to draw on. The Bank of France itself theorises the inability of the ECB, or at least its partial inability, to fulfil the main objective set for it, i.e. the stability of prices and the financial system²³. The persistent threats related to the climate crisis and environmental transition policies significantly undermine the operation of these functions. Therefore, continues the French banking institute, one way forward would be for governments to send credible signals for the implementation of an orderly and ambitious, as well as predictable, transition to ensure the smooth running of regular banking activities. In particular, three aspects are highlighted that can significantly influence the conduct of monetary policy within the European Union, but can be extended to the entire world. First, the difficulty of devising a single monetary policy since shocks occur in an asymmetric and heterogeneous manner on European soil. This implies different economic and social consequences from country to country, setting up unequal regulatory development scenarios, also based on the greenhouse gas emissions of the country in question. Related to this is the second point, which focuses on the quantitative and qualitative value of the shocks that have and will take place. Catastrophic phenomena and their intensity have increased considerably in recent years, making shocks unpredictable events and generating particular problems in the transmission channels of monetary policy. Climate-related risks gripped the efficiency and success of monetary strategies, forcing the European community to convene a Eurosystem Strategy Review in early 2020 in order to learn whether the monetary policy undertaken was aligned

²³ Refer to Art. 127 of the Treaty on the Functioning of the European Union (European Union, 2012) and Art. 105 of the Treaty of Lisbon of 13 December 2007 (European Union, 2007), both with reference to the objectives and tasks of the European System of Central Banks (ESCB).

with the stated objectives of the Treaties. This was carried out 17 years after the previous one, a large period of time in which issues such as digitisation, an ageing population, the global financial crisis, the recent pandemic crisis and, above all, global warming have arisen. Factors influencing the choices of the end consumer, households, businesses and the market as a whole. Thus, issues with implications that cannot be ignored by monetary policy. And as announced, climate risks have received greater attention than the others, a central issue that has led institutions to a more solid and incisive, at times tangible, commitment which, although still in the consolidation phase, reflects a change in their approach. Indeed, the last element in question concerns the process of replacing or modifying the current economic model with a more sustainable system. The French national bank reiterates that this must occur gradually, as an abrupt and unexpected climate transition could generate economic and social effects that are inconsistent with those anticipated. Therefore, the path must be taken as soon as possible, paying attention also to the manner and timing in which it takes place, since speed is not always synonymous with effectiveness, a topic that will be taken up in the last chapter concerning greenflation and the compatibility path (Dees, Weber, & Ouvrard, 2022) .

In conclusion, the French lending institution states that central banks must be at the forefront of the move towards a climate-neutral economy. Sending strong signals to the market could change investors' appetite and reduce dependence on carbon and oil, i.e. fossil fuels. Many issuers of green bonds and other green financial instruments have found a broader base of financial supporters that can encourage the spread of green bonds into the economic fabric, thus weaving the firm foundations of a more sustainable future (Descombes, Kergadallan, & Le, 2022) . A future that lies ahead and, while rich in potential, remains uncertain and full of challenges. To make the point more clearly, greenium and greenwashing represent the two sides of the same coin. Specifically, greenium refers to the financial circumstance whereby the price of green bonds is higher than the price of conventional bonds and, together with high demand, generates lower returns. In other words, investors are attracted by the added value associated with sustainability and positive environmental impacts, rather than profit maximisation. On the contrary, greenwashing represents a negative side of green finance. In fact, in recent years, an increasing number of economic agents, from the private to the public sector, have entered the world of sustainability. With the help of certifications and declarations, as well as certificates and proclamations, they have made a concerted effort to participate in the fight against climate change. A practice emulated by a broad audience, also to improve one's public image. The problem arises at this juncture. Not all declarations and certifications prove to be true, triggering what is known as greenwashing —a deceptive practice whereby a company or entity falsely

claims its commitment to sustainability by presenting a green and responsible image, but without any actual change in its activities or genuine environmental practices. A practice that finds reason in the growing consumer interest in green and sustainable products.

The Bank of Italy, like the French Bank of Italy, has also conducted research on the recently developed topics of the existence of greenium and its evidence and the phenomenon of greenwashing. These studies present the same issue from a different perspective, offering a more comprehensive, if not complete, view than the previous one. Moreover, the fact that two central banks, such as those mentioned above, devote significant resources to the analysis and development of sustainability issues, exploring their strengths and weaknesses in order to understand the dynamics of emerging trends, how to maximise benefits and mitigate criticalities, reveals the existence of a transformative process underway in the global socio-economic system, which will inevitably lead to the definition of new regulatory and normative frameworks. For instance, the estimated results suggest that the greenium episode happens for a number of reasons. First, end-consumer preferences do not depend solely on the payoff generated by the investment portfolio, but also on the added value that the eventual purchase of a green bond would produce on an ethical level. Secondly, the increase in the number of certifications issued and regulatory pressure to ensure high transparency are seen as the main reasons for the reduced risk associated with green financial products. Finally, green bonds are investment assets with long-term time horizons. Allocating capital to environmental and sustainable projects would seem to be not just a moral issue, linked to the consumer's preferred basket of goods and detached from profit as the ultimate goal, but a true long-term financial strategy. A choice based on a different awareness, matured following the pandemic shock that has allowed the acquisition of new diriment information so that a wider slice of investors can approach, with less scepticism, projects focused on reducing the global carbon footprint (Liberati & Marinelli, 2024) .

Looking back at the results of the S&P Global Ratings, we see a clear superiority of success achieved by green bonds over the entire remaining range of green financial products. Looking at the main ones, we first observe a sharp decline in the issuance of Sustainability-Linked Bonds (SLBs), which plummeted by 14 percentage points in 2023 alone. This is mainly due to the easy achievement of Sustainability Performance Targets (SPTs), such as reducing CO2 emissions by a certain threshold or improving energy efficiency by a certain date, and the overly lenient punitive measure of a 0.25 per cent increase in the bond's interest rate, which the issuer will have to pay to the investor. An insufficient sanction to derive a serious and sustained commitment. It causes a slowdown that poses serious credibility problems and significantly

reduces the attractiveness of SLBs, triggering disinterest in allocating capital even by those genuinely interested in ESG impact. In essence, SLBs are seen as an unlabelled bond, a bond without a sustainable label.

Afterwards, passing the baton to Social Bonds and Sustainable Bonds, the figures remained virtually unchanged. While there was a sharp decline in Social Bonds in the Old and New Continent region, there was a significant increase of 43% in the Asia-Pacific region. A figure from which to begin a brief reflection on the different needs shown from region to region. In Europe, there is a marked interest in other financial instruments, which also, not exclusively, embrace the environmental aspect, a consequence of a mature awareness and an adequate and developed infrastructure to deal with environmental challenges. This is a different priority compared to other geographical areas, such as the Asia-Pacific region, where there is a greater emphasis on social issues, resulting from the need to build, expand or strengthen an existing welfare system and then undertake sustainable policies to combat climate change. In any case, this trend parallels that of Sustainable Bonds, which are also characterised by constant stability and investments mainly from supranational agencies. Indeed, SBs possess the capacity to raise funds on a large scale and, through their financial strength, to implement green projects of global interest, which concern both environmental protection and the improvement of social conditions.

Finally, the green bond family is the most prosperous green financial instrument, registering a 10% growth in 2023. And putting a magnifying glass on the general trend of GSSSBs discussed above, there appears to be a slow and steady decline of North American issuers, leaving room for overseas European neighbours. Furthermore, although it is non-financial corporations that own the largest share of green bonds in the global market, after almost three consecutive years of growth, the volumes of the financial services sector finally matched those of financial corporations. Sovereign bonds grew significantly in 2023, with several large European economies, such as Italy, Germany, the UK and France, each issuing around USD 10 billion of sovereign green bonds (S&P Global, 2024) .

Finally, market analyses are readily supplemented with research on a regional scale in order to provide a better estimate of the current status of green finance and its speed of progress. 2023 was a rebound year in emerging markets following a gradual abandonment of the depressive monetary policies initiated the year before. This generated a 45% increase in sales of green bonds to international investors compared to the previous year, 65% if we exclude China, which recorded a 28% increase. However, such growth has given rise to healthy demand, without

shortages or excesses, influenced by informed choices, and characterised by diversified and sustainable investments. India, for example, issued its first sovereign green bond, demand for which was four times higher than supply, performing well beyond expectations and allowing the sovereign to take a stronger stance, including by raising prices. In general, taking into account the many factors affecting market performance, but if the inflationary wave were to stabilise, or at least calm down, and geopolitical situations were not to exacerbate more than they already have, particularly in the Middle East and Eastern Europe, we should see a steady annual increase in GSSS of 7%. A figure that largely reflects the improved sentiment also found in the jurisdictional work of political and institutional forces willing to establish sophisticated regulations and taxonomies, giving way to a universal taxonomy, which began with the cohesion of the European and Chinese taxonomies, despite the latter contributing to moderate growth. An international commitment that would facilitate risk assessment and asset performance, based on transparency and credibility that would enlarge the pool of borrowers, in which all players would be willing to work to create a cross-border compatibility that is for now only imaginable and has immense potential. An endeavour, this, already begun and observed in embryonic markets, but playing the crucial leading role and meeting the needs of emerging markets intrigued and willing to seriously embrace these issues (IFC - Amundi, 2024).

And before embarking on the last leg of this journey and crossing the threshold of the final chapter, it is imperative to have grasped the essential threads that, like interwoven golden threads, emerge between the lines of these pages. Starting with the link between ethics and money, and then moving on to the narration of the current nature of the market, the reflection sets out to explore the founding reasons that should inspire in man that rational conviction that without immediate intervention, very little can be hoped for. Moving on with scrupulous attention, we dwell on the many facets of the main sustainable financial instruments, devoting the right amount of time to examining the potential of emerging markets, which will inevitably assume an increasingly prominent role in the context of international agreements. And finally, we come to the ultimate question: can green finance, in its entirety, be considered the best of all possible alternatives?

A seemingly open question, but in reality defined by a narrow network of responsive channels. Time is a crucial element for every living species and for the planet itself. Time is a simple line encompassing the complexity of infinity, and for humans it is relatively short, as short is the remaining space of action before the point of no return. And as much as global warming, ever closer to becoming an irreversible climatic catastrophe, is about to invest the celestial sphere and its inhabitants, the only ones to suffer its damaging effects will be the latter, making the

former experience one of many thermal variations as part of a cycle in perpetual becoming. Therefore, the fulfilment of the ambitious project, enshrined in green finance and its green financial instruments, does not appear so much as the morally superior choice or as the favourite among multiple possibilities, but rather as a path imposed by circumstances, at times the most plausible and, consequently, the least illusory.

To conclude, the next chapter will discuss the strengths and weaknesses of green finance. Following this, attention will be paid to the expectations and possible global scenarios that are to be formed, dealing in particular with the national legal sphere and commenting on the degree of feasibility of an international convergence, directed towards a slow process that is already underway and with the final goal of the laborious but necessary realisation of a universal taxonomy. In this sense, the aim is not to question the validity of green instruments, an answer given earlier, but rather to better understand their limitations and the true potential they conceal so that awareness and collective commitment to the creation of a sustainable financial system will increase in tandem.

3. Taxonomy around the world

One could start by examining and discussing the list of future goals and expectations for green financial instruments, ranging from challenges to opportunities, and from solutions to expected outcomes. But it is essential to start with the concept encapsulated in the so-called 'technocratic paradigm'. In short, this sees man placing extreme faith in technology and the advancements it brings, believing that he can reach any goal, sooner or later. A definition very similar to the Positivist philosophical current that arose in the late 19th and early 20th century, where there was great faith in technological progress. Confidence at the time was fostered by a combination of historical factors, including the crisis of traditional political ideologies, the Industrial Revolution that would alter the global economic landscape, and the nascent and steadfast desire to create a modern society characterised by continuous inventions aimed at increasing common welfare. The beginning of a period that could be defined as the 'age of accelerated progress', giving rise to a fervent optimism towards science, technology and rationality, from the Wright brothers' first flight (1903), a means of pushing the physical limits of the human body, to the recent creation of Artificial Intelligence, which challenged the very boundaries of the human mind. Different phases of the same time frame and with common values, thus allowing progress to expand from the industrial field to the social and civil field. A constant but non-linear evolution, as the pages of history teach us, sometimes changing the very perception of progress. And yet, the results of this continuous development have shown that from mere economic interest, the fundamental driving force behind the industrial revolution and so many others, the demand for justice, freedom and dignity can sprout from it, like blades of grass between the cracks of a scorched earth.

Noble ideals these, aimed at the community and its prosperity, seemingly devoid of criticality and without a single crack. But in reality, as in its time, every technical advancement or improvement is accompanied today by a real danger induced by a power, that of technology, which can be wielded more or less well, more or less selfishly, giving rise to imbalances that lead to perpetual clashes. In today's experience, a very concrete example comes directly from the social world and the new media. These, in fact, have now gone from being a tool to being the environment, from objects to subjects in the social universe. Another well-known example is certainly the militarisation of countries. Blatant was the arms race during the Cold War in which the countries involved were convinced that greater military power could guarantee

security and supremacy over others, leading however to a continuous escalation of tension and increasing the risk of conflict instead of extinguishing it.

Therefore, the real difficulty lies in the ability to establish a correct and virtuous relationship between technological and human development, without one prevailing over the other. Put another way, the technocratic paradigm sees a world as a formless reality totally available to human manipulation, power, desires and obliquities (Rossini, 2015) . Technology is not the real problem; rather, what is decisive are the ways in which it is used, the purposes that guide its use and the logics through which it is justified.

The conciliatory thought that links the technocratic paradigm to Green Finance is simple: if you possess the power to save something, you also have the power to destroy it. The difference depends solely on the common will to be embraced. In this sense, Green Finance should be implemented not only because, among the various options, it is consistent with the values and ethical principles shared by the international community, or, even more compellingly, to avoid scenarios of environmental collapse and human survival, but above all by its two fundamental premises: on the one hand, the technocratic paradigm, which sanctions its full operational feasibility; on the other, technological advancement, which constitutes its central concrete projection towards an inclusive, sustainable and resilient socioeconomic model. Hence, Green Finance is not only an ethical opportunity or an ecological necessity, but rather an indispensable structural strategy to orient global financial flows in the direction of ecological transition and climate neutrality, i.e. to guarantee the systemic conditions favourable to the continuous development of mankind over time.

3.1 EU Green Taxonomy

Before proceeding to dissect the deeper aspects of the European taxonomy apparatus, as well as the succession of the main stages up to the issuance of the most recent directives, it is imperative to understand its most superficial aspect, namely its definition, as well as the reasons for its use. Continuing in this direction, a document offered directly by the European Commission is cited, aimed precisely at dispelling any doubts orbiting the taxonomy of the European Union. The initial premise, as in previous pages for other similar situations, is that the work of the European community will often be named as an authoritative source from which to draw the main foundations of the taxonomic structure, the EU having adopted and invested considerable resources in the creation of a robust, state-of-the-art regulatory system.

So, the answer to what is meant by taxonomy is provided directly by the European Commission in a special guide, defining it as a "common language that investors can use to make investments in projects and economic activities that have a significantly positive impact on the climate and the environment" (European Commission, 2023) . Therefore, the taxonomy stands as a financial pillar and market transparency tool, helping to direct financial flows towards specific policies of ecological transition. Six environmental objectives are thus identified and, to be considered sustainable, the activity undertaken must fulfil two criteria: making a ***substantial contribution*** to at least one of the indicated objectives and ***doing not significant harm*** (DNSH).

The environmental objectives are:

- Climate change mitigation
- Adaptation to climate change
- Sustainable use and protection of water and marine resources
- Transition to a circular economy
- Pollution prevention and control
- Protection and restoration of biodiversity and ecosystems

In addition, two specific types of activities are recognised: transitional and enabling. The former refers to activities for which there are as yet no low-carbon alternatives with the best market performance in terms of greenhouse gas emissions. Obviously, it is stipulated that such activities must not hinder the development and diffusion of more sustainable alternatives. The second, enabling refers to those activities that directly contribute to one of the environmental objectives, such as the development of new technologies for energy efficiency or renewable energy storage.

Obviously, the various Delegated Acts enacted over the years have been added to the taxonomy. Among the most important of these is the first, the Climate Delegated Act, dedicated to climate mitigation and adaptation objectives. It came into force in January 2022 and allowed for a first concrete assessment of the sustainability of economic activities. Next came the Environmental Delegated Act, establishing the technical criteria for the remaining targets and completing the European taxonomic operational framework. Finally, other Delegated Acts known for their importance are the Complementary Climate Delegated Act and the Disclosure Delegated Act. The former expands the content of the Climate Delegated Act to include natural gas and nuclear energy as transitional activities, provided certain conditions are met. The second, on the other hand, defines how companies, both financial and non-financial, must disclose the percentage of environmentally friendly economic activities they carry out or invest in.

These criteria, among many others, are defined and extensively addressed in the well-known Taxonomy Regulation (TR - 2020/852) that came into force on 12 July 2020 (Bruhl, 2021) . It establishes a new regulatory framework, capable of establishing a shared Europe-wide system of disclosure obligations for companies and financial operators, which are required to communicate how they assess the environmental sustainability of their activities. In other words, the taxonomy represents a guideline aimed at improving the availability and accessibility of information, reducing uncertainty and encouraging green financing.

Likewise, the European taxonomy arises in a context of an open outcome: the regulatory soil is fertile, but the season is short, and the harvest depends on timely sowing. If the initiative does not take root in time, it risks becoming a fruitless field or, even worse, as dry as a desert. Especially if it is seen as being sandwiched between the European Green Deal and the Paris Agreement, the attainment of whose ambitious goals is one of the EU's firm intentions. And if little time is available for the implementation of a taxonomy, many are the motivations that underpin it and drive political will towards it. The taxonomy aspires to become an operational reference point for investors and companies, a support step in the planning and financing of sustainable transition, while at the same time helping to reduce market fragmentation, combat greenwashing and accelerate the flow of capital towards sustainable and transitional projects, as well as enhancing the reliability of financial instruments (European Commission, 2023) . Its impact would extend to a broad spectrum of financial actors, including commercial banks, financial institutions, asset managers, private equity funds, insurance companies, pension funds, informal investors, public entities, national development banks, microfinance institutions and credit unions, and many others (CCAP, 2022) .

Thus, the regulatory landscape in which the European taxonomy settles has far wider boundaries than a simple initiative. The need to obtain funds for climate neutrality has forced the commission to review part of the EU regulatory fabric. And to make up for the lack of economic resources, there were numerous avenues and new channels from which the EU drew. And sustainable finance turned out to be the most promising avenue, capable of channelling the necessary resources to achieve the set climate goals. So it was that the European Commission set up a series of bodies over the years to pass the baton on, starting with the High Level Expert Group (HLEG) in 2016, whose legacy was later passed on to the Technical Expert Group (TEG) in 2018 and concluding in the Platform of Sustainable Finance (PSF) in 2020. The common aim is to help the EU integrate ESG values into the financial markets, directing capital towards activities consistent with the ecological transition.

Going in order, in 2018 the HLEG officially published the Final Report, a set of policy recommendations aimed at making the European market more sustainable. This formed the foundation for the implementation of the Action Plan on Financing Sustainable Growth, published in March of the same year. The plan was intended to further link finance to sustainability, a process that had already started a few years earlier with the Paris Agreement, and included ten key actions grouped into three categories: promoting market transparency, redirecting flows towards sustainable activities and integrating sustainability into risk management (European Commission, 2018) . In other words, in addition to promoting greater intelligibility among sustainability benchmarks and enhancing their disclosure, the plan reiterates the need for a clear and detailed taxonomy, a crucial tool for markets and essential for the EU's alignment with its strategic objectives. Thus, we see the first change of orientation, from a strategic to a technical-operational process.

The official representative of this new step was the biennial establishment of the TEG with the aim of translating what was described in the Final Report and the EU Action Plan into practical answers. The new group had the primary task of developing the Taxonomy Regulation, a project already conceptually initiated by the HLEG, which recommended its creation, referring more precisely to a classification system. In addition to this, the TEG was directly involved in the execution of other practical tasks and indirectly in the formulation of some regulations, as the need for disclosure requirements for financial and corporate institutions, enabling investors to make informed investment decisions and providing stakeholders with relevant sustainability information was a common thought. For these reasons, the Sustainable Finance Disclosure Regulation (SFDR), the Non-Financial Reporting Directive (NFRD) and the Corporate Sustainability Reporting Directive (CSRD) are highly relevant instruments in ensuring the

success of an environmentally sustainable financial system. These regulations were issued with effective entry into force on different dates. In chronological order, the Non-Financial Reporting Directive was born in 2014, well before the expert groups. The NFRD came into being to establish rules on the disclosure of non-financial information, intended only for some of the large companies to improve ESG traceability. The categories covered were insurance companies, banks and large unlisted companies with more than 500 employees. This was a very small portion of the market and led to much criticism. Therefore, the Commission took the first steps towards a more extensive reporting directive. In 2021, the proposal for a Corporate Sustainability Reporting Directive was adopted, extending the obligations to all large companies and reviewing the content of reporting to facilitate comparability and external risk analysis. This completely replaced the previous NFRD and made the current one more aligned and harmonised with both the text of the Taxonomy and the lines in the SFDR (Bruhl, 2021) .

From this it follows that the HLEG and the TEG made a valuable contribution, acting more as catalysts and inspirers than as the actual authors of these regulations. In continuity with the aphorism quoted above, they were the ones who irrigated the field, so that the fruits could be reaped by those who came later. And indeed, the third and final actor in this passing of the baton was the Platform on Sustainable Finance (PSF), a currently active advisory body of 35 members and 14 observers. The tasks assigned concern the implementation and revision of the technical criteria of the taxonomy, and the monitoring of capital flows towards sustainable investments. In other words, the intention is to foster a better dialogue and operational intertwining between the various institutional and entrepreneurial components involved, effectively sanctioning a new phase in the implementation process of sustainable finance (European Commission) .

From this point on, other milestones were reached such as the Regulatory Technical Standards (RTS) and the European Sustainability Reporting Standards (ESRS).

The former is generally regarded as a technical specification approved by the European Commission, but the key development bodies are the European Banking Authority (EBA) and the European Securities and Markets Authority (ESMA). The aim is to ensure proper implementation and harmonisation of regulations within the European Union, avoiding duplication or inconsistencies. Therefore, the European authorities developed the SFDR RTS, a regulation that combines the SFDR and the TR, which are closely interconnected, while introducing harmonised indicators for measuring the Principle Adverse Impact (PAI) that a financial product might have, be it an investment decision or an advisory strategy (Bruhl, 2022)

The ESRS, introduced by the CSRD and developed by the European Financial Reporting Advisory Group (EFRAG), officially mandated by the European Commission, establish a set of technical standards for ESG reporting and for the regulatory implementation of reported obligations. The enshrined criteria are currently aimed at large companies, but over the years the boundaries are expected to expand to include small and medium-sized enterprises by 2026. In fact, large companies, in order to ensure their own compliance and avoid sanctions, will be prepared to request information on ESG principles from suppliers and supply chain companies, giving rise to a cascading effect that will also affect SMEs (Etifor) .

But a crucial role, which has become a cornerstone of CSRD and guides the entire ESRS approach, is played by the concept of dual materiality: financial and impact. The former refers to the influence that ESG factors generate on the company and its economic performance (outside-in), conversely, the latter concerns the impact that the company in turn generates on society and the environment (inside-out). This is to be considered in the current legal context in which dual materiality has made the European regulatory framework a pioneering system, perhaps the only one currently in the world, capable of combining both approaches, but without definitive regulatory convergence. In this regard, numerous interoperability initiatives have been undertaken between the International Sustainability Standards Board (ISSB)²⁴ and the Global Reporting Initiative (GRI)²⁵ , which aim to avoid duplication and to foster more harmonious ESG reporting globally, or at least shared financial materiality (Fumagalli, 2025) . For its part, this type of documentation, supported by traditional accounting principles such as fairness and transparency of data, allows companies to analyse the impact that ESG criteria have on their business performance. This would allow for more responsible and sustainable strategic decisions, while considering the needs of all stakeholders, internal and external. Thus, the dual materiality expressed in ESRS makes the European model distinctive compared to many international standards, but the broader purpose that such reporting brings with it, i.e. not only the protection of investors' financial interests, but also the pursuit of sustainable development objectives, must be considered.

²⁴ The ISSB was established in 2021 by the IFRS Foundation. It is set up with a dedicated approach to financial materiality and its objective is to foster a comprehensive understanding of the sustainability factors that impact companies. In 2023, the organisation published IFRS S1, on Sustainability Financial Reporting, and IFRS S2, on Disclosure of Climate-Specific Risks and Opportunities. The standards of the Sustainability Accounting Standards Board (SASB) were incorporated into ISSB, accelerating the harmonisation of global market sustainability standards (Durante, 2024) .

²⁵ The Global Reporting Initiative (GRI) is an independent non-profit organisation that develops sustainability reporting standards that are among the most widely used globally. They adopt the impact materiality approach and act as a catalyst for a sustainable world, providing a common language for the thousands of companies and organisations that want to take responsibility for their impact (GRI, s.d.) .

And in the final step, it is worth mentioning the Omnibus Package, a plan to simplify and harmonise the complex European regulatory structure by introducing standardised templates for sustainability reporting. The package aims to amend part of the CSRD and also the CSDD²⁶ to make ESG reporting more effective and less burdensome, but also to unlock and attract new investments and enable companies to embrace a transition to a sustainable economy. This financial breathing space, which allows companies not to be suffocated by excessive regulatory burdens, also tends to avoid that obligations addressed to large companies, the main recipients of the new policies, can fall back on and burden small companies and their value chains. So, the main novelties are:

- Application of CSRD aimed only at large companies within a specific perimeter and thus excluding about 80% of companies;
- Limiting the effects that reporting obligations could have on small companies, leading EFRAG to develop a standard to act as a shield and reducing the information boundaries that large companies or banks can adopt;
- Limit the reporting obligations under the EU Taxonomy by ensuring that companies that will fall under the category of 'large enterprise' in the future will report voluntarily.

According to current estimates, the savings generated will amount to around EUR 4.6 billion, with a drastic reduction in administrative costs incurred to date. This is an ambitious plan that, in order to achieve its objective of facilitating the business world, will affect some of the main European regulatory pillars: from the aforementioned CSRD, through the most recent ESRS, to the Taxonomy. It is a process that will take time and gradualness, especially for co-legislators grappling with policies to comply with the new changes agreed with the European Commission. One only has to think of the 'deadline suspension' proposal, which is intended to postpone reporting obligations for companies subject to the CSRD by about two years (European Commission, 2025) .

Against this backdrop, the image emerges of a European Union that has meticulously assembled a complex and articulated regulatory mechanism: every cog (directives, regulations, standards) has been precisely placed in a balance designed to last and function effectively. Now this

²⁶ The Corporate Sustainability Due Diligence Directive (CSDD) is a directive that came into force in July 2024 with the intention of promoting sustainable and responsible corporate behaviour by addressing the negative impacts on human rights and the environment that their activities produce. Like many of the latest international standards, it too is aimed at large companies and, among other obligations, they are required to implement a transition plan for climate change mitigation (European Commission, 2024) .

machine, thus constructed, is ready to start moving towards its final destination: climate neutrality. The next step will be to quickly turn negotiated commitments into concrete actions and measurable results, with each step sharing progress.

Milestones in the Development of the EU Taxonomy Framework until 2025

Year	Milestones	Description
2016	<ul style="list-style-type: none">• High-Level Expert Group (HLEG)	Established to advise the European Commission on integrating sustainability into financial policy.

Year	Milestones	Description
2018	<ul style="list-style-type: none"> Final Report of HLEG 	Strategic recommendations leading to the EU Action Plan on Financing Sustainable Growth.
	<ul style="list-style-type: none"> EU Action Plan on Sustainable Finance 	Introduced 10 key actions grouped into: transparency, sustainable capital flows, and ESG risk integration.
	<ul style="list-style-type: none"> Technical Expert Group (TEG) 	Formed to operationalize the Action Plan and develop the Taxonomy Regulation.
2020	<ul style="list-style-type: none"> Taxonomy Regulation (TR - 2020/852) 	Legal framework defining sustainable economic activities; came into force on 12 July 2020.
	<ul style="list-style-type: none"> Platform on Sustainable Finance (PSF) 	Advisory body created to review technical criteria, monitor sustainable capital flows, and coordinate implementation.
2021	<ul style="list-style-type: none"> Corporate Sustainability Reporting Directive (CSRD) 	Proposed to replace Non-Financial Reporting Directive (NFRD - 2014); extends reporting to all large companies and improves ESG data comparability.
2022	<ul style="list-style-type: none"> Climate Delegated Act 	Specifies criteria for climate change mitigation and adaptation objectives.
2023	<ul style="list-style-type: none"> Environmental Delegated Act 	It completes criteria for remaining four environmental objectives of the taxonomy.
	<ul style="list-style-type: none"> Complementary Climate Delegated Act 	It includes natural gas and nuclear energy as transitional activities under strict conditions.
	<ul style="list-style-type: none"> Disclosure Delegated Act 	It defines how financial and non-financial companies must disclose their alignment with the taxonomy.
	<ul style="list-style-type: none"> SFDR Regulatory Technical Standards (RTS) 	It harmonises disclosure requirements and introduces Principal Adverse Impact (PAI) indicators.
	<ul style="list-style-type: none"> European Sustainability Reporting Standards (ESRS) 	Developed by EFRAG under CSRD; establishes ESG reporting standards for large companies, to be extended to SMEs by 2026.
2025	<ul style="list-style-type: none"> Omnibus Package 	Streamlines and simplifies ESG disclosures, adjusts CSRD and CSDD scopes, limits burdens on SMEs, and introduces voluntary taxonomy reporting. Core to ESRS: combines financial materiality (outside-in) and impact materiality (inside-out).

3.2 Global Perspective

It is natural that, following the illustration of the main milestones that can be defined as real milestones, the crucial role played by taxonomy becomes clearer. Certainly the European one is the most structured, advanced and effective, but it is not the only one to exist. Many taxonomies have sprung up and developed around the globe, and even more so the finance programmes developed by institutions and companies, reflecting a significant and common drive for green finance. The Bendigo Bank's green home loans in Australia; the government-led green mortgage initiatives of Dutch banks in Europe; solar energy financing by the NRB Bank of the United States; the clean air auto loan products of VanCity in Canada; the issuance of climate credit cards by Radobank in Europe; the Landcare term deposit by Westpac in Australia (Ozili, 2022) . These are only an infinitesimal part of a strong and foundational current, embraced and shared by governments, banks and organisations across the four corners of the earth, and the next paragraphs will offer a summary analysis of the regulatory configurations in place today in the major taxonomies, excluding the EU Taxonomy.

3.2.1 United Kingdom

Staying within the continent's borders, but outside the supranational European community, the United Kingdom represents an interesting starting point. The CBI²⁷ in 2019 highlighted how a large number of companies and financial institutions were progressively adopting green finance instruments, while suggesting that existing financial legislation should be revised to introduce specific incentives to support such practices. However, on the other side of the coin, a significant number of economic actors showed resistance in embracing this approach, mainly caused by a lack of knowledge on the subject, inadequate current policies on sustainable finance issues, and limited access to data. But by now the climate crisis could no longer be ignored and in 2023, the UK government published the Mobilising Green Investment strategy as a green finance strategy aimed at redirecting capital towards sustainable projects, consolidating the UK's role as a global player. The nascent taxonomy is set against a backdrop of growing commitment to climate neutrality, with a particular focus on COP 26, held in Glasgow in 2021,

²⁷ The Confederation of British Industry (CBI) is a trade organisation that represents the interests of 150,000 businesses, the largest entity of its kind in the UK, and is the common voice that with great authority attempts to influence policy and promote an environment in which business can thrive, bringing industry and government together while supporting sustainable growth in both the business and social worlds (CBI, s.d.) .

which saw more than 90 per cent of the world's GDP sign up to the zero emissions goal. The document is divided into three sections: foundation, alignment and investment. The first is concerned with clarifying the key concepts of green finance, making them easier to understand and thus to analyse the main environmental and financial challenges. The second concerns how and how the financial system can and should adapt to the new climate requirements, i.e. through standards, regulations, guidelines and transparent disclosure. The final part, on the other hand, focuses on the operational strategies that can be applied to attract public and private investments, with a consequent demonstration of the main financial instruments, central institutional infrastructures and key sectoral initiatives, such as natural markets²⁸ or the UK Infrastructure Bank (UKIB)²⁹ (HM Government, 2023) .

3.2.2 Ukraine and Russia

If, on the other hand, we shift the magnifying glass to Eastern European countries, excluding EU member states, we will see less inclination on the part of government authority to encourage institutions and private investors to contribute to green finance. This is probably due to a complex historical past that has confronted Eastern European countries with situations that redefine their current priorities, often placing them outside of sustainable finance issues. Ukraine, beyond the current geopolitical situation that certainly sees the priorities of the political agenda shifting towards points distant from climate neutrality, is a well-known example traditionally disinterested in the disbursement of resources towards a circular economy. Ukrgasbank, the Ukrainian green bank, did not originate from a government initiative, but rather from a combination of factors, resulting from banking modernisation and the growing market demand for digitalisation of financial products.

Russia lends itself to be the only real case of success, relying on a much firmer political and economic stability than its neighbouring nations. At COP 26, as did the UK, the Russian Federation, through the State Development Bank, announced the official adoption of the Russian Green Taxonomy. Its conception and design was immediately aligned with the Climate Bond Taxonomy and with some components coming directly from the EU Taxonomy (Climate

²⁸ Nature markets allow farmers and natural resource managers to sell carbon and other ecosystem services through sustainable management and nature restoration projects. They can be voluntary or regulatory obligations.

²⁹ The UK Infrastructure Bank (UKIB) is an economic policy bank owned by the UK government with the aim of moving private capital into infrastructure by offering guarantees and providing capital.

Bonds Initiative, 2021) . Thus, it lends itself from the outset to be a regulatory structure compatible with international best practices, facilitating financial exchange and interoperability.

3.2.3 China and Singapore

Turning to the Asian continent, there have been remarkable developments in sustainable finance. Strong is the virtuous complicity grafted between the countries of the Asian pole, whose markets have reported a considerable increase in green bonds, with China leading the way since 2015. In 2021, the People's Bank of China finally published the Green Bond Endorsed Project, defining criteria and categories for green bond projects, including green financial bonds in the interbank system (Green Finance Platform, 2020) . Financial cooperation is one of the cornerstones to ensure a progressive allocation of resources towards economically sustainable activities. For this reason, a major initiative is the Common Ground Taxonomy between the EU and China published in 2021 under the auspices of the International Platform on Sustainable Finance (IPSF). The analysis carried out included 72 activities distributed across 6 macro sectors and assessed whether, in terms of emissions mitigation, there was any form of correspondence, even partial overlap or significant divergence. Furthermore, concepts such as Adaptation Objective, Do No Significant Harm (DNSH) and Minimum Social Safeguards, which are too different between the two legal models, were not considered. The aim was not to unify the two taxonomies normatively, but to foster the development of a common language for international green finance, based on transparency and cooperation (IPSF Taxonomy Working Group, 2021) . The subsequent handshake between the EU, China and Singapore is also a genuine expression of a social, rather than political, commitment, reflecting a common will to establish a stronger synergy across the global spectrum. In November 2024, the IPSF published the Multi-Jurisdiction Common Ground Taxonomy (M-CGT) to improve the interoperability of taxonomies, first between the EU and China, and now extended to Singapore. An inspiring model that other countries can imitate and which allows for cross-border financing in markets served by the respective taxonomies (Monetary Authority of Singapore, 2024) .

3.2.4 Honk Kong

Finally, Honk Kong has also taken steps towards the realisation of a circular economy. First with the establishment of an inter-agency steering group to create an environment conducive to

the growth of green finance, and later with various other projects, including the design of a comprehensive database platform to provide investors with adequate accessibility to information on green investment options, or the establishment of a self-assessment framework to measure the level of sustainability of individual licensed institutions. Path finalised in May 2024 with the publication of the Hong Kong Taxonomy by the Hong Kong Monetary Authority. It stems from feedback asked from stakeholders on the creation of a prototype. This is received with great fanfare and interest, seen as a tool to increase clarity on ESG financial issues and reduce greenwashing. It is defined as a living document, constantly changing and adapting, which will attempt to expand the boundaries of the activities and sectors involved, currently stopped at 12 grouped in 3 macro-areas. Project followed in parallel with the launch of a beta cloud platform to enable the banking sector to develop more expertise in climate risk management (HKMA, 2024) .

3.2.5 India

Looking at India, the world's third largest emitter of CO₂ and with around 1.4 billion people living in areas exposed to climate disasters, until 2020 it had not significantly supported the flow of green capital, giving strong indications of a distinct lack of incentive policies. But in recent years it took a different path, conceiving the need for a financial transition, culminating in May 2025 when India's Ministry of Finance announced a draft for the Climate Finance Taxonomy. It will be instrumental in supporting the achievement of its environmental goals such as climate neutrality by 2070, expanding the use of electricity from renewable sources to 50 per cent by 2030, and reducing the emission intensity of national GDP by 45 per cent by 2030. Targets that will require about USD 2.5 trillion in climate finance to be surpassed, a very considerable capital (Segal, 2025) . But the Indian taxonomy is not entirely of its own making, but draws inspiration from existing taxonomies, classifying activities into two groups: climate-supportive and transition-supportive, very similar to the classification adopted by the Canadian taxonomy. And the international sharing of knowledge on green finance gives a significant boost to the Indian framework in its development, which is geared towards facilitating resource flows to climate-friendly technologies and activities, mitigating greenwashing and establishing shared and transparent reporting (Thomasson, 2025) .

Thus, summarising the current situation in the Eastern quadrant, one cannot deny the effort made and the results achieved in bringing the market closer to financial innovations with an

environmental footprint, but there are still facets to be adjusted, many of which are widespread across the continent, such as the still insufficient awareness of climate risks, the lack of an adequate information system and the poor implementation of government incentives, either in the form of impulses towards new market segments or in sanctions on investments in carbon-intensive activities. In other words, the foundations on which an innovative and climate-resilient financial system can be built have been laid, but now it is time to raise awareness of the importance and benefits of green finance among economic agents by continuing to improve existing reporting and transparency models or developing new ones based on a mutual sharing of ESG knowledge.

3.2.6 Southafrica and Nigeria

And while Asia consolidates a collaborative framework, Africa is at the forefront of sustainable finance, ready to define its contours and trajectories. Studies have been conducted and the most advanced forms of sustainable development are located in South Africa and Nigeria. The former, through the Industrial Development Corporation of South Africa, issued the first green bond in 2012 and the funds invested are earmarked for renewable energy projects. In addition, South Africa was the only African country to pursue a national strategic environmental transition plan, relying on sophisticated markets to facilitate green financial transitions, such as the Johannesburg Stock Exchange when it created a dedicated green segment within it. In 2020, the National Treasury published a preliminary technical paper with the central theme 'Financing a Sustainable Economy' with the intention of simulating the allocation of resources towards the development of a climate-resilient economy and among the various recommendations was the creation of a taxonomy capable of attracting new investments, strengthening credibility and disseminating constant monitoring of results. Thus, two years later, the South African Green Finance Taxonomy was published with the support of the Taxonomy Working Group and in collaboration with South Africa's Sustainable Finance Initiative. The intention was to create an easily accessible classification scheme from which to learn knowledge and information and in which to demonstrate the credentials of green activities. This establishes a governance structure in line with national environmental policies and drawing on international best practices, which are necessary tools for shaping a fair and sustainable economy (National Treasury, 2022) .

Nigeria, on the other hand, was the first African country to issue a sovereign green bond, the fourth in the world, and has entered into several collaborative negotiations, e.g. with Morocco, to develop state programmes to direct economic resources towards environmental objectives.

Other emerging green countries, although less significant in terms of volume, are experimenting with new forms of financing such as the issuance of blue bonds, the crowdfunding approach for clean energy, green credits and agreed guidelines. And crucial success factors for the development of a green finance market, currently accounting for 1 per cent of global emissions, include government involvement, which is crucial in the early stages of development, also aimed at improving disclosure and promulgating consistent incentives, and international collaboration to provide clear guidelines and establish a definition in line with international standards.

3.2.7 Latin American and the Caribbean

On the American continent, especially in Latin America and the Caribbean, processes are underway to downsize the market and create an investment ecosystem that aims to combine economic growth and environmental protection. But as with many countries, this requires an information structure in line with needs, greater transparency to encourage informed and easily understandable decisions and an alignment between the different taxonomies. A process undertaken and concluded by Mexico, which in March 2023 published the Mexican Sustainable Finance Taxonomy, the first taxonomy in the world to consider social objectives, establishing gender equality as one of the priority objectives (Ministry of Finance and Public Credit, 2023) . And to facilitate investment opportunities also in the other countries in the region, making the process of adaptation to climate risks homogenous, the Common Framework of Sustainable Finance Taxonomies for Latin American and the Caribbean was devised as a voluntary guideline for all those countries wishing to develop or currently developing a sustainable finance taxonomy (UNEP, 2023) .

3.2.8 Canada

Finally, shifting our attention to North America and focusing on the second largest country in the world, Canada, we note the creation of a group of experts with the task of sending the government recommendations deemed most relevant to the topic of green finance. These include the need to establish a global standard, to integrate climate risks into the regulation of the Canadian financial system, and to open up the borders of green fixed income securities. And so it was that at the end of 2021, the government established the Sustainable Finance Action

Council (SFAC), consisting of 25 of the major market players, with the aim of integrating Canadian sustainability finance and its standards. In the same year, a first draft of a Canadian Transition Taxonomy was proposed, a project that was suspended in 2022 due to internal misalignments and resumed the following year through the publication of the Roadmap Report in which a Green and Transition Taxonomy Framework was proposed. This came to fruition in October 2024 when the government promoted Made-In-Canada sustainable guidelines to speed up the process of climate neutrality by 2050. Within the taxonomy, 'green' assets are distinguished from 'transition' assets, promoting a classification system that is clear and understandable to investors as well as financial market participants such as banks, insurers, pension funds and asset managers. Credibility is one of the core principles of the neo-taxonomy, which, like many other taxonomies, aims to ensure interoperability with other jurisdictions and stimulate transformative investments in the domestic economy (Department of Finance Canada, 2024).

3.2.9 United States

With regard to the United States, each presidential term reflects the will of elected parties, thus putting the accelerator or brake on the development of environmental policies, deliberating decisions in line with the priorities of the incumbent administration. Therefore, it would not make sense to talk about the environmental reforms or sustainable development plans adopted by predecessor Biden and others to follow, if the new tenant of the White House, Trump, has initiated a massive dismantling while also declaring war on the European ESG directives. So, the current situation describes an extremely delicate global scenario when one considers that the United States is the world's second-largest CO₂ emitter after China and is Europe's main trading partner, the continent with the most advanced sustainable taxonomy, creating uncertainties and regulatory contrasts. But going in order, as soon as he took office, the 47th President of the United States revoked the founding executive order 'tackling climate crisis', with which Biden attempted to perfect a comprehensive climate finance plan and stimulate investments aligned with climate goals, and abolished the White House Office of Domestic Climate Policy, tasked with coordinating national climate policy and ensuring its consistency (Naxitis, 2023). In the following years, the knock-on effects of Republican reforms against the ecological transition became apparent. Among the most notable signs, the exit of several US banking giants from Net Zero agreements represented a crucial step in the intersection of finance and sustainability, generating global spillovers and slowing the momentum of many

international initiatives. The withdrawal from major climate alliances by major US financial institutions and the world's largest asset management companies has produced a shock that has spread across the global green finance landscape. These include the reduction of the membership of the Net-Zero Banking Alliance (NZBA) and the Net-Zero Asset Managers (NZAM) initiative, with JP Morgan Chase, Citigroup, and Bank of America dropping out of the former and Blackrock and Vanguard the latter. The main cause was the clash between sustainability goals and shareholder returns, to be contextualised within a market characterised by rising energy prices and resurgent investment in fossil fuels. The green transition cannot be realised without international collaboration in which even the European Union, a world leader in climate action, sees a growing influence of pro-Green Deal parties (SRB LAB, 2025) . Ultimately, the United States is on a reversal course from the environmental policies promoted in past decades and supported by financial incentives, regulations, directives and action plans, now all being dismantled. Hence the need to initiate even more stringent and binding international cooperation than before, in order to breathe new life into green projects and overcome political divisions by uniting around the common goal of decarbonisation (Romano, 2025) .

3.2.10 New Zealand and Australia

To conclude, Oceania is summarily composed of New Zealand and Australia. The former manifests an active government that has even set up the New Zealand Green Investment Finance with the aim of accelerating investments and employing them in the reduction of greenhouse gas emissions and technological advancement in eco-friendly and innovative companies. In doing so, the New Zealand Government received non-binding advice and recommendations from the Independent Technical Advisory Group (ITAG) through the Centre for Sustainable Finance in 2024. In doing so, the Minister of Climate Change agreed to work with the Centre to develop a national taxonomy (New Zealand Government, 2025) . Australia, on the other hand, initially exhibited an extremely environmentally averse government and caused a significant financial deficit that acted as a brake on the widespread adoption of environmentally friendly technologies. Therefore, state-owned investment banks have had to start playing a crucial role in bridging the financing gap, stimulating private capital participation, facilitating learning within the ESG sector, building confidence in green initiatives and becoming advocates for sustainable financial solutions. Until, in 2020, the Australian Sustainable Finance Institute (ASFI) published a Roadmap to reshape Australia's financial system to support a resilient and

prosperous society, setting out 37 recommendations with a view to achieving an inclusive, carbon-neutral economy. But this was only the first step. In 2023, a Taxonomy Technical Expert Group was established to produce an Australian Taxonomy that saw the light of day on 17 June 2025, marking an important milestone in the government's sustainable finance roadmap. The new taxonomy will be voluntary and will be piloted first by Australia's leading financial institutions. In addition, the Action Plan 2025-2027 has also been published, which will focus on 26 priority actions in 8 key areas, taking into account the progress achieved by the Roadmap and, in particular, the slower progress (ASFI, 2025).

The following graphs summarise the status of taxonomies globally, including those already operational, under development or currently under consultation. The analysis also examines the nature of the taxonomies, whether oriented towards environmental sustainability (green) or transition, and the processing channel, distinguishing between public, private or hybrid initiatives. The data show that most taxonomies are 'green' in nature and, more importantly, that the public sector is systematically involved in their definition. The only exceptions, where the initiative falls exclusively on private industry, concern the development of standards, information sets or guidelines, rather than actual taxonomy frameworks. This confirms the constitutive role of the state apparatus in structuring taxonomies, underlining their central function in the governance of sustainable finance and, in particular, in the development of green finance.

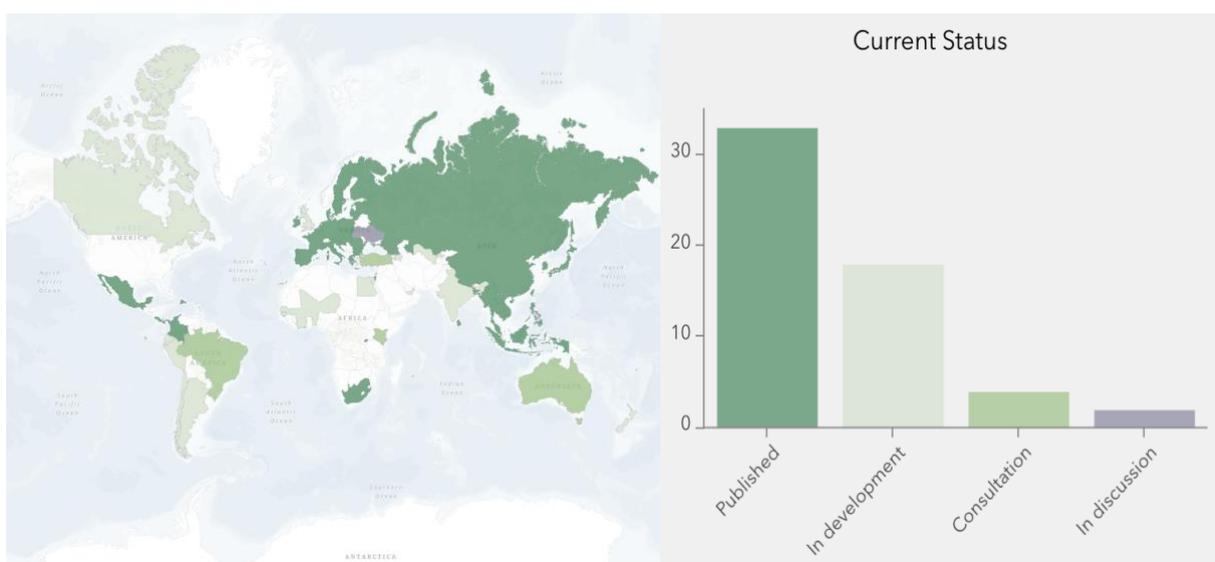


Fig. 10: The multiplication of Taxonomies worldwide and the current status. There are 57 taxonomies in total: 33 published, 18 in development, 4 in consultation and 2 in discussion (GFI, 2023).

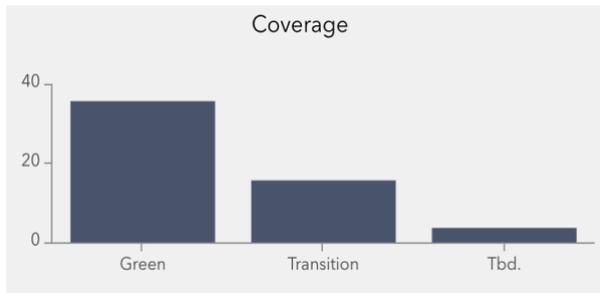


Fig. 11: Number of taxonomies by type of coverage. Precisely, 36 green and 16 transition (GFI, 2023) .

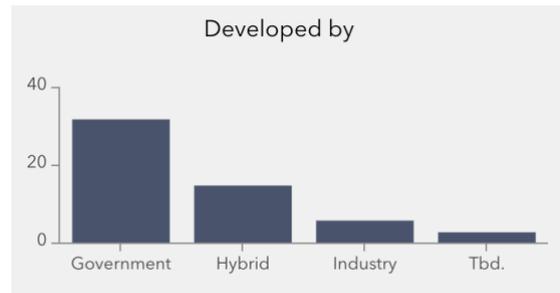


Fig. 12: Number of taxonomies by author type. Precisely, 32 by government, 15 hybrid and 6 by industry (GFI, 2023) .

4. Green Finance: Between Progress and Obstacle

4.1 Critical Issues and Challenges

The present chapter aims to address the criticalities inherent in the new financial system with a sustainable footprint and the strategies suitable for containing them. Although not sufficient to support the political line in favour of green finance, the fragilities that will be addressed can nevertheless serve as a helpful tool for monitoring the results obtained and analysing the inefficiencies present, as well as a primary source for setting corrective measures.

4.1.1 Taxonomy

The taxonomy not only reflects the theoretical and operational foundation of green finance, the guiding principle of its realisation, but is also the subject of intense international pressure on its validity in the absence of a universal taxonomy. In this regard, Nadia Humphreys, a member of the Technical Expert Group in the EU, the Green Technical Advisory Group in the UK, the Taxonomy Technical Expert Group in Australia, the Consultative Working Group proposed by ESMA, a party directly involved in the creation of the Platform Sustainable Finance and currently responsible for climate and regulatory solutions at Bloomberg, affirmed the concept of equivalence. The idea is for a company to respect its own national taxonomy and be recognised as equivalent to a corresponding system. Based on this, Humphreys states that one of the upcoming challenges will be to establish a principles-based framework that facilitates the assessment of equivalence across jurisdictions through technical expert groups, but that at present there is no stable basis that can guarantee automatic recognition of equivalence between taxonomies (Fronza, 2023).

The CCAP itself, an international benchmark for climate policy and action, suggests the need to strike a balance between harmonisation and localisation to reduce regulatory fragmentation across jurisdictions. The rationale is that, on the one hand, governmental institutions have embarked on paths to develop green taxonomies; however, considering the local context, their own national commitments, and aligning them with specific environmental objectives within country boundaries. This is a large-scale process that can be attributed to proactive behaviour, but on the other hand we see the creation of a multitude of taxonomies leading to deep

discrepancies in definitions, priority sectors and classification of green economic activities. In the minds of investors, the lack of a universal taxonomy standard has led to great confusion and uncertainty, especially on the validity of investments in sustainable projects. It is in the light of this that interoperability emerges as a methodological approach capable of creating the basis for unifying and deepening global collaboration and reducing the regulatory gap. In fact, according to the CCAP, the next step should fall on a careful search for a balance between international objectives and integration of regional circumstances, i.e. between harmonisation and localisation, with the aim of increasing investor confidence and also increasing cross-border capital flows in the development of a green economy. It is precisely between the alignment of one taxonomy to the others and the adaptation of context in local jurisdictions that policy makers together with members of technical working groups are able to scan the political and technical aspects that need to be harmonised or localised, while predicting whether a taxonomy improves or compromises interoperability. In other words, they are nothing more than a transformative policy tool with which to build transparent frameworks and ensure the coherence of markets with the climate targets and constraints set by the Paris Agreement. In this sense, it will also be interesting to observe the evolution and consequent broadening of sustainable finance priorities to new social issues, including minimum social guarantees in developing countries and their climate vulnerability (Syed, Pangelinan, & Fuster, 2024) .

4.1.2 Green definition

Remaining at the centre of the public debate and international discussion is the need to clearly define which projects are to be considered 'green', i.e. to send shared criteria to classify activities considered environmentally sustainable uniformly. This need has been extensively addressed in the process of convergence to a universal taxonomy and deserves further investigation. There are very different currents of thought among stakeholders, those who prefer a broad definition of 'green' and those who prefer a narrower, more rigid definition, aimed at accurately identifying a company's level of sustainability and, by increasing the transparency of the positive and negative impacts of individual projects, would stimulate companies and institutions to invest resources in moving towards a higher shade of green. A detailed classification based on process criteria, and possibly the introduction of particular thresholds, could raise awareness of the growing importance of a sustainable and climate-resilient economy, allowing users to understand why certain elements are permissible and what the expected environmental benefits are. On the other hand, increased complexity could cause deviations from the general objective

of improving the environmental performance of all companies and not only those falling within specific sectors or parameters. In any case, it is generally agreed that the definition of green, regardless of the approach taken, is a first step towards a clearer delineation of green finance and an advancement among sustainable development goals (European Commission, 2017) . For this reason, the European Union has the function of strategic guide and regulator, with the task of leading other countries towards shared regulatory frameworks consistent with the green transition.

4.1.3 Resource Allocation

Other critical issues lie in the allocation of financial resources, which are mainly blocked in the northern part of the globe. Ensuring a universal taxonomy and thus a sustainable economy means simultaneous progress towards common goals. Operational convergence is crucial for the realisation of sustainable development. But the current situation shows an extremely divergent distribution of resources between developed and developing countries. The latter, without sustainable investments, will suffer greater effects from the climate crisis and increase the number of climate refugees, as well as worsen their economies. Advanced countries should ensure free access to green economic activities and ESG projects by subsidising economic aid and directing resources to the Global South (Babic, 2024) . One of the most widely used instruments to mitigate the imbalance is de-risking, a set of measures aimed at reducing or transferring high risk exposure, in this case of a climate nature, through the use of mixed finance, an approach that combines private and public capital. The OECD itself considers that a rapid acceleration towards clean energy investments is necessary and that public resources are insufficient to achieve this goal, suggesting the mobilisation of private capital as the only solution. This approach envisages a downsizing of investments aimed at stimulating the markets and reducing the risk perceived by private investors in relation to green plans in fragile economic contexts. Indeed, in emerging or low-income countries, the risk is very high due to political instability, weak institutions, lack of transparent data, volatile currencies and limited access to financial markets (OECD, 2022) .

4.1.4 Mainstream and Additionality

Another crucial point to ensure the transformation of green finance is the shift from a model focused mainly on transitional actions to one in which sustainability becomes a central and integrated criterion in all financial decisions. In this way, the phenomenon would not remain niche, reserved for specific sectors, but extend and become the norm in the way capital and resources are allocated on a large scale. In other words, moving away from spot finance to a normalisation of green finance within banks, financial institutions and the capital market. A cultural and regulatory change, a better understanding of green financial technologies and the outlining of a transparent regulatory framework become indispensable elements for a successful green transformation. For such a transition to be truly sustainable, it must also take the form of a 'just transition', a new structural principle designed to ensure inclusiveness and avoid the generation of new social inequalities. Added to this is the concept of 'additionality', understood as an incremental flow of financial resources determined by a policy and destined for a specific objective, i.e. to support environmental activities. Put another way, additionality is a guiding principle that determines whether a green project is actually generating a positive environmental impact that would not otherwise have occurred, i.e. whether the funds raised to finance it would not have been realised through the normal flow of investments, thus producing additional environmental benefits (Palgrave Studies in Impact Finance [PSIF], 2020) .

4.1.5 Greenwashing and Greenflation

Another problem that widely affects the system in all its parts is 'greenwashing', 'environmental façade', also known as 'green appeal', a term first used in 1986 by the American environmentalist Jay Westerveld regarding the practice used by hotel chains to reduce the use of towels and thus washing, which according to them had a great impact on the environment, but the real reason was to cut operating costs. Thus, greenwashing refers to the practice used mainly by companies, but also by institutions and associations, whereby investors are induced to believe in certain statements about the company's commitment to sustainability, when in fact it is merely the spreading of unfounded and misleading information. And through misrepresentations, misleading consumers, delays are generated, trust is lost and the necessary actions to achieve sustainability goals are blocked. The greatest risk lies in financing activities that appear to be sustainable, but behind which there is no environmental or social benefit. To overcome this problem, various institutional actors have issued guidelines to impose transparency and clarity on companies, promoting truthful language and avoiding the

publication of false claims. These include the EU Greenwashing Directive, finally approved on 17 January 2024, which aims to protect consumers from misleading communications and to combat premature obsolescence of goods, with fashion, food, automotive and energy being the most exposed sectors. Finally, if on the one hand the untruthful celebration of sustainable performance within the company generates Greenwashing, on the other hand the concealment of environmental results actually achieved, often for fear of being accused of greenwashing, generates Greenhushing (Balocco, 2025) . With the former one runs the risk of spreading bad practice, while with the latter one runs the risk of preventing the spread of good practice.

And in more recent years, 'Greenflation' has come under the spotlight of public opinion and international debate, drawing attention to the possible economic and distributional costs that the implementation of climate policies, aimed at reducing emissions and promoting a green transition, would produce. On the one hand, inflationary increases may be caused by excessive demand for clean energy accompanied by insufficient production, not yet scalable, which in turn would generate demand for critical raw materials. On the other hand, sustainable policy decisions could also affect the structure of the labour market, reducing the employment rate in the short term and stimulating green innovation, which would bring inflation down. Starting from the assumption that the empirical literature on these effects is still remarkably scarce and with mixed results, as well as focusing only on advanced and homogeneous economies, a first answer has been given regarding the use of the Carbon Tax and the Emission Trading System (ETS). The Carbon Tax is associated with a significant and persistent increase in the price level, but transitory on the inflation rate. Effects multiplied when considering regions and sectors characterised by high emissions and low innovation capacity. On the other hand, the ETS and even non-market-based climate policies (such as subsidies for research and development) have not been found to have statistically significant effects on prices. Finally, a number of suggestions are made in the implementation of green projects. Meanwhile, policy makers should safeguard households most exposed to a reduction in real income through targeted compensation mechanisms. After that, the evidence shows that it pays to implement policies when economic conditions are favourable to avoid high inflationary effects. Ultimately, it is crucial to incentivise policies that foster research and innovation in the field of sustainability in order to contain the costs associated with the ecological transition, with a focus on the internationalisation of environmental impacts in economic processes (Bettarelli, Furceri, Pisano, & Pizzuto, 2025) .

4.1.6 Performance and Incentives

To conclude, the analysis of the main source of scepticism in green investments is a focal point through which to learn about the reduced flow of capital and formulate appropriate solutions. It is the economic performance and more generally the performance of green companies. Certainly, a large proportion of investors will be attracted by the ethical nature of the investment, but the economic nature also plays a crucial role in directing resources. In fact, according to authoritative sources, the Green Economy market has grown rapidly at a compound annual growth rate of 13.8% market capitalisation compared to 8.3% for global stock markets, lending itself to be a market with huge investment opportunities. In fact, if considered as a single sector, it could be said that the green economy has outperformed all sectors except technology, with the energy sector accounting for 46% of the green economy in listed equities and 30% of green bond proceeds. In 2023, following the pandemic and a relapse of the green market, it resumed growth and outperformed again. Despite this, many investors still decided to withdraw funds from ETFs and mutual funds specialising in sustainable capital allocation. The green bond market is certainly the most advanced and best structured, registering strong growth again in 2023 and contributing to a 10% increase in green exposure for about a third of industries. The measurement focused on greenness, the level of sustainability, classifying the source of revenue into three tiers (Tier), from the most stringent to the most extensive. It turns out that 95 per cent of the green economy is made up of Tier 1 and 2 activities, a surprising figure (LSEG Studios, 2024) . The European Union itself states that the leading companies in the EU taxonomy and those in transition have outperformed the broader benchmarks since the beginning of 2019. Two indices were created: Leader, to monitor the performance of companies with high revenues, and Transition, to monitor companies with high investments in green capital relative to revenues. According to data updated in May 2024, both indices generated cumulative returns of 110% and 116% respectively, outperforming the STOXX 600 by 80% and the MSCI ACWI by 89% (European Commission, 2024) .

A trend that parallels that of political commitment and supporting incentives on the part of individual nations. Promoting a radical change in a country's financial system, reshaping it according to ESG principles, requires considerable efforts, both at the regulatory and societal level. Therefore, the simultaneous pursuit through the combined participation of public authorities with private industry cannot be circumvented, let alone postponed. This is imperative in the light of a continuing dependence on fossil fuels and polluting sectors, an assertion also embraced by the Climate Bonds Initiative. Failure to provide the right incentives to encourage banks to adopt the transition can prove fatal and set back the process of sustainable

development by years. In the opinion of many scholars, the existence of fossil assets disincentivises investment in decarbonisation without bringing about a real change in the everyday way of consuming and producing goods, effectively rendering green finance efforts ineffective and allowing the environmental disaster already underway to continue (Mansour & Chenguel, 2023) .

In support of this, one only has to look at two current examples to ponder the direction international policy is taking. In Europe, in June 2025, a letter was sent to the Commission to withdraw the Green Claims Directive (GCD), which had been proposed two years earlier as part of the broad Green Deal. The intention was to define minimum requirements for companies regarding reporting and verification, ensuring reliability and transparency of their environmental commitment. Thus, the ultimate goal was to counteract greenwashing, the proliferation of false information, by providing for periodic reviews and the development of new labels with respect to existing labelling systems. The rationale for the request was that the new proposals would make the regulatory structure too complex and articulated, with no supporting evidence that the expected benefits would outweigh the costs incurred (Segal, 2025).

Turning to the second emblematic case, however, one has to fly over the Atlantic Ocean and arrive in Washington D.C. to contemplate President Trump's anti-green policy. As already mentioned, the United States plays a major role in the international regulatory framework and is highly influential in climate policy. The new administration wasted no time in withdrawing the nation from the Paris Agreement, in cancelling entire research programmes, including the National Oceanic and Atmospheric Administration (NOAA), a pioneer in the development of climate models, and in boosting the fossil fuel industry, especially coal as the US is the world's largest reservoir. The tariff announcement is part of a series of reforms aimed at undermining the European Green Deal and restoring steadily declining purchasing power. In fact, more than 50 per cent of all US exports to Europe concern fossil products, a percentage that is bound to fall as the EU intends both to create its own energy independence and security and to turn to other countries for mutual cooperation in the transition, with China standing out among them, recalling the Common Ground Taxonomy (Romano, 2025) .

In other words, all that is happening could be described as a major climate disconnect between divergent commercial wills. The disconnect between the climate crisis and current policies only reduces the likelihood of a sustainable and resilient economy over time, precisely when there is a year-on-year increase in temperature and intensification of extreme weather events.

4.2 Opportunities and Prospects

And like a river reaching its mouth, this paper aspires to become not a point of arrival, but an opening channel: a living current from which a broader and more ramified analysis can flow, capable of touching and nourishing many of the issues just touched upon. The next points will focus on the opportunities and prospects that Green Finance nurtures. The key concept of this premise is not to be traced back exclusively to the urgency to adapt in order to survive, a need inherent to every living being, but is based on the opportunity to lead a transformation, not only economic, but also cultural and social, which sees sustainable finance as a nodal passage towards a fairer and more solidarity-based tomorrow.

4.2.1 Fintech and Digitalisation

One of the most promising and controversial developments within sustainable finance is the increasing digitisation of processes and the spread of technologies fintech. The latest innovations are capable of opening up new channels of contact between investor and business, facilitating the flow of capital and increasing its accessibility. Tools such as crowdfunding and robo-advisors have initiated a disintermediation process with which to reduce transition costs and simplify communication between parties. Furthermore, the use of Distributed Ledger Technology (DLT), such as blockchain, ensures better transparency and traceability of capital flows, allowing real-time monitoring and verification of compliance with ESG practices. In other words, reducing greenwashing and increasing investor confidence, two crucial aspects of green finance. And as with taxonomy, one of the biggest obstacles in fintech is the lack of a common classification and reporting standard. In addition, moving from the real world to a virtual world, we see the emergence of technological risks related to cybersecurity, the environmental impact of technologies and their resilience. In light of these challenges, the introduction of harmonised digital ESG standards, the use of technologies for continuous monitoring and the intervention of public institutions are the preferred ways to facilitate the development of digital ecosystems for green finance (Palgrave Studies in Impact Finance [PSIF], 2020) .

4.2.2 Corporate Social Responsibility and Eco-Innovation

Another food for thought is Corporate Social Responsibility (CSR), understood as "the ongoing commitment of companies to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families, as well as the local community and society at large" (PSIF, 2020) . Thus, it is a behaviour imparted to companies from within that obliges them to integrate social, environmental and ethical considerations during investment decision-making processes. This implies the application of ecological, social and governance criteria with which to select or exclude strategic assets, while at the same time striving to promote business plans aimed at achieving their objectives (Renneboog, Ter Horst, & Zhang, 2008) .

Added to this is Eco-Innovation (EI), often a concrete manifestation of CSR and considered one of the key factors in helping communities achieve their sustainable development goals. Following the definition given by the European Union, EI refers to "all forms of innovation that create business opportunities and bring benefits by preventing or reducing their impact or optimising the use of resources". A practice closely related to the way goods and services are consumed and produced, offering the possibility of improving resource efficiency and achieving sustainable economic growth. One of the many concrete ways in which the European Commission has acted is through the Eco-Innovation Action Plan (EcoAP) with which, in addition to confirming Europe's leading position in the market, it attempts to mitigate environmental impacts and foster a more effective alignment between innovation dynamics and market needs (European Commission, 2020) . Other research has counted Eco-Innovation as a formidable catalyst through which to optimise the use of resources and counteract the effects of the climate emergency (Directorate-General for the Environment (European Commission), 2012) . The OECD itself defines EI as the "result of a reduction in environmental impact, whether intentional or not". Furthermore, the analysis of activities is divided into three dimensions: objectives, mechanisms and impacts. Objectives refer to the areas of interest, mechanisms refer to the manner in which they are carried out, and impacts refer to the effects on the environment. Thus, EI is considered to be at the heart of 'green growth', referring to the post-Kyoto phase and suggesting systemic solutions, even non-technological ones, with which to involve new actors and transform entire production systems (OECD, 2010) . But to stay in more recent times, the UN defined EI as a 'coordinated set of changes or new solutions to products, processes, market approach and organisational structure that lead to an improvement in a company's performance and competitiveness'. It highlights the importance that such a practice would have on SMEs, i.e. in the application of a model capable of incorporating

sustainability into the entire supply chain. Such a strategy would bring concrete benefits such as expansion and access to new markets, increased profitability and production, attraction of new investments and contribution to regulations and standards (UNEP, 2024) .

4.2.3 Ecolabel and Benchmark

Continuing, another approach to implementing green finance is the environmental label, which is part of the broader spectrum of green branding. This is a label that certifies and distinguishes products and services for their reduced environmental impact throughout their entire life cycle, from raw material extraction to disposal. Through the Sustainable Finance Action Plan, the EU has developed the EU Ecolabel, an eco-label currently applied to around 100,000 products and services, primarily in retail, which rewards their environmental performance and recognises their compliance with strict ecological criteria. The benefits of their use, as with other instruments already discussed, concern an increase in market trust as well as reputation, demonstrate their commitment and create business opportunities based on cost savings (European Union) . At the international level is the Global Ecolabelling Network (GEN), the world's leading eco-labelling network and a reference point for green certification. As a practice not yet regulated in non-EU countries, green branding raises the risk of communication drifts such as greenwashing. Therefore, among the founding values promoted by the network are the elimination of such misleading practices and the dissemination of skills for the design of truly responsible consumption solutions, aimed at institutions and companies (GEN, 2025) .

Besides Ecolabels, the EU Taxonomy also provides a good basis for the development of climate benchmarks. Towards the end of 2023, the Platform on Sustainable Finance formulated the strategic proposal of Taxonomy-Aligning Benchmarks (TABs) stating that it wanted to apply the taxonomy rules and direct capital flows towards low-carbon activities. To do this, the EU had to act on two fronts: expand the green capex, i.e. spending on green assets, and ensure a steady reduction of emissions in the portfolio. A framework for action with a focus on reviewing both the minimum requirements every three years and the annual measurement of CO₂ emitted. A virtuous mechanism is thus set in motion that sees a strategic allocation of resources, moving sustainable finance from a definition and reporting phase to a concrete implementation phase, while at the same time offering investors the opportunity to contribute to climate change mitigation. Here, the benchmark becomes a nodal point to ensure interconnection between capital, instruments and environmental transition (Platform on Sustainable Finance, 2023) .

2018 was the first time that new benchmark index categories were defined by the European Parliament, which adopted a proposal to amend the regulation and introduce new benchmarks. But the breakthrough year is 2025. First, a text was drafted by the Platform itself, geared towards the realisation on the ground of two benchmarks in particular: Climate Transition Benchmarks (CTB) and Paris-Aligned Benchmarks (PAB). Indices constructed in accordance with minimum standards and whose underlying activities are aligned with the climate transition and the Paris Agreement commitment, respectively. Through this document, which is a non-regulatory text, concrete governance models, standardised metrics, and technical limits are provided to help asset managers adapt their strategies to the ESG obligations in the SFDR (EU Platform on Sustainable Finance, 2025) . Secondly, the Council announced the adoption of the Financial Benchmarks Regulation with the aim of reducing red tape, especially for SMEs, by lowering administrative burdens by 25 per cent without compromising policy objectives. In addition, it would make changes to some rules in the area of directors, such as the obligation to register indices to facilitate regulatory oversight and prevent misinformation (European Council, 2025).

4.2.4 Green Bond Standard and Green Indicators

In the continuation, one could not ignore the European Union's Green Bond Standard, a financial instrument that, together with the EU Taxonomy, represents the key building block for building a European market favourable to green investments. These standards encapsulate a set of rigorous criteria, enhancing the accountability structure of environmental performance and encouraging funding in new green projects. It is a policy that is revolutionising the green bond market, imposing stricter criteria and more precisely defining green investment rankings. A move whose effects also extend to the sustainability bond market, contributing to sustainable development goals and responsible production practices. Expectations are for a significant growth in demand for EU GBS-compliant green bonds and a stronger incentive for companies to adopt sustainable business models (Bellini, 2024) .

Ultimately, a role, albeit still marginal, is played by other types of indicators, known as Key Performance Indicators (KPIs). In general, they are measurement tools used to measure and assess the achievement of strategic objectives within an organisation. In other words, their importance lies in the ability to translate performance into quantitative data, contributing to responsible and transparent management. Among these, the most relevant environmental indicator is the Green Asset Ratio (GRA), which reflects the proportion of assets aligned to the

taxonomy to total assets covered. It is calculated by considering both the taxonomy-compliant share of capital and the taxonomy-compliant share of capital expenditure of the underlying assets. In addition to being compulsory for lending institutions, voluntary use by retail investors is discussed to foster a better understanding of ESG information provided by financial product providers. A 'green rating' based on the percentage of revenues aligned to the taxonomy, increasing as the taxonomy ratio increases (Bruhl, 2022). Thus, the use of green indicators could incentivise new investments, foster greater clarity and stimulate unprecedented comparisons between financial institutions, contributing to the realisation of green finance.

Conclusion

In the light of the entire paper, laying the last personal stone, one begins to glimpse the beginning of a much larger edifice than it may seem at first glance. Eradicating a centuries-old market system, built on the exchange of goods and services with no regard for environmental impact, and whose foundations are rooted in the industrial revolution, is often criticised today, but has. However, proponents of human progress are a far from simple challenge. The question of whether it is worth the effort has an answer that is evident to many: YES.

Furthermore, after analysing the defining status of green finance, explaining the economic actors involved and examining the main financial instruments, after taking a snapshot of the current global scenario in the face of the climate crisis, delving into the European taxonomy and comparing the different continental approaches, after identifying opportunities and obstacles of green finance, it is natural to focus on another question: has a direction already been taken? Again, the answer is clear: YES. The flow of public and private resources committed to the ecological transition and the transformation of the financial system is now underway, and a reversal would not only be economically disastrous, with the risk of wiping out the investments already made, but also temporally unsustainable, given the urgency of the action and the time required by possible alternatives. Such a change would entail huge costs, widespread uncertainty and instability in the markets.

From an economic perspective, several studies have analysed the overall balance of climate change, assessing the social costs and benefits of mitigation policies. The common perception often holds that the social costs outweigh the benefits (Tol, 2021), neglecting, however, two effects: on the one hand, the economic damages related to future environmental catastrophes, which are bound to increase in frequency and intensity; on the other hand, the benefits that will result in the long run from effective and timely action, considering also the possible damages averted.

The chessboard of international politics is now imbued with a shared interest. Although some slowdowns or second thoughts have shaken the balance, the will to continue along the trajectory of green finance persists, driven also by the growing evidence of the effects of climate change. As if the entire world were in a boat steered by political leaders and headed for an unprecedented, epochal storm. It is time to change course, and this paper has investigated how. The transition is already underway and affects a growing plurality of areas, from the Blue Economy to the Digital Economy, all the way to gender equality, which the United Nations has

recognised as an indispensable aspect of tackling the climate crisis. But however much the private actor may mobilise, without the support of the public sector, the goals will remain unattainable. A continued and strategic commitment by state institutions to support climate policies is therefore indispensable in the coming years.

In conclusion, what might appear as a compromise or economic sacrifice today, will be remembered tomorrow as one of the most far-sighted collective decisions. The architecture of green finance is still under construction, but its foundations are now solid and irreversible. It is now up to governments, businesses and citizens to consolidate their structure, making it capable not only of withstanding the shock of change, but also of driving it. Finance, if well-directed, can become the driving force behind a sustainable transition, through a renewed pact between the public and private sectors, the innovative use of green finance instruments, and the consistent adoption of regulatory frameworks capable of incentivising responsible investment, monitoring climate risks, and ensuring greater transparency for market players.

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