Department of Law

MSc in Law, Digital Innovation and Sustainability

Course of Green and Sustainable Finance

NET ZERO: FROM TARGETS TO ACTIONS

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Academic Year 2021/2022

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INTRODUCTION

Topic Relevance

The physical effects of global warming are increasingly visible across the globe, elevating climate change to a life-threatening menace. Indeed, the stability of the global climate is severely undermined by human civilization and its actions. In the recent past, many have tried to investigate the implication of climate change and how to prevent it from evolving into a global risk. In the same way, as the average temperature rises, together with acute hazards, the scientific community has tried to warn that the accumulation of anthropogenic greenhouse gases (GHG) emissions in the atmosphere may lead to a worldwide catastrophe. As a result, international players started to pose the foundations for a global climate policy framework, with the adoption of the Kyoto Protocol and, later on, of the Paris Agreement. However, scientists are worried that the current course of action is not sufficient to mitigate the environmental and socioeconomic consequences of climate change, as the Earth is on a trajectory leading to an increase in temperature between 2.1°C and 3.9°C by 2100 compared to pre-industrial levels. A prompt intervention is needed to prevent excessive accumulation of GHG in the atmosphere. All economic actors must contribute to the decarbonization of the global economy, to reach the goals of the Paris Agreement and hopefully secure the future of humanity. The focus of climate policy is now on net-zero emissions, a concept that is intrinsically connected with climate science, but is operationalized thanks to cultural, economic, and political architectures.

As climate change is a dominant theme in today's perspective, financial institutions play an essential role in directing capital flows towards environmentally friendly activities, enabling the transition to a net-zero emission world. The consequences of a changing climate are creating new and unprecedented forms of financial risks that investors must address, as climate risk is becoming a crucial factor in companies' long-term plans. A significant step in addressing climate change is recognizing that it plays a significant part in shaping investment risk. Confirming the above there are numerous initiatives involving different financial institutions (banks, asset managers, insurers, etc.) such as the Glasgow Financial Alliance for Net-Zero and the more sector-specific Net-Zero Banking Alliance (NZBA). Financial institutions can provide guidance, capital and incentives to those actors who are aligned with the Paris

Agreement's goals. As this paper focuses on banking institutions, it is important that they are aware of the climate impact of their loan and investment portfolios and, thus, assessing financed emissions is key to modelling a comprehensive strategy for decarbonization and managing climate-related risks.

Research Question and Literature Review

This research aims at investigating how banks set their net-zero targets, with an *excursus* on the main target-setting and emission accounting methodologies: SBTi, PCAF, PACTA and Barclays' BlueTrack. Furthermore, the paper offers a deep dive on a sample of six EMEA banks to examine how financial institutions pursue their targets through concrete actions. In particular, two key questions arise:

- Is the market aligning on a single target-setting methodology?
- What are the relevant sectors on which banks are focusing their efforts to achieve net-zero objectives?

The sample is made up as follows: BBVA, Intesa Sanpaolo, UniCredit, Société Générale, Barclays and Nordea. The reason for the choice of this benchmarking group is related to the fact that all these banks are among the leading institutions by capitalisation of the largest European economies. The research was carried out by analysing the Climate Reports and Sustainability Reports of each bank up to the year 2021, presenting the main emission targets and achievements.

In addition, the research presents a first qualitative part, analysing both the current climate change policy framework and the evolution that have occurred in the recent past. For the drafting of this first part, legislative sources and academic literature were reviewed, such as articles published in law and finance journals. The full texts of the Paris Agreement, the Kyoto Protocol and the UN Framework Convention on Climate Change were also consulted.

CHAPTER I

1. The International Climate Change Policy Framework: from Kyoto Protocol to Paris Agreement

The environmental consequences of using fossil fuels were already being investigated in the late 19th Century, through the contributions of Swedish scientist Svante Arrhenius, who calculated the heat gain deriving from pollutant emissions produced using fossil fuels and, in 1908, Arrhenius formulated the greenhouse theory. Over the following years, other scientists confirmed Arrhenius's theories, but economic development goals ultimately prevailed, and the extensive use of fossil fuels continued to be considered fundamental for overall economic growth.

The First World Climate Conference (FWCC), held in 1979, is the first relevant attempt to acknowledge the dangers posed by climate change. Indeed, the Conference found that the international community needed to foresee and prevent man-made changes in climate patterns that might compromise the well-being of humanity. In 1988, the United Nations General Assembly adopted the resolution titled "Protection of Global Climate", in which it stated that the Assembly is concerned that "*certain human activities could change global climate patterns with potentially severe economic and social consequences*"[1].

As a result of this, great progress has been made regarding the study of the implication of climate change, especially through the work of the Intergovernmental Panel on Climate Change (IPCC)[2]. It was founded in 1988 by the World Meteorological Organization (WMO) and the United Nations Environmental Programme (UNEP) to provide a clear and scientifically based view of the current state of knowledge on climate change and its potential impact. To date, the IPCC has published five reports, the first of which dates back to 1990 and contains hypotheses on the effects of human activity on climate. The assumption made in the report concurred in formulating the United Nations Framework Convention on Climate Change (UNFCCC) as part of the 1992 UN Conference on Environment and Development (i.e., Rio Earth Summit). The Convention entered into force on March 21, 1994, and, to date, has been ratified by 197 States with the ultimate aim of preventing "dangerous" human interference with the climate system.

[1] https://www.ipcc.ch/site/assets/uploads/2019/02/UNGA43-53.pdf

[2] The IPCC is an intergovernmental body open to all member countries of the United Nations and WMO. Currently, 195 countries are members of the IPCC. Governments participate in the review process and plenary sessions, where major decisions on IPCC work programs are made, and where Reports are accepted, approved and adopted. Each government has an IPCC Focal Point who coordinates IPCC-related activities in their country. Major international, intergovernmental and nongovernmental organizations also participate in the work of the IPCC (https://ipccitalia.cmcc.it/cose-lipcc/)

The Countries which have ratified the Convention are called Parties to the Convention and, since that time, have taken part in the Conference of the Parties[3] (COP), which is held periodically to review the national communications and emission inventories submitted by Parties[4].

Article 2 clearly states the main goal of the Convention:

"*The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner*."[5]

Also, in article 3, the UNFCCC stresses the importance of the Principle of Common But Differentiated Responsibilities (CBDR), according to which historical considerations cannot be ignored in approaching a conscious and reduced use of fossil fuels. The principle holds that, even though all Countries are responsible for the development of global society, industrialized States did take advantage of extensive use of fossil fuels in the past, without knowing the negative impact it would have on climate patterns. Thus, CBDR justifies the differentiation of the burdens borne by countries, given the different extent to which they have contributed to the deterioration of the climate[6]. In 1995, the so-called Berlin Mandate stipulated that there were no obligations for States which were not included within Annex I of the UNFCCC. Annex I contained the list of developed countries, on whom the burdens of climate change fall.

This principle played a key role in the implementation of the Kyoto Protocol, adopted in 1997. It followed an annex-based differentiated structure, leading to the creation of a "firewall" between developed and developing countries. Notably, binding obligations on the reduction of greenhouse gas emissions regarded the 37 industrialized countries included in Annex I. This approach was considered to be too rigid, as it did not take into account the rapid economic growth of the emerging countries with booming emissions rates, such as China and India.

[3] The COP is the supreme decision-making body of the Convention. All States that are Parties to the Convention are represented at the COP, at which they review the implementation of the Convention and any other legal instruments that the COP adopts and take decisions necessary to promote the effective implementation of the Convention, including institutional and administrative arrangements (https://unfccc.int/process/bodies/supreme-bodies/conference-of-the-parties-cop)

[4] https://unfccc.int/process/bodies/supreme-bodies/conference-of-the-parties-cop

[5] https://unfccc.int/resource/docs/convkp/conveng.pdf

[6] https://www.ispionline.it/en/pubblicazione/un-climate-regimes-achievements-and-failures-31837

Moreover, the United States did not ratify the Protocol, thus evading its obligations and declaring the Protocol a failure, given that countries bounded by the agreement accounted for 14% of global emissions[7]. This is also confirmed by the fact that, by the end of the commitment period in 2012, emissions of pollutant gases in the atmosphere had steadily increased.

1.1. The Paris Agreement

Given the difficulties that arose in the implementation of the Kyoto Protocol and its failure, it appeared necessary to eliminate the Berlin Mandate's interpretation of the CBDR principle. Indeed, the common responsibility had to be re-established to overcome the Protocol's annex-based approach.

According to Nespor (2016), two events turned out to be pivotal in the creation of the Paris Agreement: the Cop 15 held in Copenhagen in 2009 and the so-called Durban Platform, established during the COP 17 in South Africa in 2011. The first led to the implementation of the Copenhagen Accord which, though not legally binding, brought several major issues to the attention of the international community, including the intention to implement the Green Climate Fund[8]. Furthermore, a common intent to reduce emissions was outlined, although the differentiated approach was still present, and developed countries committed to establishing a set of rules for directing financial contributions towards emerging economies. On the other hand, developing countries were open to recognizing their role in climate change and taking initiatives to counter it according to each country's capabilities.

As mentioned above, the other main element in the subsequent creation of the Paris Agreement is the Durban Platform, which represented a finely balanced compromise between the principal negotiating groups in the UN climate-change regime[9]. In the Durban Platform there was no direct reference to the CBDR, developed or developing countries, thus allowing a significant step forward compared to the Kyoto Protocol. On top of that, the Ad Hoc Working Group on the Durban Platform was established to oversee negotiations aimed at creating a global agreement to be legally effective starting from 2020.

[7]S. Nespor , *La lunga Marcia per un accordo globale sul clima: dal Protocollo di Kyoto all'Accordo di Parigi*, in Rivista Trimestrale Diritto Pubblico, fascicolo 1, Giuffré Editore, Milano, 2016, p. 91

[8] The Fund was later established during COP 16 in Cancùn in 2010

[9] D. Bodansky, *The Durban Platform Negotiations: Goals and Options*, Harvard Project on Climate Agreements Viewpoint, 2012, p. 1

Both these elements were complemented by the publication, in 2014, of a summary document of the IPCC's fifth report. In this document, the IPCC emphasized the seriousness of the situation, stating that: "*Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and the sea level has risen*"[10]. The report also stressed the importance of adaptation and mitigation strategies to reduce the risks posed by climate change, as they represent two complementary approaches to reducing risks over different timescales[11].

Finally, in December 2015, the Climate Change Conference was held in Paris, which led to the creation of two different documents, the COP Decision and the Paris Agreement, collectively referred to as "The Paris Outcome"[12]. Of the two documents, only the Paris Agreement represents a legally binding international treaty, which must be submitted for ratification by the States, which commit to developing adaptation and mitigation strategies, starting from 2020. Specifically, the 195 participating countries have made a commitment to contain the rise in global temperature within 2°C by the end of the century, with the additional goal of containing it to 1.5°C above pre-industrial levels. The Paris Agreement marked a strong change in direction compared to the previous regime architecture, since it provided for the participation of all countries and the existence of the same obligations, without distinguishing between developed and emerging economies. In addition, the Kyoto Protocol's top-down approach was abandoned to make way for a bottom-up approach, implying that the Paris Agreement does not impose specific reduction targets, but leaves it up to governments themselves to set goals and policies. Therefore, collective efforts are promoted, albeit with respect for the differences between countries, both in terms of organizational and technological capabilities through "Nationally Determined Contributions" (NDCs). Notably, the Paris Agreement does not provide for any sanction mechanism against those countries which could possibly fail to fulfil the commitments established at the national level, but, according to article 28, it allows parties to withdraw after three years. In addition, the Paris Agreement invites countries to formulate and submit by 2020 long-term low greenhouse gas emission development strategies (LT-LEDS) to better frame the collective efforts towards the long-term horizon. However, unlike NDCs, LT-LEDS are not mandatory, but they place the NDCs into

[10] IPCC, *Climate Change 2014 : Synthesis Report*, 2014, p. 2
[11] Ivi, p. 17
[12] S. Nespor, *La lunga Marcia per un accordo globale sul clima*, 2016

the context of countries' long-term strategies, providing a clear path for the future development priorities.

Looking at the structure of the Paris Agreement, the objectives are stated in Article 2, which sets global warming containment targets with an aforementioned "double-goal mechanism". Furthermore, Article 2 reiterates the importance of developing an adequate set of skills to adapt to the adverse effects of climate change and to embark on a climate-resilient and low GHG gas emission development pathway. Finally, regarding financial flows, Article 2 requires that these be consistent with the goals of pursuing low-emission and climate-resilient development.

According to Article 4, in pursuit of the previously mentioned global warming containment goals, countries aim to peak global emissions as soon as possible. This will be followed by rapid reductions in order to achieve, in the second half of the century, a balance between anthropogenic emissions and removal of GHG[13]. In this perspective, at the time of ratification and then every five years starting from 2023, each country must report and update the sequence of national mitigation contributions it intends to make to reduce emissions. These contributions can be adjusted at any time by the proposing country, given that they must represent a progression from the previous contributions.

Article 6 of the Paris Agreement provides for the establishment of a market mechanism which, in full respect of the environment, promotes cooperation between private and public entities, with the aim of promoting the reduction of polluting emissions. This mechanism seeks to foster sustainable development through the international transfer of nationally determined contributions. Moreover, part of the proceeds must be used to support developing countries in facing possible economic challenges when adapting their national strategy to climate change policies. A special body of the Conference of the Parties is in charge of managing this mechanism and it aims to promote mitigation in overall global emissions while fostering sustainable development.

To fill the lack of a sanction mechanism, which could undermine the achievement of the targets, several instruments have been provided to ensure the implementation of the Paris Agreement. The first of these mechanisms provides for the establishment of the Enhanced Transparency Framework (ETF), which governs not only the interpretation of the Paris Agreement's provisions, but also their implementation. The ETF is the concrete expression of

[13] L. Aristei, *L'Accordo di Parigi: obiettivi e disciplina*, in Rivista Quadrimestrale di Diritto dell'Ambiente, Numero 3, G. Giappichelli editore, 2017, p. 79

the duty to inform, according to which each country must report once every two years on its progress in adaptation and mitigation strategies. Furthermore, starting in 2023, the various States will provide relevant information to the *Ad Hoc Working Group*, which will assess the "Global Stocktaking", in other words, which actions are effective in achieving the established objectives. Another valuable tool for the implementation of the Paris Agreement is based upon the technological and financial assistance from developed countries. In this perspective, Article 10 sets forth an *ad hoc* Technology Framework to govern the transfer of technologies to emerging economies, even though financial obligations regarding industrialized countries are not specified. Nevertheless, the Agreement reaffirms the important role of developed countries towards emerging economies in providing financial assistance, while encouraging voluntary contributions by other Parties. Indeed, climate finance is crucial for mitigation, as large-scale investments play a key role in reducing GHG emissions. Climate finance is equally important for boosting adaptation, as significant financial resources are needed to adapt to the adverse effects and reduce impact of climate change. In this regard, Article 9 is entirely dedicated to "green" finance. Also, given the fact that not all developing countries have sufficient capabilities to face the challenge posed by global warming, climate-related capacity-building is key in the Paris Agreement. Developed countries are called upon to promote capacity-building actions in developing countries.

When the Paris Agreement was approved, the reaction of the financial markets was immediate. Indeed, there was a collapse in the shares of companies linked to the fossil fuels industry, while there was an increase in the share price of companies involved in the so-called "green economy".

Nevertheless, the Paris Agreement did not establish definitive rules for emission reductions, delegating this task to the subsequent COPs. In particular, during COP22 in Marrakech, the parties focused on finding an agreed definition of developed and developing countries, which differs from the one given under the 1992 Convention. Accordingly, the distinction considers the principle of common but differentiated responsibility, with special attention to the historical responsibilities of national realities, as well as the current impact on the environment. In 2021, COP26 was held in Glasgow, organised by the United Kingdom in partnership with Italy. It represents one of the biggest and most important international summits on climate change since the Paris Agreement. Close to 200 countries participated in order to adopt the "Climate Pact", which is a powerful tool for renewing the commitment made in 2015 to significantly reduce global emissions. The meeting was preceded by the publication of the latest IPCC report, which points out that the 1.5°C limit could be exceeded as early as 2030,

with serious consequences for the planet. Considering that climate change is no longer a low-level issue, but a life threatening global emergency, one of the main goals of COP26 was to phase out coal and prevent all countries from financing new coal-fired plants. Although more than 40 countries agreed to quit coal for power generation and 23 countries sign the "COP26 Coal to Clean Power Transition Agreement", many major coal producers did not sign the settlement, including the USA, Australia, China and India. In addition, methane was a big topic of discussion in COP26, as it is the second biggest contributor to global warming after CO_2. The EU and the USA proposed a "global methane pledge", under which actors commit to a 30% reduction in methane emissions by 2030, from 2020 levels. The pledge was signed by 105 countries, but the major producers of methane emissions (Russia, China, and India) did not sign it. Similarly, the issue of deforestation found its way into the COP26 debate, being one of the major drivers of climate change and biodiversity loss. 130 nations pledged to stop deforestation by 2030, but during the final proposal, some countries backed out despite the presence of endangered forests in their territory.

From a finance standpoint, the leading role of developed countries towards emerging economies was reaffirmed during the Conference. This translates, as already established by the Paris Agreement, into the establishment of funds amounting to USD 100 billion for climate finance. Furthermore, economic resources must be allocated to research, innovation and to the development of "green" technologies to tackle climate change.

Both the Paris Agreement and the subsequent COPs show that a holistic approach to sustainability, economic growth and human community development is needed. The goals set by the various climate summits must be implemented both at the local community level and at the supranational level. The decisions taken first in the Paris Agreement and then in COP26 represent important steps for the success of the UN 2030 Agenda for Sustainable Development, signed in 2015.

2. 2030 UN Agenda: 17 Development Goals

The 2030 Agenda for Sustainable Development is an action agenda for people, planet and prosperity and it was signed on September 25th, 2015 by 193 UN countries. It consists of 17 Sustainable Development Goals (SDGs), which are part of a broader, structured programme of 169 targets to be achieved in the economic, social and environmental area. The goals are wide-ranging and involve all spheres of society, from the private to the public sector. In particular,

the 17 SDGs underline that sustainability is not a purely environmental issue, but encompasses three dimensions – social, ecological and economic – and aim to end poverty and inequality, combat climate change and promote respect for human rights. The international community recognizes that eradicating poverty in all its forms and dimensions is the greatest global challenge and an indispensable requirement for sustainable development. The 2030 Agenda is the result of decades of debates and multilateral summits on climate change and related social and economic issues affecting the international community. National governments are the main actors when it comes to the successful implementation of the programme.

It is important to emphasize that the 2030 Agenda does not end with the 17 SDGs which, on the contrary, represent focus areas necessary for the achievement of sustainable development, or in other words, a development path which meets the needs of present generations without compromising the ability of future generations to meet their own. The 17 goals must be viewed systemically, recognizing their imperfect nature but also their ability to represent the most pressing needs of the contemporary world. The SDGs are indispensable tools for measuring sustainable development outcomes, although they do not all have the same standing. Indeed, some can be regarded as "means" to achieve other "higher-level" final goals. For instance, water and energy SDGs (6 and 7) are not final goals but are rather the means to achieve final goals such as health and well-being[14]. In this perspective, SDGs can be seen as a very complex system of interconnected goals and means, so when deciding how to achieve a mean-type goal, the contribution it makes to the final-type goal must be considered. Also, mean-type goals can be classified into five categories, according to their function: resources, environment, education, economy and governance[15]. Resource goals encompass SDGs 2, 6 and 7 (food, water and energy respectively) and they are, by their very nature, interdependent on each other. Environment goals comprise SDGs 13, 14 and 15 (climate, oceans and land respectively) and they highlight the main environmental concerns. The third category, Education (SDG 4), mainly plays an enabling role, along with Health (SDG 3). On the other hand, Economy (SDGs 8, 9, 11 and 12) is considered to be fundamental for extracting, transforming and allocating resources, as well as the main source of jobs. The last category is Governance (SDG 16), which plays an essential role in coordinating the implementation of the various SDGs. Notably, this mechanism facilitates the adoption of an integrated approach regarding SDGs, increasing the effectiveness of the decisions and reducing the costs.

[14] M. Bengtsson, M. Elder, L. Akenji, *Making SDGs Implementation Easier: Thinking about Goals as Means*, IISD SDG Knowledge Lab, 9 March 2017
[15] Ibidem

The SDGs, together with the Paris Agreement, form a real roadmap for the international community in the direction of a more sustainable world, with a particular focus on economic and social dimensions. Moreover, they offer a long-term perspective that transcends the immediate impact considerations related to possible election campaigns and are therefore helpful tools in sustaining robust, modern and dynamic economies in a world with a better standard of living and decreasing inequalities.

Figure 1: The 17 Sustainable Development Goals

Source: ISTAT, https://www.istat.it/it/benessere-e-sostenibilit%C3%A0/obiettivi-di-sviluppo-sostenibile/quali-sono-i-17-goals

Overall, the 2030 Agenda embodies different core principles:

- Universality: the Agenda is universal in scope and commits all countries to contribute towards a collective effort to achieve sustainable development.
- Leaving no one behind: the programme seeks to benefit all people in need and depravation.
- Interconnectedness and Indivisibility: the 17 SDGs are interconnected and indivisible, thus they must be treated in their entirety.
- Inclusiveness: the 2030 Agenda calls for the participation of society as a whole.
- Multi-stakeholder Partnerships: in order to mobilise and share technology, skills and financial resources, the Agenda provides for a multi-stakeholder approach to support the achievement of the 17 SDGs.

The essence of the 2030 Agenda consists of five core principles that direct the policies on sustainable development, also known as the "5Ps": people, prosperity, planet, partnership and peace. This means that for a development intervention to be sustainable it must take into account the social, economic and environmental consequences it generates and lead to conscious choices in terms of the trade-offs, synergies and spin-offs it creates[16]. Thus, the 2030 Agenda invites stakeholders to think holistically and creatively about the approach to sustainable development, which must involve all spheres of civil society in a collective and prolonged effort.

3. The European Framework

Given the growing awareness on the part of international actors, the European Union has also adopted a course of action to tackle global warming and promote the reduction of pollutant emissions in the atmosphere. With the 2019 Green Deal, the EU aims at playing a leading role in the global strategy against climate change and the goal of the programme is to achieve climate neutrality by 2050. As part of the European Green Deal, the EU will present measures focusing on the theme of sustainability, which are stated in various ways, including from the socio-economic perspective. In fact, the Green Deal is an innovative plan because it reconciles green policies, focused on environmental protection, with actions aimed at reducing social inequalities and it will support the digital transition of European economies. The ambitious emission reduction plans promoted by the Green Deal are coupled with the Just Transition Mechanism, which was presented in January 2020 as a tool to ensure that the transition to a carbon neutral economy is not overly harsh on those who still rely heavily on fossil fuel or carbon intensive industries. The Mechanism stands on three pillars: the Just Transition scheme under InvestEU, the Public Loan Facility and The Just Transition Fund. Specifically, the Transition Fund is the most important element of the Mechanism, because it provides 40 billion euros to be allocated over the period 2021-2027. This amount will be used to support companies in implementing the transition, investing in research and innovation in small and medium enterprises, and in the development of new digital skills for workers.

The European Green Deal plays a crucial role in the EU's post-pandemic recovery, as it remains a priority also in relation to the fight against the consequences of Covid-19. In this regard, within the Next Generation EU (NGE) Plan a part of the funds have been designated

[16] United Nations System Staff College Knowledge Centre for Sustainable Development, https://www.unssc.org/sites/default/files/2030_agenda_for_sustainable_development_kcsd_primer_en.pdf

for the Just Transition, so that each Member State, in order to be eligible for NGE funds, must allocate at least 37% of the expenditure in the National Recovery Plan to the ecological transition[17].

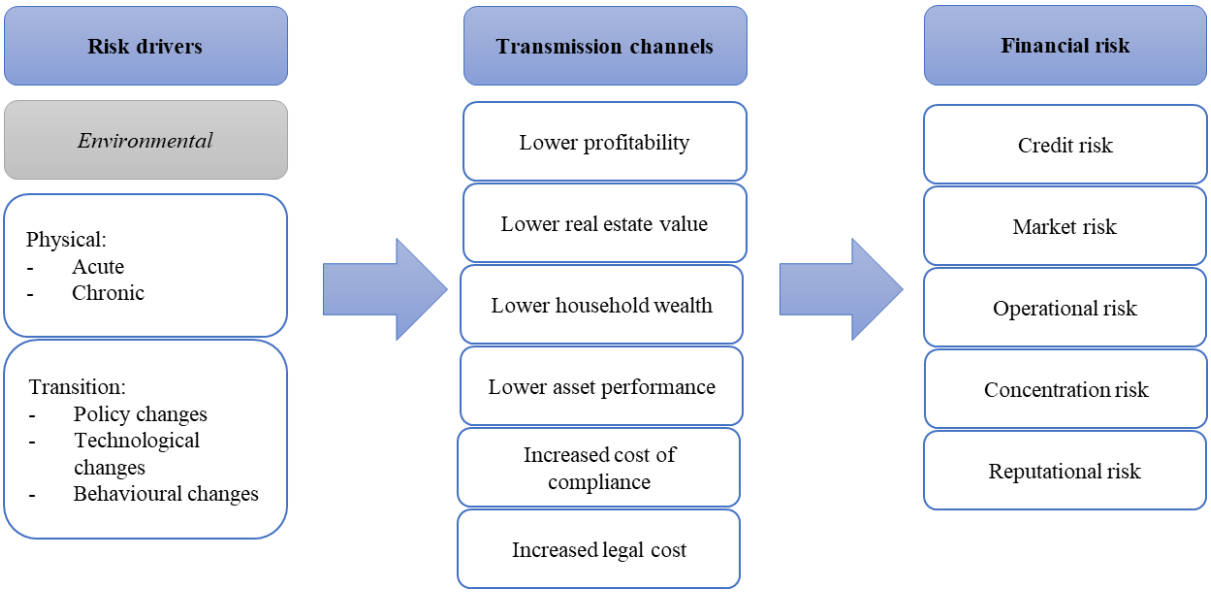
3.1. Banking Supervision on Climate-related Financial Risk

The transition to a low carbon economy implies both risks and opportunities for the entire economic system and for financial institutions. Indeed, the physical damage resulting from climate change represent an important challenge for the real economy and the financial system. In this regard, the ECB has identified climate-related financial risks as main concerns for the euro area banking system. Institutions are required to implement a strategic, holistic and forward-looking approach to considering climate-related and environmental risks. These risks pose unique challenges to economic actors, such as a lack of historical precedent, a long-term time horizon and a great level of uncertainty. Environmental risks represent the negative financial impacts stemming from the action of environmental factors on banks' counterparties or invested assets, representing an important factor for investment risk too. As the EBA states, these risks include climate-related risks, of which the main drivers are physical and transition risks, and they affect economic activities and damage the financial system. Climate risk drivers are related to the financial risk faced by banks through transmission channels (Fig. 2). These are categorized by the Basel Committee on Banking Supervision as microeconomic or macroeconomic. The first ones include the causal chains by which climate risk drivers affect banks' individual counterparties, potentially resulting in climate-related financial risk to the banking sector[18]. Then again, macroeconomic transmission channels include the paths by which climate risk drivers impact macroeconomic factors, such as economic growth, and how these may affect the financial system, through the effects on the economy in which banks operate.

[17] Recovery and Resilience Facility, https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en

[18] Basel Committee on Banking Supervision, *Climate-related Risk Drivers and Their Transmission Channels*, April 2021, p.10

Figure 2: How environmental risks may affect financial risks through different transmission channels



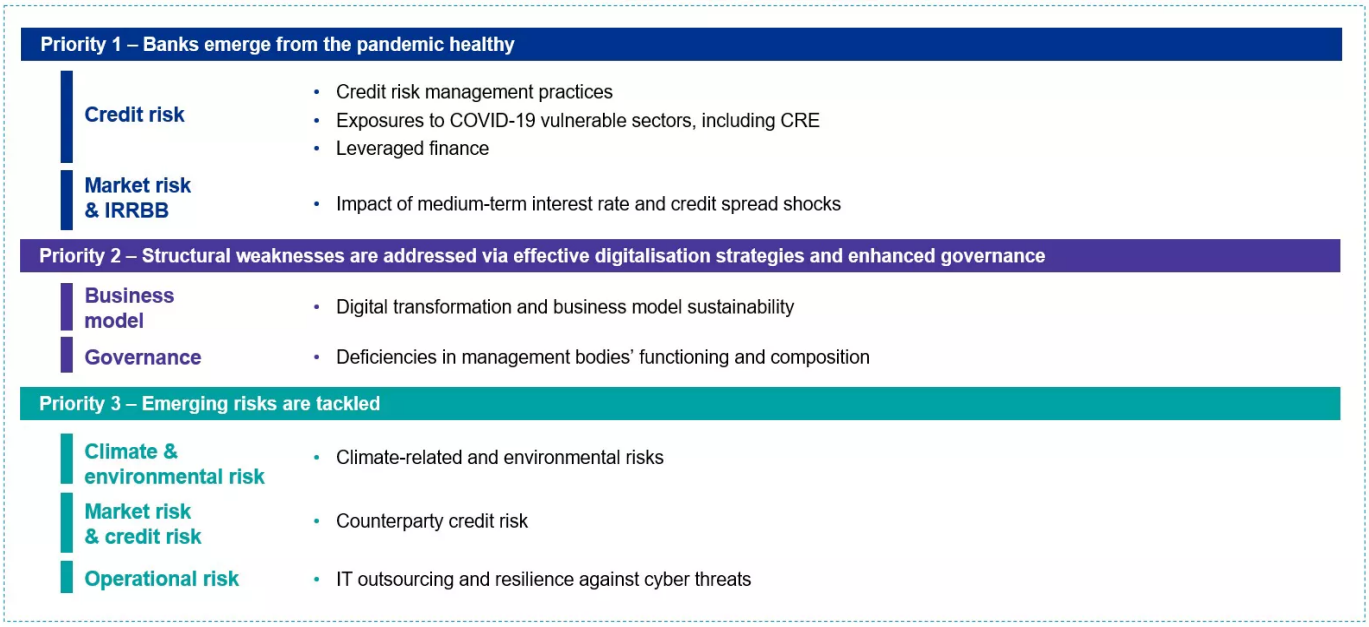
Source: European Banking Authority, *The Role of Environmental Risks in the Prudential Framework*, 2 May 2022

The impact on economic activities can occur directly, for instance, through lower corporate profitability or devaluation of assets, or indirectly, through macro-financial changes[19]. Notably, climate-related risks affect the resilience of a bank's business model over the long-term, as physical and transition risks may trigger additional losses stemming from so-called "liability risk" or "reputational risk". These risks could impact investments too, as climate-risk is largely recognized as a feature of investment risk. Indeed, many institutional investors and other stakeholders have started demanding further information on climate risk management. Nevertheless, the extent and distribution of these risks can be attenuated through the adoption of *ad hoc* mitigation measures and also by the characteristics of the transition pathway. In this perspective, environmental policies play a crucial role, together with technological development and changes in market preferences.

In December 2021, the ECB released its supervisory priorities for 2022-2024 (Fig. 3), recognizing that already existing vulnerabilities in the banking system have been exacerbated by the Covid-19 pandemic, with an impact on banks' capability to manage emerging risks, particularly in the area of climate-related and environmental risks.

[19] ECB, *Guide on Climate-related and Environmental Risks: Supervisory Expectations Relating to Risk Management and Disclosure*, November 2020, p. 10

Figure 3: SSM priorities 2022-2024



Source: KPMG Global, https://home.kpmg/xx/en/home/insights/2021/12/ssm-supervisory-priorities-2022-2024.html

The European Banking Authority (EBA) closely monitors the soundness of the euro banking area, and it was given several mandates to assess how ESG risks can be integrated into the prudential supervision framework. Currently, methodologies to assess the impact of climate-related financial risks are being developed, also focusing on the loss of ecosystem services (water stress, biodiversity loss) which may be drivers for financial risks.

The main features of climate-related and environmental risk include the far-reaching impact on breadth and magnitude, an uncertain and longer-term time horizon and the dependency on short-term actions[20]. Remarkably, the change in climate patterns has a wide area of impact, ranging from very large geographical areas to different sectors, including agriculture, fisheries and energy. On the other hand, sectors that are likely to be affected by the transition to a low carbon economy comprise transport, energy, manufacturing, agriculture and construction. Therefore, the impact of climate change may vary substantially across different geographical areas and economic sectors and the climate-related risks for euro-area institutions are expected to manifest in the medium to long-term. In this regard, it is essential that financial institutions implement a forward-looking approach, as the planning horizon and average loan tenor is often shorter than the time period in which climate-related risks are expected to arise.

[20] Ivi, p. 13

These climate risks features are changing the overall risk framework in the financial sector and the EBA is strongly committed to provide adequate supervisory tools which can support the European banking sector. In line with its overall approach to the prudential framework, the EBA has chosen a risk-based approach which seeks to ensure that the requirements reflect underlying risks and ultimately support banks' resilience to all risks[21]. From a micro-prudential standpoint, this translates into making sure that the surveillance requirements are in line with the underlying risk profiles of exposure associated with environmental objectives or subject to environmental impacts, ensuring the resilience of individual banks. Looking at the macro-prudential perspective, the EBA's risk-based approach aims at safeguarding financial stability, mitigating possible systemic risks stemming from environmental matters and thus granting the soundness of the financial system as a whole.

Climate-related and environmental risks present an additional challenge, which concerns the so-called "negative externalities". Indeed, the negative effects of financing or purchasing a carbon-intensive product fall on the community and not directly on the financier or purchaser. As the investment decision may not consider the harmful effects on society as whole (in other words, the pricing does not comprise the environmentally driven social costs), all of this represents a problem that must be tackled through the recognition of environmental factors and risk drivers in the pricing and capital allocation mechanism. In this regard, "double materiality" plays a primary role, as, from a risk-based perspective, environmental risks can be defined as the negative materialisation of environmental factors through the counterparties or invested assets. The inside-out perspective (financial materiality) concerns the economic and financial activities of counterparties or invested assets that can be negatively impacted by environmental factors, affecting the values of such activities[22]. Conversely, the inside-out perspective (environmental materiality), prescribes that economic and financial activities of counterparties or invested assets can have negative consequences on environmental factors. Thus, the "double materiality" feature should be taken into account, in a way that it can help the risk-sensitive prudential framework in the recognition of the effects of environmental risk drivers on financial risks, hence ensuring that all the aspects are adequately capitalised and reflected in the pricing process. Nevertheless, political authorities are key players in providing the best tools, such as policies and regulations, to deal with environmental-related externalities.

[21] European Banking Authority, *The Role of Environmental Risks in the Prudential Framework*, 2 May 2022, p. 16 doi:10.2853/329394
[22] Ivi, p. 17

Table 1: Examples of climate-related and environmental risk drivers

Risk affected	Physical		Transition	
	Climate-related	Environmental	Climate-related	Environmental
	• Extreme weather events • Chronic weather events	• Water stress • Resource scarcity • Biodiversity loss • Pollution • Other	• Policy and regulation • Technology • Market sentiment	• Policy and regulation • Technology • Market sentiment
Credit	The probabilities of default (PD) and loss given default (LGD) of exposures within sectors or geographies vulnerable to physical risk may be impacted, for example, through lower collateral valuations in real estate portfolios as a result of increased flood risk.		Energy efficiency standards may trigger substantial adaptation costs and lower corporate profitability, which may lead to higher PD, as well as lower collateral values.	
Market	Severe physical events may lead to shifts in market expectations and could result in sudden repricing, higher volatility and losses in asset values in some markets.		Transition risk drivers may generate an abrupt repricing of securities and derivatives, for example for products associated with industries affected by asset stranding.	
Operational	A bank's operations may be disrupted due to physical damage to its properties, branches and data centres as a result of severe weather events.		Changing consumer sentiment regarding climate issues can lead to reputation and liability risks for the bank as a result of scandals caused by financing environmentally controversial activities.	
Other risk types	Liquidity risk may be affected in the event of clients withdrawing money from their accounts to finance the damage repairs.		Transition risk drivers may affect the viability of some business lines and lead to strategic risk for specific business models if the necessary adaptation or diversification is not implemented. An abrupt repricing of securities, for instance, due to asset stranding, may reduce the value of a bank's high-quality liquid assets, thereby affecting liquidity buffers.	

Source: ECB, *Guide on Climate-related and Environmental Risks: Supervisory Expectations Relating to Risk Management and Disclosure*, November 2020

3.2. ECB Climate Risk Stress Test

Banking supervisory authorities conduct regular stress tests to check the resilience of banking institutions to possible financial and economic shocks. The European Central Bank (ECB) conducts supervisory stress tests annually, and in 2022 the focus is on climate related risks, which are becoming an increasingly pressing priority for supervisors. Particularly, the stress test aims to identify the challenges banks face in managing climate risks, so as to identify vulnerabilities and, conversely, strengths in the banking system. Nevertheless, the ECB acknowledges that banks will encounter challenges during the exercise owing, for example, to scarce data availability, complex internal reporting systems and the lack of common disclosure requirements for climate risk[23]. Therefore, the climate stress test has to be regarded as a learning experience, both for financial institutions and supervisors. In the area of climate stress tests there is a precursor, as in 2021 the Bank of England (BoE) conducted a similar exercise, involving the largest UK banks and insurers. The Climate Biennial Exploratory Scenario (CBES) explored both physical and transition risks to different extent. The results revealed a lack of data on essential factors that participants need to understand to successfully manage climate risks. Nevertheless, the BoE intended for the CBES to be a learning exercise, both for supervisors and participants[24].

One of the main goals of the ECB's 2022 climate stress test is to assess the capability of banks in facing climate-related financial risks through three different modules. Module 1 consists of a questionnaire assessing banks' internal climate risk stress test framework. Module 2 focuses on two climate risk metrics. Metric 1 assesses the sustainability of institutions' business models by measuring their income from climate-relevant exposures[25]. On the other hand, Metric 2 evaluates the banks' exposure to carbon-intensive industries, based on greenhouse gas emissions and loans at counterparty level. Finally, Module 3 includes a bottom-up stress testing, with a special focus on both physical and transition risks. The latter include risks arising from the transition process to a low-carbon economy and the transition risk drivers are mainly represented by societal changes. Instead, physical risk drivers are changes in both weather and climate that impact economies.

[23] European Central Bank, *In the spotlight: 2022 supervisory climate stress test*, 16 November 2021 https://www.bankingsupervision.europa.eu/press/publications/newsletter/2021/html/ssm.nl211116_2.en.html
[24] See more: https://www.bankofengland.co.uk/stress-testing/2022/results-of-the-2021-climate-biennial-exploratory-scenario
[25] Ibidem

Concerning Module 3, the ECB provides macro-financial scenarios, largely based on Phase II of the Network for Greening the Financial System's (NGFS) model outputs[26]. With regard to transition risk, the macro-financial scenarios consider both the long-term and the short-term time horizon. The long-term orderly scenario, which is based on the "Net Zero 2050" model, supposes that climate change regulations are introduced at an early stage and then implemented gradually, so that global warming is limited to 1.5°C. According to this model, transition risks – together with physical risks – are relatively mitigated. On the contrary, the long-term disorderly scenario, that is based on the NGFS "Delayed Transition" model, assumes that environmental and climate policies are not introduced until 2030. Thus, strong interventions are needed to keep global warming below 2°C and this results in higher transition risks, as well as increased probability of physical risks, due to the delay in the implementation of green policies. Lastly, the hot house world scenario hypothesizes the absence of new climate regulations and that the current efforts are totally insufficient to counter climate change. This long-term scenario is based on the NGFS "Current Policies" model, which postulates that uncontrolled global warming will lead to physical risks of extreme magnitude, even though transition risks will be negligible because the transition to a low-carbon economy has not yet begun.

In a short-term perspective, the scenario calibration is based on the NGFS "Delayed Transition" model and so the disorderly transition risk scenario evaluates banks' vulnerabilities triggered by a sharp increase in the price of carbon emissions over a three-year time period. Notably, this event has to be considered as a tail-risk representation suitable for stress testing. The goal of the tail-risk situation is to assess the sensitivity of banks' current balance sheets to unexpected sharp measures to curb carbon emissions in the near term[27].

The assessment of physical risk focuses on two extreme weather events representing the main climate risks in Europe: severe drought and heatwave and flood risk. In the first case, the scenario assumes that the extended periods of hot weather may lead to sizeable output losses across different economic sectors and consequentially banks may incur shortfalls as well. With regard to flood risk, river flooding has been historically considered to be a major source of physical risk in Europe and, thus, the risk is expected to increase because of climate change. However, flood risk is different across the several regions of Europe and so the scenario takes

[26] See more: https://www.ngfs.net/ngfs-scenarios-portal/

[27] European Central Bank, *Macro-financial Scenarios for the 2022 Climate Risk Stress Test*, https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.macrofinancialscenariosclimateriskstresstest2022~bcac934986.en.pdf

into account within-country variation in risk. Importantly, to keep the exercise manageable and to preserve the learning value of it, the methodology focuses on the acute feature of physical risk over a one-year period, assessing the impact on credit risk only. Banks are required to provide bottom-up projections for credit risk and, before the submission of the projections, they had to deal with several challenges, including:

- How to reflect the impact of carbon pricing in credit risk projections.
- How to produce long-term projections given the dynamic balance sheet assumption. Indeed, according to the ECB's methodological note, financial institutions are expected to take into account both the specific strategy of a bank and the banks' business environment related to the development of macro-economic scenarios.
- The ECB did not provide a probability of default (PD) and a loss given default (LGD) path generator as a standard benchmark on the expected impact across different scenarios. So, the calibration of credit risk parameters to ECB scenarios represents a challenge for financial actors.

Another main objective of this climate stress test is to better understand banks' data capabilities when it comes to climate-related financial risk. As the preparatory phase revealed the difficulties faced by most of banks regarding the availability of the data required by the ECB, many actors had to rely on a mix of publicly available data, third-party providers and proxies to fill any gap in their internal system. This is especially true regarding Scope 1, 2 and 3 emissions data for non-SME corporate counterparties, as well as for energy performance certification rating assigned to mortgage and corporate real estate exposures[28].

Overall, the 2022 climate stress test exercise will contribute to identifying vulnerabilities in the banking system, while helping to enhance data availability and quality. Therefore, to emphasize the propaedeutic nature of the exercise, the final output[29] will be integrated into the Supervisory Review and Evaluation Process (SREP), using a qualitative approach. In this regard, the supervisory climate stress test is considered to be an important tool for developing the response to risks posed by climate change and it will accompany the transformation of the banking system towards a more climate-resilient approach.

[28] KPMG, *2022 ECB Climate Risk Stress Test: Let's Keep the Ball Rolling*, 15 March 2022, https://home.kpmg/xx/en/home/insights/2022/03/2022-ecb-climate-risk-stress-test-time-to-get-the-ball-rolling.html

[29] The publication of aggregated results is planned for the third quarter of 2022

CHAPTER II

4. The Net-Zero Challenge

Private and public institutions all over the world increasingly recognize that physical risk – together with transition risks – related to climate change will continue to build up if the international community does not take a stand to significantly reduce GHG emissions. In this perspective, the new focus of climate policy is on net-zero emissions. Net zero refers to the state in which activities within the value chain of an organization result in no net impact on the climate from GHG emissions. As of December 2021, more than 70 countries accounting for more than 80% of global CO_2 emissions and about 90% of global GDP had put net-zero commitments in place[30]. In addition, more than 5000 participated in the UN's Race to Zero campaign, that encourages non-state actors – cities, companies, regions, financial and educational institutions – to take action to significantly reduce emissions by 2030. Climate scientists have identified 1.5°C warming as a possible threshold above which negative feedback loops, such as the melting of permafrost or the rising sea level, may be activated, leading to irreversible and severe damage to the planet. Therefore, to stabilize the climate and limit physical risks, it is necessary to reduce the addition of GHGs into the atmosphere to net-zero levels.

Although net zero is an inherently scientific concept, its importance extends far beyond the boundaries of the scientific community, as it represents a frame of reference through which climate policies will be developed in the coming years. Indeed, the path to net zero involves important social, economic and ethical considerations.

From a purely scientific point of view, various research has highlighted the longevity of the impact of GHG emissions and the monotonic, non-linear relationship between cumulative net anthropogenic CO_2 emissions and CO_2 induced surface warming[31]. Notably, CO_2-induced warming stops once the net anthropogenic emissions stop. The result of this is that, unless net CO_2 emissions reach or go below zero, the induced surface warming is expected to remain high in the next decades or even centuries. Given the durability of the effects of pollutant emissions, net-zero policies must be structured over a long-time horizon and, to keep climate change within the 1.5°C goal, the emissions must fall by approximately 45% by 2030. In this case, it

[30] McKinsey, *The Net Zero Transition: What Would It Cost and What Would It Bring?*, January 2022, p. 53
[31] S. Fankhauser, S.M. Smith, M. Allen, *et al. The meaning of net zero and how to get it right*, in Nature Climate Change, Number 12, 15–21, 20 December 2021, p. 15 https://doi.org/10.1038/s41558-021-01245-

will be possible to reach net-zero targets around 2050. Based on the Paris Agreement and the goal of limiting global warming to 1.5°C, scientists suggest that there is a finite budget of greenhouse gases that can still be emitted into the atmosphere. The 50% probability of reaching the abovementioned target corresponds to an emission budget of 400-800 $GtCO_2$, which implies that the emissions peak around 2030 and then fall to reach net zero in 2050[32]. Nevertheless, current emissions rates, which have steadily increased since 1970, clearly demonstrate that the carbon budget for 1.5°C would likely be exceeded within about the next decade, while the 2°C carbon budget would be exceeded in about three decades. Given the cumulative feature of the warming process and the fast consumption of the emission budget, timing is critical.

Since the carbon budget refers to the global atmosphere, it needs to be translated into individual decarbonization pathways for different entities, such as countries and businesses. As seen above, the Paris Agreement leaves it up to the parties to decide emissions pathways and NDCs to global net-zero. What's more, companies are expected to formulate their own net zero pledges, guided by voluntary schemes (Cities Race to Zero, Science Based Target Initiative etc.) that encourage firms to reduce their emissions as fast as possible. However, the effectiveness of voluntary commitments is often questioned, as they allow too much discretion in the design of net zero pathways, which may not be aligned with global climate action in general. There are various schemes to track the progresses, such as CDP[33] and the Transition Pathway Initiative[34]. All countries contribute to global GHG emissions, even though the individual emission rates vary according to GDP and population. The largest emitters – that account for about 60% of global emissions – have different characteristics based on their economies. For instance, China's emissions come mainly from power and industry. Likewise, India's emissions stem from power generation and heavy-emitting industry processes. On the other hand, US emissions derive primarily from the consumption of fossil fuel by the road transportation system, as well as power. Also, looking at cumulative emissions, the USA is the largest emitter, with the greatest number regarding cumulative historical CO_2 emissions.

Although global actors have increased their attention and commitment to net zero, the path is not straightforward. According to a recent McKinsey report titled "*The Net Zero Transition:*

[32] Ibidem
[33] CDP is a not-for-profit charity that runs the global disclosure system for investors, companies, cities, regions and states to manage their environmental impacts (see more on www.cdp.net).
[34] The Transition Pathway Initiative (TPI) is a global asset-owner led initiative that assesses companies' preparedness for the transition to a low carbon economy (see more on www.transitionpathwayinitiative.org).

What Would It Cost and What Would It Bring?", there are five reasons why it is difficult to implement an effective strategy:

- The scale and pace of the step-up in spending needed on physical assets, considering that energy and land-use systems must be transformed over the next decades.
- The net-zero action requires a collective and global effort, though the burdens of the transition would not be evenly felt.
- The near-term changes needed for long-term benefits.
- The need for rapid and radical changes in lifestyles and business practices that have been established over a long period.
- The central role of energy in all economic activity, meaning that the transition would need to be carefully managed.

This reflection shows, *inter alia*, how the transition to net zero affects our lives and well-being. As of today, governance, accountability and reporting mechanisms are often inadequate, while long-term strategies are not adequately supported by short-term actions. Many actors have not yet set out detailed plans to achieve their commitments and are vague about the role of carbon offsets in place of cutting their own emissions.

Furthermore, Russia's invasion of Ukraine in February 2022 is having a heavy economic, social and human impact across many countries and sectors. Considering that Russia is one of the world's largest producers of oil and gas, the global effort toward a comprehensive environmental regulation may likely fail. Clearly, the ongoing war will complicate the net zero transition in the short term. The invasion of Ukraine took place at a delicate time, characterised by insufficient progress in terms of emissions reductions. Moreover, the world was preparing for Covid-19's post-pandemic recovery, after huge economic and humanitarian losses. In February 2022, supply chains were under significant stress, energy markets were already tight, and global commodity prices had risen considerably[35]. The Russia-Ukraine conflict, together with the extraordinary manifestation of climate change around the world, aggravated all of these factors, paving the way for a marked decline in energy and food security and affordability. According to a McKinsey article titled "*The Net-Zero Transition in the Wake of the War in Ukraine: a Detour, a Derailment, or a Different Path?"* there are several actions that have become more and more critical to accomplishing the net-zero transition in light of the ongoing

[35] H. Samandari, D. Pinner, H. Bowcott, O. White, *The Net-Zero Transition in the Wake of the War in Ukraine: a Detour, a Derailment, or a Different Path?*, in McKinsey Quarterly, May 2022, p. 2

conflict. First, private-sector leaders play a crucial role in supporting governments in the implementation of a visionary and forward-looking approach and, thus, companies could consider three actions:

- As global volatility increases, it is essential to develop a robust capability for managing under uncertainty. The company must be able to identify and tackle evolving circumstances promptly.
- Companies should accelerate the decarbonization process of their core operations, building a strong green procurement system that reflects new risks and opportunities.
- Firms should support multilateral cooperation, especially when it comes to international sustainability agreements, commitments, standards, and practices. This means taking a leading role at company, industry, and ecosystem levels. In this perspective, the leadership could represent a critical factor in determining the impact of the conflict on the prospects of the net-zero transition.

Then again, according to McKinsey, the role of financial institutions will continue to be critical, and banks would benefit from three sets of actions:

- Given the international landscape, banks need to develop a more resilient approach to reducing financed emissions and need to think through a more complex decarbonization strategy for businesses. Additionally, financial institutions need to provide the right support and incentives to companies on net-zero paths.
- Banks need to build the capability to identify and capitalize on new decarbonization opportunities that are emerging as fossil fuel prices rise, while renewable prices continue to fall.
- To help companies tail off legacy assets, financial institutions need to develop and scale new solutions, such as including special purpose vehicles that would enable firms to ring-fence legacy-emitting assets and retire them based on net-zero commitments.

Finally, government leaders can capture an important opportunity, as energy and commodity prices continue to rise, together with concerns about energy security. Indeed, this gives governments an important opportunity to accelerate the deployment of net-zero technologies, considering three courses of action:

- Government leaders could consider developing an integrated economic and national resource strategy, laying down a cooperative approach across departments and industries to identify and coordinate innovation, financial inputs, and infrastructure necessary to achieve decarbonization and energy security targets. This would include designing plans for facilitated retirement of stranded assets and accelerating efforts to project future mineral resources requirements that ensure a high level of resilience under different circumstances.
- Leaders need to establish clear demand signals, to be coordinated with a specific supply strategy that involves an acceleration in emission-reduction commitment timelines, as well as the setting up of regulations to phase out emissive assets over time.
- To accelerate the deployment of net-zero technology – especially across energy efficiency and renewable generation – governments can implement further public funds and financial incentives. Also, this would mean reforming permit and approval systems to exploit net-zero technology faster, while tightening the process for the implementation of emissive assets.

4.1. The Net-Zero Banking Alliance

The Net-Zero Banking Alliance (NZBA) is an industry-led, UN-convened alliance that brings together banks worldwide to accelerate and support the transition to a low-carbon economy, based on the Paris Agreement's targets. The NZBA was launched by 43 Founding Members in April 2021 and, since then, has grown to represent about 40% of global banking assets. It is organized by the UN Environment Finance Programme (UNEP FI) and is accredited by the Race to Zero campaign. Moreover, the NZBA represents the banking element of the Glasgow Financial Alliance for Net Zero (GFANZ), a practitioner-led, global coalition of financial institutions, which provides a forum for leading actors to boost the transition toward a zero-emissions global economy. The GFANZ brings together more than seven financial sector net zero alliances, including more than 500 members. To enable financial institutions to define credible pathways to foster the transition to a low-carbon future, GFANZ developed a four-principle-based framework, which aims at increasing financial support to those companies which are already Paris-aligned. In June 2022, GFANZ published five guidelines on transition planning for financial institutions.

In general, banks joining the NZBA initiative sign the "Commitment Statement" through which they commit to achieving the net-zero target by 2050. Particularly, the NZBA's Commitment Statement is signed by a bank's CEO, who commits the institution to align its lending and investment portfolios with pathways to net-zero by 2050 or sooner. In order to do that, banks will have to make explicit, within 18 months of joining the climate alliance, the targets to be achieved by 2030 and then by 2050. In addition, financial institutions will annually publish absolute emissions and emission intensity and, within a year of setting targets, disclose progress against a board-level reviewed transition strategy, setting out proposed actions and climate-related sectoral policies[36]. The relevant sectors according to the NZBA are: coal, power generation, oil & gas, transportation, real estate, cement, steel, agriculture and aluminium. The banks' commitment is strengthened by the UNEP FI "*Guidelines for Climate Target Setting for Banks*". The Guidelines have been developed by the UNEP FI's Collective Commitment to Climate Action (CCCA) signatories, to present the principles for the setting of credible, effective and ambitious objectives based on the Paris Agreement's goals. Indeed, limiting global warming well below 2°C from pre-industrial levels is a challenging plan and financial institutions will have to re-design their business models in a way that ensures the implementation of a climate-neutral and climate-resilient approach. The Guidelines outline four core principles for target-setting and shall be applied according to the "comply or explain" principle:

I. Banks shall set and publicly disclose intermediate and long-term goals to promote meeting of the Paris Agreement's temperature targets.
II. Banks shall establish an emission baseline and annually measure and report the emissions profile of their lending and investment portfolios.
III. Banks shall apply widely recognized science-based decarbonization scenarios to support both the long-term and the intermediate objectives and to ensure that the latter are aligned to the goals of the Paris Agreement.
IV. Banks shall periodically review targets to ensure their consistency with climate policies.

Specifically, signatories of the NZBA are required to apply the Guidelines, setting their first round of targets within 18 months, and within a further 18 months, set targets for all (or

[36] https://www.unepfi.org/net-zero-banking/commitment/

for the majority) of carbon-intensive sectors listed in the document[37]. The targets thereby defined should be part of the strategic plans and approved by the highest executive and governance bodies (Board of Directors and CEO). Targets should also be expressed in terms of absolute emissions and emission intensity. Within one year of setting the targets, the bank is required to disclose a "Transition Plan" in which it outlines both the envisaged actions[38] to achieve the objectives, the order of implementation and the timeline. Lastly, the NZBA requires annual public disclosure in which, in addition to absolute emission and emission intensity, the bank reports targets and scenarios (for example, the IEA Net Zero Scenario), as well as the progress made. The recommended framework is the Task Force on Climate Financial Disclosure (TCFD).

Furthermore, the NZBA welcomes those banks which have signed the UN Principles of Responsible Banking, which represent a unique framework for promoting a banking strategy aligned with the 2030 UN Agenda and the Paris Agreement. The framework, created in 2019, outlines six Principles (Fig. 4), which foster sustainable finance practices. Signatory institutions aim at embedding these principles into their business model.

Figure 4: The six Principles for Responsible Banking

[37] UNEP FI, *Guidelines for Climate Target Setting for Banks*, April 2021, https://www.unepfi.org/wordpress/wp-content/uploads/2021/04/UNEP-FI-Guidelines-for-Climate-Change-Target-Setting.pdf

[38] *Inter alia*, client engagement, exclusion policies, disinvestment and capacity building

Source: UNEP FI, https://www.unepfi.org/banking/bankingprinciples/more-about-the-principles/

5. Overview of the Main Public Methodology Options for Target Setting

Despite the international policy framework on climate change, chances are that there will be a global increase in temperature between 2.1°C and 3.9°C by 2100 compared to pre-industrial levels. In this perspective, there is the pressing need to implement effective short-term actions, involving all sectors of society to reach net-zero emissions by 2050. Financial institutions play a key role in facilitating the transition, by directing capital flows towards decarbonization. To do that, they should fully understand the impact of climate-related financial risks on their portfolio, as well as the environmental impact of GHG emissions linked to their loan and investment activities. Therefore, measuring financed emissions is essential to identify risks, navigate emission reduction goals and disclose progress.

Since the IPCC released the "Special Report on Global Warming of 1.5°C" in 2018, many actors decided it was time to commit to net zero, and the number of pledges from financial institutions has risen in short order. However, the formulation of net-zero targets may vary significantly based on the services offered and the various relationships of a specific institution. Moreover, financial institutions deal with different mixes of asset classes, sectors, geographies, and individual companies, which might have a variety of decarbonization trajectories[39]. Banks, due to their activity, can include net-zero alignment in their decision-making process and, thus, direct capital flows towards net-zero aligned companies or projects.

In order to discuss the following topics of this paper, it is important to define what Scope 1, Scope 2 and Scope 3 emissions are according to the GHG Protocol "*A Corporate Accounting and Reporting Standard"*:

- Scope 1 emissions encompass the direct GHG emissions which occur from sources that are owned or controlled by the company.
- Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by the company and the emissions that physically occur at the facility where the electricity is generated. The term "purchased electricity" refers to the electricity that is acquired or otherwise brought into the company's organizational perimeter.

[39] Science Based Targets, *Foundations for Science-based Net-zero Target Setting in the Financial Sector*, Version 1.0, April 2022, p. 18

- Scope 3 is an optional reporting category that comprises indirect GHG emissions. Scope 3 emissions are the consequence of the company's activities, even though they are not generated by sources owned or controlled by the company. For instance, the transportation of fuel purchased by the company generates Scope 3 emissions.

Banks need reliable methodologies to inform financing decisions. However, given the heterogenous landscape in which they operate, all of the Paris-alignment methodologies available rely on simplifications and assumptions. Banks may choose to rely on more than one framework, as they take different approaches that might not be exhaustive due to the fact that they undergo an iterative process.

A crucial element of Paris-alignment methodologies is that of climate scenarios, as they set the minimum level of ambition regarding temperature goals, and they provide information on how to reach a particular outcome. Indeed, different scenarios imply different economic, technology and societal hypothesis on the roadmap needed to achieve specific targets. The methodologies presented below – SBTi, PACTA and BlueTrack – mainly rely on climate scenarios developed by the International Energy Agency (IEA). They are built upon the World Energy Outlook 2019 and the Energy Technology Perspective 2017. On the other hand, the target-setting approach is based on the quantification of the financed emissions and the PCAF standard provides for a framework for emission accounting.

Another aspect to consider when analysing Paris-alignment methodologies is that of emission metrics. In fact, banks can set emission targets in absolute or relative terms to examine progress made along the net-zero pathway. Namely, there are two GHG emissions metrics that are covered by the methodologies analysed below: an absolute emission metric, which is related to an absolute volume of GHG emissions, and a physical emission intensity metric linked to GHG emissions per unit of physical output. Although both of these metrics can be used to achieve a global target, the choice of using one instead of the other could lead to a series of consequences that might affect the bank's strategy. As a matter of fact, emission intensity targets do not always lead to a reduction in absolute emissions. However, intensity targets might be suitable for certain sectors with particular characteristics.

5.1. Science Based Targets initiative: Sectoral Decarbonization Approach

The Science Based Targets initiative (SBTi) aims to guide the private sector towards effective climate action through science-based emission reduction targets. The SBTi's mission is to ensure that companies have the necessary tools they need to set targets according to climate science. Targets adopted by a company are considered "science-based" when they are in line with the latest scientific framework necessary to achieve the Paris Agreement's temperature goals, to limit global warming well below 2°C above pre-industrial levels, while pursuing the 1.5°C targets. Given the complexity and the dynamic nature of the scientific agenda, SBTi contributes by conducting in-depth research and analysis, as well as consulting scientists and experts. The target-setting methods promoted by SBTi are instructive frameworks, based on three elements: a GHG budget, a set of emission scenarios and an allocation approach[40]. Notably, a GHG budget is an estimate of cumulative gases[41] that can be emitted over a certain period, while limiting global warming to a definite amount. This element is strictly related to emissions scenarios, which provide precious information on how emission reduction can be achieved under different circumstances. The scenarios used are mainly the ones stemming from the International Energy Agency (IEA) analysis, which has an appreciable amount of sectoral granularity. The SBTi target-setting methods use two main methodologies to allocate emissions at a company level: convergence and contraction. According to the convergence method, all companies within a given sector shall reduce their emission intensity to a common value by a certain year. However, this approach can only be used with sector-specific emission pathways and physical intensity metrics. On the contrary, the contraction approach implies that all companies shall reduce their absolute emissions or economic emission intensity at the same rate. In this case, the contraction method can be suitable for both sector-specific and global scenarios.

Several criteria and recommendations must be met so that a financial institution's targets can be recognized by the SBTi. The recommendations are not mandatory, but they ensure a high level of transparency and the assessment of best practices. Particularly, the document "*SBTi Criteria and Recommendations for Financial Institutions*" (April 2021) provides for a series of target validation sector-specific criteria. To measure and report emissions, financial

[40] Science Based Targets, *Foundations of Science-based Target Setting*, Version 1.0, April 2019, p. 6

[41] These gases, as defined by the Kyoto Protocol and UNFCCC, are: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbon (HFCs), perfluocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3)

institutions shall follow the "*GHG Protocol Corporate Standard"*, "Scope 2 Guidance" and "*Corporate Value Chain (Scope 3) Accounting and Reporting Standard"*.

Financial institutions committing to SBTi are expected to set targets covering their entire carbon footprint, including financed emissions. Another important aspect of the SBTi method is that it draws on the carbon accounting principles stemming from the Partnership for Carbon Accounting Financial (PCAF). Particularly, under the SBTi framework, financial insitutions are encouraged to conduct an institution-wide inventory of financed emissions, in line with PCAF's "top-down" approach[42]. SBTi has set out guidance for financial institutions offering an asset-class-based classification with required, optional and out-of-scope products. Notably, the financial institution is able to set science-based targets for four asset classes: real estate, mortgages, electricity generation project finance and loans.

The SBTi is the most comprehensive framework as it theoretically applies to any sector. Emission can be captured by the SBT Portfolio Coverage Approach (PCA), the Temperature Rating Approach (TRA) or by the Sectoral Decarbonization Approach (SDA). Within the SBT Portfolio Coverage Approach, financial institutions commit to having the totality of their clients set their own approved SBTs. On the other hand, the Temperature Rating Approach requires that financial institutions pledge to align to a given temperature pathway by engaging with their clients on setting targets so that the client's emissions are transformed into a corresponding temperature rise. These two approaches do not comply with the NZBA's requirements, as they do not provide information on absolute and/or relative emissions. In spite of that, the SDA, developed in partnership with CDP, UN Global Compact, World Resources Institute (WRI) and WWF, sets forth an emission intensity pathway for companies. The SDA sets physical intensity targets (e.g. CO_2 per unit of economic output) based on sectoral intensity pathways derived from climate scenarios. This method considers sectoral differences which impact the various sector Scope 1 scenarios. Additionally, the SDA provides for sector-specific Scope 2 scenarios, and it can be used to set plausible Scope 3 targets. The SDA uses the convergence of emissions intensity and leverages the Beyond 2°C Scenario (B2DS) from the IEA Energy Technology Perspectives 2017. The SDA provides a pathway for a bank's portfolio emission intensity to converge towards the benchmark by 2050 and SBTi defines the SDA's target criteria as follows:

- Ambition: well-below 2°C pathway for each sector as a minimum ambition.

[42] PCAF's approach seeks to source data from corporate disclosures, while it calculates financed emissions according to an "attribution factor" (e.g. proportion of a bank financing in enterprise value)

- Time frame: 5 and 15 years, although banks are encouraged to develop long-term targets up to 2050.

The SDA was developed for companies operating in homogenous energy-intensive sectors and it follows a "convergence approach" to allocating carbon budgets[43]. Given the sectoral and geographical connotation of the SDA, it can be applied to different geographies. On the contrary, the SBTi sets the convergence of sectors' emissions by 2050, according to a more globalized approach. Thus, specific regional dynamics are not taken into account, representing a shortcoming in the overall methodology.

For those sectors or asset classes that do not fall under the SDA umbrella, banks may choose to use either PCA or TRA. These two metrics may also represent a precious tool to complement the SDA in order to meet minimum coverage requirements for specific asset classes[44].

5.2. Partnership for Carbon Accounting Financials (PCAF) as Emission Accounting Standard

PCAF is a global partnership of financial institutions[45] that aims to develop and implement a comprehensive, harmonized approach to account for and report the GHG emissions stemming from lending and investment activity. Financed emissions provide valuable information when it comes to transition risks and related opportunities. To ensure transparency and accountability, PCAF set forth the "*Global GHG Accounting and Reporting Standard for Financial Industry*", which is an open-source global accounting standard. The standard is a core component of PCAF's mission to boost the involvement of the financial industry in addressing climate change. Consequently, PCAF is open to any financial institution and thus it has developed GHG accounting standards that apply to any financial entity, covering six asset classes, such as: listed equity and corporate bonds, business loans and unlisted equity, project finance, mortgages, commercial real estate, and motor vehicle loans. Given the crucial role of

[43] ShareAction, *Paris-alignment Methodologies for Banks: Reality or Illusion?*, April 2021, https://api.shareaction.org/resources/reports/ShareAction-Paris-Alignment-Report-2021.pdf
[44] Science Based Target Initiative, *Financial Sector Science-based Target Guidance*, Version 1.0, February 2022, https://sciencebasedtargets.org/resources/files/Financial-Sector-Science-Based-Targets-Guidance.pdf
[45] The PCAF Steering Committee was originally composed of the institutions that started the initiative on a global scale: ABN AMRO, Amalgamated Bank, ASN Bank, Global Alliance for Banking on Values (GABV) and Triodos Bank. Nowadays, it also includes Morgan Stanley, NMB Bank, and the UN-convened Net-Zero Asset Owner Alliance

banks in financing the transition to a low-carbon economy, PCAF collaborates with banks worldwide, as well as with investors (e.g., pension funds, asset owners and managers). Among the partners and collaborators, there is also SBTi, as it cooperates with PCAF to enable financial institutions to align their portfolios with the Paris Agreement's goals. Indeed, financial actors that decide to set science-based targets using SDA can use PCAF to measure their financed emissions for baselining and tracking progress against it[46]. Thus, the accounting methodology outlined by PCAF is consistent with the SDA and the adoption of the standard enables the SBTi alignment.

PCAF has elaborated methodologies for the aforementioned asset classes[47], which largely overlap with the SBTi categories, as well as sector-specific guidelines on how to effectively measure the emissions of a specific activity. The framework also provides for a scoring system to assess the methodology used. The score is assigned depending on the data quality and margin of error. This means that, in order to achieve a higher PCAF scoring result, it is essential to prioritise higher-ranked data sources. In this case, the disclosure of data scoring is recommended, so that financial institutions can improve their data quality over time. If verified emissions data is unavailable, companies use data proxies based on physical, revenue or asset intensity estimates.

Regarding the relationship with other financial sector climate initiatives, PCAF plays a complementary role for other initiatives, providing a framework for measuring financed emissions and recognizing the importance of synergies in building a global pathway to net zero. Particularly, PCAF collaborates with the following initiatives:

- UNEP FI Principle of Responsible Banking and its Collective Commitments to Climate Action;
- United Nations-convened Net-Zero Asset Owner Alliance;
- Task Force on Climate-related Financial Disclosure;
- Science Based Target initiative;
- Carbon Disclosure Project;
- European Commission Technical Expert Group on Sustainable Finance;
- Centre for Climate-aligned Finance of Rocky Mountain Institute

[46] https://carbonaccountingfinancials.com/about#steering-committee
[47] More details on the methodologies to measure financed emissions on: PCAF, *The Global GHG Accounting and Reporting Standard for the Financial Industry*, first edition, November 2020

5.3. Paris Agreement Capital Transition Assessment (PACTA)

PACTA is an open-source, free climate-scenario analysis tool to assess corporate lending portfolio alignment with the Paris Agreement goals. It was developed by 2° Investing Initiative (2DII) and launched in 2018 as an open-source toolkit. During COP24 in Katowice, five banks – BBVA, BNP Paribas, ING, Société Générale and Standard Chartered – committed to develop a methodology to align lending portfolios with the Paris Agreement's targets. Thus, to help banks to meaningfully assess the alignment of their corporate lending portfolios with climate scenarios, an *ad hoc* tool called "PACTA for Banks" was developed in September 2020. This tool helps banks to measure the alignment of the lending profile with climate scenarios across a set of climate-relevant sectors and technologies[48]. Notably, forecast data are provided free of charge by Asset Resolution, a commercial data provider developed by 2DII. In turn, Asset Resolution relies on different providers which acquire data on individual assets in climate-relevant industries using various research methods, including direct engagement with industry[49]. On the other hand, forward-looking information is based on publicly available investment and production plans.

The PACTA methodology is very sector or technology-specific and it links financial exposure to physical assets. The main concept of the PACTA methodology is that an effective decarbonization process comes from relevant shifts in technology or energy source, where climate scenarios provide such pathways. Therefore, there is a differentiation between two types of sectors: sectors with a technology roadmap (e.g. power, fossil fuels and automotive) and sectors without a technology roadmap (e.g. steel and cement). Then, it compares the outputs produced by each type of technology to projection of reference climate scenarios. PACTA covers several climate-relevant sectors, such as power, coal mining, oil & gas, automotive, cement, and steel that account for about 75% of global emissions, while the real estate sector is not included under the PACTA umbrella. Specifically, for each of these sectors, PACTA focuses on precise segments of the value chain that control the extent of the impact on the environment and on which decarbonization actions must be concentrated. According to 2DII, the segmentation ensures an effective comparison between the output of each sub-segment. As PACTA focuses on decarbonization for specific segments of the value chain, some

[48] https://www.transitionmonitor.com/pacta-for-banks-2020/b
[49] ShareAction, *Paris-alignment Methodologies for Banks: Reality or Illusion?*, April 2021, p. 46 https://api.shareaction.org/resources/reports/ShareAction-Paris-Alignment-Report-2021.pdf

vulnerabilities may arise along the way. For instance, the segmentation could lead to an underestimation of the assets' interdependence across the value chain.

Regarding the benchmarking options, PACTA takes into account a wide range of scenarios published by IEA. In particular, the toolkit leverages from the IEA's World Energy Outlook 2019 and the ETP 2017. Whereas with the SBTi approach the possibility of selecting different scenarios is limited, with PACTA it is possible to range between national and regional scenarios. This is an important feature, as it allows more granularity in benchmarking assumptions. In addition, PACTA allows banks to compare their portfolios against PACTA's complete dataset, as it includes a corporate economy "market" benchmark.

As the PACTA methodology mainly relies on physical, asset-based company data, it provides for granular, regional, and sector-specific production pathways that can be compared with various scenarios. An important element of the PACTA portfolio alignment tool is the Transition Disruption Metric (TDM), which helps investors to prepare for a transition, that might be disruptive, to a net-zero economy. The TDM complements the PACTA's model and it compares the portfolio's transition pace in a five-year time frame (2021-2026), based on the production of forecasts of the companies in the portfolio, with what companies are expected to do from 2026 to align with the Forecast Policy Scenario (FPS) by the end of 2030. Then, the TDM will provide a quantitative score which represents the potential disruption, according to how far the portfolio lags or leads the FPS scenario from 2021 to 2026. Looking to the results, a higher score corresponds to a higher chance of portfolio disruption in the medium-long term. Conversely, a lower score indicates that investors mitigated the transition risk by moving ahead of the FPS. Thanks to the TDM, PACTA is also suitable for measuring the exposure to risks associated with the transition to a low-carbon economy.

6. An Example of Bespoke Methodology: BlueTrack by Barclays

The English bank Barclays has developed a tailored methodology, BlueTrack, to measure its financed emissions (Scope 3 emissions) and track them at the portfolio level against the goals of the Paris Agreement. BlueTrack represents a valuable ally in tackling climate change and boosting the transition to a low-carbon economy. The methodology builds on and extends existing industry approaches to cover lending and capital market financing.

Since 2020, Barclays has updated its methodology, particularly for Energy and Power sectors, increasing the granularity of Scope 1 and Scope 2 intensity estimate to include company-specific circumstances. As of today, Barclays evaluates methane emissions for

Energy to deliver a detailed measurement of absolute emissions. In 2022 Barclays published 2030 targets for sectors like Cement and Steel, as sub-sectors of Metals. With regard to the scenarios leveraged, Barclays is replacing the IEA Sustainable Development Scenario (IEA SDS) with the updated IEA Net-Zero Emissions 2050 (IEA NZE) scenario, which achieves net zero CO_2 emissions by 2050. The outlined scenarios have been selected due to the fact that they are developed by a reliable external provider. Additionally, the scenarios are aligned with the goals of the Paris Agreement and offer a high-resolution dataset.

BlueTrack encompasses four model steps, answering to eight key design questions in line with the SBTi SDA approach (Tab. 2). The first step of the methodology is to build a Paris-aligned portfolio benchmark using an external climate scenario. When BlueTrack was first developed, the best available scenario was the IEA SDS, which is aligned to a 1.7°C forecast and it outlines a pathway for achieving net-zero CO_2 emissions in the Energy sector by 2070. Now, given the update to the IEA NZE 2050, the bank is setting new targets for its Cement, Steel, Energy and Power portfolios. Yet, the 2025 targets previously set for Energy and Power under the IEA SDS remain untouched. The second model step is to measure the emissions produced by Barclays clients. The bank aims to evaluate emissions across a specific set of business processes that comprise the most material parts of the value chain and are in harmony with the benchmark scenario. Setting boundaries is key to defininig the emissions a company is responsible for. Then, the emissions are quantified based on data extrapolated by various external sources, such as company-reported emissions data and model emissions based on the sector. The third step is to attribute client emissions to the bank's financing activity, by defining the activities in scope. At this point, the bank analyses how the provided financing should be allocated across the different business activities of the clients and then each financing portion is linked to the client's absolute emissions or emissions intensity metric. In this regard, Barclays includes both lending in the reporting data and capital market financing that had been allocated a year prior to the reporting date, giving an exhaustive picture of the support provided to the clients. Notably, Revolving Credit Facilities (which are typically undrawn) represent the majority of Barclays lending. As already mentioned, debt and equity funding arranged in the capital markets are considered to be in-scope too. As the company-level emissions metrics are identified, they need to be linked to the financing that Barclays provides to its clients. Ultimately, Barclays continues to monitor possible industry developments on the topic of green financing within the Power metric, particularly through PCAF's New Methods public consultation regarding green bonds. The fourth and last step of the BlueTrack methodology concerns the aggregation of company-level measurement to a portfolio-level metric. There are

three main metrics: physical intensity, absolute emissions, and energy mix. The last one is regarded as a secondary metric used for reporting purposes only, as it measures the amount of financing Barclays provides to coal, oil, gas or zero-carbon source of energy[50]. Physical intensity evaluates how much CO_2 is released, on average, for a specific amount of economic activity, while the absolute emissions metric measures the absolute emissions generated by a company over a period of time.

Table 2: BlueTrack's model steps and key design questions

Model steps	**Design questions**	**BlueTrack methodology**
Construct Paris-aligned portfolio benchmarks	What metrics are used for which scenario?	Absolute emissions; emissions intensity
	What scenario is used for benchmark construction?	IEA SDS (previously); IEA NZE 2050
Measure client emissions	What scope of emissions are considered?	Energy: 1, 2, 3 Power: 1 Cement: 1, 2 Metals: 1, 2
	What data is used for the calculations?	Data provided by external databases; company reported data
Link emissions to financing	What financing activities are considered in-scope?	All corporate lending
	How is provided financing linked to company-level emissions metrics?	Ratio between financing provided to the company and the book value of total assets
Aggregate to a portfolio-level	How are physical intensity metrics aggregated?	Exposure weighting approach
	How are absolute metrics aggregated?	Sum of financed emissions

Source: Author's elaboration based on: Barclays PLC, *About BlueTrack: an Update on our Methodology for Reducing our Financed Emissions*, 2022

[50] Barclays PLC, *About BlueTrack: an Update on our Methodology for Reducing our Financed Emissions*, 2022, https://home.barclays/content/dam/homebarclays/documents/citizenship/ESG/2022/Barclays_Blue%20Track-White-Paper-2022.pdf

7. Discussion

Nowadays, Paris-alignment methodologies have become a central topic in the financial industry. Due to the recent development of these frameworks, they present some challenges that need to be addressed. First, methodologies alone are not sufficient to ensure the achievement of the Paris Agreement's goals. A robust policy framework needs to be developed in order to complement the models, as they do not prohibit financing of carbon-intensive sectors. Thus, policies should promote the exclusion strategy regarding both coal and unconventional oil and gas. For thermal coal, ShareAction[51] suggests that the strategy should be designed around a clear phase-out plan by 2030 in OECD and by 2040 globally. Likewise, preservation of biodiversity should be pivotal. An effective policy framework should encourage companies to disclose the significant positive and negative contribution to the overall global biodiversity preservation strategy. Although not mandatory, the SBTi has developed two recommendations concerning fossil fuels. One outlines a thermal coal phase-out roadmap across all activities for banks, leading to a complete gradual withdraw of coal by 2030. Secondly, banks are required to disclose fossil fuel investments and lending on an annual basis.

Next, only one of the Paris-alignment methodologies previously outlined include a climate scenario that is in line with a 1.5°C temperature goal. As mentioned above, climate scenarios dictate not only the temperature target, but also the roadmap to achieve a specific temperature outcome. This implies several considerations, including ethical and economic ones. An important difference between SBTi and PACTA is that the latter includes a wide range of scenarios, giving the possibility to choose a regional or national subset of climate scenarios. This opportunity translates into a more granular analysis, even though none of the benchmarking options includes a 1.5°C output yet.

Considering the first methodology presented, SBTi, it is noteworthy that project finance asset class solely includes power generation. Therefore, other sectors which might be associated with fossil fuel assets are not included, as well as advisory services and capital market underwriting. This represents an important flaw in the overall framework, also because underwriting is not included under the PCAF's umbrella. By contrast, BlueTrack by Barclays fills this gap as capital market underwritings falls under the framework's scope. SBTi and PCAF rely on a top-down approach to assessing the counterpart's environmental

[51] ShareAction is a campaigning organisation that promotes responsible investment practices to improve corporate behaviour on ESG matters

footprint, while the PACTA methodology adopt a bottom-up strategy. This, for SBTi and PCAF, leads to problems in terms of reliability, as emissions are calculated directly by the counterparties, and data quality and granularity. Nevertheless, PACF's scoring system fosters a transparent framework to evaluate the data quality in a compelling way. Thanks to this method, external communication by banks is improved in terms of transparency and engagement with borrowers to boost emission disclosure. Conversely, PACTA's approach to data sourcing ensures consistency across companies and sectors, but, as ShareAction underlines, there might be problems to reconcile asset-level data and client-reported figures. As the Katowice Banks affirm, PACTA's data coverage and quality is subject to variations according to company size and different data providers.

The PACTA framework is not prescriptive regarding target setting, but it implicitly focuses on a five-year timeframe. This allows estimation of the counterparties' performance according to the bank's corporate relationship cycles and it optimizes the target setting process in the short term. Yet, PACTA for banks should not be seen as an exhaustive tool, as it needs to be complemented by medium- and long-term goals to create a broader strategy. Moreover, the non-prescriptive nature of the framework can lead to heterogenous levels of ambition and interpretations regarding the final outcome.

Concerning BlueTrack by Barclays, it assesses the portfolio alignment at a sectoral level (Power and Energy), and, like PACTA, it relies on physical data from Asset Resolution. BlueTrack takes a similar bottom-up and segmentation approach to the PACTA's, but it translates data into emission-based metrics. In comparison with SBTi, which is theoretically applicable to any sector, BlueTrack's sector coverage is less extensive as it focuses mainly on Power and Energy, while setting new targets for Cement and Steel. Additionally, the SBTi framework is more exhaustive as it covers the entire value chain of fossil fuel companies. On the other hand, BlueTrack considers not only lending, but also underwriting of equity and debt securities as in-scope of the methodology, ensuring a greater level of commitment. A positive feature of BlueTrack is that the framework includes the IEA NZE 2050 climate scenario, which is consistent with the 1.5°C outcome. The scenario does not present a temperature overshoot and is in line with reductions assessed by the IPCC in its "*Special Report on Global Warming of 1.5°C*". However, just like the other Paris-alignment methodologies, BlueTrack suffers from data quality and quantity challenges, making it less transparent compared to the PCAF scoring system.

Table 3: comparison between the main target-setting methodology options

	Target-setting methodologies			**NZBA requests**
	SBTi	PACTA	BlueTrack	
Developed by	CDP, WWF, WRI, UNGC	2DII	Barclays	n/a
Type of framework	Instructive framework	Open-source and free toolkit	Bespoke methodology	n/a
Framework provider	PCAF	Asset Resolution	Barclays	n/a
Financial instruments	Corporate lending, project finance (power sector), equity and bonds	Corporate lending, project finance, equity and bonds	Corporate lending, project finance, capital markets underwriting	Corporate lending, investments
Reference scenario	IEA 2017 B2DS (only global)	IEA NZE 2050 and other scenarios (both global and regional)	IEA SDS, IEA NZE 2050	Aligned with Paris 1.5°C
Metrics	Physical emission intensity	Emission intensity, technology mix (power, automotive and fossil fuels), production volume trajectory	Physical emission intensity, absolute emissions and technology mix	Emission intensity and/or absolute intensity
Data	Company data and/or sector averages	Bottom-up approach (physical data)	Bottom-up approach (physical data)	n/a
Alignment level	Asset class and individual sectors	Sector and individual technology	Individual sectors	Individual sectors

Source: Author's elaboration based on ShareAction, *Paris-alignment Methodologies for Banks: Reality or Illusion?*, April 2021

Table 4: Main pros and cons of the target-setting methodology options

	SBTi	**PACTA**	**BlueTrack**
Pros	➢ Free ➢ Prescriptive framework, which ensures comparability and accountability ➢ "Delayed" monitoring, as it is based on counterparties' data ➢ Numerous companies, even outside the financial sector, use it	➢ Open-source and free toolkit ➢ "Real-time" monitoring, as it is based on estimation of counterparties' performance according to financial data ➢ National and regional climate scenarios	➢ Absolute emission metric for fossil fuels ➢ Capital market underwriting
Cons	➢ The "top-down" approach could create problems regarding data quality and reliability ➢ Only global climate scenarios	➢ Segmentation of the value chain ➢ Does not include emission metrics ➢ With Asset Resolution proprietary data becomes fee-based	➢ As a proprietary methodology, it is not meant to be marketable

Source: Author's elaboration based on ShareAction, *Paris-alignment Methodologies for Banks: Reality or Illusion?,* April 2021

CHAPTER III

8. Sample Presentation: EMEA Banks

To investigate how banks translate net-zero targets into actions, the following paragraph will present the sample of EMEA banks chosen to conduct the comparative analysis. Particularly, the aim of the benchmarking is to identify how the market is moving towards the goals of the Paris Agreement, also identifying possible best practices. In this regard, two questions arise. The first concerns the emergence of a primacy of one target-setting methodology over another, while the second question focuses on which high-emitting sectors are the most relevant for banks.

The benchmarking group is composed as follows:

- BBVA (Spain);
- Intesa Sanpaolo (Italy);
- UniCredit (Italy);
- Société Générale (France);
- Barclays (United Kingdom);
- Nordea (Finland/Scandinavia).

The reason why these banks were chosen is that they represent the largest banking institutions by capitalisation in the leading European Economies.

9. BBVA

BBVA is a global financial group founded in 1857 and has been developing its sustainability agenda for years. As proof of this, BBVA joined the NZBA in April 2021 as a founding member and is also present in the main sustainability indices, such as the Dow Jones Sustainability Index. Moreover, the bank has been involved in the development of several sustainable finance initiatives, such as the UN Principles for Responsible Banking.

As part of its involvement in climate action, in 2021 BBVA announced intermediate targets for the decarbonization of its loan portfolio in 2030, considering a broader strategy to achieve net-zero by 2050. Additionally, in 2021 BBVA committed to reducing exposure to coal-related activities to zero by 2030 in developed countries, and by 2040 in the rest of the

countries in which it operates. Intermediate decarbonization targets concern four CO_2-intensive industries present in BBVA's portfolio: power and electricity generation, automobile manufacturing, steel production and cement production. In this perspective, BBVA has chosen to follow emission intensity metrics per production unit, starting in 2020 and setting targets for 2030. The approach is coherent with the SDA methodology, together with the PACTA methodology to assess the portfolio alignment.

Figure 6: BBVA's intermediate targets for the decarbonization of the loan portfolio

Sector	Emissions scope	Metric	Benchmark scenario	BBVA baseline (2020)	BBVA 2030 target	Absolute effort	CAGR(*)
Power	1+2	kg CO2e/MWh	IEA Net Zero 2050	249	120	(52%)	(7.0%)
Auto	3	g CO2/km	IEA Net Zero 2050	220	118	(46%)	(6.0%)
Steel	1+2	kg CO2/tonne steel	IEA Net Zero 2050	665	515	(23%)	(2.5%)
Cement	1+2	kg CO2/tonne cement	IEA Net Zero 2050	695	575	(17%)	(1.9%)
Coal	NA	Portfolio trend (€Mn)	NA	Phase out plan already announced in March 2021: ▪ 2030 for developed countries ▪ 2040 globally			

(*) Percentages are the Compound Annual Growth Rate between the base year (2020) and 2030

Source: https://www.bbva.com/en/sustainability/bbva-announces-decarbonization-targets-for-new-economic-sectors-by-2030/

Furthermore, BBVA contributed to the development of the PCAF methodology, to set alignment targets and to measure the emissions. Notably, the loan portfolio's alignment must reflect three characteristics according to BBVA:

- Provide client guidance, as indicators to assess the decarbonization strategy are essential to target financial flows toward net-zero enabling technologies and activities.
- The mitigation of transition risk by increasing the weight of the exposure with clients involved in decarbonization pathways.
- Transparency is an essential feature, thus BBVA has joined various initiatives that promote reporting regarding decarbonization strategies and objectives. The bank's

commitment to transparency is strengthened by the publication of the annual TCFD Report.

In 2021, BBVA revised its Pledge 2025, doubling its initial targets of directing sustainable finance to 200 billion euros through 2025. Indeed, from 2018 to 2021, the bank allocated a total of 85,817 million euros to sustainable activities[52]. Together with these activities, BBVA has been a key player in financing sustainable projects, such as projects of self-generation and energy efficiency, throughout 2021. Moreover, BBVA has been active in the issuance of bonds linked to environmental performance, such as green bonds and social and sustainable bonds. BBVA continues its action in supporting the growth of the green bond market in geographical areas outside Europe.

10. Intesa Sanpaolo

Intesa Sanpaolo is the largest Italian banking group with a significant international presence. The bank pays great attention to issues of environmental and social sustainability and therefore it adheres to important international initiatives, such as the UN Global Compact. The group's commitment to sustainability and ESG is underlined by its decision to the NZBA in October 2021. To emphasize the group's ESG vocation, the 2022-2025 Business Plan confirms the bank's important role as leader in Italy, with its commitment to allocate 115 billion of euros to the transition towards a low-carbon economy. In addition, Intesa Sanpaolo is committed to reducing its emissions to zero by 2030 and to achieving net-zero target for its loan and investment portfolios by 2050. Particularly, the bank has set the 2030 net-zero target for its own emissions with 100% purchase of energy from renewable sources at group level. The emission reduction target complies with SBTi requirements.

The GHG emissions that Intesa Sanpaolo reports in CO_2 equivalent – in line with the GHG Protocol standard – are related to Scope 1 and Scope 2 emissions. The bank promotes the reduction of these emissions through the implementation of the *Own Emissions Plan*, that outlines specific medium to long term actions to limit the consumption of traditional electricity, natural gas, and diesel. The Own Emissions Plan takes the place of the multi-year Environmental and Sustainability Plan – the Climate Change Action Plan (CCAP) – which will

[52] BBVA, Report on TCFD 2021, December 2021, https://shareholdersandinvestors.bbva.com/wp-content/uploads/2022/03/BBVA_TCFD_Report_December_2021_ENG.pdf

be reported until 2022. The CCAP was designed to include climate and emissions objectives for 2022 and 2037.

Table 5: The 2030 targets of the Own Emissions Plan

Scope	Base Year	% of emissions considered compared to the total scope	Base year emissions (tCO_2eq)	Target year	Reduction target Vs Base year	2021 Results
Scope 1+2 (market based)	2019	100%	96,192	2030	-53%	-16%
Scope 3 Paper	2019	100%	6,025	2030	-40%	-35%

Source: https://group.intesasanpaolo.com/it/sostenibilita/ambiente/impatti-ambientali-diretti/emissioni-gas-a-effetto-serra/risultati-e-obiettivi

In the 2022-2025 Business Plan Intesa Sanpaolo presented net-zero aligned targets for 2030 in the following high-emitting sectors: oil & gas, power generation, automotive and coal mining. The targets are set against the 2019 baseline and the reference climate scenario is the IEA Net-Zero 2050. The group commits to request SBTi certification.

Table 6: Net-zero aligned targets for 2030 in high-emitting sectors

	Sectors and Scope	Metrics	Baseline 2019	Target 2030
High-emitting sectors	Oil & Gas (Scope 1, 2 , 3)	gCO_2e/MJ	64	52-58
	Power Generation (Scope 1, 2)	$kgCO_2e/MWh$	214	110
	Automotive (Scope 3)	gCO_2e/km	162	95
	Coal Mining (exclusion policy)	Eur bn exposure	0.2	0 by 2025

Source: https://group.intesasanpaolo.com/content/dam/portalgroup/repository-documenti/investor-relations/presentazioni-it/2022/Piano%20di%20Impresa_2022-2025_IT.pdf

11. UniCredit

UniCredit is one of the main Italian banking groups and has a strong international vocation. The group is committed to a climate-neutral future and thus UniCredit has joined, over the years, many international initiatives, such as the Principles for Responsible Banking (2019) and the NZBA (2021).

To reduce the bank's environmental footprint, UniCredit has set numerous targets concerning both its own operations and lending activity. UniCredit aims to reduce its emissions to zero by 2030, while, by 2050, it aims to achieve net-zero emission for its investment and lending portfolios. Notably, during 2022, the bank has set an additional target concerning the maximum exposure to carbon-intensive industries. UniCredit is also re-aligning its environmental lending according to the new EU Taxonomy regulation. Together with that, with the group published its "*Sustainable Bond Framework*", underlining the growing importance of green financial instruments in the bank's funding activity. Moreover, UniCredit discloses climate-related contents according to the TCFD Framework and applies the PACTA methodology to measure the alignment of its lending portfolio against the goals of the Paris Agreement.

The bank has set ambitious sustainability targets and in 2020 reached the goal of 60% reduction of its emissions, planning to reach 80% by 2030. According to the group's new Coal Policy, UniCredit is committed to a complete and global phase-out of coal sector financing by 2028. Similarly, the new Oil and Gas Policy prohibits the financing of new projects in the Artic oil and offshore Artic gas[53]. Additionally, UniCredit does not provide financial services and products aimed at new exploration of oil and expansion of oil reserves to owners/operators.

12. Société Générale

Société Générale is one of the most important financial groups in Europe. The bank acknowledges the importance of sustainable development and social justice. In particular, the group has joined several international initiatives which foster the transition to a carbon neutral future. Indeed, Société Générale is a founding signatory of the Principles for Responsible Banking and, together with the other Katowice Banks, has made valuable contribution to the development of Paris-aligned methodologies, particularly the PACTA. Furthermore, Société

[53] https://www.unicreditgroup.eu/en/a-sustainable-bank/our-new-esg-targets.html

Générale is a member of the NZBA and therefore committed to align its lending and investing activities with specific climate scenarios consistent with the Paris Agreement's targets. The group has to set the first round of intermediate targets (2030) focusing on the most carbon-intensive macro-areas in the bank's portfolios. Société Générale identifies some priority areas, including coal, oil & gas, agriculture, power generation, iron & steel, transport, aluminium, cement, commercial and residential real estate. To assess and report its climate footprint, the group uses both alignment and carbon footprint measurements. The reason behind this combined approach lies in the fact that measuring the carbon footprint may be useful in identifying priority portfolios to target and to assess the overall absolute emission reductions, but this method faces some challenges (e.g. data quality and availability, double counting, volatility). Conversely, the alignment method offers a more complete perspective for managing the portfolios.

Table 7: Overview of approaches and methodologies used for decarbonising Société Générale's credit portfolio

Objectives	**ALIGNMENT** Used to set targets and decarbonize portfolios					**CARBON FOOTPRINTING** Used for identifying high-emitting sectors, but not for target setting and piloting
Methodologies	PACTA/Katowice	Poseidon Principles	NZ Steel Initiative	FBF Approach	In development	PCAF
Portfolios	Coal, oil&gas, power, cement, automotive	Shipping	Steel	Residential real estate	Other sectors	All sectors in corporate credit portfolio

Source: Société Générale, *Climate Disclosure: Société Générale's Climate Report Aligned with the TCFD Recommendations*, December 2021

In 2019, the bank announced its intention to phase-out of thermal coal by 2030 in EU and OECD countries, and globally by 2040. The indicator selected is the financing of thermal coal extraction and power (Eur gross commitment – index base 100), in line with the Katowice

application of the PACTA methodology[54]. For benchmarking, the reference scenario is that of the thermal coal extraction and power demand trend, stemming from the IEA's SDS 2020. In the bank's climate disclosure, it is reported that, between 2019 and 2020, the total exposure to thermal coal power and mining was reduced by 19%.

Regarding oil and gas, Société Générale was among the first institutions to commit, in 2020, to an overall reduction of the exposure to this sector by 10% (in absolute terms) by 2025. The scope of the commitment was then enlarged in 2021, thus including several activities linked to Arctic petroleum, Amazonian petroleum, tar sands and extra heavy crude oil. Société Générale commits to reduce its upstream oil and gas portfolio by 10% by 2025 (baseline end of 2019). Between 2019 and 2020, the reduction of the total exposure to upstream oil and gas was about 8%. The scenario used in this case is the oil and gas production trend from the IEA's SDS 2020. However, the group affirms that the target is more ambitious than the scenario itself.

To track and reduce the emissions stemming from the group's power generation portfolio, Société Générale uses the CO_2 intensity pathway for the power sector (gCO_2/kWh) derived from the IEA's SDS 2020. The reduction target is set at 67 gCO_2/kWh by 2040, with mid-term targets at 212 and 163. Société Générale monitors the overall alignment of both its fossil fuel and power generation portfolio, based on the primary and secondary energy financing mix. According to the Climate Report 2021, the bank selected as an indicator the share of fossil fuel energy sources (% of gross commitment) in its energy portfolio. In this case, the benchmark is the energy demand mix from the IEA's SDS 2020.

Not only that, but the bank is also a founding signatory of the Poseidon Principles, created to involve the shipping sector in the transition, by setting specific environmentally responsible standards. In 2019 Société Générale took part in the Getting to Zero Coalition to develop and deploy commercially viable zero-emission vessels on the high seas by 2030. Next, in 2021, the bank joined the Call to Action for Shipping Decarbonisation, which promotes the shift to net-zero vessels and fuels by 2030.

Regarding the steel and aviation industry, Société Générale is co-leader of the Steel Climate-Aligned Finance Working Group. The Group aims at establishing a framework to promote the low-carbon transition in the steel sector, by disclosing and assessing to which degree the GHG emissions related to each financial institutions' portfolio comply with the

[54] Société Générale, *Climate Disclosure: Société Générale's Climate Report Aligned with the TCFD Recommendations,* December 2021, p. 46

1.5°C temperature target. Lastly, the bank is a founding member of the Aviation Climate-Aligned Finance Working Group, focusing on the decarbonization of the aviation sector.

13. Barclays

In March 2020, Barclays announced its intention to become a net zero bank by 2050, following an ambitious climate strategy based on three pillars: achieving net-zero operations, reducing the bank's financed emissions, and boosting the transition to a low-carbon economy.

As already mentioned, Barclays has developed an *ad hoc* Paris-alignment methodology, BlueTrack, to meet the goals of the Paris Agreement. The following table (table 6) outlines the targets selected by Barclays and the progresses made, as well as the new announcement the group is making. The bank recognizes the importance of target setting activities and Barclays' approach is consistent with the PCAF methodology.

Barclays recognizes that most of its carbon impact comes from financed emission and so the bank is committed to align its financing strategy with the Paris Agreement's goals. In November 2020, the bank set targets prioritizing the Power and Energy sectors, as they are the most carbon-intensive sectors in which Barclays is heavily involved. Thus, the initial target was that of 30% reduction by 2025 in the CO_2 intensity of its Power portfolio. Likewise, Barclays set a 15% reduction target in absolute emissions of its Energy portfolio by 2025, against a December 2020 baseline of 75. Both targets were informed by the IEA's SDS, and, at the end of 2021, significant progresses were made, as Barclays achieved an 8% reduction in Power CO_2 intensity and a 22% reduction in absolute emissions in Energy. New 2030 targets are being set for Energy and Power, as well as for Cement and Steel. Similarly, the bank will introduce targets for sectors like Automotive Manufacturing and Residential Real Estate, with the aim of broadening the scope of the analysis. An important step forward for Barclays is represented by the inclusion of methane emission in the Energy sector. Indeed, this ensures a more granular and precise measurement of the absolute emissions for its Energy portfolio.

Restriction policies play a complementary role to sector-specific emission-reduction targets. Barclays applies restrictive policies when it comes to thermal coal mining and power and unconventional oil and gas, which includes restriction in the financing of oil and gas projects in the Artic Circle. In particular, the bank has decided not to provide any financing directed to the construction or expansion of coal-fired power plants, as well as the development of greenfield thermal coal mines around the world. Barclays is strengthening its policy, as a

complete phase-out of financing to clients involved in thermal coal mining or coal-fired power generation is expected by 2035. The bank's phase-out path is designed according to different deadlines, in respect of the cultural, economic and societal differences in various parts of the world. By 2030, Barclays will introduce phase-out dates for clients involved in coal-fired power generation in the UK and the EU, while, for the rest of the world, by 2035.

Table 8: Barclays' selected targets and progress

Strategic pillar		Previously announced target	Progress	New announcement
Achieving net-zero operations		By the end of 2021	2021	
		• -80% GHG emission reduction Scope 1 and Scope 2 (market based) against a 2018 baseline • Source 90% renewable electricity for Barclays global operations	• -86% GHG emission reduction. • 94% renewable electricity • Carbon neutral for Scope 1, 2 and 3 business travel emissions.	• -90% GHG emission reduction in Scope 1 and 2 (market based) by the end of 2025 against 2018 baseline. • Source 100% renewable electricity for Barclays global operations by the end of 2025.
Reducing Barclay's financed emissions		By the end of 2025	2021	By the end of 2030
Portfolio reduction targets	Energy	• -15% absolute CO_2 emission reduction against a 2020 baseline	• -22% absolute CO_2 emission reduction	• -40% absolute CO_2 emission reduction against a 2020 baseline of 78.5 Mt CO_2e (Scope 1, 2 and 3)
	Power	• -30% CO_2 emission intensity reduction	• -8% CO_2 emission	• -50% to -69% CO_2 emission

		against a 2020 baseline (Scope 1)	intensity reduction	intensity reduction against a 2020 baseline of 320 $kgCO_2/MWh$ (Scope 1)
	Cement	n/a	n/a	• -20% to -26% CO_2 emission intensity reduction against a 2021 baseline of 0.620 $MtCO_2e/Mt$ (Scopes 1 and 2)
	Steel	n/a	n/a	• -20% to -40% CO_2 emission intensity reduction against a 2021 baseline of 1.926 $MtCO_2e/Mt$ (Scopes 1 and 2)
		Previously announced target	New announcement	
Restrictive policies	Thermal coal mining	• By 2025, no financing to entities that generate more than 30% of their revenue from thermal coal mining • By 2030, no financing to entities generating more than 10% of their revenue from thermal coal mining	• By 2023, no financing to new clients engaged in thermal coal mining and no financing to existing clients generating more than 30% of revenues from thermal coal mining • By 2023, Barclays will not provide general corporate financing to	

			clients with entities engaged in opening new thermal coal mines or material expansion of existing coal mines • By 2030, in OECD phase out of financing to clients engaged in thermal coal mining, while in the rest of the world no financing to entities generating more than 10% of their revenue from thermal coal mining • By 2035, phase out of financing to clients engaged in thermal coal mining
	Thermal coal power	• By 2030, no financing to companies generating more than 10% of their revenue from thermal coal power	• By 2023, Barclays will not provide general corporate financing to clients with entities engaged in developing new coal-fired power plants or material expansion of existing coal-fired power plants • By 2030, in the UK and EU, phase out of financing to clients engaged in thermal coal power, while in the rest of the world no financing to clients generating more than 10% of their revenue from thermal coal power • By 2035, phase out of financing to clients involved in coal-fired power generation

	Previously announced target	Progress	New announcement
Financing the transition	Existing targets	2021	
	• Facilitate £100 bn in green financing	• Circa £62bn green financing facilitated	Barclays is currently reviewing its

	between 2018 and 2030 • Invest up to £175m by 2025 of Barclays' own capital in environmentally focused early-stage companies • Grow Barclays' green bond portfolio to £4bn over time	• £54m capital invested • £3.4bn green bond portfolio	sustainable financing strategy

Source: author's elaboration based on Barclays' Climate Strategy Targets and Progress (22 March 2022) https://home.barclays/content/dam/home-barclays/documents/citizenship/Sustainability/Barclays-Climate-Strategy-Targets-and-Progress-2022-Final.pdf

14. Nordea

Nordea is a Nordic bank strongly committed to sustainability, which is integrated in every aspect of its business strategy and is co-founder and supporter of several UN-convened climate initiatives. In 2021, Nordea became a member of the NZBA, while supporting the CCCA. In 2020, Nordea joined the PCAF to boost the target-setting process, as well as to support the formulation of more long-term objectives. In line with the PCAF's framework, the bank attributes a share of its clients' emissions to Nordea's scope 3 carbon footprint[55]. The calculation of financed emissions is based on client data, when available. For lending customers who have to yet quantify their emissions, Nordea applies general emission factors at sectoral level from the PCAF's database. However, the bank is aware of the challenges arising from data quality and data access delay.

In its sustainability strategy, the bank has identified four main pillars, thanks to a combined materiality and impact analysis: climate action, social responsibility, governance and culture and financial strength. The pillars draw on the UN Sustainable Development Goals and the Paris Agreement. In particular, the bank is committed to reducing its emissions to zero by 2050 and, for this, targets have been formulated for 2050, 2030 and the shorter term (2023-2025).

[55] Nordea *Annual Report 2021*, 2021, p. 318 https://www.nordea.com/en/doc/annual-report-nordea-bank-abp-2021.pdf

By 2030 the goal is to reduce the carbon footprint of Nordea's lending and investment portfolios by 40-50% against a 2019 baseline. The bank is also moving towards a significant reduction in the emissions linked to its internal operations thanks to a reduction target of 50% by 2030 and 30% by 2023 against a 2019 baseline.

In order to develop a comprehensive sustainability strategy, Nordea has started to prioritise sectors according to their level of financed emissions and exposure to climate-related risks. The analysis identified the following sectors as the ones that need a deep assessment: oil, gas and offshore; shipping; mining; paper and forest products; animal husbandry; fishing and aquaculture; utilities distribution and waste management; crops plantation and hunting; air transportation; land transportation; capital goods; construction; real estate management[56]. In 2021, the bank conducted deep dives on three sector portfolios: shipping, oil, gas and offshore and mining and supporting activities. The evaluations aimed at measuring financed emissions and assessing customer's alignment with Nordea's sustainability strategy. Another goal of the analysis was to examine climate-related financial risks, as well as opportunities, related to these sectors to define a clear environmental strategy and subsequent targets.

Regarding the oil, gas and offshore sector, during 2021, Nordea significantly improved its Sector Guideline, designing a phase-out path for unconventional oil and gas, including drilling extraction in the Artic. The bank also improved its emission data quality, as customer-level data now cover more than 80% of Nordea's exposure[57]. Similarly, a deep analysis was carried out regarding the mining and supporting activities sector, pinning down very different opportunities and risks that may affect the pathway towards net zero. Notably, Nordea no longer has any lending exposure related to thermal coal mining. Lastly, for the shipping sector, the bank is involved in different partnership, aside from the NZBA, to boost a cleaner and carbon-neutral shipping industry. Specifically, Nordea is signatory of the Poseidon Principles, and its shipping portfolio is 1.1% lower than the global trajectory. Moreover, Nordea follows the Responsible Ship Recycling Standards, which foster responsible ship recycling, while minimizing the dangers stemming from hazardous material onboard. During 2021, Nordea was able to sign 100% of new loan agreements in accordance with responsible recycling principles.

[56] Ivi, p. 32 https://www.nordea.com/en/doc/annual-report-nordea-bank-abp-2021.pdf
[57] Ivi, p. 319

15. Discussion

Looking at the different documents and sustainability reports of the banks in the benchmarking group, some differences emerge in terms of commitments and clarity of the net-zero roadmap. These differences in targets and subsequent actions may derive from different cultural settings and socioeconomic circumstances. As already mentioned in this paper, the net-zero pathway is not only a science-based concept but is also deeply intertwined with a single country or an area's historical, economic, as well as legislative, background. For instance, in the Nordic parts of Europe great attention is posed on environmental matters. In 2016, Norway's parliament has approved a proposal to achieve climate neutrality ahead of the EU's proposed timeframe of 2030. Not only that, but the governments of the Nordic countries also committed to become the most sustainable region by 2030, underlining its efforts to try to fight climate change. Confirming the above are the results of the Environmental Performance Index (EPI), which provides a data-driven summary of the state of sustainability around the world[58]. Indeed, in 2022, the Nordic countries and the UK are positioned in the forefront of the index, while France is 12th, Italy is 23rd and Spain 27th.

As summarized in the following table (Tab. 8), many players have started to communicate specific sectorial targets, oftentimes including numerical disclosure. However, targets may vary from peer to peer according to metrics, baselines, and reference climate scenarios. Many banks' targets are informed by the IEA NZE or the IEA SDS. Furthermore, discrepancies in metrics are particularly visible when it comes to Oil & Gas, for which metrics range from absolute emissions ($MtCO_2$) to absolute exposure and baselines are differ as well (Tab. 9).

Besides, every bank in the benchmarking has developed a coal-fired policy and has pledge to phase-out of thermal coal in the decades to come (in any case, before 2050). Indeed, the combustion of fossil fuels accounts for almost 83% of global CO_2 emissions and the sector is striving to decarbonize through energy efficiency, electrification and mitigation of methane emissions[59]. On top of that, the Oil & Gas sector represent a point of attention, as most banks in the sample deliver not only sector-specific coverage, but also numerical short and mid-term targets (2025 and 2030). Similarly, banks disclose numerical targets for the Power sector (Tab. 10), emphasizing its relevance from an economic point of view, especially in relation to the transition to a carbon-neutral economy. As a McKinsey research affirm, the Power sector will

[58] https://epi.yale.edu

[59] McKinsey, *Sectors are Unevenly Exposed in the Net-Zero Transition*, 25 January 2022, https://www.mckinsey.com/capabilities/sustainability/our-insights/sectors-are-unevenly-exposed-in-the-net-zero-transition

play an important role both in terms of economic development and increasing electrification of other sectors, according to the NGFS Net Zero 2050 scenario. As already mentioned, the NGFS Net Zero 2050 model supposes that climate change regulations are introduced at an early stage and then implemented gradually, so that global warming is limited to 1.5°C by 2050.

Table 9: a comparison between sector-specific targets coverage

✓ Sector coverage with targets disclosure

− Sector coverage

⊘ Policy on the phase-out of thermal coal

	Target	Oil & Gas	Power	Coal	Cement	Steel	Automotive	Shipping
BBVA	2030		✓	⊘	−	✓	✓	
Intesa Sanpaolo	2030	✓	✓	⊘			✓	
UniCredit	2030	−		⊘				
Société Générale	2025	✓	✓	⊘			✓	✓
Barclays	2025	✓	✓	⊘	✓	✓		
Nordea	2030	−		⊘				−

Source: Author's elaboration based on public reports and announcements

Table 10: Oil and Gas portfolio metrics, baselines and targets comparison

Bank	Metric	Baseline	Target
Intesa Sanpaolo	Physical intensity	64	By 2030: 52-58
Société Générale	Absolute exposure	100	By 2025: -10% exposure reduction (absolute terms)
Barclays	Absolute emissions	75	By 2025: -15% absolute CO_2 emission reduction

Source: Author's elaboration based on public reports and announcements

Table 11: Power portfolio metrics, baselines and target comparison

Bank	Metric	Baseline	Target 2030
BBVA	Physical intensity	249	120
Intesa Sanpaolo	Physical intensity	214	110
Société Générale	Physical intensity	260	212
Barclays	Physical intensity	320	-50% to -69% CO_2 emission intensity reduction

Source: Author's elaboration based on public reports and announcements

The analysis suggests that the PCAF framework dominates the market in terms of emission accounting standard, as it provides for the quantification of financed emissions. PCAF developed the *Strategic Framework for Paris Alignment* to guide institutions towards the economic and environmental transition, thanks to an open and global network of companies. In addition, what emerges is that the majority of the banks in the benchmarking are adopting the SBTi SDA as target-setting paradigm (Tab. 11). Not only that, but also BlueTrack by Barclays is based on the SDA and the PCAF. Indeed, the NZBA, which is the most followed paradigm by banks, poses its methodologic foundations on the convergence between the SBTi and the PCAF principles, with a specific focus on physical intensity metrics. The success of SBTi is probably due to the fact that the methodology is theoretically applicable to any sector, as long as it is covered by one the approaches available (SDA, TRA and PCA). Additionally, SBTI's prescriptive nature can promote comparability and accountability. Notably, BBVA and Société Générale both committed to develop near-term targets based on SBTi, despite of being two contributors for the creation of the PACTA methodology. BBVA's target-setting process is consistent with the SDA, while using PACTA for portfolio alignment. Likewise, Intesa Sanpaolo emission reduction targets comply with the SBTi standard, and the bank is committed to obtain the SBTi certification. Then again, Barclays' tailored methodology, BlueTrack, draws on the SBTi SDA, as it focuses on reducing portfolio intensity based on a sector-based approach.

Table 12: Target-setting methodologies used by banks in the benchmarking

Bank	SBTi	PACTA
BBVA	✓	✓
Intesa Sanpaolo	✓	
Société Générale	✓	✓
Barclays	✓	

Source: Author's elaboration based on public reports and announcements

Overall, as this sample of banks demonstrate, financial institutions are aware of the challenges and threats posed by climate change. These banks are putting their credibility on the line and the public is now invited to check their progress. In spite of this, there are shortcomings that must be tackled to achieve the Paris Agreement's goals. For instance, as suggested by the World Economic Forum, a global carbon price, driven by collective policy actions and market dynamics, would provide clarity[60]. Similarly, the availability and quality of data concerning companies involved in high-emitting sectors represents a challenge that must be addressed. A solution can be found in an international agreement that sets proper accounting practices to create a common ground on which to uniformly measure everyone's progress. According to an analysis conducted by Carbonsink[61] in their Net Zero Readiness Index 2022, companies should implement five core practices to enable the environmental transition:

1. Measuring and reporting Scope 3 emissions, in order to assess the bank's overall carbon footprint. Quantifying Scope 3 emission is a complex process that requires the involvement of the entire "supply chain" to ultimately gain insight of the bank's environmental impact.
2. Financial institutions must set reduction targets in line with (climate) science.
3. The emission reduction plans must be ambitious.

[60] World Economic Forum, *Banks Can Achieve Net-Zero Pledge by 2050. Here's How*, 11 October 2021
[61] Carbonsink is a leader in Italy in climate consulting for companies and in developing mitigation projects that generate high-quality carbon credits, certified by international Gold Standard, Verified Carbon Standard and Plan Vivo standards

4. Supporting mitigation projects to balance the emission produced and financed. Carbonsink encourages the use of carbon credits certified by international standards to offset residual emissions.
5. Ensuring clear and effective communication, to align with the expectations of the scientific community. Additionally, this would reduce the risk of greenwashing.

Lastly, the net-zero transition is strictly related to the climate policy framework. It is time to ensure a harmonized global approach, providing incentives to promote companies to embrace the net-zero ambition.

CONCLUSIONS

Limiting the rise in global temperature is essential for preserving life on the planet and to preventing acute climate hazards from becoming more and more frequent and disruptive. Addressing climate change will require great efforts in decarbonization and all actors in the real economy are required to reduce their GHG emissions in the atmosphere. To reach the temperature goal of 1.5°C above pre-industrial levels, a holistic and comprehensive strategy is needed, involving all spheres of society.

In this perspective, financial institutions are indispensable elements, as they provide economic actors with capital flows and guidance. Banks are stepping up the climate challenge, as demonstrated in the numerous UN-convened initiatives, such as the NZBA and the UN Principles for Responsible Banking. Indeed, banks are putting their credibility on the line, pledging to the transition to a net-zero economy and ensuring it happens within the timeframe identified by the scientific community. Paris-aligned target-setting and emission accounting methodologies – such as SBTi, PCAF and PACTA – are valuable allies to pursue ambitious objectives and to design a credible roadmap. The analysis conducted on a sample of EMEA banks – BBVA, Intesa Sanpaolo, UniCredit, Société Générale, Barclays and Nordea – showed that the market is aligning on the use of SBTi as the main methodology for target-setting, with a significant convergence of PCAF as emission accounting standard. In particular, Barclay's proprietary methodology, BlueTrack, is also based on SBTi's Sectoral Decarbonization Approach (SDA).

Nevertheless, concrete actions are needed to help banking clients become engaged in the transition and to communicate with regulators. Financial institutions are required to measure and disclose their financed emissions, as well as the corrective actions put in place to reduce them.

There are still many challenges that must be addressed, such as a harmonized accounting system for carbon to guarantee that progress is tracked in the same way for everybody. However, many financial institutions are delivering important results in assessing their financed emissions and boosting sustainable practices. What is certain is that there is a long way to go, and time is almost up, as the IPCC reminded us in its last report. The world needs a strong, collective intervention to secure the future of the generations to come.

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Summary

The physical effects of global warming are increasingly visible across the globe, elevating climate change to a life-threatening menace. The scientific community has tried to warn that the accumulation of anthropogenic greenhouse gases (GHG) emissions in the atmosphere may lead to a worldwide catastrophe. As a result, international actors started to pose the foundations for a global climate policy framework, with the adoption of the Kyoto Protocol and, later on, of the Paris Agreement. However, scientists are worried that the current course of action is not sufficient to mitigate the consequences of climate change. Therefore, all economic actors must contribute to the decarbonization of the global economy and the focus of climate policy is now on net-zero emissions. This concept is not only scientifically rooted, but also presents cultural, economic and ethical implications.

In this context, financial institutions play an essential role in directing capital flows towards environmentally friendly activities, enabling the transition to a net-zero emission world. This research aims at investigating how banks set their net-zero targets, with an excursus on the main target-setting methodologies: SBTi, PCAF, PACTA and Barclay's BlueTrack. Moreover, the paper offers a deep dive on a sample of six EMEA banks to examine how financial institutions pursue their targets through concrete actions. The sample is made up as follows: BBVA, Intesa Sanpaolo, UniCredit, Société Générale, Barclays and Nordea. The research was carried out by analysing the Climate Reports and Sustainability Reports of each bank up to the year 2021, outlining the main emission targets and achievement.

In addition, this paper presents a first qualitative part, analysing both the current climate change policy and the evolution that have occurred in the recent years.

The International Climate Policy Framework: from Kyoto Protocol to Paris Agreement

The First World Climate Conference (FWCC) was held in 1979 and it represents the first relevant attempt to acknowledge the dangers posed by climate change. In 1988, the United Nations General Assembly adopted the resolution titled "Protection of Global Climate", in which is stated that the Assembly is concerned that "*certain human activities could change global climate patterns with potentially severe economic and social consequences*".

As a result of this, great progress has been made regarding the study of the implications of climate change, especially through the work of the Intergovernmental Panel on Climate Change. The first IPCC report dates back to 1990 and contains hypothesis on the effects of

human activity on climate patterns. The assumptions made in the report concurred in formulating the 1992 UN Framework Convention on Climate Change (UNFCCC), with the ultimate goal of preventing "dangerous" human interference with the climate system. The countries which have ratified the Convention are called "Parties to the Convention" and, since that time, have taken part in the Conference of the Parties (COP).

The UNFCCC stresses the importance of the Principle of Common but Differentiated Responsibilities (CBDR), according to which historical considerations cannot be ignored in approaching a conscious and reduced use of fossil fuels. The CBDR justifies the differentiation of the burdens borne by countries, given the different extent to which countries have contributed to the deterioration of the climate. Thus, the UNFCCC featured an Annex (Annex I) that contained the list of developed countries on whom the burdens of climate change fall. In 1995, the Berlin Mandate stipulated that there were no obligations for countries which were not listed in Annex I of the UNFCCC.

The CBDR Principle, and the interpretation of the Berlin Mandate, played a key role in the adoption, in 1997, of the Kyoto Protocol. This created a "firewall" between developed and developing countries, as the annex-based approach was considered to be too rigid. The United States did not ratify the Protocol, which did not consider the rapid economic growth of both Chine and India.

Given the difficulties that arose in the implementation of the Kyoto Protocol and its substantial failure, the Berlin Mandate's interpretation of the CBDR Principle needed to be overcome. In December 2015, the Climate Change Conference was held in Paris, which led to the creation of the so-called "Paris Outcome", made up by the COP Decision and the Paris Agreement. Of the two documents, only the Paris Agreement represents a legally binding international treaty. The 195 participating countries have made a commitment to contain the rise in global temperature within 2°C by the end of the century, with the additional goal of containing it to 1.5°C. The Paris Agreement provided for the participation of all countries and the existence of the same obligations, without the distinction between developed and developing States. The Paris Agreement does not impose specific reductions targets, but collective efforts are promoted through the "Nationally Determined Contributions" (NDCs). Particularly, the Paris Agreement does not provide for any sanction mechanism against those countries which could possibly fail to fulfil the commitments established at the national level.

Nevertheless, the Paris Agreement did not establish definitive rules for emission reduction, delegating this task to the subsequent COPs. In COP26, held in Glasgow, close to 200 countries participated to adopt the "Climate Pact", which is a powerful tool to renew the

commitments to reduce the emissions. One of the main goals of COP26 was to phase out of coal and prevent all countries from financing new coal-fired plants. However, many major coal producers did not sign the settlement, including the US, Australia, China and India. Additionally, methane was a big topic of discussion during COP26, but the major producers of methane emissions did not sign the proposed "global methane pledge". From a finance standpoint, the COP26 underlined the leading role of developed countries towards emerging economies.

2030 UN Agenda: 17 Development Goals

The 2030 Agenda for Sustainable Development is an action agenda for people, planet and prosperity and it was signed on September 2015 by 193 UN countries. It consists of 17 Sustainable Development Goals (SDGs), which are part of a broader, structured programme of 169 targets to be achieved in the environmental, social and economic areas. Thus, the SDGs underline that sustainability is not a purely environmental issue, but encompasses three dimensions – social, economic and ecological – and aim to end poverty and inequality.

The SDGs, together with the Paris Agreement, form a real roadmap for the international community in the direction of a more sustainable world, with a particular focus on social and economic dimensions.

The essence of the 2030 Agenda consists of five core principles that direct the policies on sustainable development, also known as the "5Ps": people, planet, partnership, and peace. This means that for a development intervention to be sustainable it must take into account the social, economic and environmental consequences it generates and lead to conscious choices in terms of the trade-offs, synergies and spin-offs it creates [62]. Thus, the 2030 Agenda invites stakeholders to think holistically and creatively about the approach to sustainable development, which must involve all spheres of civil society in a collective and prolonged effort.

The European Framework and Banking Supervision on Climate-related Financial Risk

The European Union has also adopted a course of action to tackle climate change and promote the reduction of pollutant emissions in the atmosphere. With the 2019 Green Deal, the

[62] United Nations System Staff College Knowledge Centre for Sustainable Development, https://www.unssc.org/sites/default/files/2030_agenda_for_sustainable_development_kcsd_primer_en.pdf

EU will present measures focusing on the theme of sustainability, including the socio-economic perspective. The EU Green Deal is an innovative plan because it reconciles green policies with actions aimed at reducing social inequalities, while supporting the digital transition of the European economies. The ambitious emission reduction plans in the EU Green Deal are coupled with the Just Transition Mechanism, to ensure that the transition to a low-carbon economy is not overly harsh on those who still rely heavily on fossil fuel or carbon intensive industries.

The transition to a low-carbon economy implies both risks and opportunities for the entire economic system and for financial institutions. Institutions are required to implement a strategic, holistic and forward-looking approach to considering climate-related and environmental risks. These risks pose unique challenges to economic actors, such as a lack of historical precedent, a long-term time horizon and a great level of uncertainty. Environmental risks represent the negative financial impacts stemming from the action of environmental factors on banks' counterparties or invested assets. In this regard, the ECB has identified climate-related financial risks as main concerns for the euro area banking system. In December 2021, the ECB released its supervisory priorities for 2022-2024 recognizing the challenge posed by climate-related and environmental risks. These are commonly understood to comprise both physical and transition risks, which affect economic activities and damage the financial system. The extent and distribution of these risks can be attenuated through the adoption of ad hoc mitigation erasures and also by the environmental policy framework in use.

The European Banking Authority closely monitors the soundness of the euro banking area and it was given several mandates to assess how ESG risks can be integrated into the prudential supervision framework. Climate-related and environmental risks are changing the overall risk framework in the financial sector, given that they present a far-reaching impact on breadth and magnitude, an uncertain and long-term time horizon, and the dependency on short-term actions. The EBA is strongly committed to provide adequate supervisory tools which can support the European banking sector to address the challenges posed by climate change.

In this perspective, banking supervisory authorities conduct regular stress tests to check the resilience of the banking institutions to possible financial and economic shocks. The ECB conducts supervisory stress tests annually and in 2022 the focus is on climate-related financial risks. In the area of climate stress tests there is a precursor, as in 2021 the Bank of England (BoE) conducted a similar exercise, involving the largest UK banks and insurers. The Climate Biennial Exploratory Scenario (CBES) explored both physical and transition risks to different extent. The results revealed a lack of data on essential factors that participants need to

understand to successfully manage climate risks. The ECB's test aims to identify the vulnerabilities and the strengths in the financial system. Another main objective of the 2022 climate stress test is to better understand banks' data capabilities when it comes to climate-related financial risk. Indeed, the preparatory phase underlined the difficulties faced by banks regarding the availability of the data required by the ECB.

Overall, the ECB climate stress test is considered to be an important tool for developing the response to risks posed by climate change, while enhancing data quality and availability.

The Net-Zero Challenge and the Net-Zero Banking Alliance (NZBA)

Net zero refers to the state in which activities within the value chain of an organization result in no net impact on the climate from GHG emissions. As of December 2021, more than 70 countries accounting for more than 80% of global emissions and about 90% of global GDP had put net-zero commitments in place. Moreover, individual decarbonization pathways, for different actors, are needed to reach the goals of the Paris Agreement. Companies are expected to formulate their own net zero pledges, guided by voluntary schemes that enables the emission reduction as fast as possible. However, the effectiveness of these voluntary schemes is often questioned, as they allow too much discretion in the design of net zero roadmaps, which may not be aligned with global climate action.

Although net zero is an inherently scientific concept, its importance extends far beyond the boundaries of the scientific community, as it represents a frame of reference through which climate policy will be developed in the next years. Indeed, the path to net zero involves important social, economic, and ethical considerations. The transition to net zero affects our lives and wellbeing. As of today, governance, accountability and reporting standards are not adequate, while long-term strategies are not effectively supported by short-term actions.

In April 2021, 43 Founding Members launched the Net-Zero Banking Alliance, an UN-convened, industry-led alliance that brings together banks worldwide to accelerate the transition to a low-carbon economy. The NZBA represents the banking element of the Glasgow Financial Alliance for Net-Zero (GFANZ). Moreover, the NZBA welcomes those banks which have singed the UN Principles for Responsible Banking, which represents a unique framework for promoting a banking strategy aligned with the 2030 UN Agenda and the Paris Agreement. Banking joining the NZBA initiative sign the "Commitment Statement" through which they commit to achieving net-zero targets by 2050. Banks will have to make explicit, within 18

months of joining the alliance, the climate targets to be achieved by 2030 and then by 2050. In addition, financial institutions will annually publish absolute emissions and emission intensity and, within a year of setting targets, disclose progress against a board-level reviewed transition strategy, setting out proposed actions and climate-related sectorial policies.

Overview of the Main Public Methodology Options for Target Setting: SBTi, PCAF and PACTA

Given the complexity of the climate change subject, there is the pressing need to implement effective short-term actions, involving all sectors of society to reach net-zero emissions by 2050. Banks play a key role in facilitating the environmental and economic transition, by directing capital flows towards decarbonization. In order to do this, banks must understand the impact of climate-related financial risks on their activities, as well as the environmental implications of GHG emissions linked to their loan and investment portfolios. Thus, measuring financed emissions is crucial to identify risks, navigate emission reduction goals and disclose progress.

Banks need reliable methodologies to inform financing decisions and setting net-zero targets, which may be subject to significant variations based on the services offered and the relationships of a specific institution. Given the heterogenous landscape, all the Paris-aligned target-setting methodologies available depend on simplifications. Therefore, banks may choose to rely on more than one framework. A crucial element of the Paris-aligned methodologies is that of climate scenarios, as they imply different economic, technology and societal hypothesis on the roadmap needed to reach net-zero by 2050. Additionally, emission metrics are essential, since banks can set their emission targets in absolute or relative terms to examine the progress made along the way. There are two GHG emission metrics that are covered by the main target-setting methodologies: an absolute metric, which is related to an absolute volume of GHG emissions, and a physical emission intensity metric, linked to GHG emissions per unit of physical output.

The Science Based Target initiative (SBTi) framework aims to guide the private sector towards effective climate action through science-based emission reduction target. The target-setting methods promoted by SBTi are instructive frameworks, based on three elements: a GHG budget, a set of emission scenario and an allocation approach. The climate scenarios used are those stemming from the International Energy Agency (IEA) analysis. The SBTi method draws on the carbon accounting principles derived from the Partnership for Carbon Accounting

Financial (PCAF), which is a global partnership for financial institutions to implement an harmonized approach to account for and report GHG emissions stemming from the lending and investing activity. Namely, under the SBTi framework, financial institutions are encouraged to conduct an institution-wide inventory of financed emissions, in line with PCAF's top-down approach. The SBTi methodology theoretically applies to any sector, as emission can be captured by three approaches: the SBT Portfolio Coverage Approach, the Temperature Rating Approach and the Sectoral Decarbonization Approach (SDA). Particularly, financial actors that decider to set science-based targets using the SDA can use the PCAF framework to measure their financed emissions for baselining and tracking progress against it. In this sense, the accounting methodology outlined by PCAF is consistent with the SDA and the adoption of the standard enables SBTi alignment.

On the other hand, the Paris Agreement Capital Transition Assessment (PACTA) is an open-source, free climate scenario analysis tool to assess corporate lending portfolio alignment with the Paris Agreement goals. To help banks to meaningfully assess the alignment of their corporate lending portfolios with climate scenarios, an ad hoc tool called "PACTA for Banks" was developed in September 2020. Forecast data are provided free of charge by Asset Resolution, that relies on different data providers which acquire data on individual asset in climate-relevant industries using various research methods. The PACTA framework is very sector and technology-specific and it links financial exposure to physical assets. For each sector, PACTA methodology focuses on very precise segments of the value chain and this segmentation may lead to an underestimation of the assets' interdependence across the value chain. Moreover, PACTA takes into account a wide range of scenarios published by IEA and it is possible to range between national and regional scenarios. This allows more granularity compared to the SBTi framework, in which the possibility of selecting different climate scenarios is very limited. Another important difference is that PACTA relies on a bottom-up approach, while both the SBTi and PCAF methodologies rely on a top-down strategy. This can lead to problems in terms of data reliability, as emissions are calculated directly by the counterparties, as well as data quality and granularity. Nevertheless, the SBTi framework is more exhaustive, as it covers the entire value chain of climate-relevant companies.

An Example of Bespoke Methodology: BlueTrack by Barclays

Barclays has developed a tailored methodology, BlueTrack, to measure its financed emissions and track the at the portfolio level against the goals of the Paris Agreement. With regard to the climate scenarios leveraged, Barclays is replacing the IEA Sustainable Development Scenario (IEA SDS) with the updated IEA Net-Zero Emissions 2050 (IEA NZE), which achieves net zero CO2 emissions by 2050. In this perspective, the bank is setting new targets for its Cement, Steel, Energy and Power portfolios. BlueTrack encompasses four model steps, answering to eight key design questions in line with the SBTi SDA approach (Tab. 1).

Table 1: BlueTrack's model steps and key design questions

Model steps	**Design questions**	**BlueTrack methodology**
Construct Paris-aligned portfolio benchmarks	What metrics are used for which scenario?	Absolute emissions; emissions intensity
	What scenario is used for benchmark construction?	IEA SDS (previously); IEA NZE 2050
Measure client emissions	What scope of emissions are considered?	Energy: 1, 2, 3 Power: 1 Cement: 1, 2 Metals: 1, 2
	What data is used for the calculations?	Data provided by external databases; company reported data
Link emissions to financing	What financing activities are considered in-scope?	All corporate lending
	How is provided financing linked to company-level emissions metrics?	Ratio between financing provided to the company and the book value of total assets
Aggregate to a portfolio-level	How are physical intensity metrics aggregated?	Exposure weighting approach
	How are absolute metrics aggregated?	Sum of financed emissions

Source: Author's elaboration based on: Barclays PLC, *About BlueTrack: an Update on our Methodology for Reducing our Financed Emissions*, 2022

Comparison Between the Target-Setting Methodology Options

Table 1: comparison between the main target-setting methodology options

	Target-setting methodologies			**NZBA requests**
	SBTi	PACTA	BlueTrack	
Developed by	CDP, WWF, WRI, UNGC	2DII	Barclays	n/a
Type of framework	Instructive framework	Open-source and free toolkit	Bespoke methodology	n/a
Framework provider	PCAF	Asset Resolution	Barclays	n/a
Financial instruments	Corporate lending, project finance (power sector), equity and bonds	Corporate lending, project finance, equity and bonds	Corporate lending, project finance, capital markets underwriting	Corporate lending, investments
Reference scenario	IEA 2017 B2DS (only global)	IEA NZE 2050 and other scenarios (both global and regional)	IEA SDS, IEA NZE 2050	Aligned with Paris 1.5°C
Metrics	Physical emission intensity	Emission intensity, technology mix (power, automotive and fossil fuels), production volume trajectory	Physical emission intensity, absolute emissions and technology mix	Emission intensity and/or absolute intensity
Data	Company data and/or sector averages	Bottom-up approach (physical data)	Bottom-up approach (physical data)	n/a
Alignment level	Asset class and individual sectors	Sector and individual technology	Individual sectors	Individual sectors

Source: Author's elaboration based on ShareAction, *Paris-alignment Methodologies for Banks: Reality or Illusion?*, April 2021

Table 2: Main pros and cons of the target-setting methodology options

	SBTi	**PACTA**	**BlueTrack**
Pros	➢ Free ➢ Prescriptive framework ➢ "Delayed" monitoring, as it is based on counterparties' data ➢ Numerous companies, even outside the financial sector, use it	➢ Open-source and free toolkit ➢ "Real-time" monitoring, as it is based on estimation of counterparties' performance according to financial data ➢ National and regional climate scenarios	➢ Absolute emission metric for fossil fuels ➢ Capital market underwriting
Cons	➢ "Top-down" could create problems regarding data quality and reliability ➢ Only global climate scenarios	➢ Segmentation of the value chain ➢ Does not include emission metrics ➢ With Asset Resolution proprietary data becomes fee-based	➢ As a proprietary methodology, it is not meant to be marketable

Source: Author's elaboration based on ShareAction, *Paris-alignment Methodologies for Banks: Reality or Illusion?*, April 2021

Empirical Evidence from EMEA Banks

To investigate how banks translate net-zero targets into actions, the paper analyses a sample of EMEA banks. The aim of the benchmarking is to identify how the market is moving towards the goals of the Paris Agreement, also identifying possible best practices. The sample is made up as follows:

- BBVA (Spain);
- Intesa Sanpaolo (Italy);
- UniCredit (Italy);
- Société Générale (France);
- Barclays (United Kingdom);
- Nordea (Finland/Scandinavia).

The benchmarking has been conduct based on the sustainability reports of the banks in the sample as at the year 2021. The results of the consultation suggest that there are differences in terms of commitments and clarity of targets. These differences may be explained by the different economic and socio-cultural contexts of the sample banks. Indeed, the net-zero

philosophy lies on ethical, economic and social considerations, as well as on scientific basis. Many players have started to communicate specific sectorial targets, including numerical disclosure. However, targets may vary from peer to peer according to metrics, baselines and reference climate scenarios. Many banks' targets are informed by the IEA NZE or the IEA SDS. Discrepancies in metrics are particularly visible when it comes to Oil & Gas, for which metrics range from absolute emissions ($MtCO_2$) to absolute exposure.

Regarding fossil fuels, every bank in the benchmarking has developed a coal-fired policy and has pledge to phase-out of thermal coal in the decades to come (in any case, before 2050). Indeed, the combustion of fossil fuels accounts for almost 83% of global CO_2 emissions and the sector is striving to decarbonize through energy efficiency, electrification and mitigation of methane emissions[63]. On top of that, the Oil & Gas sector represent a point of attention, as the majority of banks in the sample deliver, not only sector-specific coverage, but also numerical targets. Similarly, banks disclose numerical targets for the Power sector too, emphasizing its relevance from an economic point of view, especially in relation to the transition to carbon-neutral economy. The Power sector will play an important role both in terms of economic development and increasing electrification of other sectors, according to the NGFS Net Zero 2050 scenario.

Table 3: a comparison between sector-specific targets coverage

✓ Sector coverage with targets disclosure

− Sector coverage

⊘ Policy on the phase-out of thermal coal

	Target	**Oil & Gas**	**Power**	**Coal**	**Cement**	**Steel**	**Automotive**	**Shipping**
BBVA	2030		✓	⊘	−	✓	✓	
Intesa Sanpaolo	2030	✓	✓	⊘			✓	
UniCredit	2030	−		⊘				

[63] McKinsey, *Sectors are Unevenly Exposed in the Net-Zero Transition*, 25 January 2022, https://www.mckinsey.com/capabilities/sustainability/our-insights/sectors-are-unevenly-exposed-in-the-net-zero-transition

Société Générale	2025	✓	✓	⊘			✓	✓
Barclays	2025	✓	✓	⊘	✓	✓		
Nordea	2030	−		⊘				−

Source: Author's elaboration based on public reports and announcements

The analysis suggests that in the market the PCAF framework is dominant concerning the emission accounting process, as it provides for the quantification of financed emissions. In addition, what emerges is that the majority of the banks in the benchmarking are adopting the SBTi's SDA approach. BlueTrack by Barclays is also based on the SDA and the PCAF. Indeed, the NZBA, which is the most followed paradigm by banks, poses its methodologic foundations on the convergence between the SBTi and the PCAF principles, with a specific focus on physical intensity metrics.

Table 4: Target-setting methodologies used by banks in the benchmarking

Bank	SBTi	PACTA
BBVA	✓	✓
Intesa Sanpaolo	✓	
Société Générale	✓	✓
Barclays	✓	

Source: Author's elaboration based on public reports and announcements

Overall, the benchmarking demonstrates that financial institutions are aware of the challenges and threats posed by climate change. These banks are putting their credibility on the line and the public is now invited to check their progress. In spite of this, there are shortcomings that must be tackled to achieve the Paris Agreement's goals. For instance, the availability and quality of data concerning companies involved in high-emitting sectors represents a challenge that banks must address. Similarly, a global carbon price that draws on policy actions and market dynamics would provide clarity in the pathway to net zero. In this sense, a possible solution would be that of setting proper accounting practices to create a common ground on which uniformly measure everyone's progress.

Lastly, the net-zero transition is strictly intertwined with the climate policy framework. International actors should ensure a harmonized global approach to the environmental transition, providing incentives to promote companies to embrace the net-zero ambition.

Conclusions

Limiting the rise in global temperature is essential for preserving life on the planet and to preventing acute climate hazards from becoming more and more frequent and disruptive. Addressing climate change will require great efforts in decarbonization and all actors in the real economy are required to reduce their GHG emissions in the atmosphere. To reach the temperature goal of 1.5°C above pre-industrial levels, a holistic and comprehensive strategy is needed, involving all spheres of society.

In this perspective, financial institutions are indispensable elements, as they provide economic actors with capital flows and guidance. Banks are stepping up the climate challenge, as demonstrated in the numerous UN-convened initiatives, such as the NZBA and the UN Principles for Responsible Banking. Paris-aligned target-setting and emission accounting methodologies – such as SBTi, PCAF and PACTA – are valuable allies to pursue ambitious objectives and to design a credible roadmap. The analysis conducted on a sample of the major EMEA banks by capitalization– BBVA, Intesa Sanpaolo, UniCredit, Société Générale, Barclays and Nordea – showed that the market is aligning on the use of SBTi as the main methodology for target-setting, with a significant convergence of PCAF as emission accounting standard. Barclay's proprietary methodology, BlueTrack, is also based on SBTi Sectoral Decarbonization Approach (SDA).

There are still many challenges that must be addressed, such as a harmonized accounting system for carbon to guarantee that progress is tracked in the same way for everybody. However, many financial institutions are delivering important results in assessing their financed emissions and boosting sustainable practices. What is certain is that there is a long way to go, and time is almost up, as the IPCC reminded us in its last report. The world needs a strong, collective intervention to secure the future of the generations to come.