Financial sector's climate transition requires public policy support

Note written by Jean-Marie Andres & Louise Le Borgne

1. Insufficient climate-related investments and a growing level of transition uncertainty raise concerns notably for the financial sector

Insufficient climate-related investments and a growing level of transition uncertainty raise significant concerns, particularly within the financial sector.

The inadequate pace of climate-related investments and the subsequent increase in transition uncertainty rank among the most pressing concerns in achieving a globally sustainable net-zero transition of economies.

Observing the insufficient level of climate-related investments across economies worldwide, it becomes evident that, given the current pace of the climate transition, meeting the commitments of the Paris Agreement remains unattainable. Instead, we risk falling into a scenario known as the 'too little and too late transition', as articulated by the Climate Policy Initiative[1]. Their analysis indicates that the compounded annual growth rate of investments needed for a sufficient transition amount to 21%, whereas the actual rate currently averages around 7%. Consequently, the current level of investment reaches only 33% of the required threshold.

The consequences of such an inadequate response will extend beyond mere diplomatic concerns, encompassing human and ecological impacts. The anticipated increase in frequency and severity of extreme weather events is poised to exact a substantial toll on both the environment and humanity.

In addition to the rising incidence of natural catastrophes and the subsequent physical risks they pose, another weighty burden emerges due to the escalating uncertainty inherent in insufficient transition efforts. This elevates the likelihood of abrupt and disruptive adjustments, resulting from inadequately planned transitions. Optimal outcomes can only arise from a gradual and well-managed shift toward a low-carbon economy. Conversely, an escalating scale of climate-related adverse events could trigger unpredictable and significant economic impacts through sudden and disorderly changes in energy consumption and the devaluation of carbon-intensive assets. 'Late and sudden transition scenarios' inevitably follow the 'too little and too late transition scenario'. The longer the initiation of climate-related transition is delayed, the higher the associated costs become, amplifying various risks for the most vulnerable countries and citizens. A report from the Banque de France[2] confirms that starting from 2030, the GDP reduction resulting from a delayed transition deviates increasingly from the orderly transition scenario, culminating in a -2.1% deviation in 2050.

Delays in communicating national transition plans and the absence of precise, well-defined international targets introduce escalating risks for private and financial entities.

Consequently, there exist significant perils both in the absence of action and in adopting a wait-and-see stance. Simultaneously, hasty, inappropriate, or uncoordinated transitions also pose considerable risks.

The Financial Sector's Exposure to Transition Risks

The financial sector currently faces, and will increasingly confront, a heightened exposure to these risks. Failure to effectively mitigate these risks could lead the mechanisms that underpin the financial sector towards reduced funding for the transition, potentially favoring short-term funding. Such a scenario, driven by a rush towards high-emissive technologies or energies, risks compromising the speed and optimality of the transition and innovation.

1. A decade of Data: 2011-2020.
2. "Too little, too late": Impact of a disorderly climate transition. https://blocnotesdeleco.banque-france.fr/en/blog-entry/too-little-too-late-impact-disorderly-climate-transition

Risks Associated with Ecological and Energy Transitions: The Imperative of Decision-Making and Global Coordination

The ecological and energy transition stands as a critical imperative in mitigating the devastating impacts of climate change and environmental degradation. However, this intricate process introduces substantial risks to the global economy. Both physical and transition-related factors contribute to these risks, exerting influence over economic activities and, consequently, the financial system. This influence may manifest directly, leading to diminished business profitability or asset devaluation, or indirectly, through macro-financial shifts, liability risks, and reputation risks.

The scale and distribution of physical and transition risks fluctuate based on the level and timing of mitigation measures, as well as the manner in which the transition unfolds –whether in an organized or chaotic fashion. The potential losses stemming from climate and environmental risks are closely intertwined with the future adoption of climate and environmental policies, technological advancements, consumer preferences, and market sentiment.

Several specific factors, among others, amplify these risks:

- Anticipated but Hard-to-Plan Disruption of Traditional Sectors: This could result in job losses within industries reliant on fossil fuels.
- Market Volatility: Significant shifts in business models can lead to volatility in financial markets and company/asset valuations.
- Need for New Sustainable Infrastructures and Technologies: While crucial, this can generate high costs and financial uncertainties, particularly within highly indebted contexts.
- Technological and Economic Barriers: Overcoming these is vital before implementing large-scale technologies. Established industries' resistance to new technologies might hinder the transition.
- Increased Vulnerability of Indebted Entities: Both governments and companies undergoing ecological transition projects could face heightened vulnerability.
- Inequality in Transition: Disparities among countries and sectors could result in global financial imbalances, particularly impacting economic competitiveness and market access.
- Rising Demand for Rare Resources: This may induce price volatility, impacting supply chain stability and production costs of green technologies.
- Energy Cost Volatility: The growing reliance on intermittent renewable energies with uncertain production and storage could render the economy more susceptible to energy cost fluctuations.
- Potential Geopolitical Disruptions: These could arise from struggles over access to rare earths, metals, renewable resources, and key technologies, influencing international and commercial relations.
- Ensuring equitable risk distribution among economic stakeholders is of paramount importance. Insurers, civil society, and investors all have roles to play in managing the risks associated with the ecological transition. The support of civil society is vital for adaptation and resilience efforts, safeguarding vulnerable communities from the impact of extreme weather events.
- Effective risk-sharing mechanisms are essential, as ecological and energy transitions could be financially burdensome for low-income individuals – such as the shift to electric cars in areas lacking accessible public transportation, thereby exacerbating economic inequalities.
- Challenges in accessing reliable data and assessing the economic costs of climate change persist, given that numerous potential costs extend beyond the scope of traditional economic analysis.

2. Possible causes

2.1 An inadequate reliance on the financial sector and risk supervisors to drive investment

While enhancing climate-related risk management within the financial sector is crucial, it alone will not suffice to mitigate the disorderly transition risk.

Clearly, the emergence of physical risks poses significant, albeit still somewhat distant, threats to the financial sector. Moreover, these risks compound subsequent macroeconomic vulnerabilities. In response, financial regulation, supervisors, and the management of financial institutions will increasingly focus on addressing these concerns and refining risk anticipation processes.

However, the additional proactive measures undertaken by the financial sector will provide clarity, yet may not fully alleviate the many uncertainties – both technological and policy-driven – that underscore the magnitude of these macro risks.

Furthermore, a transition scenario that prioritizes minimizing financial sector risks may not necessarily align with the most optimal transition scenario for economies. The European Systemic Risk Board[3] (ESRB) emphasizes that employing bank capital requirements to discourage funding for carbon-intensive activities might prove insufficient. As long as such activities remain profitable, it might be challenging to entirely eliminate their financing from the banking sector. Alternatively, lowering capital requirements for entities with low carbon footprints could fall below the prudentially optimal threshold. Additionally, successful removal of "dirty loans" from the banking system through capital regulation might result in alternative funding gravitating towards high-emitting, yet profitable, activities.

Ultimately, the inherently long-term nature of climate-related risks diminishes the effectiveness of risk mitigation strategies as catalysts for comprehensive economic transition. Climate risks introduce unique measurement challenges, as historical data offers limited insight into future climate-related risks. Beyond current climate stress testing, substantial work remains to comprehend the financial sector's exposure to climate risks – a process that unfolds over a time horizon exceeding the scope typically considered for prudential regulation. This reality implies that relying solely on financial sector-based climate-related risk mitigation might inadvertently contribute to postponing a timely and substantial phase of economic transition.

In 2021, the International Monetary Fund (IMF) acknowledged the responsibility of central banks and financial regulators in supporting the shift towards a low-carbon economy, primarily by redirecting financial flows crucial to the transition. Nevertheless, the IMF cautioned against overestimating the capabilities of regulators and supervisors, as their diagnostic and policy toolkits are still in their nascent stages. Moreover, the IMF underscored the potential pitfalls and unintended consequences associated with assuming these new responsibilities. Consequently, the IMF concluded that financial regulators alone cannot usher in a low-carbon economy and should not risk being solely responsible for such a transformation.

Similarly, an ESRB report proposed that while bank capital requirements may play a supplementary role, more direct policy measures – such as carbon taxes – hold far greater potential to effectively reduce emissions and associated externalities by directly curbing the profitability of carbon-intensive investments.

2.2 Focusing on Transparency and the Green Economy

The emphasis on transparency, while valuable, should not be viewed in isolation. This focus is expected to naturally redirect savings, financing, and the intentions of both financial institutions and corporations toward the green economy.

One explicit advantage of enhanced disclosures, as proposed by the Task Force on Climate-related Financial Disclosures, lies in facilitating well-informed decisions regarding the allocation of capital. These decisions can be based on a more comprehensive evaluation of climate-related risks affecting companies, their suppliers, and competitors across short, medium, and long-term horizons.

In 2018, within the European Union (EU), the Final Report from the High-Level Expert Group on Sustainable Finance took a more proactive stance. It aimed to tackle the funding deficit by exploring regulatory modifications to mobilize the substantial funding potential within the private capital sphere. The High-Level Expert Group (HLEG) emphasized that achieving this ambition necessitates no less than a transformation of the entire financial system, including its culture and incentives.

Building upon these statements, the EU Commission extended its efforts by establishing a workstream to support the European Green Deal's objective of channelling private investments into the transition towards a climate-neutral economy.

3. ESRB Moodys https://www.moodysanalytics.com/regulatory-news/nov-16-22-esrb-report-examines-effective-tools-for-carbon-emission-reduction

It is important to note that the outcomes of this workstream predominantly encompass disclosure regulations and standards. These include corporate disclosures of climate-related information, EU labels and disclosure standards for benchmarks (climate, ESG), sustainability-related disclosures in the financial services sector, and specific tools and standards such as the EU taxonomy for sustainable activities and the European green bond standard.

These approaches, varying in their level of ambition, revolve around corporate risk and opportunity analysis. Anchored in transparency standards, they operate under the assumption that introducing structured sustainability dialogues among diverse stakeholders connected to corporations will facilitate the transition of economies.

Nonetheless, recent objections raised by prominent global investment players indicate that savers, particularly, confront a growing conflict between sustainability aspirations and more conventional return and security objectives. Furthermore, while these constructive exchanges between micro-economic entities and their stakeholders are commendable, they may not yield the same impact as an international carbon tax. Such a tax could effectively address the imbalance caused by excessively subsidized carbon-based energy. Additionally, it could help clarify the uncertainties surrounding pivotal choices, choices that only policy makers can address – such as the role of hydrogen in economies, the long-term viability of subsequent infrastructures, the evolution of multimodal transportation and urban options, and the prioritization of transitions in the future.

2.3 Some essential development needs remain poorly founded

The imperative for developmental investment is further underscored by the exacerbating impact of climate change on existing vulnerabilities. Recent years have witnessed a notable shift in development finance towards projects explicitly addressing climate-related concerns.

I4CE[4] has identified three pivotal gaps within international development funding:

Firstly, as mentioned earlier, the quantum of development finance available falls short of meeting global demands. This deficiency is evident in the expanding financing shortfall for the Sustainable Development Goals (SDGs). A report by Oxfam and Development Finance International (DFI) substantiates this, revealing that public expenditure alone lags behind SDGs requirements by a third – a glaring gap that necessitates an additional annual investment of at least $ 1.5 trillion for the SDGs to be realized.

Secondly, certain countries continue to encounter difficulties in accessing development finance. This is partly attributed to the burden of high interest payments and outdated risk perceptions. Additionally, the reliance on loans as a primary source of development finance contributes to the escalating debt load of developing nations, consequently constricting their fiscal manoeuvrability to address both climate and developmental priorities. A concerning statistic from 2021 underscores this: 88% of World Bank financing was channelled through loans. Moreover, data from the IMF reveals that, as of 2022, 19 out of 35 low-income African countries already faced imminent debt distress or high-risk scenarios.

Lastly, a significant misalignment persists in the allocation of development finance, often failing to direct resources where they are most critically required for sustainable development. Notably, the bulk of international public resources is dedicated to climate change mitigation ventures. However, there exists an unequivocal need for these funds to be directed towards unlocking adaptation projects and addressing the surge in losses and damages induced by the impacts of climate change in developing economies – areas that continue to pose intricate financing challenges. Remarkably, amidst mitigation endeavours, development finance institutions exhibit a propensity to predominantly favour profitable ventures, mirroring the priorities of the private sector. Such ventures typically include renewable energy projects in power generation. Consequently, other sectors equally pivotal to sustainable development are overlooked, largely due to their inherent difficulty in establishing financially viable projects within specific country contexts. These sectors encompass domains such as agriculture, land use and deforestation, and household energy efficiency. The complexities involved in translating these sectors into bankable projects hinder their access to necessary funding.

2.4 So far, a poor political and economic transition planning

It is unrealistic to anticipate a seamless and timely transition when transition planning, both at micro and macro levels, is still in its nascent stages. Let's provide a swift overview of zerotracker.net, an initiative aimed at enhancing the transparency and accountability of net zero targets declared by nations, states, regions, cities, and corporations. It is readily apparent that the number of targets and

4. Reforming development finance to enable the sustainable development transition – I4CE. https://www.i4ce.org/reformer-financement-developpement-pour-permettre-transition-vers-developpement-durable-climat/

interim milestones established by these entities remains limited, and even fewer have comprehensive plans in place.

At best, we are informed of the targets themselves, yet the strategies selected to attain these objectives are often obscure. The formulation of an appropriate climate-related transition pathway is a work in progress, largely due to persisting uncertainties related to technology, policy frameworks, and the challenges inherent in decision-making. Simultaneously, this widespread delay in planning exacerbates the overarching uncertainty.

3. In this context a few priorities become of the essence

3.1 Leverage the data corporations and financial institutions making increasingly available

In an economy undergoing transition, information asymmetry will inevitably escalate, potentially leading to suboptimal decision-making. Crucial information regarding companies' transition plans becomes paramount in this context, as operational transformations take time, and companies may pursue vastly different strategies, yielding significantly disparate outcomes. Such information pertaining to the existence, quality, and execution of transition plans serves as vital insight for a company's value chain, encompassing financial institutions. These entities rely on these plans to fulfill their own objectives and assess the financial risks associated with their clientele.

Jurisdictional and international reporting standards, such as the Corporate Sustainability Reporting Directive (CSRD) and International Sustainability Standards (ISS), include the provision of information on decarbonization targets spanning various time horizons. They also encompass details regarding levers and actions that companies intend to employ to attain these objectives[5]. The CSRD's contribution lies in standardizing the shared information, thereby alleviating reporting costs for companies. The ongoing negotiations in the Parliament surrounding the Corporate Sustainability and Social Responsibility Directive (CS3D) mandate the adoption of this plan – an "obligation to do" that adheres to four key principles: scientific basis, scope 3 inclusion, associated investments, and double materiality.

The incorporation of scope 3, the most intricate to quantify due to its requirement for comprehensive knowledge of a product's value chain – especially its often outsourced segments – represents progress in policy coordination and the predictability of future trajectories. This addition also addresses the issue of carbon leakage, arising from the transfer of emission-intensive activities from developed to developing countries. This regulation will grant interested investors access to data concerning these emissions. Companies are thereby prompted to exercise greater vigilance, as this plan imbues a sense of responsibility over the future value chain and encourages forward-looking investments in emerging technologies.

However, a more unified and standardized framework for guidance would optimize the utility of this data. Clarification regarding the preparation of this information, including the presence of an implementation and change program, the extent of management and governance involvement, and a standardized presentation format, would enhance comparability, auditability, and, by extension, ease of utilization.

An encouraging stride in the aviation sector is the Collective Climate Aligned Finance (CAF) Framework project, supported by the industry. This initiative establishes shared objectives to decarbonize the aviation sector, ensuring consistency and transparency in reporting. It levels the playing field for gauging progress, compelling financial institutions to disclose annually, in alignment with the Net-Zero Banking Alliance, the alignment of greenhouse gas emissions from aircraft, airlines, and their financiers with the 1.5°C trajectory.

While the credibility and recognition of the roadmap by numerous global NGOs is imperative, the aviation industry must equally endorse and embrace an aviation roadmap to foster a comprehensive transition strategy.

3.2 Develop consistent and understandable transition planning at complementary relevant levels (financial institutions, corporations, countries…)

In the present landscape, financing for sustainable development follows a fragmented framework that distinguishes between funding for development, climate-related endeavors – including mitigation, adaptation, and addressing loss and damage – alongside support for risk reduction and, more recently, funding allocated to biodiversity. However, this compartmentalization lacks authenticity, as development, climate considerations, risk

5. In particular, the CSRD requires the disclosure of a significant set of information such as: the reduction objectives, the levers and actions to achieve these objectives, the investments and financing, the blocked emission potential, the planned alignment potential with the European taxonomy, integration from the plan into the overall strategy and approval by management and governance and the progress made.

management, and biodiversity are all intricately interconnected and shaped by each country's unique context. Therefore, I4CE contends that only an integrated approach, grounded in the specific circumstances of each nation, can effectively mitigate trade-offs and maximize synergies across these dimensions. Countries must chart distinctive trajectories, prioritize funding, and formulate transition plans that optimally align these objectives with their current national realities while contributing to global aspirations.

For instance, the correlation between access to sustainable energy in developing nations and development is profound – it serves as a prerequisite for essential energy services, while also facilitating low-carbon emission practices, thereby advancing both mitigation and adaptation efforts. Considerations of climate change's uneven regional impact underscore the complex web of physical risks. It's only through the holistic consideration of these dimensions within a country's particular context that a comprehensive financing strategy for clean energy access can be effectively devised.

Given that the time horizon for sustainable development financing extends beyond the norm of the financial system, financial institutions must cultivate a proactive and systematic utilization of reference tools. These tools aid in assessing a country's long-term transition and risk management, especially in light of the inherent complexities. A backcasting approach, divergent from the conventional focus on short-term, cost-effective emissions reduction, becomes indispensable. While current trends emphasize this approach, particularly in light of the shared goal to limit global warming to well below 2°C by 2050, its application reveals a blind spot in infrastructure investments with substantial inertia, such as transport, buildings, and urban structures. In these cases, short-term effects tend to overshadow long-term considerations. For instance, an aviation transition plan grounded in backcasting may falter if reliant on uncertain technologies (like large-scale electric or hydrogen propulsion by 2035) while overlooking the pivotal role of adjusting traffic volume to align with CO2 emission reductions.

Moreover, as emphasized by IPCC reports[6], the pursuit of sustainable development necessitates systemic shifts. Instead of the historical project-based approach, a concerted focus should be directed toward fostering transformation on an economy-wide scale. Recent instances of support for sectoral transformation, exemplified by the Just Energy Transition Partnerships (JETPs), represent a commendable stride in this direction. These partnerships foster collaboration between emerging and developed countries to facilitate a just energy transition. Notably, JETPs in South Africa, Indonesia, and Vietnam signify significant strides in sectoral-level transformative action. These initiatives involve substantial funding to support decarbonization and promote equitable energy transitions. While calls for European-level trajectories have emerged from the financial sphere, particularly for sectors like oil and gas, development financing demands a more comprehensive approach that transforms the economy holistically, transcending sectoral boundaries.

The pivotal role of public authorities becomes evident in ensuring private companies receive clear and credible objectives, coupled with a conducive economic environment encompassing coherent communication, transparent regulations, and appropriate incentives. This prioritization is essential, yet insufficient on its own. A critical aspect involves the formulation of transition plans at both jurisdictional and state levels. Such plans, constructed within the framework of legal requirements, should also be supplemented by international coordination and a carbon tax or tariff mechanism to prevent competitive distortions when global objectives and transitions are misaligned. These plans further serve to elucidate technical advancements and guide systemic research and innovation.

Sectoral-level planning, characterized by granularity and responsiveness to private companies' needs, is equally crucial. These plans must factor in interdependencies, encompassing material and technological requisites, as well as social implications like employment and access to essential services. Ultimately, embracing this integrated, multi-dimensional approach holds the key to realizing sustainable development aspirations.

3.3 Hope that policy makers will bring about the necessary clarifications, incentives and risk reduction, that financiers cannot achieve

At its core, there exists a finite carbon budget to be allocated from now until 2050. This budget signifies the maximum cumulative amount of CO_2 emissions permissible to attain carbon neutrality and curb global warming to a predetermined temperature threshold. Adhering to this carbon budget by 2050 is now an imperative, necessitating its steadfast observance throughout the transitional trajectory.

6. In all of the IPCC reports it is outline that global scale and systemic changes are required, but this report is insisting on it : https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter17.pdf

Pathways to Progress: Market forces unlikely able to address the challenges

Bloomberg has unveiled the findings of two energy scenarios: the Economic Transition Scenario (ETS) and the Net Zero Scenario (NZS). Let's delve into the assumptions and outcomes of each:

- Climate Targets: The Energy Transition Scenario (ETS) illustrates the trajectory of greenhouse gas emissions, driven by cost-effective technological shifts, without specific climate targets. In contrast, the Ambitious Energy Transition Scenario (NZS) boldly strives to realize the Paris Agreement's objectives, curbing global warming at 1.77°C by 2050 and achieving complete net emissions neutrality.
- Energy Transition: The ETS adheres to historical patterns, relying on firm short-term legislative measures for energy transition, without imposing added restrictions for meeting climate objectives. On the contrary, the NZS adopts a transformative, sector-specific approach from the grassroots level, presenting a scientifically grounded route to fulfill the Paris Agreement's aims. This encompasses phasing out fossil fuels and embracing carbon-free energy sources.
- Energy Sources: The ETS prioritizes commercially available technologies to meet energy demand, projecting a 46,000 terawatt-hour electricity production by 2050. Conversely, the NZS places heavy reliance on renewables, clean hydrogen, and nuclear power to realize net zero emissions, forecasting electricity production exceeding 80,000 terawatt-hours by 2050.
- Energy Efficiency: Both scenarios underscore the importance of energy efficiency gains. Nonetheless, the ETS leans towards established technologies, with less emphasis on electrification. Conversely, the NZS emphasizes broad electrification across transport, industry, buildings, and heating systems to enhance energy system efficiency and decrease overall consumption.
- Carbon Capture and Storage: While CCS plays a notable role in the ETS, its significance markedly escalates in the NZS, contributing to 11% of emissions reduction during the scenario period. This signifies a remarkable upswing in CO2 capture volumes between 2021 and 2050.
- Investments: The ETS involves short-term market-linked investments, exerting minimal impact on current energy infrastructure. Conversely, the NZS demands substantial investments to realize ambitious decarbonization objectives. It necessitates substantial funding in clean energy supply ventures, encompassing renewables, clean hydrogen, carbon capture, and nuclear power. For every dollar invested in fossil energy supply, nearly five dollars must be allocated to low-carbon energy sources.

It's crucial to note that the IPCC reports emphasize demographic shifts, economic and social development, and technological advancements as principal drivers of future greenhouse gas trajectories. However, the available Bloomberg reports do not explicitly factor in demographic changes and their integration into the energy scenarios.

From these two scenarios, it becomes evident that the market's economic forces alone may prove insufficient to achieve our aspirations. It is imperative to complement these efforts with well-crafted public policies.

For instance, SUPAERO's analysis[7] reveals that to uphold global warming at 1.5°C, the median global carbon budget from 2020 to 2050 is approximately 380 $GtCO_2$. Should the temperature target be 2°C, the permissible net CO_2 emissions over this period cannot exceed 860 $GtCO_2$. Among financial circles, discussions ponder whether this carbon allocation will follow a linear trajectory or a more gradual ramp-up. This deliberation considers the delayed deployment of new technologies, which may not be feasible until after 2035 or even as late as 2040. Central to the discourse is the equitable allocation of this carbon budget across vital sectors. For instance, considering aviation's contribution of 2.6% to global anthropogenic emissions, its carbon budget by 2050 varies between 10 to 22.8 GtCO2, contingent on the targeted warming level (+1.5°C to +2°C).

Public authorities also bear the responsibility of defining standards and norms for transition planning, ensuring shared efforts across economies,

7. Calculation made by ISAE-SUPAERO researchers based on IPCC 1.5° scenarios. https://www.polytechnique-insights.com/tribunes/energie/comment-le-secteur-de-laviation-pourrait-elle-respecter-laccord-de-paris/#note-3

and absorbing associated risks. Currently, multiple ambitious international planning standards have emerged, like the taskforce on climate-directed financial disclosure, the GFANZ Recommendations and Guidance on Financial Institution Net-zero Transition Plans, and the transition plan taskforce. However, the lack of global adoption hinders effective coordination between private companies and the financial sector in devising optimal transition strategies. Scenarios encompass myriad necessary assumptions and exclusions, amplifying the challenge of coordinating planning efforts. Additionally, industrial and financial entities find themselves reliant on scenario modelling institutions, contributing to inefficiencies and potential time lag issues.

Companies increasingly depend on external model providers, yet their comprehension of these models' limitations often remains incomplete. In certain cases, climate change information derived from these models is publicly disclosed despite not being comprehensively understood. Such disclosures can raise concerns, such as benign economic outcomes in high physical risk scenarios, potentially misguiding institutions, and advisers. This misrepresentation could also undermine regulators' assessment of systemic risk.

A crucial case in point is the offset carbon sector, necessitating swift regulation and standardization. Addressing the risk of double counting and preventing the issuance of subpar carbon offset credits is essential. Carbon offset supply pressure is set to intensify across various sectors, even as existing projects witness decreasing sequestration capacity, especially in forest-based projects.

Even with clarified objectives and transparency tools from public authorities, a monumental, comprehensive transformation of the economy lies ahead, demanding substantial financial and human support. While the private sector will contribute, the magnitude and swiftness of the change necessitate public support to efficiently coordinate, ensure, and facilitate the transition. This entails mobilizing research and development capacities for new technologies.

In our pursuit of a sustainable future, comprehending and evaluating diverse energy scenarios is imperative. Two divergent approaches, the Energy Transition Scenario (ETS) and the Ambitious Energy Transition Scenario (NZS), present distinct avenues to achieve our global climate goals. These scenarios underscore that a transition reliant on historical trends, existing technologies, and short-term market investments is far from optimal, potentially leading to emissions consistent with a 2.6°C warming trajectory by the century's end.

While achieving low-carbon alignment in portfolios is deemed essential for a credible economic decarbonization, this approach, characterized by "avoidance" or "commitment" strategies to mitigate physical risks, may fall short in addressing most transition risks. In the financial realm, conventional risk management tactics such as "risk transfer" through hedging and insurance, or "diversification", are unlikely to comprehensively cover exposure to transition risks. The NGFS (Network for Greening the Financial System) underscores the necessity of considering the diverse requirements of the financial sector to ensure sufficient funding for the transition. Failing to ensure the reliability of decarbonization strategies across different scales could lead to a paradox between greening the economy and greening financial portfolios. This is particularly problematic as the sectors requiring transformative shifts are often those in need of costly transitions.

Incentive schemes, including tax exemptions and direct subsidies, can play a pivotal role in mitigating the challenges and uncertainties accompanying transformation. The extensive changes needed in high-emitting sectors involve substantial investments in new assets (such as factories, transport, and supply chains) and the development of new technologies (like carbon capture, clean energy, and biodiversity preservation). These investments often disrupt the usual depreciation and amortization patterns of assets, impacting long-term profitability. In sectors resistant to reduction, like aviation, adopting a "market-shaping" approach may be essential. This could entail providing patient public financing, characterized by longer terms and accepting potentially lower returns, either directly or through public financial institutions or public-private financial arrangements incorporating risk sharing.

Supporting these changes requires the establishment of a comprehensive structure, potentially involving private stakeholders under the guidance and coordination of public support. This structure could offer training, technical assistance, pertinent connections, information on existing programs, and incentive systems. This support would be especially valuable for small and medium-sized enterprises (SMEs), which often lack the financial and human resources available to larger corporations.

As the prospect of a seamless net-zero transition diminishes, the importance of adaptation planning grows. Similar guidance from public authorities should be extended to adaptation strategies, complementing the overall framework for a successful transition.

ANNEX 1

2 transition plan taskforces to Net-zero:

	GFANZ Recommendations and Guidance on Financial Institution Net-zero Transition Plans	TPT (transition plan Taskforce)
Founding organization	GFANZ (Glasgow financial alliance for Net-0)	HM Treasury
What is the primary objective of the group?	The GFANZ is a global coalition of leading financial institutions committed to accelerating the decarbonization of the economy. Achieving the objective of the **Paris Agreement requires a whole economy transition**. Companies, banks, insurers, and investors will **need to adjust their business models, develop credible plans for the transition to a low-carbon, climate-resilient future, and then implement those plans.**	Issue recommendations that will form **the basis of regulatory requirements (UK for TPT, TCFD and GFANZ framework) for transition plan information and corresponding guidance.** The target of the 3 recommendations is Net-Zero by 2050. It suggests going beyond TCFD guidance by recommending the disclosure of current and planned engagement activities aimed at driving behavioral and business model changes within the entity's industry, companies, and customers in its value chain or portfolio.
Date of publication	The report **"Financial Institution Net-zero Transition Plans-Fundamentals, Recommendations, and Guidance"** was published in November 2022. The report **"Expectations for Real-economy Transition Plans"** was published in **September 2022**.	Disclosure framework was published in **November 2022**, a consultation period is planned between Nov 2022-Feb 2023. Final publication in summer 2023.
Definition of transition plan	A net-zero transition plan is a set of **goals, actions, and accountability mechanisms** to align an organization's business activities with a pathway to net-zero GHG emissions that delivers real-economy emissions reduction in line with achieving global net zero.	A transition plan **is integral to an entity's overall strategy,** setting out its plan to contribute to and prepare for a rapid global transition towards a low GHG-emissions economy.
Key features; how to planified ?	- Foundations: by defining the **organization's objectives to reach net zero by 2050 or sooner,** in line with science-based pathways to limit warming to 1.5°C, **stating clearly defined and measurable interim and long-term targets and strategic timelines**, and identify the priority financing strategies to enable real-economy emissions reduction; - Implementation and engagement strategy: **Engage with peers, government, and public sectors** to accelerate and scale the net-zero transition in the real economy, **provide transition-related education and advice**, utilize existing and new products/services to **support and enhance clients' and portfolio companies' transition efforts** aligned with the institution's net-zero strategy, **establish and enforce policies and conditions for priority sectors** (*e.g.*, thermal coal, oil and gas, deforestation) and other high-emitting activities to define business boundaries in line with net-zero objectives; - Metrics & targets: establish a **comprehensive set of metrics and targets, focus on aligning financial activity with the real-economy net-zero transition, measure changes** in client and portfolio GHG, monitor progress in the near, medium, and long term; and - Governance: defining roles, responsibilities remuneration, skills and culture aligned with net-zero objectives. 4 key financing strategies to enable the net-zero: **Climate solutions** (technologies, services, and tools that mitigate, eliminate or remove GHG emissions), **aligned** (entities that are already aligned to a 1.5 degrees C pathway), aligning (entities committed to aligning to a 1.5 degrees C pathway) and **managed phaseout** (high-emitting physical assets that can be phased out before end-of-life).	Values are : Ambition (objectives, priorities, and their impact on business model), action (implementation and engagement strategy) and accountability (metrics, targets, and governance). The TPT Disclosure Framework recommends is based on TCFD principles but propose further detail beyond the TCFD 4 keys to planify.
Do they consider the technical constraints of different sectors (level of detail/latitude of application to sectors)	Where appropriate and possible, statements should be endorsed by the Board (or equivalent strategic oversight body). Institutions should also consider **articulating and adapting their strategy** to : - **business context** (institution's size, business units/operating models, departments, products, and services will affect or contribute to net-zero objectives; - **assumptions** (transition pathway uncertainties and implementation challenges); - **timing** (in addition to near-term GHG emissions reduction, objectives that target medium-term outcomes); - **geographical context** (differences in policy and regulatory environments, regional business activity, other country, or region-specific risks and opportunities).	- The proposed stages of the TPT can be **universally applied across sectors**, although terminology and process steps may vary. - Entities are advised to prioritize decarbonization and risk mitigation based on the materiality of their emissions profile, **considering factors like sector, size, and geography.** - In addition to financial planning, entities need to carry out a **sensitivity analysis of assumptions specific** to their plan, such as: • technology evolution, • supply chain actions, • policy changes and • demand evolution, to assess the feasibility of the plan and inform future iterations of implementation and engagement strategies. - **Information on sectoral transition plans** will be developed to provide additional guidance to complement the TPT.

ANNEX 2

Leading NGOs and international institutions involved in global energy transition planning

Organization	Sponsor	Action	Typical" deliverables
IPCC (Intergovernmental Panel on Climate Change) *https://www.ipcc.ch*	Created by the **WMO** (World Meteorological Organization) and the UNEP (United Nations Environment Programme).	Prepares **Assessment Reports** about the state of scientific, technical, and socio-economic knowledge on climate change, its impacts and future risks, and options for reducing the rate at which climate change is taking place. Also produces **Special Reports**, and **Methodology Reports** (notably guidelines for national GHG inventories).	- General or specifical **Assessment and synthesis reports.** - **Methodology** on GHG inventory.
IEA (International Energy Agency) *https://www.iea.org*	The **OECD** supports and facilitates its operations of the IEA, which is an (autonomous agency of the OECD).	The IEA provide **authoritative analysis, data, statistics, policy recommendations and solutions** to ensure energy security and enable world's transition to clean energy. It provides **climate scenarios**, information on last innovations, as well as **simulators and calculators** regarding energy transition.	- **Reports** on energy-related topics and programme. - **Simulation** of transition.
NGFS (Network for Greening the Financial System) *https://www.ngfs.net/en*	Initially eight central banks (France, England, Japan, Italy, Canada, Sweden, European and people's bank of China) and supervisors.	Enhance the role of the financial system to **manage risks and to mobilize capital for green and low-carbon investments** in the broader context of environmentally sustainable development and the goals of the Paris agreement. It **defines and promotes best practices** to be implemented within and outside of the Membership of the NGFS and conducts or commissions analytical work on green finance.	-Analysis on **climate-related risks** through reports on finance. - Climate scenarios. - **Stocktake on Financial Institutions' Transition Plans** and their Relevance to Micro-prudential Authorities.
GHG Protocol *https://ghgprotocol.org*	Multi-stakeholder partnership where **WRI** (World Resources Institute) and the **WBCSD** (World Business Council for Sustainable Development) have a leading role	GHG Protocol establishes comprehensive global **standardised frameworks** to measure and manage GHG emissions from private and public sector operations, value chains and mitigation actions. It develops standards, tools and online training that helps countries and cities track progress towards their climate goals.	- GHG accounting standards. - Sectorial tools (including scope 3 accounting).
SBTi (Science Based Targets initiative) *https://sciencebasedtargets.org*	No specific sponsor. Collaboration between several organisations: the **CDP**, the **United Nations Global Compact**, the **WRI** and the WWF (World Wildlife Fund).	**Science-based** target setting resources and guidance. Independently assesses and approves companies' targets in line with its strict criteria.	**Target-setting** and guidance directed to company and sector scale.
CDP (Disclosure Insight Action) *https://www.cdp.net/en/*	Charitable limited liability company EU funding support.	CDP runs **the global disclosure system for investors, companies, cities, states, and regions** to manage their environmental impacts. Provides data to international institution and taskforces and developed a **scoring methodology guidance** providing comparability on the market.	- The **CDP score for companies** (to show where they are on the road to 1.5-degree, deforestation-free and water-secure future). - Disclosure system.
VCMI (Voluntary Carbon Market Integrity Initiative) *https://vcmintegrity.org*	Independent non-profit organization. Received co-funding from the Children's Investment Fund Foundation, Ballmer Group, the Bezos Earth Fund, Google LLC, the Packard Foundation and the UK Department for Business, Energy, and Industrial Strategy (BEIS).	VCMI is a multi-stakeholder platform to drive credible, net-zero aligned participation in voluntary carbon markets. Promoting demand-side integrity (to ensure meaningful use of carbon credits for voluntary purposes and the associated business case for scaling voluntary carbon markets) and supply-side integrity (by promoting access as countries develop voluntary carbon markets policies and engaging with supply-side integrity efforts to ensure transparency and assurance).	Categorization and utilization scheme for claims to **transparently communicate** how carbon credits are being used.
ICVCM (Integrity Council for the Voluntary Carbon Market) *https://icvcm.org*	Independent governance body.	It is setting and enforcing definitive **global threshold standards, drawing on the best science and expertise available**, so high-quality carbon credits channel finance towards additional GHG reductions.	A set of Core Carbon Principles (CCPs), which will set new **standards** for high-quality carbon credits and define which carbon-crediting programs and **methodology** types are CCP-eligible.

Actual role and interactions between these organisations

- **IPCC** has strong international credibility. Its research results have been used during various summits and COPs as a scientific reference to establish international policies and agreements, notably the Paris Agreement.
- Data from the **IEA** is an important source for many organizations. The IEA collaborates with entities such as the African Union, APEC, ASEAN, Asian Development Bank, G7, G20, International Energy Forum, IRENA, OPEC, UNFCCC, CEM, BioFuture Platform, Mission Innovation, Energy Efficiency Hub, RETA, and more. The IEA also frequently provides expert advice in discussions at the Conference of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC).
- **SBTi** partnership includes **CDP, UNGC, World Resources Institute, WWF**. SBTi is an important resource for companies. However, their latest reference data are those from the 2017 **IAE**'s work (SBTi considers the **IEA** and **IPCC** scenarios, but as far as the IPCC is concerned, it does not yet consider the AR6 scenario, which is the latest to date). This poses a problem in terms of updating targets and factoring in accelerating technological innovations.
- The Sectoral Decarbonization Approach (SDA) from the SBTi is an alternative method of deriving carbon intensity measures and targets from global mitigation pathways for some of the most carbon-intensive activities. The current version of SDA supports 1.5°C targets for power generation, while methods for other sectors are based on well below the IEA's 2°C pathways. SBTi has ongoing efforts to further develop 1.5°C sectoral trajectories, such as the one published by SBTi for the power sector in June 2020, and will consider the publication of forthcoming IPCC AR6 and IEA scenarios.
- **CDP** collaborates with **UNGC** (United Nations Global Compact), the **We Mean Business coalition, UN's Marrakech Partnership for Global Climate Action, Business for Nature, IUCN, Taskforce on Nature-related Financial Disclosures, the Investor Agenda, the Future of Sustainable Data Alliance, Impact Management Platform, ACA Brazil, Brazilian Association of State Environmental Entities, Water Europe, the Alliance for Corporate Transparency, the Climate Action Network, UN-Water Expert Group, ADEME**, and more. CDP is an accredited observer to the **UNFCCC**, an accredited observer to the **UN Environment Programme**, and holds Consultative Status with the **UN Economic and Social Council**. The **European Commission Joint Research Centre** (JRC) is a data partner of CDP. CDP's global policy team engages with policymakers and regulators including the United Framework Convention on Climate Change, the Sustainable Development Goals, TCFD, EFRAG, ESMA, and others.
- NGFS collaborates with the National Institute of Economic and Social Research, Climate Analytics, and more.
- On June 15, 2022, the GFANZ announced its direction for the transition plan and worked closely with the TPT to develop its framework.
- The FCA is working closely with HM Treasury on the development of a sustainable investment labelling regime. The labels will help consumers select investment products based on their sustainability characteristics and will be supported by the underlying SDR disclosures.