



Impact of Finance and Investment on Net-Zero Transformation

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Abstract. Climate change poses severe challenges globally, and achieving net-zero emissions by 2050 is imperative. This study explores the important role of finance and investment in this transition. Through systematic analysis, including a literature review, it assesses how financial institutions can effectively mobilize capital, manage risks, and integrate ESG factors to impact the net-zero transition. The research indicates that green financial products, such as green bonds, significantly promote the development of low-carbon projects, while ESG integration reduces climate risk and enhances long-term returns. Policy recommendations are provided to guide stakeholders in promoting sustainable investment and achieving net-zero emissions. By conducting thorough evaluations and backing policies, financial bodies can efficiently gather funds, mitigate climate hazards, and foster sustainable growth, thus playing a significant role in realizing worldwide net-zero emissions. This approach aids in tackling climate change issues and lays a robust groundwork for sustained economic expansion and societal steadiness.

Keywords: Risk management, climate change, green finance, social responsibility, sustainable investment.

1 INTRODUCTION

Because of the 2015 Paris Agreement, the development of ESG investing and the emergence of net zero emission policies, climate risk is certainly the most important topic and challenge for asset owners and managers now and will remain so over the next five years.[1] Finance and investment play a key role in driving the global transition to net-zero emissions. Addressing the major challenge of climate change requires countries and regions to achieve net-zero greenhouse gas emissions by 2050. This goal will require not only technical and policy support but also significant capital investment and guidance. Financial institutions can accelerate the development and deployment of low-carbon technologies and projects by offering green finance products such as green bonds and sustainability bonds. Moreover, by integrating environmental, social, and governance (ESG) factors, financial institutions can reduce climate risk and improve long-term investment returns.

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Although studies have shown that green finance significantly contributes to low-carbon project financing, there is a need for a systematic and comprehensive analysis of the full impact of finance and investment on the net-zero transition. This study aims to assess the specific role of financial institutions in advancing the net-zero transition, explore the impact of investment on technological innovation and market development, analyze the guiding role of financial policies and market mechanisms, and examine the role of financial institutions in ESG integration and risk management. This study will adopt systematic analysis, literature review, and case study methods to comprehensively demonstrate the multifaceted impact of finance and investment on the net-zero transition.

What is the net-zero transition? It refers to the goal of reducing greenhouse gas emissions, particularly carbon dioxide (CO₂) emissions, to control global warming to within 1.5°C above pre-industrial levels. According to the Paris Agreement, 197 countries have agreed to limit global warming to below 2°C and to pursue efforts to limit it to 1.5°C. However, net zero is much more than a scientific concept or a technically determined target. Achieving net zero requires operationalization in varied social, political and economic spheres.[2] The core objective of this transition is for the attainment of net-zero carbon emissions, i.e., zero or equal to zero net global greenhouse gas emissions. This means that emissions do not exceed the absorptive capacity of natural systems, or that gases are captured and stored through technological means to reach a zero-emission state.

The issue of global climate change now stands as a significant global challenge, and in recent years anthropogenic greenhouse gas emissions have accelerated changes in the earth's climate system, preceding severe climatic occurrences, rising sea levels, and the downfall of ecosystems. This has serious environmental, social and economic implications. Against this backdrop, reducing carbon emissions has become a key task in addressing the climate crisis, and financial institutions and investors have a key role to play in driving a zero-emissions transition.

Why the impact of finance and investment on net-zero transition is significant? Solving the net-zero equation cannot be divorced from pursuing economic development and inclusive growth. It would require a careful balancing of the shorter-term risks of poorly prepared or uncoordinated action with the longer-term risks of insufficient or delayed action.[3] First, the realization of a net-zero transition will require significant financial investment and technological innovation, and financial institutions can support the study and advancement, utilization and spread of technologies with low and zero carbon emissions by providing financing, investment and risk management services. The flow of these funds and resources will have a direct impact on the speed and effectiveness of achieving the net-zero goal. Second, financial and investment interventions can promote technological innovation and market competitiveness. By investing in innovative areas such as new energy technologies, energy efficiency enhancement, and carbon capture and storage, financial institutions can reduce technology costs and accelerate technological progress, thus advancing the whole sector towards achieving a low-carbon and zero-carbon state. This approach aids businesses in boosting their competitive edge while also generating fresh avenues for expansion and job prospects for economic progress.

The expenditure required for tangible assets during the shift to net-zero is substantial, as it would require significant changes to the seven energy and land-use systems that produce the world's emissions: power, industry, mobility, buildings, agriculture, forestry and other land use, and waste.[3] Nevertheless, there are many reasons why we need to push for a net-zero emissions transition. Global climate change poses an enormous threat to human societies, ecosystems and economies. The concept of "Green Finance" (GF) has evolved over a period of time in accordance with the aspirations of the economies. Growing global concern towards environment protection.[4] The shift towards net-zero emissions stands as a principal strategy for diminishing greenhouse gas emissions and combating climate change. Failure to take action will lead to more serious climate disasters in the future, affecting the global ecological balance and human survival. Secondly, net-zero transition not only helps to reduce air and water pollution and improve environmental quality, but also reduces the incidence of human health problems. Moreover, by reducing overdependence on finite resources, net-zero transition helps to enhance the resilience and sustainability of society. More and more countries and enterprises around the world have realized the importance of low-carbon development and have begun to take action to address the challenges of climate change. In this process, relevant financial institutions can promote the development and application of clean energy, energy-saving technologies and sustainable land management by providing financial support and investment guidance, and evaluate and control risks related to the environment and climate, along with their associated social effects, in their investment collections by implementing environmental, social, and governance (ESG) standards. By combining the power of financial institutions with major reforms in energy and land-use regimes, the worldwide shift towards an economy with reduced carbon emissions and a model of sustainable growth can be hastened, contributing significantly to the battle against climate change and the attainment of worldwide emission reduction goals.

A net-zero transition would have a significant and often frontloaded effect on demand, capital allocation, costs, and jobs. Reaching net-zero emissions will require a transformation of the global economy.[5] Transitioning to net-zero involves a prolonged duration, mainly because it involves comprehensive reforms and deep adjustments to the entire economic system, energy structure, social behavior, and technological innovation.

Financial entities to achieve a net zero status. Key benefits include the following: Increased business resilience and competitiveness, driving innovation and reputation building.[6] Efforts made by financial and investment bodies during the net-zero shift can boost competitive edge and lessen their vulnerability to risks related to policy, regulations, and climate change. An analysis of the relevant conditions required for a net-zero goal can reveal opportunities that arise from the transformation of economic sectors, which can drive innovation. It's essential for financial entities to focus on creating innovative financial offerings to facilitate the shift to a low-carbon state when assisting their clients to meet their emissions targets, which not only provides new competitive revenue streams for financial institutions, but also enables them to build a good reputation in the market. These studies will provide a comprehensive understanding of the

key role and influencing factors of finance and investment in promoting a net-zero transition, and provide theoretical support and policy recommendations for the realization of global emissions reduction targets and sustainable development.

An understanding of the net-zero transition reveals that it also faces issues involving multiple aspects, including policies, market mechanisms, technological innovations, financing needs and social and economic impacts. The huge amount of capital required for the net-zero transition, including the development of renewable energy infrastructure, energy-efficient technologies and low-carbon projects, needs to be financed through diversified financing channels, such as government subsidies, green bonds and green funds. To effectively manage climate-related risks, financial institutions need to comprehensively assess and manage physical and transformational risks, incorporate factors related to environment, society, and governance (ESG) into investment choices to enhance sustainability and risk-resistance of their portfolios. In terms of international cooperation, there is a need to strengthen coordination and cooperation in global climate governance, support developing countries in realizing a low-carbon transition, and at the same time address the employment and social impacts that may be brought about by the transition of high-carbon industries, and mitigate the negative impacts of the transition through social protection measures.

There is no net-zero world without a sustainable trading system.[7] In many nations, opportunities for green finance, such as renewable energy, energy efficiency, are commercially feasible but insufficient due to supply or demand constraints.[8] A sustainable trading system is indispensable for achieving the net-zero objective. Numerous nations offer chances for eco-friendly financing, including advancements in renewable energy and energy efficiency, while commercially viable, often fail to realize their full potential due to supply and demand constraints.

Sustainable trading systems are crucial in achieving a net-zero transition. First and foremost, global cooperation and coordination are key, as a net-zero transition requires the concerted efforts of all countries. A sustainable trading system can facilitate the free global flow of technology, capital and resources and promote the widespread application of low-carbon technologies and projects, thereby accelerating the realization of the net-zero goal. Secondly, reducing carbon leakage was another important aspect. Preventing the transfer of high-carbon emitting production to countries with lower environmental standards through the establishment of coherent international trade standards and norms can help reduce the risk of global carbon leakage. A sustainable trading system can also promote the marketization of green products and services, increase trade in green technologies and renewable energy products, and additionally aid in fostering a worldwide economy with low carbon emissions.

In terms of the commercial viability and constraints of green finance opportunities, renewable energy projects and energy efficiency improvement projects are economically viable and can generate considerable returns. However, the widespread application of these projects is limited by supply and demand. For example, constraints in technology development, infrastructure development, and raw material supply, such as insufficient grid capacity and immature energy storage technologies, can affect the spread of renewable energy. In addition, the lack of market demand may be due to factors such as insufficient public awareness of green products and services, unclear

business expectations of return on investment and insufficient policy support. In order to address supply and demand constraints, policy support and incentives are key. Governments should formulate and implement a range of policy measures, such as subsidies, tax incentives and mandatory green standards, to incentivize enterprises and individuals to invest in and use green products and services. At the same time, green infrastructure, such as smart grids, energy storage facilities and green transportation systems, should be strengthened to remove bottlenecks on the supply side. Innovation in market mechanisms is also an important way to address supply and demand constraints, and mechanisms such as the carbon market and green certificate trading can enhance the market demand and economic benefits of green technologies and projects.

Some academics investigate the impact of finance on the low-carbon growth of the industry from the perspective of finance and hold that changes in the financial sector correspond to changes in the overall economy, the socio-economic situation, trade openings, and other variables.[9]

Investing in zero-emission and sustainable projects is in many cases consistent with financial returns, and this consistency is becoming more evident over time.

First, by adeptly managing risks, these investments have the potential to diminish both physical and transformative dangers linked to climate change. For example, investing in low-carbon projects can mitigate the impacts of extreme weather events and help companies adapt to changing policies and regulations, avoiding fines and reputational damage from non-compliance. In addition, as the global focus on climate change increases, sustainable investments can ensure that companies stay ahead of policy changes and reduce the negative impacts of policy uncertainty.

Changing market demands also offer great potential for sustainable investment. Consumers are increasingly inclined to choose environmentally friendly and sustainable products and services, driving the growth of related industries. Concurrently, an increasing number of investors are considering investing in initiatives that yield social and environmental advantages, which further boosts the demand for sustainable investment products.

In terms of economic benefits, investing in energy-efficient technologies and renewable energy projects can significantly reduce energy costs and improve the operational efficiency and profitability of enterprises. Sustainable projects emphasize on efficient use of resources, reducing wastage and further lowering operational costs, thereby improving financial returns. On the innovation-driven side, sustainable investments often drive technological innovation and development, leading to new business models and market opportunities that promote environmental protection while generating significant financial returns. Enterprises practice sustainable development to build competitive advantage, attract more customers and investors, and increase market share and profits.

Professionals engaged in the business of 'green financing' (that is, those responsible for mobilizing capital to launch low-carbon energy and efficiency projects) should be aware of the stepped-up investment effort required to lay the groundwork for a future consistent with 2 °C, and even more so 1.5 °C. [10]

2 CONCLUSION

The net-zero shift is significantly influenced by overall financial and investment strategies. Financial institutions can effectively catalyze capital to support the implementation of zero-emission and sustainable development projects by providing green financial products such as green bonds and sustainability bonds. These investments not only accelerate the promotion of clean energy and energy efficiency projects, but also expand the scale and influence of the relevant markets, driving the pace of economic transition to low-carbon. Second, financial entities are progressively focusing on environmental, social, and governance (ESG) aspects, integrating them into their investment strategies to mitigate the risk of climate change and bolster the resilience of long-term investments. Through ESG integration, financial institutions not only protect investors' assets, but also contribute to the realization of corporate and social sustainability goals. Market promotion and innovation incentives by financial institutions drive the development of green technologies and innovations, such as renewable energy technologies and energy efficiency improvements. By introducing innovative financial instruments, such as carbon financial products and green insurance, financial entities have played a pivotal role in boosting market demand and hastening the shift towards an economy with reduced carbon emissions. Finally, investing in net-zero transition and sustainable development projects not only reduces energy costs and resource wastage and improves operational efficiency, but also enhances the market competitiveness and brand image of enterprises. These long-term economic benefits not only bring stable financial returns to enterprises and investors, but also play a role in fostering the sustainable growth of both society and the environment.

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