A Study of Green Finance in India

Md Wakil Hossain
Assistant Professor in Commerce,
Goenka College of Commerce &
Business Administration, Kolkata, West Bengal
mdwakilhossain@gmail.com
https://doi.org/10.5281/zenodo.18182715

ABSTRACT

Green finance acts a crucial role in promoting inclusive, resilient, and sustainable economic growth by delivering environmental benefits.It facilitates the movement of financial resources from public, private and non-profit organization to sustainable development priorities issues. Acknowledging the importance of green finance, UN Environment has been engaged in aligning countries' financial systems to direct financial flows toward the attainment of the 2030 Sustainable Development Goals. To achieve sustainable economic development, India requires a comprehensive national green finance policy. The country is estimated to need approximately USD 4.5 trillion in green infrastructure investment by 2040 (Jha and Baksi, 2019). Mobilizing this level of funding will require contributions from both public and private sector institutions, with banks playing a crucial role in advancing green finance. Accordingly, this study focuses on the green financing initiatives undertaken by public and private sector organizations and banks in India, and also proposes measures to promote positive environmental outcomes at the national level. The study adopts a descriptive research design and is based on secondary data sourced from government reports published by the Government of India, as well as reports from public and private sector organizations and banks operating in India.
Key Words: ***Green Finance, Climate Mitigation, Green Initiatives, Green Investments.***

A. INTRODUCTION

Green finance in India refers to financial products and services designed to promote environmental sustainability and address climate change. It involves funding projects that benefit the environment, like renewable energy, energy efficiency, and sustainable infrastructure, through various instruments like green bonds, green loans, and green deposits. The goal is to channel investments towards environmentally friendly projects and reduce pollution while supporting sustainable economic growth.

Green financing has emerged as a critical component of India's transition toward a sustainable future. As the country seeks to lower its carbon footprint and achieve its environmental objectives, green financing provides individuals and businesses with viable avenues to adopt environmentally sustainable solutions. This paper examines various green financing instruments, including eco-friendly loans and the green finance initiatives offered by Bank of Baroda.

Green financing refers to providing financial support for projects that have a positive impact on the environment. This includes funding for renewable energy, energy-efficient buildings, sustainable infrastructure, and other initiatives that help reduce pollution and conserve resources. Green finance is crucial for driving the adoption of clean technologies and meeting India's climate targets.

There are different products under green finance which are graphically presented in the below and which are divided into mainly four categories which are as followings

Figure 1: Products of Green Finance

Source: Jin Noh Hee, Financial Strategy to Accelerate Innovation for Green Growth (2010).

B. LITERATURE REVIEW

Sharma (2024) opined that the green finance worked as investment in low carbon and green growth industry which were sometimes less attractive than the conventional commercial industry. The author mentioned four types of green finance like as retail finance, corporate finance, insurance finance and assets management and highlighted on the implementation of green finance through the system of eco-efficient infrastructure. **Agarwal and Keswarni (2024)** referred the name of some fundamental element of green banking like carbon footprint reduction, investing sustainably and ethical financing. Researchers mentioned the initiatives of green banking which were paperless transaction, green investment fund, green bonds and energy efficient branches. Authors found green banking challenging because of high initial investment cost and risk assessment, regulatory environment and customer perceptions. **Kumar and Sandhu (2023)** explained the meaning of green finance and told that green finance was an effort for providing financial investment in an eco-friendly project to control greenhouse effect, global warming and pollution control. The authors mentioned the name of National Action Plan on Climate Change (NAPCC) and Climate Change Finance Unit

(CCFU) which worked for reducing the effect of climate change. **Kumar and Kundalia (2023)** noted green bond to be the debt instrument to collect capital for making investment to the environmental and climate-based projects. The authors followed that there were different types of green bonds and these played a pivotal role to maintain the environmental balance from different aspects in this ecosystem with the proper manner of sustainability. Researcher found that the green bond was used effectively to generate renewable energy and cleaned transportation system and also helped to form eco-friendly project **Rajesh**. **S. (2022)** opined that green banking was the environmental-friendly practices and reduction of the bank's carbon footprint. The researcher mainly focused on the establishment of financial institution in an area in a manner as a result the overall reduction would be done for external emission of carbon and internal carbon footprint. **Ranjan et. Al. (2021)** mentioned that green finance referred that the arrangement which played vital role to maintain the environmental sustainability and adopt some initiatives to protect unexpected climate change. The researchers found public policies were also formed in the name Circular Carbon Economy (CCE) and Principle for Responsible Investment (PRI) and some other initiative also under United Nation Environment Progamme (UNEP). The authors mentioned the role of Corporate social responsibility from 2008 and for Non-Banking Financial Institution from 2013 under Companies Act 2013 for the betterment of climate related matter also referred the pioneer initiative of establishing Green Finance Bank in United Kingdom. **Jha and Baksi (2019)** mentioned the role of green finance to reduce the emission of greenhouse gases and the contribution for the sustainability using the renewal energy system. The authors noted the investment of public and private banks also the non- banking financial institutions in the different green projects or initiatives.

C. OBJECTIVES OF THE STUDY

1. To analyse different sources of green finance in India
2. Analysing the changes in green financing patterns in respect of Public, private and foreign investment in India
3. To evaluate the contributions of various sub sectors in green financing under climate mitigation

D. **RESEARCH DESIGN**

Data Type and Source

The study adopts a descriptive research approach and utilizes secondary data obtained from government reports issued by the Government of India, along with published reports of public and private sector organizations and banks in India.

Methodology

This paper is made on descriptive manner and the necessary secondary data are collected from different government and banking website. These data are analysed through the bar diagram and explained conceptually to assess the performance green finance for the financial year 2021-22.

E. ANALYSIS AND FINDINGS

1. a. Conceptual Details of Green Finance

Green Financing

Financial institutions (like Small Industries Development Bank of India (SIDBI)) has adopted three-main approaches, firstly, giving financial support in subsidized rate and focused through the Green Finance Schemes for mitigation and adaptation schemes in Micro Small Medium Enterprise (MSME) sector. Secondly, different developmental activities forwarding to an enhanced consciousness and formation of an ecosystem to make easier the adoption of climate resilient steps by MSMEs. As a third step, to inspire other Banks/ Financial institutions (FI) to invest in Energy Efficiency projects using the proper training, also hand holding and Risk Sharing Facility support.

To do the improvement of MSME sector to manage the environment change and with a target to make easiest greening of MSMEs keeping in mind the nations promise at Conference of Parties (COP26) at Glasgow Support Policy, thrust have been given importance in the Union Budget 2022 for different type of initiatives like climate action, solar, e-mobility, clean energy, battery, waste management, energy efficiency by taking the help of energy service

1. b. Green Funding Products

"**Green Finance Scheme**" indicates mainly transport, waste, energy, renewable, mobility etc., including acceptance of Environmental, Social and Governance (ESG) parameters. The present schemes like End-to-End Energy Efficiency (4E) funding Projects have been revised and simplified. Achievement level becomes 168% growth which indicates outstanding performance of green loans in the period 2021- 2022 financial year (SIDBI Annual Report, 2021-22).

1. c. Partial Risk Sharing Facility for Energy Efficiency project

Rapid improvement is found in energy efficiency projects and it is applied with the help of Energy Service Companies (ESCOs). The facility gives Risk Sharing Facility for Energy Efficiency Projects aided by the Participating Financial Institutions (PFIs). Recently 13 Banks and Non-Banking Financial Corporation (NBFCs) including State Bank of India (SBI), Bank of Baroda (BOB), Canara Bank, Housing Development Financial Corporation (HDFC) Bank and Indian Renewable Energy Development Agency Limited (IREDA) have been empaneled as Private Finance Initiative (PFIs). Till FY 2022, 45 Electrical Engineering (EE) projects have been financed under the facility to a total project value of 476.44 crore with a borrowed amount of 231 crore and secured amount of 173.31 crore (SIDBI Annual Report, 2021-22).

1. d. Cluster-Oriented Interventions in India

Hands on training is given to 100 MSME clusters for accepting green and clean activities (SIDBI Annual Report, 2021-22).. In the long run, this will drive towards major reduction in energy consumption and Green House Gas (GHG) release and resource consumption. This initiative helps to become self-reliant and such type of initiative is followed by Government of India (GoI) to get the successful result to control the energy consumption and GHG release. So many activities have been introduced in the MSME level of Bihar and West Bengal making a target around 10,000 MSMEs in different areas of these two states (SIDBI Annual Report, 2021-22).

1. e. Carbon Neutrality

Following the COP26 announcement, banking institutions have committed to a phased reduction of their carbon footprint, targeting carbon neutrality by 2024 and net-zero emissions thereafter, with the initiative likely to inspire other financial institutions and stakeholders..

1.f. Green Climate Fund Support Mechanisms

Financial Institutions are acting on important schemes and programs to submit to the Green Climate Fund (GCF). Ministry of Environment Forest and Climate Change (National Designated Authority of India) has stationed for the three schemes total amount around USD 1,250 Mn (SIDBI Annual Report, 2021-22).

1. g. International Co-operations

Banks have made contact with international partners and cooperation with Asian Development Bank (ADB) and some other international financial institutions. The World Bank, The Montreal Group, International Development Finance Club (IDFC) in collaboration with Agence Française de Développement (AFD) have started Green Indian Financial System (GIFS) Initiative which seeks to enable such dialogues and negotiations on some green initiatives in the Indian financial system. Discussions with Deutsche Gesellschaft für International Zusammenarbeit (GIZ) and the The World Bank country team is progressing toward setting up risk-sharing facilities for municipal solid waste and compressed biogas.

Green finance flows in our country are not sufficient and it is much lower than needed amount. When requirement of green finance in India is Rs. 309 thousand crores (~USD 44 billion) per year but in 2019-20 , It was only one fourth of the necessary amount.

The Landscape of Green Finance in India tracks financial flows to major sectors, including clean energy, clean transport, and energy efficiency. This study finds both public and private sources of capital in national and international context which constructs a framework to follow up the flow of finance from the source to the last level through diverse instruments.

1.h. Green Financing through Clean Energy, Clean Transport and Energy Efficiency

From the following pictures (figure2) it is easily understood that clean energy is available for us using the solar panel and pollution problem is reducing through proper management of garbage and water purity of this earth. Here energy efficiency model have also been presented through the system of improving building insulation. For maintaining our healthy life style, it is very important that the negative impact of emitted carbon from the different transportation system be minimised or brought to nil using e-rikshaw (Toto) or electronic bus and electric train in long route.

Figure 2: Picture of green financing through Clean Energy, Clean Transport and Energy Efficiency

2. Performance of Green Finance in respect of Climate Mitigation

In the context of climate change, the "mitigation sector" in India refers to efforts focused on reducing and limiting greenhouse gas emissions and the impacts of climate change. This involves transitioning to low-carbon energy sources, improving energy efficiency, and implementing sustainable practices across various sectors.

Flow of finance to mitigation sectors enhanced by 20% and it reached to Rs. 3,712 billion (USD 50 billion) per year in 2021-22 in comparison to Rs. 3,093 billion (USD 44 billion) in the year 2019-2020 (CPI 2024). This positive change was possible through the active participation of the financial institutions and banking sectors in different levels.

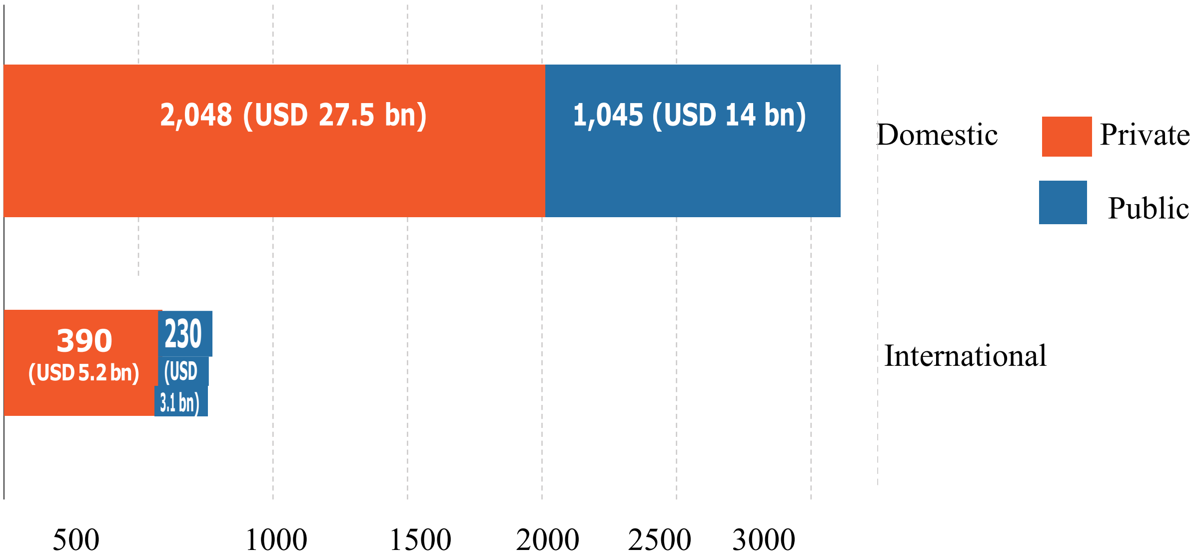
Domestic Mitigation Finance

Contribution of green finance in climate mitigation in India is managed through indigenous sources and out of this domestic mitigation finance, the private sector's contribution is 66% (Rs.2,048 billion/USD 28 billion). Public sources manage 34% (Rs. 1,045 billion/USD 14 billion) which includes the government budgetary expenditure (both central and state) and in the year 2021-22 Rs. 596 billion (USD 8 billion) was used for mitigation purpose which is higher than the amount Rs.574 billion in 2019-20. It also indicates the upward trend of financing in mitigation sector. Contribution of Public sector undertakings (PSUs) is the residual 43%.

International finance enhanced to 17% (INR 620 billion / USD 8.3 billion) of India's total mitigation flows in 2021–22, increasing from approximately 15% in 2019–20. Private investment emerged as the dominant component of international mitigation finance, comprising 63% (INR 390 billion / USD 5.2 billion) in 2021–22, compared to 40% in 2019–20. This growth was primarily driven by commercial financial institutions, which contributed

55%, followed by foreign direct investment at 27%. The trend reflects increasing market maturity in specific sectors and subsectors, particularly solar energy. The remaining 37% (INR 230 billion / USD 3.1 billion) of international mitigation finance originated from public sources, including official development assistance and other official flows.. It is presented through bar diagram

Chart1. **Green finance (mitigation sectors) by sources (INR bn)**



Source: Landscape of Green Finance in India-2024

3. Green Financing under Sub-Sector of Climate Mitigation

Different sectors like Clean energy and energy efficiency, clean transportation are related concepts focused on reducing environmental impact and improving resource utilization. Clean energy refers to sources that produce minimal or no emissions, including renewable energy like solar and wind, and some non-renewable sources like nuclear power. Clean transportation aims to develop low-emission vehicles and transportation systems, such as electric vehicles and public transit. Energy efficiency focuses on using less energy to perform the same task, saving resources and reducing pollution.

Clean Energy: Clean energy sources generate minimal or no greenhouse gas emissions or pollutants during their production.
Example
Renewable energy sources like solar, wind, hydro, and geothermal, as well as nuclear energy.

Clean transportation aims to reduce emissions from the transportation sector by promoting alternative fuels, advanced vehicle technologies, and expanding public transit.
Examples:
Electric vehicles (EVs), hybrid vehicles, biofuels, and efficient public transportation systems.

Energy efficiency refers to the ratio of energy output to energy input, with higher efficiency indicating more effective use of resources.
Examples:
Using energy-efficient appliances, improving building insulation, and adopting fuel-efficient vehicles.

Clean energy received the highest share of mitigation financing in 2021–22, accounting for 47% of total funds, followed by energy efficiency at 35% and clean transportation at 18%. While clean transportation attracted the smallest proportion of funding, the sector recorded substantial growth, with financing increasing by 94% between 2020–21 and 2021–22.

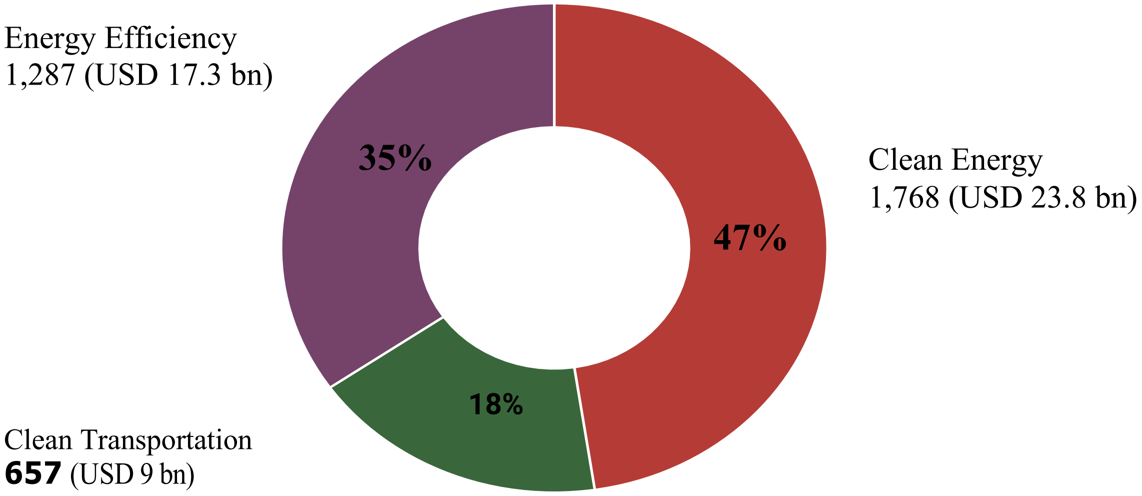


Chart 2: Sector Wise Green Financing under Climate Mitigation (INR bn)
Source: Landscape of Green Finance in India-2024

4. Findings

- Green finance encompasses multiple sectors, including renewable energy, waste management, transport, energy, and mobility, while integrating Environmental, Social, and Governance (ESG) parameters.
- Banking institutions give financial support in different environmentally friendly schemes and project to apply green financing concept in different sectors.
- MSME sectors play a vital role to implement green financing successfully.
- Banking institutions have decided to adopt a phased approach to reducing their carbon footprint, with the objective of achieving carbon neutrality by 2024 and progressing toward net-zero emissions thereafter.
- Indian financial institutions are working intensively with the international organizations (World Bank, Montreal Group and IDFC) to prevent the climate changes.
- Green financing directly helps to minimize the emission of greenhouse gases
- Domestic source of green financing for mitigation covers 83% and international source only 17% and it is increased only by 2% (in 2019/20- 15% and 2021/22-17%)
- Private sector's investment (66%) is double in comparison of government sector (34%) for the domestic mitigation finance.
- Green finance flow under sub-sector of climate mitigation is 47% for clean energy, 35% for energy efficiency and only 18% for clean transportation

F. CONCLUSION

It is evident that green finance is essential to protect the climate and maintain the sustainability through the intensive use of green financing across the country. Banking sectors, non-banking financial institutions (NBFC) and other financial institutions also play an important role to implement the green financing concept in different corner of this nation successfully. International collaborations are also there and the outcome seems promising. To control the greenhouse gas, climate mitigation is compulsorily used under the three sub-sectors like clean energy, energy efficiency and clean transportation.

G. RECOMMENDATION

It is well known fact to the people that when huge amount of money is invested to earn a certain amount of money as profit from their investment, but it has some risk factors. Out of these risk factors, one major factor is environmental and climatic changes in today's situation which can badly affect our eco-system and health condition. So, some matters can be suggested in respect of this research like as

1. To be focused on climatic matter seriously and sincerely.
2. Government regulatory framework is required and some strong financial initiatives also to be taken to implement the green financing projects across the country.
3. For the financial institutions, compulsion for green investment in each year to be mentioned consequently the implementation of green finance would be better than the present time.

REFERENCES

Agarwal, P. K., & Keswarni, K. (2024). *Green banking*. Chartered Secretary, 54(9), 81–85.

Bank of Baroda. (2024). *Green finance*. https://www.bankofbaroda.in/banking-mantra/others/articles/sustainable-green-financing#title-id

Climate Policy Initiative. (2024). *Landscape of green finance in India*. https://www.climatepolicyinitiative.org/publication/landscape-of-green-finance-in-india-2024/

Jha, B., & Bakshi, P. (2019). Green finance: Fostering sustainable development in India—Challenges. International Journal of Recent Technology and Engineering, 8(4), 3798–3801.

Kumar, M., & Sandhu, V. (2023). A review of India's green funding: Opportunities and difficulties. South India Journal of Social Sciences, 21(1), 39–48.

Kumar, S., & Kundalia, L. (2023). Green bonds: Role and scope in India's financial and fiscal landscape. Journal of the Indian Institute of Banking & Finance, 94(3), 43–56.

Rajesh, S. (2022). Green banking practices in India: Opportunities and challenges. Asian Journal of Management and Commerce, 3(1), 161–165.

Ranjan, A., Nath, S., & Ghosh, S. (2021). Green finance in India: Scope and challenges. RBI Bulletin, 61–72.

Sharma, S. (2024). *Low carbon green growth roadmap for Asia and the Pacific: Fact sheet 28—Green finance* (pp. 1–10).