



GREEN FINANCE AS A TOOL FOR MOBILIZING SUSTAINABLE INVESTMENT IN EMERGING MARKET

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ABSTRACT

Achieving a sustainable investment in the near future will be done through a chain of green finance. Green finance promotes sustainable investment and helps to grow the economy with environmental sustainability. Previous studies limit on empirical evidence on how efficiently green finance mobilises sustainable investment. This study will examine the role of green finance for a sustainable investment development of economy. Further this study examines role of government and corporates for channelizing green finance for upliftment of economy with environment friendly norms. An empirical research design using secondary data from emerging economy will be used to study. Quantitative techniques are used to analyse the causal relationship between variables. Findings of the study shows green finance significantly impacts sustainable investment. The study shows the impact of Regulations and how Green finance enhances the market share of the companies. It shows that sustainability will be a major subject to be studied in near future for enhancing awareness of environment friendly projects.

Keywords:- *Green finance, sustainable investment, green economy, green instrument, investment behaviour.*



INTRODUCTION

Green finance was introduced in the late 20th century through movements supporting environment friendly activities. In 1972 the concept of sustainable development was introduced. In 1987 Brundtland commission was formed and the concept of sustainable development was popularized by this committee. In 2015 The Paris agreement gave a new form to green finance. It shows climate finance flows consistent with a pathway towards low greenhouse gas emissions. Green finance is considered as a major instrument for solving the problem of climate change and environmental issues that have been raised a lot in the last decade. In India the early stage of green finance started in 2015. India is showing an impactful role as an economy in the world as it is the fastest growing country. In its transformation journey, balance between economic growth and social responsibility is the biggest challenge for a nation (pradhan.k,2024) First green bond was issued by Yes Bank in 2015 to initiate projects related to renewable energy such as wind and solar power. The expansion and market development happened between 2016-2020.

Green bonds and renewable energy are mainly explored in the existing research. Contribution of Indian companies in promoting sustainable investment and green finance and role of banking channels in promoting green funds, green loans and green banking research is not studied effectively as yet.

The primary objective of this research is to find how green finance helps in mobilizing sustainable investment. This study also examines other green instruments like green loans, ESG funds and green banking. It identifies the role of Indian companies in promoting green finance and sustainable investments. It finds the challenges faced by the government in regulating green finance.

Various companies like Adani green power energy ltd., Gravita India Ltd., Tata Power Co.Ltd, is leading in green energy-based projects and working for sustainable development with sustainable investment. Indian renewable energy development Agency established by the government to regulate financial institutions promotes renewable energy financial projects and regulations of loans and other debt funds raised for green energy. In this study Quantitative techniques are used to study the various aspects such as policy framework by government, green instruments by companies and investors behaviour towards sustainable investment through green finance.



REVIEW OF LITERATURE

Jha.B and Bakshi.P(2019)in their study show the role of green finance in promoting sustainability and economic growth in India. Green finance helps us to utilize all funds towards environment friendly projects and mobilizing funds from the public-private and nonprofit sector to those products that support sustainability and climate. Muhammad. S and Kaushal.V(2018) highlights that green finance plays a crucial role in achieving sustainable development by promoting environmentally responsible investment. Indian regulatory measures such as the RBI sustainability guidelines and SEBI Green bonds framework have expanded the scope of green finance. Dhoot.P & Awate.S(2021) research paper argues that green finance has become an increasingly important aspect of financing environmentally-friendly initiatives like renewable energy, pollution prevention, waste management and energy efficiency but it also suggests that the green finance market in India is still in its infancy with limited participation from investors as well as a lack of robust governmental infrastructure supporting the green finance sector. Mishra. M (2024) discusses ESG criteria, green bonds, impact investing and sustainable lending practices as important elements of sustainable finance. It discusses various ways in which India has promoted sustainable finance through renewable energy project financing, green bond programmes, establishment of NCEF, NAFCC, integration of SDGs into business operations, and the regulations established by SEBI regarding green bonds. Chattopadhyay.P (2024) examines that global climate action requires massive financial support with the Global Climate Fund 2025 estimating a need for USD 4 trillion annually to meet Paris agreement goals. In India green finance gained momentum through policies like NAPCC (2008) and RBI's guidelines promoting environmental risk assessment in lending. Kousika.K (2025) asserts that green finance is a growing area for financing environmentally-friendly projects to be created in the country like India yet at present most investors are not engaging in the green finance marketplace due to the lack of a mature regulatory structure supporting the green finance industry and due to the ongoing development process of many investors. Kaur.M (2023) explores how green finance would assist in attaining sustainable development objectives along with offsetting environmental issues. The paper has shown the significance of having a green and transparent economic system to attain sustainable developmental objectives in India. Pradhan.K(2024) studied the outlook of green finance and sustainable development in India, focusing on regulatory structure, financial instruments,



rising trend and contribution of green technology. Their study shows the combined endeavour of the government, green investors, corporates and financial institutions will push up the journey of India in the direction of sustainable development. M.Biju et. al (2024) examines the influence of green finance on sustainable development in India. S.Sujatha and K.Sridhan (2024) highlights investment in renewable energy projects and various schemes supporting it. Their findings show most people think financial investment helps in job creation and green financing can boost a sustainable economy.

RESEARCH GAP

The existing research paper on green finance and sustainable investment mainly focuses on green bonds with a limited consciousness on other financial instruments such as sustainability linked bonds, ESG, fixed rate green notes. There is a lack of research on Indian companies' practical participation in green instruments in stock exchanges and absence of issues faced by companies in adaptation of green projects.

PROBLEM STATEMENT

The importance of green finance is increasing in India as an emerging tool for promoting sustainable development but its scope is largely concentrated around green bonds. Other green instruments are not widely adopted yet and still undervalued. There are regular initiatives taken by government bodies like SEBI and RBI about the challenges like regulatory gaps, awareness of green instruments, lack of standardisation, risk of green washing. The role of Indian companies in promoting green financial instruments is still limited. Indian government and companies are lacking behind in gaining investors' trust on green instruments and green finance projects. Therefore, a comprehensive analysis of green finance and regulation in India is much needed.

OBJECTIVES OF THE STUDY

The objective of the study is to analyse the emerging market of green finance in India in order:

- To study various green instruments other than green bonds that are available in financial markets for green investments like green loans, ESG funds, green mutual funds and green banking.



- To identify and analyse the challenges faced on application and implementation of green finance in India. To examine the role of Indian companies in growth and application of green finance for sustainable investment by evaluating their adoption of green projects.
- To analyse the government regulation policy for better implementation of green finance and green investors protection.

RESEARCH QUESTIONS

- What are the green instruments other than green bonds available in India and use for funding green projects?
- What are the challenges in application and implementation of green finance in India?
- What is the role of Indian companies in the growth and adoption of green finance and how do they adapt the green projects for sustainable investment?
- How effective is the government regulation and policy in promoting green finance and ensuring green investors protection?

RESEARCH METHODOLOGY

The present study is descriptive and analytical in nature, focusing on the growth of green financial instruments, the challenges associated with green finance, and the regulatory initiatives undertaken by the Government to promote sustainable financing in India. The study relies exclusively on secondary data obtained from reliable and authenticated sources.

Data have been collected from official government and institutional sources, including the Reserve Bank of India (RBI), National Stock Exchange (NSE), Bombay Stock Exchange (BSE), India International Exchange (India INX), as well as annual reports, sustainability reports, and other publicly available disclosures of selected companies. The study covers the period from 2021 to 2025 to examine recent developments and trends in green finance.

A purposive sample of eleven Indian companies actively engaged in green finance and sustainable development initiatives has been selected for detailed analysis. The study encompasses a broad range of green financial instruments beyond green bonds, including Environmental, Social, and Governance (ESG)-linked instruments, sustainability-linked notes, green senior securities, and other sustainable financing mechanisms. In addition, government



policies and regulatory frameworks supporting green finance are examined.

To achieve the research objectives, various analytical techniques such as comparative analysis, trend analysis, and pre- and post-reform analysis have been employed. The collected data have been processed and analysed using Microsoft Excel, utilizing tools such as pivot tables, frequency distributions, pie charts, and bar charts to facilitate interpretation and presentation of findings.

Data collection and interpretation of green instruments issued by Indian companies

Company	Instrument	Issue Year	Tenure	Fund	Financial Institution	Investors	Profits (₹ Cr)
Axis Bank Ltd.	Green Additional Tier 1 Notes	2021	2031	\$300 Million	SGX-ST, ISM, Indian INX, IFSC	Asian 58%, European 20%, US 16%, Middle East 6%	2025:26,373 2024:24,861 2023:23,172 2022:13,025 2021:6,588
Adani Electricity Mumbai Ltd.	Sustainability Linked Notes	2021	2031	\$300 Million	Indian INX	Asian 49%, EMEA 27%, North America 24%	2025:953 2024:230 2023:95 2022:122 2021:259
Adani Green Energy Ltd.	Green Senior Secured Notes	2021	2024	\$750 Million	Indian INX	Foreign Institutional Investors	2025:4,871 2024:3,986 2023:3,192 2022:1,584 2021:1,250
Import – Export Bank of India	Senior Notes	2025	2033	\$10 Billion	LSE, SGX-ST, Indian INX	Asian 50%, EMEA 32%, USA 18%	2025:32,432 2024:25,817 2023:15,558 2022:7,377 2021:2,540
HDFC Bank Ltd.	Green Senior Notes	2024	2027	\$300 Million	Indian INX	Asian 83%, EMEA 17%	2025:67,347 2024:60,812 2023:44,109
Indian Railway Finance Corporation (IRFC)	Fixed Rate Green Notes	2022	2032	\$500 Million	Indian INX, NSE IFSC Ltd.	Asian 62%, EMEA 25%, US Offshore 13%	2025:6,502 2024:6,337 2023:6,168 2022:6,090 2021:4,416
JSW Infrastructure Ltd.	Sustainability Linked Senior Secured Notes	2022	2029	\$400 Million	Indian INX	Asian 64%, EMEA 24%, US Offshore 12%	2025:1,156 2024:740 2023:327.9 2022:291 2021:190
L&T Infrastructure	ESG	2017	2024	667 Cr	NSE	International financial	2025:14,562 2024:12,966



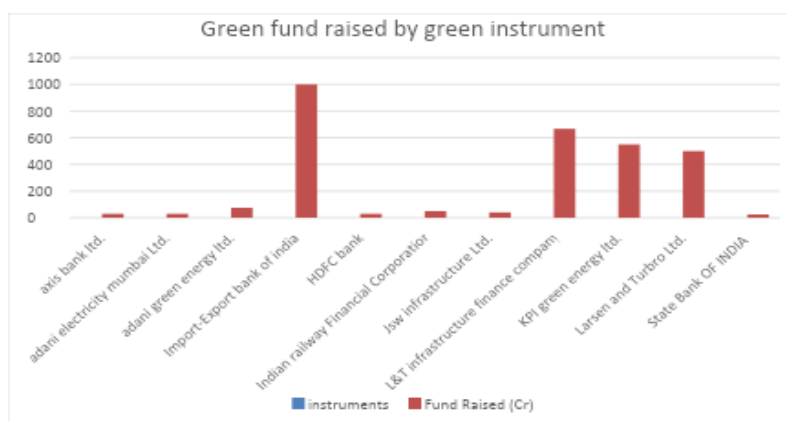
e Finance Company Ltd.						corporation (World Bank group member)	2023:10,374 2022:8,572 2021:6,965 2020:8,894 2019:8,144 2018:7,151 2017:5,920 2016:4,154
KPI Green Energy Ltd.	Green Bond	2025	2030	550 Cr	NSE	SBI Capital Market, Aseem Infrastructure	2025:325 2024:408 2023:78.39 2022:44.62 2021:14.55
Larsen & Toubro Ltd.	ESG	2025	2028	500 Cr	NSE	Institutional investors & mutual funds	2025:17,687 2024:13,059 2023:12,624 2022:10,291 2021:4,669
State Bank of India	Green Floating Rate Notes	2023	2028	\$250 Million	Indian INX	Private Placement	2025:61,077 2024:50,232 2023:31,676 2022:20,410 2021:14,488

Table: 01 (Source:- INDIAN-INX , BSE and NSE website)

DATA INTERPRETATION

The present analysis is to examine the distribution of various green finance instruments issued in the financial market by Indian companies to raise funds for their projects. The instruments are categorised into green bonds/notes, ESG instruments, sustainability linked instruments and other green finance instruments

DISTRIBUTION OF INSTRUMENT TO RAISED FUNDS



Source:- INDIAN-INX , BSE and NSE website



The bar chart shows that the Import- Export bank of India raised the highest fund of 1000 cr through senior secondary notes. Green bonds and green notes are the most used instruments for raising funds by the companies. Adani green energy limited and Adani Mumbai electricity limited used sustainability linked notes and green senior security notes for raising funds. Banks like HDFC, AXIS and SBI use green notes. The infrastructure companies like JSW infrastructure, L&T infrastructure use ESG and sustainability linked loans to raise fund from the market.

INVESTOR PARTICIPATION IN GREEN INSTRUMENTS

Asian investors show confidence in green financial instruments and dominate the investment share. Second largest shares are held by EMEA (Europe, Middle east, and Africa) shows global commitment towards green finance. A moderate participation by investors reflects their interest in green finance with caution. Banks like Axis bank, Import- Export banks attract international participation. Most of the green finance investors are institutional rather than individual investors. SBI banks raise funds through private participation

ESG and sustainability performance of Indian companies

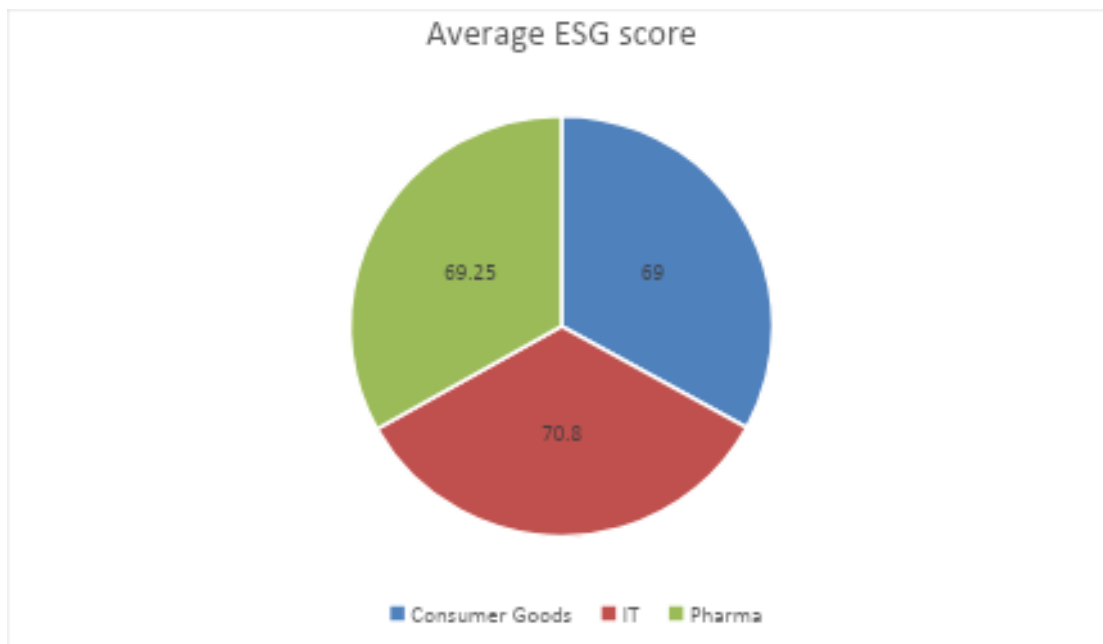
Company	Sector	Renewable energy	CSR Spend	ESG Score	Net Zero Emission	Sustainability report
Infosys	IT	77%	628 Cr	80	2040	Yes
Tech Mahindra Ltd.	IT	22.65%	95.44 Cr	77	2035	Yes
Tata Consultancy	IT	79%	1038 Cr	61	2030	Yes
Larsen & Toubro	IT	60.33%	1.457 Cr	61	2040	Yes



Wipro ltd	IT	84%	60 Cr	75	2040	Yes
Marico ltd	Consumer goods	72.7%	23.79 Cr	78	2030	Yes
Tata consumer product ltd	Consumer goods	35%	21.67 Cr	62	2040	Yes
ITC ltd	Consumer goods	52%	464 Cr	66	2050	Yes
Hindustan Unilever Ltd	Consumer goods	97%	234 Cr	74	2039	Yes
Kansai narolac paint	Consumer goods	39%	12.7 Cr	65	2050	Yes
Dr. Reddy Laboratory Ltd	Pharma	68%	77.45 Cr	73	2045	Yes
Cipla ltd	Pharma	64%	72.49 Cr	66	2025	Yes
Biocon ltd	Pharma	69%	32.46 Cr	72	2024	Yes
Divi's laboratory	Pharma	50%	50 Cr	66	Not specified	YES

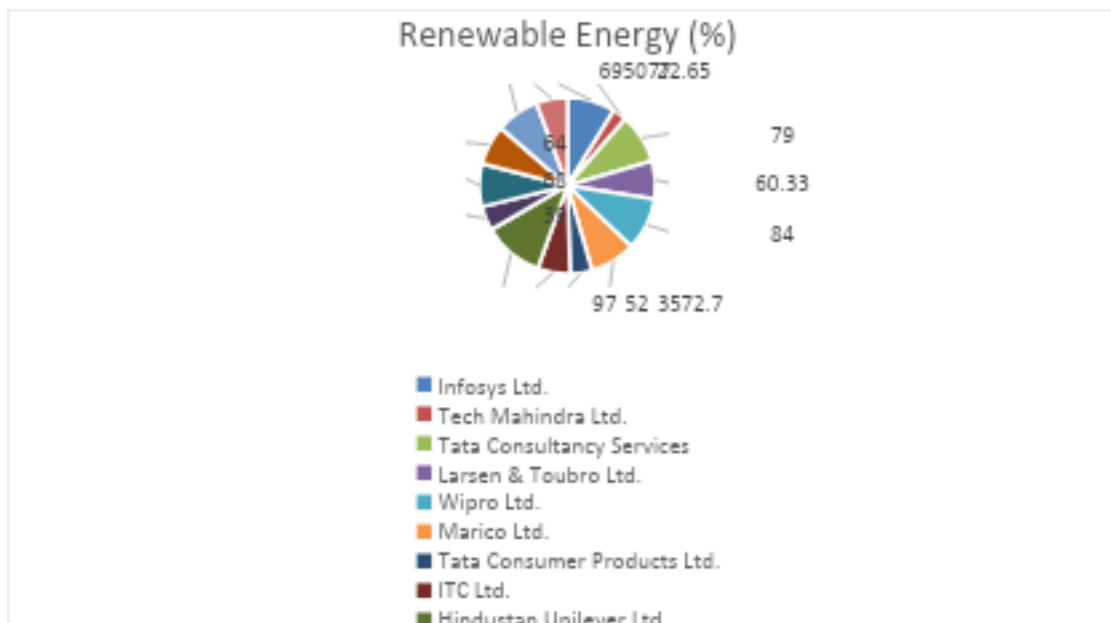
Table: 02 (Data source:- BRSR report of mentioned companies and S&P global and MSCI ESG score)

Data interpretation for examining the growth and application of green finance for sustainable investment by Indian Companies.



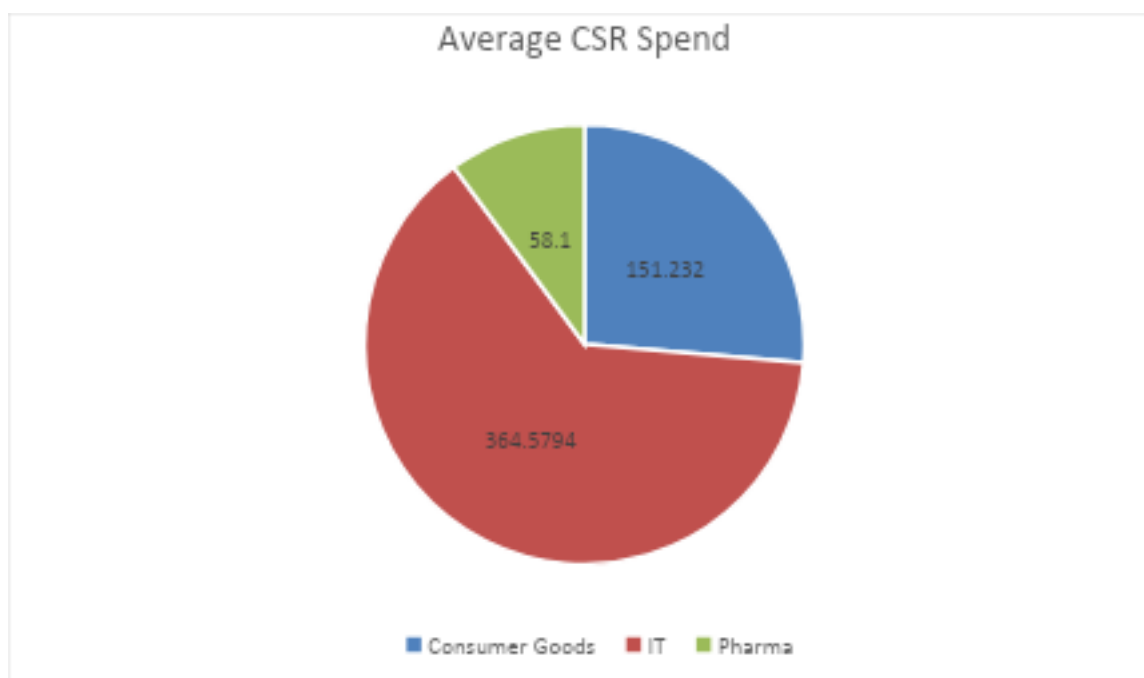
(Source:- S&P global and MSCI ESG score)

The above pivot table and bar graph shows sector-wise ESG score analysis. The results shows that there is almost similar ESG performance of the three sectors but IT is performing slightly better than consumer goods and pharma.



(Source: - BRSR report of companies)

The pie chart analyzes the renewable energy generation and usage by various companies. The analysis depicts that most companies have significantly invested in renewable energy with several firms exceeding 70% usage. Hindustan Unilever Ltd. achieved higher renewable energy usage(97%). This shows a strong commitment towards carbon emission and strengthening cleaner energy.



(Source:- CSR Report)

The analysis of CSR spent by three sectors is done through the pie chart created by using pivot tables. Companies like Tata consultancy services and Infosys Ltd. spent a lot towards social and environmental welfare, making the IT sector highly spending on CSR activities. The consumer sector shows moderate spend on CSR activity. The pharma sector shows relatively lower financial allocation towards social welfare.

GOVERNMENT INITIATIVES FOR PROMOTING AND MONITORING GREEN FINANCE

Sovereign green bonds :- Sovereign green bonds was issued in January 2023 to strengthen green finance strategy It aims to mobilize capital for green projects working on renewable



energy, clean transportation and sustainable environment development.

CURRENT STATUS:

The government has continuously issued green bonds reaching approximately 72697 Cr. by early 2026.

- Focusing on long term sustainability, the government has issued sovereign green bonds of 15000 cr. during the first half of FY 2025-26.
- Funds are provided to the projects related with electric locomotives, metro rail, solar energy planters.

Indian renewable energy development agency (IREDA) was established to promote, develop and extend financial assistance for renewable energy and energy efficiency projects under the Ministry of new renewable energy.

Current Status: -

- It is a public financial institution (PFI) awarded as “Navratna” in 2024.
- During FY 2024-2025 reported its highest profit after tax of 1699 Cr., with a growth in loan book by 28%.

A unit is set up in GIFT city Gujarat to facilitate lending in foreign currency and reduce hedging costs.

DATA INTERPRETATION

- Sovereign green bonds were introduced in January 2023 to show government initiative to towards mobilizing funds for environmentally sustainable projects.
- The total issue of green bonds will reach 72,697cr by early 2026 indicates a rapid growth in green finance projects.
- Reduction on carbon emission is shown by making a large investment in electric locomotives, metro rails and solar energy.
- An issue of 15000 cr. in FY. 2025-26 highlights continuous and long-term investment in sustainable development.
- The aim of the domestic green bond yield curve is to attract investors and stabilize the



green finance market.

- The Indian renewable energy development agency plays an important role in financing renewable energy.
- There is 28% growth in loan and profit after tax (2024-2025) shows a strong financial performance with 1699 cr. indicates a demand for green finance.
- Gift city established in Gujarat facilitates the foreign currency lending and reduces hedging cost.

CONCLUSION

The study aimed to examine the green instruments (like green bonds, ESG, sustainability linked notes etc) issued by Indian companies to strengthen their green finance projects and regulation by government bodies to encourage green investment and protect their rights. The analysis was conducted by using secondary data collected from reliable sources from government websites, company's annual reports and financial markets database (NSE and BSE).

The findings of the study reveals that green finance is rapidly growing in India but the green instruments are limited. ESG shows a growing pattern as a green instrument while sustainability linked notes are the emerging instruments.

The pivot table and pie charts used to study the ESG and sustainability performances of three sectors (IT, Consumer goods and Pharma companies) examines that all the sectors are showing an almost equal ESG performance and more than 70% of renewable energy is used by the identified companies. IT companies spent a larger portion towards the development of society through CSR. Most of the companies work towards net zero emission (a target to achieve between 2030-2045).

However, the studies find that the government is also taking initiatives towards development of green finance. Sovereign green bonds were introduced in 2023 which ensure mobilization of funds towards environment sustainability. Growth of green bonds shows rapid growth in green projects. Indian renewable energy development Agency (IREDA) was established to monitor and control renewable energy.

The Study concludes that green finance is strengthened day by day in India. Companies are investing in green projects issues and green instruments but the major investors are financial



investors rather than individuals. Governments are taking initiative to mobilise the green funds for green projects development and bring laws and regulation to regulate green markets instruments and to protect green investors trust.

RECOMMENDATIONS

Based on findings of the study the following recommendations are proposed:

Strengthen Regulatory Policies: - Government should make standardised rules and regulations for the green market with the Security exchange board of India (SEBI) and Reserve bank of India (RBI) to protect the rights of green investors. The word “green” should be defined in a proper manner and penalties should be imposed to eliminate greenwashing perception.

Monitoring and Control: - There should be a strict provision for monitoring and control of green finance projects and instruments. For real time tracking of funds use of digital technology and AI should be done. Third party audit of green projects should be ensured.

Awareness among investors: - Conduct awareness programmes to attract green investors both domestic and international. Ensure increasing retail investor participation. Increase the knowledge about benefits of green instruments among investors.

Develop domestic green markets: - By issuing a proper guideline related to green finance and green instruments and to ensure increasing frequency of green instruments for the investors.

LIMITATIONS OF THE STUDY

The present study is based exclusively on secondary data collected from published reports, databases, government publications, and other publicly available sources. Consequently, the findings are subject to the limitations inherent in secondary data analysis.

A major constraint of the study is the limited availability of reliable, comprehensive, and consistent Environmental, Social, and Governance (ESG) data across companies. Variations in disclosure practices and reporting quality may affect the comparability of ESG-related indicators.

Further, the absence of a universally accepted framework for ESG and sustainability reporting has resulted in significant heterogeneity in reporting standards among companies. Such



inconsistencies may influence the interpretation and comparative assessment of sustainability performance.

The study is also constrained by the limited availability of detailed and disaggregated data relating to investor participation, particularly with respect to domestic and foreign investors. This restricts a more nuanced examination of investor behaviour and its relationship with ESG performance.

Additionally, the analysis relies partly on government-published statistics and databases, which may be subject to issues of timeliness, revisions, and reporting accuracy. Any discrepancies or delays in data updates may affect the robustness of the study's findings.

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