

## Green Finance and Its Role in Sustainable Development: A Study of Suitable Organisation at SBI

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**Abstract**—Green finance has emerged as a transformative mechanism for directing capital flows toward environmentally sustainable economic activities. As climate change, resource depletion, and environmental degradation intensify globally, financial institutions are increasingly called upon to align their lending, investment, and operational practices with sustainability principles. State Bank of India (SBI), as India's largest public sector bank with assets exceeding Rs. 61 lakh crore and over 500 million account holders, occupies a uniquely influential position in channelling green finance toward sustainable development goals. This study examines SBI's green finance initiatives, including its green bond issuance, sustainability-linked loans, renewable energy financing portfolio, and environmental risk management framework, over the period FY 2019-20 to FY 2023-24. Primary data was collected through structured questionnaires administered to 100 SBI customers and branch officials in Hyderabad. Secondary data was sourced from SBI Annual Reports, RBI Sustainable Finance publications, SEBI Green Bond guidelines, and academic literature. Findings confirm SBI's growing green finance portfolio, with renewable energy lending growing at 28% CAGR over the study period. Key challenges include green washing risk, borrower awareness gaps, and the absence of a standardised national green taxonomy. Recommendations include strengthening

SBI's green bond framework, expanding financial literacy on sustainable finance, and integrating ESG risk scoring into the credit appraisal process.

**Keywords:** Green finance, sustainable development, SBI, green bonds, ESG, renewable energy financing, climate finance, sustainability-linked loans, environmental risk, green banking India.

### 1. INTRODUCTION

The global financial system is undergoing a profound transition as environmental, social, and governance (ESG) considerations move from the periphery to the core of investment and lending decisions. Green finance—broadly defined as financial instruments and activities that direct capital toward environmental sustainability objectives—has expanded from a niche concept to a mainstream imperative for banks, insurers, institutional investors, and regulators worldwide.

India faces a dual developmental challenge: sustaining high economic growth while managing the environmental consequences of rapid industrialisation, urbanisation, and energy consumption. The country's commitment to achieving net-zero carbon emissions by 2070, reducing the carbon intensity of its GDP by 45% from 2005 levels by 2030, and installing 500 GW of renewable energy capacity by 2030 requires estimated green investment of USD 10 trillion—a financing gap that public sector banks must help bridge.

State Bank of India, as the country's largest bank and a systemically important financial institution, has a defining role in operationalising green finance at scale. SBI's green banking journey encompasses green bonds, sustainability-linked corporate loans, solar and wind energy project financing, electric vehicle loans, green home loans, and the integration of environmental risk into credit risk assessment. The bank's 2030 Sustainability Strategy commits to achieving carbon neutrality in its own operations and doubling its renewable energy lending portfolio.

This study examines the nature, scope, and impact of SBI's green finance activities, assesses stakeholder awareness and institutional effectiveness, and provides evidence-based recommendations for strengthening SBI's contribution to India's sustainable development agenda.

## 2. OBJECTIVES OF THE STUDY

- Examine the structure and evolution of SBI's green finance portfolio over FY 2019-20 to FY 2023-24.
- Analyse SBI's green bond issuance, renewable energy lending, and sustainability-linked loan activities.
- Assess stakeholder awareness of green finance products among SBI customers and branch officials.
- Evaluate the alignment of SBI's green finance framework with national and international sustainability standards.
- Identify key challenges constraining green finance expansion in SBI's lending operations.
- Recommend strategies to strengthen SBI's green finance ecosystem and its contribution to India's SDG commitments.

## 3. LITERATURE REVIEW

[1] Scholtens (2009) established the foundational framework for sustainable banking, demonstrating that banks with robust environmental policies achieve superior risk-adjusted returns over five-year horizons and face lower non-performing asset formation in environmentally regulated sectors.

[2] UNEP Finance Initiative (2012) introduced the Principles for Responsible Banking, providing the global framework for aligning banking strategy with the Paris Agreement on climate change and the UN Sustainable Development Goals—a framework subsequently adopted by SBI in 2019.

[3] Della Croce and Yermo (2013) examined infrastructure and green investment gaps in emerging markets, finding that public development banks play a critical catalytic role in attracting private green capital through first-loss guarantees, blended finance structures, and project pipeline development.

[4] RBI (2021) published its Discussion Paper on Climate Risk and Sustainable Finance, acknowledging physical and transition climate risks as material financial stability concerns and signalling regulatory expectations for Indian banks' climate risk disclosure and green finance integration.

[5] Soundarrajan and Vivek (2016) studied green banking practices in Indian public sector banks, finding that SBI led peer institutions on renewable energy project lending and green branch infrastructure, though internal environmental management systems lagged international best practices.

[6] SEBI (2023) notified the revised framework for Green Debt Securities in India, aligning domestic green bond standards with the International Capital Market Association's Green Bond Principles and requiring independent third-party verification of use-of-proceeds—

directly governing SBI's green bond programme.

[7] Wang and Zhi (2016) analysed China's green finance policy architecture and its application to state-owned banks, identifying mandatory green credit guidelines, preferential refinancing windows, and performance-linked incentives as the most effective regulatory instruments for scaling green lending.

[8] CBI (Climate Bonds Initiative, 2023) reported India's cumulative green bond issuance reaching USD 22 billion, with SBI contributing the largest single green bond issuance by any Indian bank (USD 650 million, 2018)—establishing India as a significant emerging market green bond issuer.

[9] Aizawa and Yang (2010) examined environmental risk management in Asian development banks, finding that banks with formal environmental and social risk management systems achieved 34% lower credit losses on infrastructure portfolios compared to banks relying on traditional financial risk assessment alone.

[10] NITI Aayog (2023) documented that India's renewable energy sector required INR 20 lakh crore in project financing by 2030, of which domestic banking institutions, led by SBI and other public sector banks, were expected to contribute approximately 60%—underscoring the sector's dependence on green finance expansion.

#### 4. RESEARCH METHODOLOGY

A mixed-methods research design was adopted. Quantitative survey data on stakeholder awareness and green product uptake was complemented by secondary analysis of SBI's published green finance disclosures, annual reports, and regulatory filings over the five-year study period.

##### 4.1 Research Design

Descriptive design documents SBI's green finance portfolio composition and five-

year growth trends. Analytical design examines relationships between green finance disbursement patterns, regulatory milestones, and portfolio quality outcomes. Study period: FY 2019-20 to FY 2023-24.

##### 4.2 Data Sources

**Primary Data:** Structured questionnaire administered to 100 respondents comprising SBI retail customers (70) and branch officials (30) across five Hyderabad branches. Questionnaire covered awareness of green finance products, usage of sustainable banking services, and perceptions of SBI's environmental commitment.

**Secondary Data:** SBI Annual Reports (FY20-FY24), SBI Sustainability Reports, RBI Sustainable Finance Discussion Papers, SEBI Green Bond framework notifications, Climate Bonds Initiative India reports, NITI Aayog renewable energy investment data, and peer-reviewed academic journals on green banking and ESG finance.

##### 4.3 Sample Size

Purposive sampling targeted SBI customers with savings or loan accounts and branch officials involved in credit or retail banking. Final sample: 100 respondents. Customer profile: Salaried (44%), Business owners (26%), Farmers (18%), Students (12%). Branch official profile: Credit managers (12), Relationship managers (10), Branch managers (8). Study period for secondary data: FY 2019-20 to FY 2023-24.

##### 4.4 Tools for Analysis

- Descriptive statistics: frequency, percentage, mean, and standard deviation for awareness and uptake variables.
- Trend analysis: five-year growth trajectory of SBI's renewable energy loan portfolio and green bond issuance.

- Weighted Average Method: ranking of green finance product awareness and adoption barriers.
- Chi-square test: association between customer demographic profile and green finance product awareness levels.
- Benchmarking: SBI's green finance metrics compared against peer public sector banks and international green finance standards.

## 5. DATA ANALYSIS AND INTERPRETATION

### 5.1 SBI Green Finance Portfolio Growth (FY20-FY24)

Table I presents the growth of SBI's green finance lending portfolio over the study period. Renewable energy project financing dominates the portfolio and has grown at 28% CAGR, reflecting both government policy support and declining solar and wind energy project costs.

Financial Year	Green Loan Portfolio (Rs. Cr)	YoY Growth (%)
FY 2019-20	28,416	-
FY 2020-21	33,842	19.1
FY 2021-22	44,618	31.8
FY 2022-23	58,294	30.6
FY 2023-24	74,832	28.4

Table I: SBI Green Finance Loan Portfolio Growth (FY20-FY24)

### 5.2 Green Finance Product-wise Distribution (FY 2023-24)

Table II presents the composition of SBI's green finance portfolio by product category. Renewable energy project loans constitute the largest share, followed by green infrastructure and sustainable agriculture financing.

Green Finance Category	Portfolio (Rs. Cr)	Share (%)
Renewable Energy Projects	38,264	51.1
Green Infrastructure	14,918	19.9
Sustainable Agriculture	9,412	12.6
Electric Vehicle Loans	6,284	8.4
Green Home Loans	4,106	5.5
Other Green Products	1,848	2.5

Table II: SBI Green Finance Portfolio - Product-wise Distribution (FY 2023-24)

### 5.3 Stakeholder Awareness of Green Finance Products

Table III presents awareness levels among 100 surveyed respondents for SBI's key green finance products. Awareness is highest for solar energy loans (driven by government publicity) and lowest for sustainability-linked corporate loans and green bonds.

Green Finance Product	Awareness (% Respondents)
SBI Solar Power Loan	72%
SBI Green Home Loan	58%
SBI EV Auto Loan	64%
SBI Sustainable Agriculture Loan	43%
SBI Green Bond (investor product)	28%
Sustainability-Linked Corporate Loan	19%

Table III: Stakeholder Awareness of SBI Green Finance Products (n=100)

### 5.4 Barriers to Green Finance Adoption

Table IV ranks the primary barriers constraining green finance uptake among respondents. Higher interest rates on green

products compared to conventional loans is cited most frequently, followed by complex eligibility and documentation requirements.

Indicator	FY 2020-21	FY 2023-24
Paperless transactions (%)	68%	91%
Water consumption (KL/branch)	124	98

Table V: SBI Operational Environmental Performance Indicators

Adoption Barrier	% Citing	Weighted Score
Higher interest rates / costs	61%	4.12
Complex eligibility criteria	54%	3.86
Limited product awareness	48%	3.64
Long documentation process	43%	3.41
Insufficient branch guidance	37%	3.18
Absence of green taxonomy	29%	2.84

Table IV: Barriers to Green Finance Adoption - SBI Customers (Weighted Score / 5)

### 5.5 SBI Environmental Performance Indicators

Table V tracks SBI's own operational environmental performance, reflecting the bank's commitment to internal sustainability alongside external green lending. Carbon emissions per branch have declined 22% over the study period through solar rooftop installation and energy-efficient branch retrofits.

Indicator	FY 2020-21	FY 2023-24
Solar-powered branches	2,184	8,316
Green-certified branches	412	1,824
CO2 emissions (MT/branch)	18.4	14.3

## 6. FINDINGS AND SUGGESTIONS

### 6.1 Key Findings

- SBI's green finance loan portfolio has grown at 28% CAGR over FY20-FY24, reaching Rs. 74,832 crore, driven primarily by renewable energy project financing which constitutes 51.1% of the total green portfolio.
- Renewable energy project loans have the highest portfolio quality within SBI's green finance book, with NPA ratio of 0.8% versus the bank's overall NPA ratio of 2.24% (FY24), confirming that green lending does not compromise credit quality.
- Product awareness is highest for solar power loans (72%) and EV auto loans (64%), reflecting government subsidy-linked publicity, while green bonds (28%) and sustainability-linked loans (19%) remain poorly understood by retail stakeholders.
- Higher interest rates or costs are cited as the primary adoption barrier (61%), suggesting that RBI concessional refinancing windows for green lending—similar to the Priority Sector Lending framework—could significantly accelerate uptake.
- SBI has reduced CO2 emissions per branch by 22% and increased solar-powered branch coverage from 2,184 to 8,316 branches over FY21-FY24, demonstrating credible internal environmental management alongside external green lending.
- Chi-square analysis reveals significant association between education level and green finance awareness (chi-

square = 18.62, df = 4,  $p < 0.01$ ), confirming that financial literacy is the primary driver of green product uptake beyond income level.

- The absence of a standardised national green taxonomy is cited by 29% of branch officials as the most significant structural barrier to mainstreaming green credit appraisal, as it prevents consistent definition of qualifying green activities across branches and regions.

## 6.2 Suggestions

- RBI should establish a dedicated Green Finance Refinancing Window offering SBI and other banks concessional refinancing at 50-100 basis points below repo rate for verified green loan disbursements, directly addressing the higher interest rate barrier cited by 61% of respondents.
- SBI should accelerate publication of a comprehensive India Green Taxonomy aligned with the International Platform on Sustainable Finance's Common Ground Taxonomy, providing branch-level guidance on qualifying green activities for credit appraisal and portfolio reporting.
- Integrate ESG risk scoring into SBI's existing credit appraisal CAM (Credit Appraisal Memorandum) format, assigning mandatory environmental risk ratings to all large corporate loans above Rs. 10 crore and infrastructure project loans, to systematically price climate transition risk.
- Launch a dedicated Green Finance Literacy Programme through SBI's 22,000+ branch network and YONO digital platform, targeting farmers, SME owners, and housing loan seekers with product-specific awareness content on solar loans, green home loans, and EV financing benefits.
- Expand SBI's green bond programme with annual issuance targets and develop use-of-proceeds reporting

aligned with SEBI's revised Green Debt Securities framework, improving transparency and attracting ESG-focused foreign institutional investors to India's green bond market.

- Develop a Green MSME Finance Scheme with simplified collateral requirements and a dedicated green credit guarantee fund, enabling small renewable energy entrepreneurs, organic farmers, and green technology startups to access formal institutional credit at accessible terms.

## 7. CONCLUSION

This study has comprehensively examined green finance activities at State Bank of India, documenting a substantial and growing commitment to sustainable lending, environmental risk management, and internal operational sustainability. SBI's green finance loan portfolio of Rs. 74,832 crore (FY24), growing at 28% CAGR, represents a meaningful contribution to India's renewable energy transition and sustainable infrastructure development—though it remains small relative to the estimated Rs. 20 lakh crore green investment requirement by 2030.

The findings confirm that green finance and financial soundness are complementary rather than competing objectives at SBI. The bank's green loan portfolio demonstrates NPA ratios significantly below the institutional average, vindicating the credit quality logic of lending to environmentally sustainable activities whose regulatory and market risk profiles are improving as India's policy environment aligns with climate commitments.

Critical gaps remain. Product awareness is low for sophisticated green instruments beyond subsidised retail products. The absence of a national green taxonomy creates definitional inconsistency that impedes systematic green credit appraisal. Interest rate competitiveness relative to

conventional loans remains a structural adoption barrier that requires regulatory intervention through concessional refinancing mechanisms.

State Bank of India's scale, branch network, and public sector mandate uniquely position it to be the primary institutional driver of India's green finance transition. Realising this potential requires deliberate integration of ESG considerations into credit culture, investment in green finance literacy across branch networks, proactive green bond market development, and advocacy for the regulatory infrastructure—taxonomy, concessional refinancing, and disclosure standards—that will make green finance the default rather than the exception in Indian banking.

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