



## Green Finance and Disclosure Practices: Catalysts for Sustainable Progress: A Perspective of Indian Corporates

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### ABSTRACT

*In response to the escalating threats posed by climate change and environmental decline, green finance has become a vital tool for promoting sustainable economic development. This paper delves into the changing landscape of green finance and the importance of its disclosure, emphasizing that transparent reporting is crucial for strengthening investor trust, upholding accountability, and minimizing the risk of greenwashing. Through an analysis of international standards and Indian regulatory initiatives such as SEBI's Business Responsibility and Sustainability Reporting (BRSR) framework and the Sovereign Green Bond Framework the study demonstrates how disclosure practices are steering capital flows toward environmentally responsible projects. The paper concludes that effective green finance disclosure is both a fiscal responsibility and a strategic pathway toward sustainable, inclusive, and climate-resilient growth in the decades ahead.*

### KEY WORDS

*Green Finance, ESG (Environmental, Social, Governance), TCFD (Task Force on Climate-related Financial Disclosures).*

### What is Green Finance?

Green finance encompasses financial activities such as investments, lending, and issuance of bonds that integrate environmental considerations into decision-making. It supports initiatives including renewable energy, energy-efficient technologies, sustainable agriculture, pollution control, biodiversity conservation, and responsible resource management. Financial instruments like green bonds, sustainability-linked loans, and environmental impact funds exemplify this approach.

## 1. Types of Green Finance Instruments

There are various types of green finance, each designed to support environmentally sustainable development across sectors:

### 1. Green Bonds

Fixed-income instruments used to fund projects with environmental benefits:

- **Purpose:** Renewable energy, clean transportation, sustainable water management.
- **Example:** Adani Green, JSW Energy, and Tata Steel have issued green bonds in India.
- **Global Standard:** Often aligned with ICMA's Green Bond Principles.

### 2. Green Loans

Loans specifically earmarked for eco-friendly initiatives

- **Purpose:** Solar panel installation, electric vehicles, energy-efficient buildings.
- **Features:** Lower interest rates, longer tenures, and sustainability-linked KPIs.
- **Example:** Mahindra Finance offers EV loans; HDFC Bank provides rooftop solar loans.

### 3. Green Mortgages

Home loans for properties with high environmental ratings or upgrades:

- **Purpose:** Financing energy-efficient homes or retrofitting existing ones.
- **Benefit:** Preferential terms for sustainable housing.
- **Example:** SBI and PNB offer green home financing under priority sector lending.

### 4. Sustainability-Linked Bonds & Loans

Instruments tied to ESG performance targets:

- **Purpose:** General corporate financing with environmental KPIs.
- **Mechanism:** Interest rates adjust based on sustainability achievements.
- **Example:** Infosys and ITC use these to fund smart campuses and water reuse systems.

### 5. Green Venture Capital & Private Equity

Investments in startups and companies developing green technologies:

- **Focus Areas:** Climate tech, clean energy, circular economy, green mobility.
- **Example:** Brookfield and Tata Capital invest in solar and EV startups.

### 6. Climate Funds & Philanthropic Grants

Non-repayable funding for climate adaptation and mitigation:

- **Sources:** UN Green Climate Fund, Global Environment Facility, Tata Trusts.
- **Use Cases:** Community-based afforestation, biodiversity conservation.

### 7. Carbon Markets & Emission Trading

Market-based instruments to reduce greenhouse gas emissions:

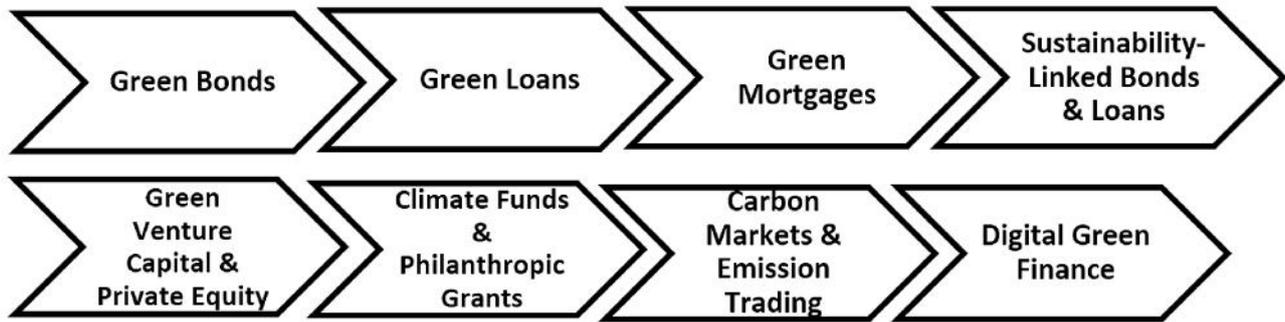
- **Mechanism:** Trading carbon credits or offsets.
- **Example:** India's PAT (Perform, Achieve, Trade) scheme under BEE.

### 8. Digital Green Finance

Fintech-enabled platforms for ESG tracking and green investing:

- **Tools:** AI, blockchain, IoT for monitoring sustainability metrics.
- **Example:** Infosys Eco Watch platform; Mahindra's ESG-linked digital lending.

Figure 1: Types of Green Finance Instruments



## Review of Literature

### i. Role of Green Finance in India's Sustainable Transition

Several Indian scholars have explored the role of green finance in addressing climate change and sustainable development.

**Sahoo and Dhal (2011)** examined the potential of green investment in the Indian energy sector, emphasizing the need for policy incentives to attract private capital into clean energy projects.

**Bhaskar and Anand (2019)** evaluated the issuance of green bonds by Indian corporates and financial institutions, finding a positive correlation between green financing and long-term sustainability targets.

### ii. Disclosure Practices and Regulatory Developments in India

The Securities and Exchange Board of India (SEBI) has played a pivotal and crucial role in formalizing sustainability reporting.

**Khurana and Sharma (2022)** analyzed the impact of SEBI's Business Responsibility and Sustainability Reporting (BRSR) guidelines, concluding that BRSR has improved the quality and consistency of ESG disclosures among the top 1,000 listed companies.

**Rai and Bansal (2021)** studied ESG disclosure practices across Indian firms and found a growing awareness of environmental reporting, though disparities exist across sectors and company sizes.

**Joshi and Rajput (2023)** evaluated the transparency mechanisms embedded in the framework and argued that credible impact reporting will be essential for ensuring investor trust and international participation.

### iii. Challenges in Green Finance and Disclosure in the Indian Context

Despite policy advances, several barriers continue to hinder effective green finance disclosure in India.

**Singh and Tiwari (2020)** pointed out that most Indian firms lack adequate ESG data systems, especially in MSMEs, leading to inconsistent reporting.

**Mukherjee (2021)** stressed the need for alignment of Indian standards with global frameworks like TCFD and GRI to ensure comparability and investor confidence.

## Objectives of Study

- i. To examine the concept and significance of green finance in promoting environmentally sustainable economic development.
- ii. To analyze the role of disclosure practices in enhancing transparency, accountability, and investor confidence in green financial initiatives.
- iii. To evaluate the current frameworks and regulations governing green finance disclosures at the global level and within the Indian context (e.g., SEBI's BRSR, India's Green Bond Framework).
- iv. To identify role of green finance disclosure from Indian perspectives.

## The Role of Green Finance Disclosure

As the green finance ecosystem expands, transparency and accountability have become essential. Green finance disclosure refers to the public reporting of the environmental impacts, credentials, and sustainability attributes of financial products and investments.

### 1. Key Reasons for Disclosure

**1.1 Credibility & Trust:** Demonstrates the genuine environmental intent of investments, minimizing greenwashing risks.

**1.2 Risk Management:** Helps investors and institutions assess environmental risks tied to their portfolios.

### 2. Global Disclosure Standards

Several frameworks shape green finance disclosure, promoting consistent and comparable reporting:

**2.1. Task Force on Climate-related Financial Disclosures (TCFD):** Recommends climate-related risk disclosures.

**2.2 EU Sustainable Finance Disclosure Regulation (SFDR):** Mandates ESG disclosures within the EU financial market.

### 3. Types of Green Finance Disclosure

Following are various types of green finance disclosure:

#### 3.1 Environmental Risk Disclosure

Identifies environmental risks affecting a company's financial performance.

**Example:** Climate change, water scarcity, pollution.

**Framework:** TCFD.

#### 3.2 Use of Proceeds Disclosure

Common in green bonds/loans; outlines how raised funds are allocated.

**Example:** Solar farm development.

**Framework:** GBP.

#### 3.3 Impact Disclosure

Reports measurable environmental outcomes of projects.

**Example:** Carbon emissions avoided, energy generated.

**Framework:** ICMA Impact Reporting Guidelines.

#### 3.4 Sustainability Strategy and Goals Disclosure

Covers long-term environmental goals, targets, and progress.

**Framework:** CDP, TCFD.

#### 3.5 Regulatory Compliance Disclosure

Focuses on meeting government-mandated green finance reporting norms.

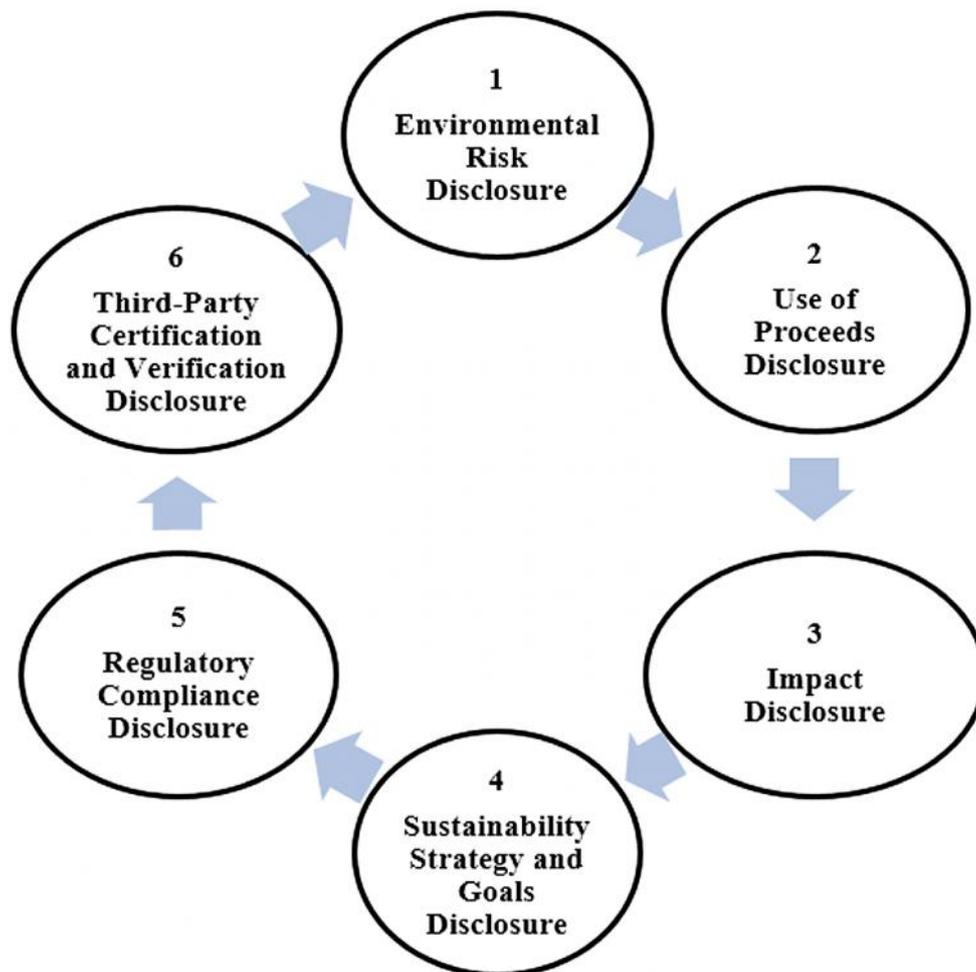
Example: EU SFDR or national green taxonomies.

#### 3.6 Third-Party Certification and Verification Disclosure

Discloses independent verification of green credentials.

Enhances reliability and reduces greenwashing risk.

Figure 2: Types of Disclosures



### Example of Integrated Disclosure

Consider a bank issuing a green bond:

1. **Use of Proceeds:** Funds solar energy project.
2. **Risk Disclosure:** Assesses biodiversity impact.

### Challenges in Green Finance Disclosure

While green finance plays a pivotal role in driving sustainable development, its disclosure faces several key challenges. These issues can compromise transparency, hinder investor confidence, and obstruct the growth of green financial markets. The major challenges include:

1. **Lack of Standardization:** There is currently no universally accepted framework for green finance disclosure. Countries, sectors, and institutions often follow divergent standards such as the TCFD, SFDR, or local taxonomies. This fragmented approach leads to inconsistent, non-comparable disclosures, complicating investment evaluation and decision-making.
2. **Challenges in Measuring Environmental Impact:** Quantifying the tangible environmental benefits of projects such as reductions in greenhouse gas emissions or improvements in biodiversity is technically complex. The absence of universally accepted, science-based metrics makes it difficult to validate environmental outcomes and assess project effectiveness.
3. **High Costs of Compliance:** Disclosure processes involve considerable costs, especially for small and medium-sized enterprises (SMEs) and institutions in emerging markets. Data collection, reporting

systems, and third-party verification demand significant financial and human resources, potentially deterring participation.

- 4. Evolving Regulatory Environment:** Green finance regulations are dynamic and still maturing. Frequent updates and changing requirements make it difficult for institutions to stay compliant, increasing the risk of outdated or incomplete disclosures.

## The Future of Green Finance and its Disclosure

The landscape of green finance is undergoing a profound transformation, driven by regulatory pressure, technological innovation, and growing stakeholder expectations. The future of green finance disclosure will be shaped by several key trends:

### Global Standardization of Frameworks

International efforts, led by bodies such as the International Sustainability Standards Board (ISSB), are focused on harmonizing green finance disclosure standards. Unified frameworks will enhance consistency, comparability, and transparency, enabling better-informed investment decisions across borders.

### Technology-Driven Transparency

Emerging technologies such as blockchain, artificial intelligence (AI), and big data will revolutionize disclosure practices. These tools will enable real-time tracking, automate reporting, improve accuracy, and ensure data immutability, significantly enhancing trust and traceability.

### Integration with Financial Decision-Making

Green disclosures will no longer be standalone sustainability reports. Instead, they will be embedded within core financial disclosures and risk assessments. Investors, lenders, and insurers will increasingly rely on environmental data to guide credit allocation, investment strategies, and pricing models.

### Full Integration of ESG Factors

Green finance disclosures will increasingly evolve into broader Environmental, Social, and Governance (ESG) reporting. Investors and regulators will demand greater transparency not only on environmental performance but also on social impacts (e.g., labor conditions, community engagement) and governance practices (e.g., board oversight, anti-corruption).

## Broader Participation from Emerging Markets

### 1. Tata Steel: Championing Green Finance and ESG Transparency

#### 1.1 Green Finance Strategy

- **Green Loans:** Tata Steel is in advanced discussions to raise \$400 million in green loans from lenders like Bank of America. These funds will support capex for low-carbon steelmaking and sustainability projects.
- **Biochar Innovation:** At its Jamshedpur plant, Tata Steel replaced ~30,000 tonnes of fossil fuel with biochar, reducing over 50,000 tonnes of CO<sub>2</sub> emissions annually.
- **Electric Arc Furnaces (EAF):** It Plans to transition to scrap-based EAF steelmaking in Punjab and other locations to reduce carbon intensity.

#### 1.2. Disclosure Practices

- **TCFD Membership:** Tata Steel is a founding member of the Task Force on Climate-related Financial Disclosures (TCFD) and has adopted its recommendations across all major sites.
- **Integrated Reporting:** The company publishes detailed Climate Change Reports and Integrated Annual Reports, aligning with SEBI's BRSR norms and global ESG standards.

#### 1.3 Governance Framework

- **Decarbonisation Governance:** Tata Steel has created a Centre of Excellence for GHG Emissions, chaired by the VP of Safety, Health & Sustainability, to oversee carbon reduction projects.

- **Board Oversight:** Committees like the CSR & Sustainability Committee and Risk Management Committee review climate risks and mitigation strategies.
- **Project Aalingana:** A Tata Group-wide initiative aiming for Net Zero by 2045, with Tata Steel aligning its operations accordingly.

#### 1.4 Performance Highlights

**Table 1 :** Highlights of TATA Steel Company

Particulars	Information
Net Zero Target	2045
Biochar Usage	30,000 tonnes replaced
CO2 Reduction	50,000+ tonnes annually
Renewable Energy Use	Expanding across plants
ESG Ratings	Strong scores from MSCI & Sustainalytics

#### 1.5 Outcome-Based ESG Reporting

- Tata Steel's ESG disclosures are shifting toward outcome-based frameworks, focusing on measurable impact rather than just compliance.
- Recognized for five consecutive years as a world steel Sustainability Champion, reflecting its leadership in climate action.

### 2. Adani Green Energy Ltd. (AGEL): Green Finance & ESG Disclosure Strategy

#### 2.1 Company Profile

- **Founded:** It was founded in 2015, headquartered in Ahmedabad, India.
- **Business Model:** It Develops, owns, and operates utility-scale solar, wind, and hybrid energy projects.
- **Portfolio:** It has over 20.4 GW of locked-in renewable capacity, with a target of 45 GW by 2030.

#### 2.2 Green Finance Instruments

- **Green Bonds:** AGEL issued green bonds under its Restricted Group 1 (RG1) Green Finance Framework, aligned with ICMA Green Bond Principles.
- **Green Loans:** In 2023, AGEL secured \$1.36 billion in green loan funding from a consortium of international banks to support the Khavda Renewable Park, the world's largest renewable energy park.
- **Use of Proceeds:** Funds are allocated to solar and wind projects, including 25 solar facilities across eight Indian states.

#### 2.3 Disclosure Practices

- **Green Finance Framework:** Published in February 2024, detailing:
  - Eligible project criteria
  - Management of proceeds
  - Impact reporting and external assurance
- **Business Responsibility and Sustainability Report (BRSR):**
  - Complies with SEBI's mandatory ESG disclosure norms
  - Reports on climate risks, water neutrality goals, and stakeholder engagement
- **ESG Ratings:** AGEL aims to be among the Top 10 global electric utility companies in ESG benchmarking by 2025.

#### 2.4 Governance & Assurance

- Board Committees:

- Corporate Responsibility Committee (100% independent directors)
- Risk Management Committee
- CSR Committee
- Verification:
  - ESG disclosures undergo external assurance before public release
  - Sustainability reporting teams operate across all locations

## 2.5 Alignment with SDGs

AGEL's ESG strategy is built around:

- **SDG 7:** Affordable and clean energy
- **SDG 9:** Industry, innovation, and infrastructure
- **SDG 13:** Climate action
- **SDG 8:** Decent work and economic growth

## 2.6 Impact Highlights

**Table 2 :** Highlights of Adani Green Energy Ltd. (AGEL)

Particulars	Information
Renewable Capacity	20.4 GW (target: 45 GW by 2030)
Carbon Displacement	80 million tons annually
Operational Sites	92 plants across 12 states
ESG Assurance	Verified by Sustainable Fitch & external auditors

## 3. HDFC Bank: Green Finance & ESG Disclosure Framework

### 3.1 Green Finance Strategy

- Sustainable Finance Framework (2023):  
It enables issuance of green, social, and sustainability bonds and loans.  
It is aligned with ICMA's Green Bond Principles, Social Bond Principles, and Sustainability Bond Guidelines.
- Eligible Green Categories:
  - Renewable Energy
  - Energy Efficiency
  - Pollution Prevention
  - Sustainable Water & Wastewater Management
- Social Categories:
  - MSME Lending
  - Affordable Infrastructure
  - Food Security
  - Socioeconomic Empowerment.

### 3.2 Disclosure Practices

- Business Responsibility and Sustainability Report (BRSR):  
Complies with SEBI's mandatory ESG norms.  
Reports on Scope 1, 2, and 3 emissions, energy intensity, and carbon neutrality targets.
- Carbon Neutrality Roadmap:  
Targets:

32% carbon neutral by FY2025  
100% by FY2032  
Includes offsets and emission reduction strategies.

- Third-Party Assurance:  
ESG data verified by independent auditors.

### 3.3 Environmental Impact Highlights

**Table 3: Highlights of HDFC Bank**

Particulars	Information
Trees Planted	17.69 lakh+ (target: 25 lakh by FY2025)
Waste Recycled	293.89 tonnes in FY2023
Renewable Energy	Solar panels installed at new offices
Scope 2 Emissions	287,667 tCO <sub>2</sub> e in FY2022
Scope 3 Emissions	42,697 tCO <sub>2</sub> e (78% from other facilities)

### 3.4 Governance & Oversight

- **ESG Working Group:** It includes members from Risk, Treasury, Credit, and ESG teams. It oversees project selection, fund allocation, and impact tracking.
- **SEMS Framework:** Social & Environmental Management System used to assess credit risks. Projects with negative environmental or health impacts are excluded.

### 3.5 Recognition & Innovation

- **Digital Banking Initiatives:** It saved 2.1 million sq. ft. of paper via green events and digital platforms.
- **Energy Management Systems:** It was implemented across 600 branches; scaling to 1,500.
- **Green Buildings:** IGBC-certified data centers and office interiors.

## Green Finance & ESG Disclosure Overview – Indian Corporates

**Table 4: Highlights of 03 Indian Corporates**

Company	Green Finance Mechanism	Key Disclosure Practices	Impact Highlights
Tata Steel	\$400M green loan (biochar, electric arc furnaces)	TCFD, GHG Protocol, Integrated Reports, SEBI BRSR	Net-zero by 2045; 50K+ tonnes CO <sub>2</sub> reduction annually
Adani Green Energy (AGEL)	\$1.36B green loans; Green Bonds (RG1 Framework)	Green Finance Framework, SEBI BRSR, TCFD	20.4 GW renewables; Carbon offset: 80M tonnes/year
HDFC Bank	SEBI-compliant ESG bonds; Sustainable Finance Framework	BRSR, GHG reporting, KPIs, SPOs	17.69 lakh trees planted; carbon-neutral by 2032

## CONCLUSION

Green finance and its disclosure mechanisms play a pivotal role in transitioning the global economy toward a more sustainable and resilient future. Transparent reporting builds investor confidence, aligns capital with environmental priorities, and strengthens accountability. However, for green finance to achieve its full impact, challenges such as standardization, verification, and impact measurement must be addressed.

As regulatory pressures intensify and investor expectations grow, companies and financial institutions must integrate environmental considerations at the heart of their financial strategies. Ultimately, robust and credible green finance disclosure will be vital in achieving global climate goals and fostering long-term economic and ecological well-being.

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