International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 08 | August - 2022 Impact Factor: 7.185 ISSN: 2582-3930

Progress and Challenges Faced by Green Finance

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Abstract

Green finance is the country's revolutionary financial model for integrating environmental conservation with economic development and profit. In this study, I am concentrating on current trends, possibilities, obstacles, and numerous investment channels in Green Finance in India, to analyze the path of green finance and learn about the goals that have been met so far because of the Indian government's initiative.

Introduction

The green financial products that must be researched and developed are classified into four major categories.

(1) Finance for Retail (Green mortgage, Green home loan, Green commercial buildings loan, Green car loan, and Green credit card)

(2) Asset Management (Green project finance, Green securitization, Green technology leasing and Carbon finance)

(3) Business Finance (Eco fund, Carbon fund and Eco RTF)

(4) Insurance (Auto insurance, Carbon insurance and Green insurance) (Reddy, 2018) (Reddy, 2018) (RBI, 2018) (ADBI institute, 2018) (Asian Development Bank, n.d.) (D, 2018) (S, n.d.) (Berensmann, 2016) (UN Environment Program, n.d.) (RBI, 2021)

In general, governments use green financing to achieve the following goals:

- Establish and secure green industry funding as well as green growth

- Promote green, low-carbon growth by developing new financial services

- Attract private capital to construct and sustain green Infrastructure.

- Increase corporate transparency of green management practices and financial support for those companies that use them

- Establish markets for environmentally friendly goods and services.

New financial instruments such as green bonds, carbon market instruments (e.g., carbon tax), and new financial institutions (e.g., green banks and green funds) are being formed to address the financial demands for these types of initiatives. Together, they make up green finance.

Green financing is at the heart of the debate over economic growth's long-term viability. Rapid economic progress frequently comes at the expense of the environment. Dwindling natural resources, a deteriorated environment, and widespread pollution endanger public health and pose a threat to long-term economic growth. To safeguard and significantly enhance the environment, countries all over the world are increasingly focusing on the usage of environmentally friendly technologies. It does, however, necessitate an adequate incentive structure to encourage additional funding for the establishment or adoption of ecologically sustainable initiatives. Other resources, such as land and labor, may follow if monies are diverted from

traditional businesses and funneled towards green and environmentally friendly sectors. Overall, this leads to an optimal resource allocation that supports long-term growth. To attain these goals, dedicated green finance policies have been developed in major nations, including all economic growth partners, corporations, governments, and central banks.

In this essay, we look at how far green financing has progressed in India. In Section II, we briefly explore some of the finest methods for promoting green finance around the world, as well as some of India's significant projects. The evolution of green finance in India is discussed in Section III. Section IV discusses the problems and the path forward, and Section V wraps things up.

II. Public Policy towards Green Finance

(a) International best practices

Since the G20's inaugural summit in 2008, climate change has been on the agenda, though the focus has lately shifted to the circular carbon economy (CCE) as a means of reducing harmful emissions. There are some

Table 1: Participation of Asian Financial Institutions in Global Initiatives

Name of the initiative	Global signa-tories	Asian Signa-tories	Global signa-tories	Asian Signa-tories
	From Volz, 2018		As at end 2019	
Principles for Responsible Investment	1,874	122	2,698	387 *
Equator Principles Financial Institutions	91	12	101	22 **
UNEP Statement of Commitment by Financial Institutions on Sustainable Development (2011)	214	38		
Sustainable Stock Exchanges	66	14 ***		

flagship programs aimed at raising awareness and encouraging the funding of green initiatives all around the world. These programs encourage financial and non-financial companies to incorporate environmental factors into their funding. The United Nations Environment Programme (UNEP), the Principles for Responsible Investment (PRI), the Equator Principles (EP) for financial institutions, and the Statement of Commitment by financial institutions on Sustainable Development all provide strategies for signatories to apply green financing. Several Indian entities have signed on to these programs (Table 1). However, only if there is a reliable source of information on the entities' overall management of environmental and social risks, as well as a track record on the entities' identification of opportunities that provide both a decent rate of return and environmental benefits, can a steady flow of finance into sustainable projects be ensured (UNEP) In this regard, the Sustainable Stock Exchange initiative encourages stock exchanges in signatory countries to create stock price indices that track the stock performance of a group of companies operating in these countries that are pioneers in incorporating Environmental, Social, and Governance (ESG) principles4 into their financial aspects. These indices are designed to help investors who want to engage in green operations. The Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE), India's two largest stock exchanges, are both involved in this program and produce different ESG indices.

The global regulatory framework can be divided into four categories. The first is financial and non-financial companies' sustainability disclosure, which requires them to declare their exposure to ESG risks from their operations regularly. Following the G20's call for corporations to accept the Task Force on Climate-related Financial Disclosures' guidelines voluntarily, such disclosures have increased (TCFD). By June 2020, 60% of the world's top one hundred major firms had pledged to support the TCFD recommendation. Leading stock exchanges, financial market regulators, and corporate affairs ministries in China (2008)6, Hong Kong (2012), the United Kingdom (2012), India (2012), the Philippines (2013), Vietnam (2013), and Singapore (2016) were among the countries to implement a framework for listed companies to disclose ESG-related risks in their jurisdiction (Volz, 2018) 7. In 2008, Bangladesh mandated biannual reporting of commercial banks' Corporate Social Responsibilities (CSR), incentivized systematic environmental risk analysis as part of credit appraisal by banks in 2011, with the norm being extended to Non-Banking Financial Institutions (NBFIs) in 2013, and included social risk assessment in 2017. As early as 2013, Bangladesh issued a consistent risk reporting format for banks. France's Energy Transition for Green Growth Law, enacted in 2015, requires asset owners and managers to report on how physical and transition risks affect their operations and assets. This legislation intends to connect disclosures to broader efforts in France to decarbonize the energy sector. The second type of financing is directed and concessional loan, which is used in some countries. In Bangladesh, for example, a ‘revolving fund' of US$26 million was established in 2009 under the green re-financing strategy to award low-interest loans to over fifty renewable energy and green enterprises. In addition, a US$200 million fund has been established for the leather-textile industry to transition to green technology in 2016. Bangladesh has required commercial banks to provide at least 5% of their loans to renewable energy and other environmentally friendly technologies since 2015. (Volz, 2018). Financial and non-financial institutions' micro and macroprudential policies come in third.

China began limiting lending to corporations in 2006 based on their environmental compliance. In 2010, Lebanon introduced a differential reserve requirement policy for commercial banks, requiring banks with a higher proportion of green projects in their loan portfolio to retain fewer reserves (Dickau and Volz, 2018). Brazil incorporated environmental factors into banks' Internal Process of Capital Adequacy Assessment in 2011, by considering lending exposure to projects with environmental and social hazards (Dickau and Volz, 2018). Finally, in 2017, Brazil proposed that banks detail their risk assessment processes as well as their exposure to social and environmental harms in their annual reports. The establishment of green financial institutions is the fourth step. In 2012, the UK government launched the UK Green Investment Bank plc, a GBP 3 billion (USD 3.9 billion) enterprise (Geddes et al., 2018). Since 2013, the Nordic countries have formed alliances of local and regional governments that have issued bonds on the financial market and distributed the proceeds to their subnational members (Kommuninvest in Sweden, Kommunalbanken and KLP Kommunekreditt AS in Norway, KommuneKredit in Denmark, and MuniFin in Finland) (Nassiry, 2018). Partially credit and bond guarantees for green financing is provided by the Asian Development Bank and the US Agency for International Development to partner banks and countries in their respective jurisdictions. In keeping with international best practices, India has implemented many policy tools throughout the previous decade, as mentioned in the sections below.

(b) Public policy in India

As early as 2007, India began emphasizing green financing. The Reserve Bank of India released a regulation in December 2007 titled "Corporate Social Responsibility, Sustainable Development, and Nonfinancial Reporting - Role of Banks," which highlights the significance of global warming and climate change in the framework of sustainable development. The National Action Plan on Climate Change (NAPCC) was created in 2008 to lay out a broad policy framework for minimizing climate change's effects (Jain, 2020). The Climate

Change Finance Unit (CCFU) was established in 2011 within the Ministry of Finance as a coordinating body for India's different green finance organizations. The introduction of sustainability disclosure requirements has been a major strategic initiative Since 2012, the Securities and Exchange Board of India (SEBI) has made it essential for the top one hundred listed businesses on the BSE and NSE based on market capitalization to produce annual corporate responsibility reports, which it has updated from time to time. SEBI established rules for green bond issuance in May 2017, including the disclosure requirements. In addition, the Companies Act of 2013 made required reporting of progress on Corporate Social Responsibilities (CSR) by the Ministry of Corporate Affairs. The board of directors should meet at least once a year, according to the Report of the Committee on Corporate Governance, to consider strategy, budgeting, board evaluation, risk management, ESG, and succession planning.

In India, there have been many fiscal and financial incentives at work. These incentives are following India's targets under the 2015 Paris Agreement to cut greenhouse gas emissions by 33 to 35 percent below 2005 levels by 203010 and to generate 40 percent of installed electric power capacity from non-fossil sources. In most states, the Government of India (Go) provides a subsidy of 30% of the cost of installing rooftop solar panels to the institutional, residential, and social sectors11. The subsidy might be up to 70% of the installation cost in some of the special category states12. In addition, beneficiaries are eligible for a generation-based incentive of $2 per unit of generation if the annual generation surpasses 1100kWh1500kWh. Furthermore, the excess power can be sold at a government-set rate. Furthermore, the Government of India initiated two phases of Hybrid and Electric vehicles Faster Adoption and Manufacturing. (FAME) scheme between 2015 and 2019, to increase credit flow, lower the upfront purchase price of all vehicles, and improve infrastructure (such as charging stations) to promote green vehicle manufacturing and sales (Jain, 2020). To offset the high initial cost of such vehicles, the State Bank of India has created a 'green car loans' scheme for electric vehicles that offers a 20-basis point cheaper interest rate and a longer repayment window than regular car loans (Jain, 2020). In the field of renewable energy, the government has also implemented a Production Linked Incentive (PLI) Scheme for the manufacturing of high-efficiency modules.

Green finance activities have also been promoted and supported by the Reserve Bank through aggressive policy measures. In 2015, it expanded its Priority Sector Lending (PSL) program to include the small renewable energy sector. Firms in the renewable energy sector13 are eligible for loans of up to thirty crores (up from'15 crore since September 4, 2020), while families are eligible for loans of up to ten lakhs for renewable energy investment. India said in September 2019 that by 2030, it aims to generate 450 GW of renewable energy.

Through its regular reports and other communications, the Reserve Bank educates the public, investors, and banks about the importance, opportunities, and challenges of green finance. The Reserve Bank, for example, mentioned the findings of the G20 Green Finance Study Group (GFSG14) in its Annual Report (2015-16) on the need for the development of local green bond markets, facilitating cross-border green bond investments, knowledge sharing on environmental risks, and improving overall green finance activities. The annual report also discusses the broader concerns surrounding green financing that need to be addressed in the future. Definitions of green activities, issues of intellectual property rights in development and technology transfer from developed countries, and bank assessments of environmental risk are among them. The Reserve Bank of India emphasized the risk of climate change on financial assets and the need to expedite green finance in its Report on the Trend and Progress of Banking in India (2018-19). It recognizes the difficulties in the development of green finance, such as "greenwashing" or misleading claims of environmental compliance, a lack of standard definitions, and maturity mismatches between long-term green investment and short-term

investor interests. It also emphasizes the importance of regulatory action to create a framework that promotes India's green finance ecosystem by raising awareness through coordinated initiatives.

In May 2016, the Indian Renewable Energy Development Agency (IREDA), a government-backed organization dedicated to boosting renewable energy investments, revealed ambitions to become India's first green bank. The India Infrastructure Finance Corporation Limited (IIFCL) has also launched a special 'credit enhancement plan' to fund feasible infrastructure projects with bond tenors of more than five years (Jain, 2020). In the following section, we will examine the progress of green financing in India, considering these actions as well as general knowledge of environmental sustainability.

III. Progress and Challenges of Green Finance in India

a) Improvements in general awareness

There is a scarcity of data from traditional sources to gauge awareness of green finance and sustainable development. In this case, Google Trends can be a useful tool for determining the pattern of Google searches conducted in various regions and at various times. It can assist us in determining the level of interest in a specific issue based on the number of Google searches. The information on the number of Google searches on any topic is normalized in Google Trends as a proportion of the total number of searches in a region over the selected period. This normalization eliminates the bias caused by changes in overall Google search activity over time. Because of the general development of internet accessibility around the world, the aggregate search volume is higher today than it was in 2004. As a result, the total number of searches for a certain topic may

Chart 1: Google Search Related to Green Finance: India's Comparative Score

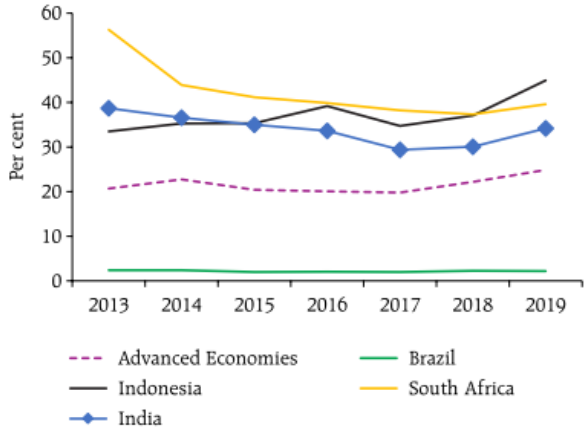
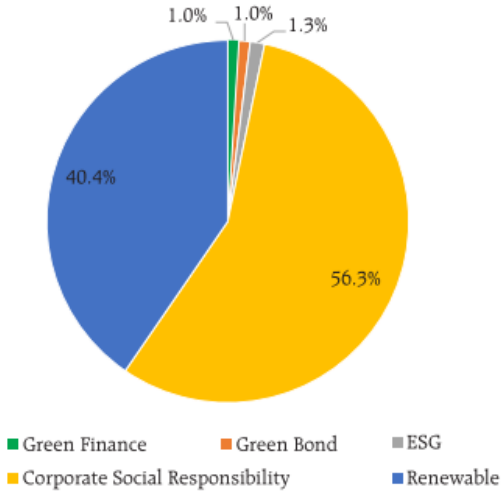


Chart 2: Distribution of Google Search of Keywords (Per cent of total): 2013-2019 Average



not provide a useful comparison of public interest in that issue over time. According to Google Trends, there is a growing interest in green finance and its significance in long-term economic development.

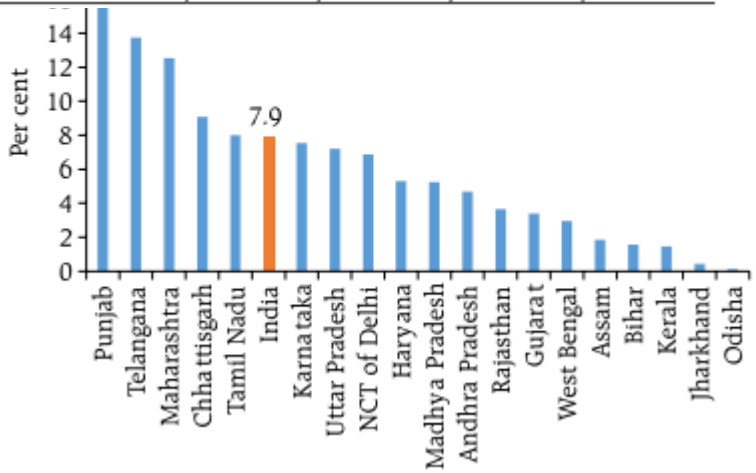
For five keywords: green finance, green bond, ESG, corporate social responsibility, and renewable, we extract the search intensity, which is the number of searches as a percentage of all searches in a country across time. The intensity of Google searches connected to climate change and green finance in India is comparable to that of advanced and major emerging nations, as shown in Chart 1. India's comparative score is greater than the advanced economies, as shown in Chart 1. As previously stated, Google Trends displays the normalized search intensities for the keywords selected. The country with the highest search intensity value is set to one hundred during normalization. The search intensity for additional nations is then adjusted accordingly. The weighted

average of these scores for the five keywords is represented by the nation scores in Chart 1, where the weights are the percentage shares of searches on a given keyword in the total number of searches across these five keywords. The public interest in India is dominated by subjects linked to corporate social responsibility and renewable energy sources, as seen in Chart 2. However, web searches for securities like green finance and green bonds are still limited (about 2 percent of all five keyword searches).

b) Green lending

Table 2: Bank Credit Outstanding to the Non-conventional Energy as on March, 2020

	Public Sector Banks	Private Sector Banks	Foreign Banks	All Banks
Amount outstanding (₹ Cr.)	21,655	12,302	2,586	36,543
As per cent of power sector credit	6.2	11.9	27.1	7.9
As per cent of total bank credit (excluding personal loans)	0.5	0.5	0.7	0.5



We turn to traditional sources for data on bank lending to sustainable projects, such as the Reserve Bank's Database on the Indian Economy, which contains publicly available data on policy rates, aggregate credit, sectoral credit, and key financial ratios relating to India's Scheduled Commercial Banks (SCBs). In the sample, the number of individual SCBs ranges from 88 in 2005 to 95 in 2019. In 2015, the Reserve Bank added the small renewable energy industry to its Priority Sector Lending (PSL) plan as part of its green finance initiative. The total outstanding bank credit to the non-conventional energy sector was over '36,543 crores as of end-March 2020, accounting for 7.9% of total outstanding bank credit to power generation (Table 2), up from 5.4 percent in March 2015. The exposure of commercial banks to the non-conventional energy sector differed by bank group (Table 2) and major Indian states (Chart 3).

c) green bonds

Green bonds are bonds issued by any sovereign organization, inter-governmental groups or alliances, or corporations to use the bond profits to fund ecologically sustainable projects. We used Bloomberg to get thorough information on green bonds issued by corporations and governments in India and other nations. For India, we first removed all corporate and government bonds issued since January 21, 2015, regardless of whether they were green bonds or not. In this regard, irrespective of the issuers' country of incorporation, we have taken those bonds with India as the country of risk. For almost five thousand bonds issued in the Indian market since 2015, we looked at the initial issuance amount in US$, coupon rate, debt to total assets ratio, and whether the bond proceeds were to be used for green initiatives or not. We used the Bloomberg terminal to get summary information for the worldwide comparison, but we did not retrieve detailed information.

Table 3: Green Bonds Issuance Since January 1, 2018 (Corporate and Government: All Maturities)

Country	Amount issued ($Mn)	Number of bond issued	Amount issued as per cent of all bond issuance (per cent)	Number of bonds issued as per cent of all bond issuance (per cent)
Euro Area[1]	1,96,854	594	1.7	0.4
China	63,023	183	0.3	0.2
USA	35,421	71	0.2	0.2
Japan	11,815	88	0.1	1.1
South Korea	11,781	44	1.0	0.4
Central and Southern America[3]	8,869	53	0.5	1.0
India	**7,992**	**22**	**0.7**	**0.3**
South-east Asia[2]	7,208	86	0.6	1.4
Australia and New Zealand	5,878	15	1.1	0.8
UK	5,311	17	0.4	0.5
Hong Kong	4,781	19	0.5	1.0
Singapore	496	9	0.05	1.2

Since 2015, India has been issuing green bonds. The outstanding amount of green bonds in India as of February 12, 2020, was US$16.3 billion. Since January 1, 2018, India has issued green bonds worth approximately $8 billion, accounting for about 0.7 percent of all bonds issued in the Indian financial market. Even though green bond issuance in India has accounted for a very modest percentage of total bond issuance since 2018, India has maintained a favourable position in comparison to numerous advanced and emerging economies (Table 3).

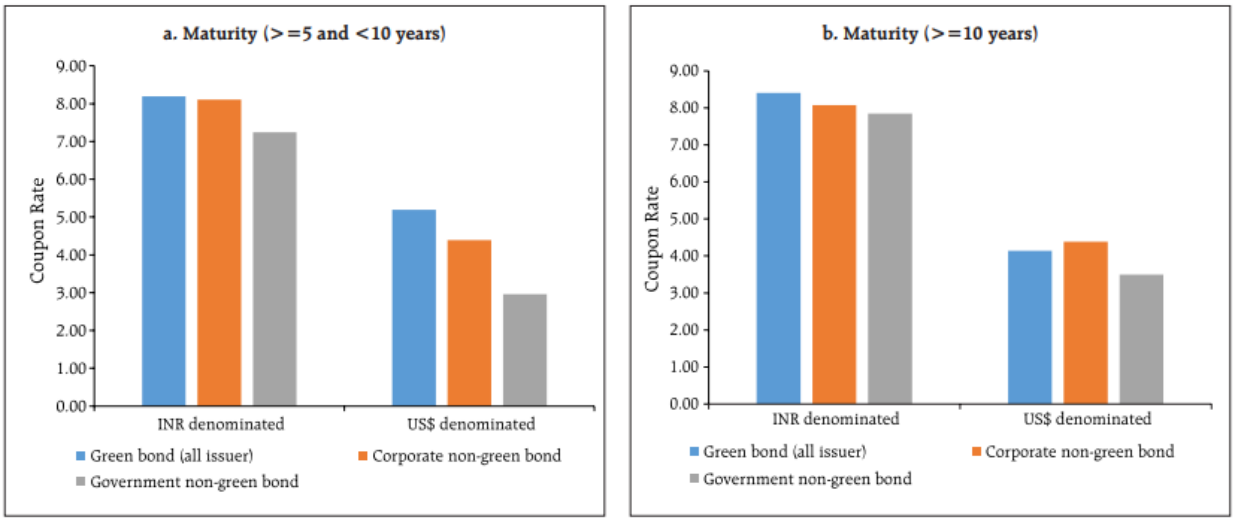
Since 2015, most green bonds issued have had maturities of five years or more, but less than ten years. Some issuers, such as Yes Bank Ltd. (2015) and Indian Renewable Energy Development Agency Ltd., have made exceptions. (2017, 2019), Rural Electrification Corporation Limited or REC Ltd. (2017), Power Finance Corporation Ltd. (2017), Indian Railway Finance Corporation Ltd (2017), and Adani Renewable Energy Ltd. (2019) fifteen have both issued green bonds having a 10-year or longer maturity. In 2019, Renew Power Pvt. Ltd. issued green bonds with a term of fewer than 5 years. Since 2015, around 76% of green bonds issued in India have been denominated in US dollars. In addition to corporations and governments, the World Bank has from time to time issued green bonds for various projects in India (Appendix Table 1). According to the World Bank's Green Bond Impact report (2019), the outstanding amount of Green Bond proceeds allocated to support the financing of such projects in India as of June 30, 2019, is anticipated to be US$640 million.

To summarise, green finance in India is still in its infancy. As of March 2020, green bonds accounted for only 0.7% of all bonds issued in India since 2018, and bank lending to non-conventional energy accounted for about 7.9% of all outstanding bank credit to the power sector. In the next section, we will discuss some of the significant issues that the green bond market in India is facing.

IV. Challenges and Way forward

Based on existing research and global experience, an integrated policy approach to green finance is gradually gaining traction. While public awareness and financing options have improved in India, high borrowing costs, false claims of environmental compliance, a plethora of green loan definitions, and maturity mismatches between long-term green investment and investors' short-term interests could pose major challenges. We will go through some of these issues in more detail in this part, as well as some policy options. Borrowing expenses In India, the cost of issuing green bonds has remained higher than that of other bonds. The average coupon rate for green bonds issued since 2015 with maturities of 5 to 10 years has remained higher than the average coupon rate for corporate and government bonds with similar maturities, as shown in panel an of chart 4. In chart 4, panel b, the INR-denominated green bonds show a similar tendency. The coupon rate on green bonds denominated in US dollars with a term of more than or equal to ten years was, nevertheless, lower than on corporate bonds.

Chart 4: Average Coupon Rate (per cent) for Bonds Issued



It should be noted that most green bonds issued in India are issued by public sector units17 or financially sound corporations. The fact that private sector issuers of green bonds reported lower debt-to-assets ratios on average than non-issuers of green bonds18 demonstrates this (Table 6). Their improved financial condition is

reflected in their stock values as well. The ratio of ESG leaders' stock price indices to headline stock price indices has been steadily rising in recent years, as seen in Chart 5. This means that the stock prices of companies that are focused on ESG-related initiatives outperform others in the market19The higher borrowing cost of green bonds in India could be due to asymmetric information (covered later in this section), higher risk perception, and other governance difficulties, although they are quite safe. According to existing research, green initiatives frequently have a high upfront cost, with some cost-cutting elements only being useful overall. Mismatches in the maturity of green projects and their funding raise borrowing costs (G20 GFSG, 2016) twenty. Due to a lack of a unified definition of green finance and information asymmetry, "green-washing" occurs frequently, in which investors receive incorrect information regarding green bonds (Bertelsmann and Lindenberg, 2016). Several of these problems are expected to exist in India, as the financial market is still developing in comparison to developed markets.

Table 6: Debt as Percentage of Total Assets for Corporates: By Category based on Green Bond Issuances

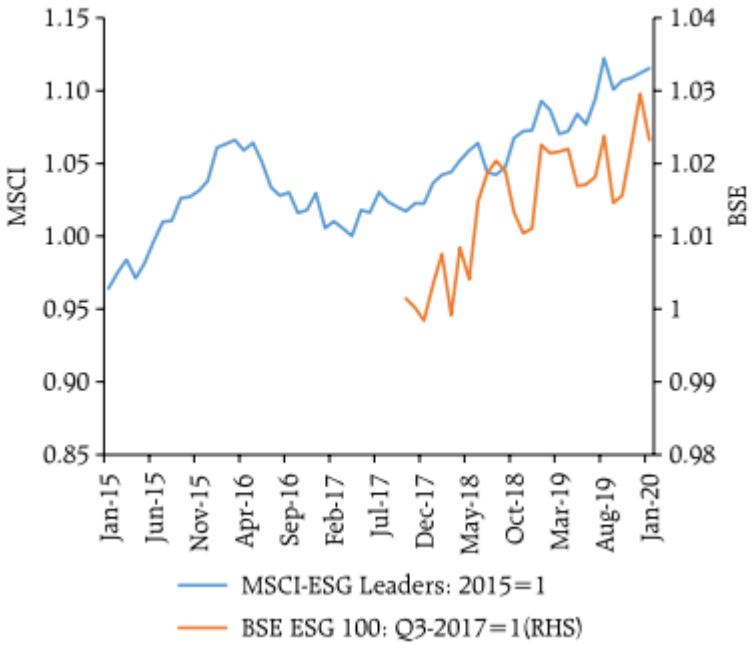
(Average between January 1, 2015 and February 12, 2020)

Sector	Issuer	Non-issuer
All	63.8	72.9
Power	67.6	77.7
Renewable/non-conventional energy	69.4	96.6

Borrowing cost and information asymmetry

The most significant difficulty has been high borrowing costs, which our data suggest may be attributable to asymmetric information. As a result, improving India's information management system may aid in the reduction of maturity mismatches, borrowing costs, and efficient resource allocation in this sector. To address this information vacuum, numerous countries, including Australia, China, India, and the United States,

Chart 5: ESG Compared to General Stock Index



establish databases dedicated to green building projects in their respective countries (Shen et al 2020). While India tracks greenhouse gas emissions through various reporting systems such as PAT (perform-achieve trade) and RPO (renewable purchase obligations), it lacks a national measuring, reporting, and verification framework for climate funding, as do many other countries (Jain, 2020).

Infrastructure development in the market

Given the scale of the home market and the low penetration of green instruments to date, there is still significant potential to be exploited. In this context, some studies highlighted the significance of

(a) better coordination between investment and environmental policies and (b) a policy framework that can be implemented at both the national and state levels to overcome existing frictions. In this vein, policy measures such as expanding the corporate bond market, standardizing green investment terminology, ensuring consistent corporate reporting, and eliminating information asymmetry between investors and recipients can all help to address some of the green finance market's shortcomings (RBI, 2019).

Other public policies

Engaging with industry associations that have taken measures to expand 'green buildings,' which are designed to use less water and energy, have better waste management, and provide healthier living areas, is another option. The government, at all levels, may be able to work with these organizations to better understand their financial and operational requirements. It may also pursue measures that make nonconventional energy generation and distribution profitable, particularly for smaller businesses. In India, there is room for well-balanced policies that provide financial incentives for green projects while also considering the impact on the supply chain, inflationary pressures, and fiscal consolidation.

V. Conclusion

Green financing is quickly becoming a top focus for government policymakers. In this study, we examine the evolution of green finance in India, and our findings show that public awareness and financing alternatives in India have improved in recent years. According to existing literature, reducing asymmetric knowledge about Green Projects through better information management systems and increased collaboration among stakeholders could pave the path for long-term economic growth that is sustainable.

The globe is currently battling COVID-19 and its impact on global economic growth. The immediate policy issue, without a question, is to jump-start the global economy. The epidemic, on the other hand, has provided an opportunity for all stakeholders to reconsider their policy, finances, and operational strategies, and to advocate for a long-term approach that is more environmentally sustainable. Green finance is unquestionably a key tool for facilitating such a change toward long-term economic success.