Environmental Finance for a Sustainable Society

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About NFCG

In 2003, the Ministry of Corporate Affairs (MCA) led a unique PPP model to set up the National Foundation for Corporate Governance in partnership with the Confederation of Indian Industry, the Institute of Company Secretaries of India, and the Institute of Chartered Accountants of India. Subsequently, the Institute of Cost Accountants of India, National Stock Exchange and the Indian Institute of Corporate Affairs also joined with an objective to promote good Corporate Governance practices both at the level of individual corporates and Industry as a whole.

NFCG endeavours to create a business environment that promotes voluntary adoption of good corporate governance practices.

Vision

Be the Key Facilitator and Reference Point for highest standards of Corporate Governance in India

Mission

- To foster a culture of good Corporate Governance
- To create a framework of best practices, structure, processes and
- Ethics
- To reduce the existing gap between Corporate Governance framework & actual compliance by corporates
- To facilitate effective participation of different stakeholders
- To catalyse capacity building in emerging areas of Corporate Governance

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Chapter 1: Introduction to Environmental Finance

Introduction

Environmental Finance (EF) is a new offshoot of 'finance' extending its contours typically to non – commercial, non – industrial and traditional ventures. Its emergence has added a new dimension to the field of finance. In common parlance, EF is used interchangeably with the terms 'green finance' and 'sustainable finance'. As it is different in nature and deployment, its sources, applications, institutional mechanism too are different and so are the regulatory and public policies, and the processes and systems governing EF. The models belonging to environmental finance include traditional finance, low – carbon finance, climate finance, green finance, socio – environmental finance, and sustainable finance. EF is a paradigm shift in the field of finance and sustainable development impacting the humankind. Environmental Finance is an emerging field so far not much known to the financial experts, public policy makers, business and industry personnel barring those engaged in emission trading. Richard L. Sandor, 1992 pointed out that EF concerns itself with economic and market analysis related to finance used for funding conservation initiatives and create symbiotic relationship between businesses and environment enhancing quality of life for society without lowering profitability (Linnenluecke et al., 2016). EF combines insights across the social sciences, natural sciences and humanities disciplines to help combat critical environmental issues and connected societal risks. In this context it may be mentioned that climate change resulting from volatile weather conditions expose corporate assets to severe risks. Regulatory resourceconstraints are affected by climate change (Linnenluecke et al., 2015). EF has recent origins in India. The Reserve Bank of India through its guidelines to Indian Banks and financial institutions (Reserve

Bank of India, RBI Bulletin, Mumbai, 2021) permitted them to consider

lending for environmental projects EF has found favour across various segments comprising businesses and commerce, public systems, organizations not for profit and family – owned entities. This happens through embedding green practices in business operations. The fusion between environmental management systems and finance provides these segments access to EF. EF focuses on new innovative technologies to reduce the ills of climate, pollution, and public health related concerns. EF instruments include corporate bonds, project bonds, asset – backed securities, finance sectors bonds, municipal bonds, supranational, sub – sovereign, or agency bonds, and equity flotation connected to ESG investments.

Evolution of EF

Environmental finance refers to the integration of environmental considerations into financial decision-making processes. This field has evolved significantly over the years in response to the growing awareness of environmental issues and the need to address them through financial mechanisms. The evolution of environmental finance started in early 1970s when environmental concerns gained prominence during which the environmental regulations and standards were introduced, creating a need for financial instruments and mechanisms to support compliance. In 2002, The development of Green Finance grew (Taghizadeh-Hesary, F., & Yoshino, N.,2019) traction emphasizing the role of finance in supporting environmentally sustainable projects. Green bonds, for example, were introduced to fund projects with positive environmental impacts, such as renewable energy and energy efficiency initiatives. The environmental finance gained popularity in 2010 when the Environmental, Social, and Governance (ESG) became an integral part of investment decision-making. The

investors started considering not only financial returns but also the environmental and social performance of companies. This shift led to the development of various ESG-themed

investment products. Rise of Impact Investing in 2010s specific form of investments generated positive, measurable social and environmental impact alongside financial returns. This approach goes beyond traditional ESG considerations by actively seeking investments that contribute to positive change. As the EF started growing the regulatory bodies worldwide began implementing policies to encourage environmental sustainability. This includes the Paris Agreement that aimed to address climate change, and various national initiatives promoting sustainable finance. Regulatory frameworks and reporting standards, such as the Task Force on Climate-related Financial Disclosures (TCFD) (Nisanci, 2021) gained prominence. The various innovative instruments in green finance, sustainable finance, environmental finance has evolved in 2020 to address environmental challenges across the globe. This includes green bonds, sustainability-linked loans, and environmental risk management tools, etc. Financial institutions started to offer products that align with environmental goals. Mainstreaming of Sustainable Finance (2020s onwards) has moved from a niche concept to mainstream adoption. Major financial institutions, corporations, and investors have committed to sustainable finance principles. The integration of environmentalconsiderations into financial decision-making is increasingly viewed as essential for long-term financial stability and resilience.

Concept of EF

Environmental finance is a multidisciplinary field that involves the integration of financial principles with environmental considerations (Cunha, F. A. F. D. S., Meira, E., & Orsato, R. J. (2021). The core concept revolves around using financial tools, instruments, and mechanisms to address environmental challenges, promote sustainability, and support

projects and initiatives that have positive environmental impacts. This field has gained

significance as societies recognize the need to address environmental issues, such as climate change, resource depletion, and biodiversity loss, through innovative financial solutions. The overarching goal of environmental finance is to align financial activities with environmental sustainability, fostering a transition towards a more resilient and environmentally responsible global economy. As the field continues to evolve, it plays a vital role in addressing urgent environmental challenges and promoting the long-term well-being of both the planet and the economy. Green Finance refers to financial products and services that support environmentally sustainable projects and initiatives. Examples include green bonds, which are debt instruments specifically earmarked for environmentally friendly projects like renewable energy or energy efficiency. Sustainable Investing concept involves integrating environmental, social, and governance (ESG) criteria into investment decisions. Investors consider not only financial returns but also the broader impact of their investments on the environment and society. Sustainable investing includes strategies such as socially responsible investing (SRI) and impact investing. While Carbon Finance deals with trading of carbon credits or allowances to reduce greenhouse gas emissions. Cap-and-trade systems and carbon offset projects are examples of financial mechanisms designed to incentivize emission reductions and promote a low-carbon economy. Environmental Risk Management manage operations investments. Regulatory Compliance, Innovative Financial Instruments and reporting standards are increasingly integrating environmental considerations into their financial strategies. This may involve obtaining financing for green projects, issuing sustainability-linked bonds, or incorporating sustainable finance principles into their overall financial planning.

Meaning and Definition

Defined in the context of the banking sector, the Price Water house Coopers (2013)[1] mention the following attributes of EF: (i) product and service innovation which promote responsible investments, and (ii) support low – carbon technologies projects. To quote Finanças Brasileiras Sustentáveis (FiBras) (2020)[2]: "EF refers to the integration of sustainability aspects in the decision-making processes of financial market actors, financial market policy and related institutional and market arrangements that contribute to the achievement of strong, sustainable, balanced and inclusive growth". As defined by Nobel Laureate Robert Solow (Solow, 1991)[3]: "Environmental finance concerns itself with the impact of environmental issues on financial decision making, which is essentially a three-step process. The first step is to identify sources of risk and/or opportunities to create value. This requires a better understanding of the interconnections between ecology and economics, which is a good thing". There is no one common definition of EF. However, going by the above definitions, EF could be said to constitute the following:

- the financing of public and private green investments in water management or protection of biodiversity and landscapes;
- extending public policy related finance for choosing and implementing environmental activities

[1] Pricewaterhouse Coopers Consultants (PWC) (2013): Exploring Green Finance Incentives in China, PWC.
[2]FiBras - Finanças Brasileiras Sustentáveis, Sustainable Finance: An Overview June 2020, Several definitions include the following aspects in SF (1) fiscal policy, including Co2 pricing, taxation and subsidies; (2) carbon emissions trading; and/or (3) financial compensation schemes for loss and damage due to results from climate change. In this document, the focus is on the perspective of (public and private) financial sector actors regarding their decision-making towards financing (e.g.credit), investment and insurance practices and the requirement to

disclose such practices

[3] Solow, R.M. (1991) Sustainability: an economist's perspective. Reprinted in: Economics of tk Environment: Selected Rendtngs, 3rd edn (Eds R. Dorfman and N. S. Dorfman), W.W. Norton, New York 1993, 179-187.

- deal with that part of the financial system devoted to environmental projects

Need for the study

Environmental Finance has recent origins in India. In common parlance, Environmental Finance is used interchangeably with the terms 'green finance' and 'sustainable finance'. EF is a paradigm shift in the field of finance and sustainable development impacting the humankind. The Reserve Bank of India through its guidelines to Indian Banks and financial institutions (Reserve Bank of India, RBI Bulletin, Mumbai, 2021) permitted them to consider lending for environmental projects. Environmental Finance has found favor across various segments comprising businesses and commerce, public systems, organizations not for profit and family – owned entities. The fusion between environmental management systems and finance provides these segments access to Environmental Finance. Environmental Finance has made its incursions in the programmes and courses in higher education institutions of repute. This study would detail the various EF instruments in national and international setting and the potential for India to harness increased resources. The scope of the study would include all - India development banks, state financial corporation's, public and private sector commercial banks, venture capital funds, stock exchanges and regulatory institutions. The investments made by global organizations in any form would also form a part of this study.

Objectives of the study

The following are the broad objectives of the study:

- To study the concept of environmental finance

- To collect the various courses and instruments that are available in the environmental finance and analyse the trends
- To draw inferences from the global practices for India

Research Questions or Hypotheses

The research questions spring up from the objectives set for the study. Keeping in view the objectives set for the study, it would centre on the following research questions:

- Is the implementation of environmental finance policy being effective?
- Is the Institutional Structure for environmental finance suitable and adequate?
- Are Indian Policies in consonance with the global trends?
- Does India have suitable educational infrastructure for environmental finance?

An attempt would be made to model EF through its indigenous and exogenous variables. Case studies on policy formulation and implementation, financing and regulation with regard to environmental finance would be conducted to present the dynamics of environmental finance in India. The publications of the concerned ministries, global organizations, environmental organizations, annual reports of Corporates would be studied besides data bases belonging to government agencies, autonomous and international bodies. The research is based on secondary data method.

Chapter 2 Literature Review

Environmental finance is a relatively new field of finance. Economists and international organizations have failed to establish a precise definition or agree upon one unanimously. However, workable definitions have been developed by a variety of scholars, organizations, and governments (Labatt, 2003). An interesting variation in this is that specific organizations, rather than defining green finance, have coined the following phrase: a sustainable financial system (Hira, 2012). According to the UNEP, a sustainable financial system incorporates the development of values and aids in dealing with financial assets. According to the Green Finance Study Group of the G20 (Berensmann, 2017), green financing is financing to promote the adoption of technologies that lower pollution. According to the People's Bank of China, green finance is a policy that refers to a set of policy and institutional arrangements aimed at attracting private money into green sectors. The notion of green financing is also different from the traditional banking approaches (Jeucken, 2010; Mishra et. al, 2021; Sahana Sankar, 2021). The European Banking Federation stated that green finance is not restricted to simply environmental change related factors (EBF, 2021). In addition, the green economy has three-fold benefits; the development of green finance strengthens, green economy promotes environmental awareness and ensures green financial development can effectively optimize the supply structure of production factors (Bergset, 2015). Environmental finance is tosupport sustainable finance is a path of innovation in finance in environmental protection (White, 1996). To promote sustainable development, green financial services have become the mainstream trend of financial development. Coulson, et. al., 2011, established evaluation index systems to analyse the performance problems of bank green service channels in operations. They found that the cost of implementing the "equatorial principle" is higher, the

credit risk generated by loans is lower (Coulson, 2003; Dimitriadis et. al., 2011; Morrish and

Lee, 2011). Internationally, the green finance divided in two categories: green finance as investment and financing activities that improves the environment investment (Coulson, 2003). It is believed that the development of green finance is based on the mutual constraints between finance and the environment (Kaufer, 2014; Apergis et. al., 2007). 'Knowledge on the whole is an environmentally neural asset that can contribute to the future', remarks economist and Nobel laureate Robert Solow (Solow, 1991).

The specific contributions of each author to the field of environmental finance (EF) may vary. Scholars often contribute to this interdisciplinary field through research papers, articles, and books that address specific aspects of EF. Here's a brief overview of the mentioned authors and their general areas of research, which may include work related to environmental finance.

Impact of Sustainable Financial and Economic Development on Greenhouse Gas Emission in the Developed and Converging Economies

Several studies have examined the relationship between environmental performance and economic development. However, most of them did not take sustainable development and financial development into account. The study argues that sustainable financial and economic development contributes to reducing greenhouse gas emissions. We use the panel data regression model to capture the relationship between greenhouse gas emission and sustainable economic and financial development. The panel data refers to the period of 2007–2017. The EU 25 countries were analysed. The results show that the relationship between sustainable financial development and environmental degradation is more relevant for converging economies than developed countries. We found that the variable "energy

productivity” has the strongest impact on greenhouse gas emissions for both country groups

(converging and developed); however, it increases for developed countries and it decreases the greenhouse gas emissions for converging economies. We also found that environmental taxes are an efficient instrument that mitigates greenhouse gas emissions, especially in developed countries group.[4]

This article explores[5] the role of financial markets for sustainable development. More specifically, the authors ask to what extent financial markets foster and facilitate more sustainable business practices. The authors highlight that their current role is rather modest and conclude that, on the old paths, a paradoxical situation exists. On one hand, financial market participants increasingly integrate environmental, social, and governance (ESG) criteria into their investment decisions, whereas on the other hand, in terms of organizational reality, there seems to be no real shift toward more sustainable business practices. The authors identify two main challenges within the field of sustainable investments that are relevant for entering new avenues that may help overcome this situation. First, a reorientation toward a long-term paradigm for sustainable investments is important. Second, ESG data must become more trustworthy. From a theoretical point of view, the authors finally highlight the potential market consequences when ESG investment criteria are used.

We study whether institutional investors[6] from around the world have heterogeneous views on the importance of corporate social responsibility (CSR). We explore legal origin as a source of shareholder heterogeneity and study the effect of civil-law and common-law institutional

[4] Ziolo, M., Kluza, K., & Spoz, A. (2019). Impact of Sustainable Financial and Economic Development on Greenhouse Gas Emission in the Developed and Converging Economies. *Energies*, *12*(23), 4514.
[5] Busch, T., Bauer, R., & Orlitzky, M. (2016). Sustainable development and financial markets: Old

paths and new avenues. *Business & Society*, *55*(3), 303-329.

[6] Bauer, R., Derwall, J., & Tissen, C. (2022). Legal Origins and Institutional Investors' Support for Corporate Social Responsibility. *Available at SSRN 4096769*.

ownership on vote support for financially materially and immaterial CSR-related shareholder proposals. Using data on 1,858 proposals that went to a vote at Russell 3000 firms between 2008 and 2020, we find that the percentage of for/against votes favoring a financially material proposal increases by 1.3 percentage points when ownership from civil-law institutional investors increases by 1 percentage point. However, we find no effect of common-law institutional ownership on support for material CSR proposals. Lastly, we find no effect of common-law nor civil-law institutional ownership on support for immaterial CSR proposals. Hence, we provide empirical evidence that investors' local institutional environment shapes their vote support for CSR proposals. Our results indicate that civil-law institutional investors, guided by a stakeholder-oriented conception of the firm, can recognise which CSR proposals are financially material.

This paper, Sustainable[7] finance as a connection between corporate social responsibility and social responsible investing, focuses on the development of terminology, concepts and instruments to introduce the concept of sustainable development into the financial practise and financial academic literature. Current developments on financial markets show an increasing interest for both socially responsible investments (SRI) and sustainable corporate responsibility (CSR). The primary goal of this study is the application of finance as a connection between CSR and SRI. The first part of this paper argues that finance urgently needs a 'sustainability approach' to connect the initiatives from the CSR companies with the investor preferences of the SRI capital market. This part is entirely devoted to the 'exchange syntax' of sustainable finance. The exchange syntax refers to the terminology of the distinguished sustainability concepts, their interconnections and the ethical values behind

[7] Soppe, A. (2009). Sustainable finance as a connection between corporate social responsibility and social responsible investing. *Indian School of Business WP Indian Management Research Journal*, *1*(3), 13-23.

them. Traditional finance is used as a benchmark for describing new developments. The second part of the paper further develops the concept of sustainable corporate finance, defining it as a multi-attribute approach to finance the company in such a way that all of the company's financial, social and environmental elements are interrelated and integrated (see Soppe (2004)). The core elements are the mission statement of the company, the relevant ethical framework, assumptions on human behaviour and the finance choices on the ownership of the company. The latter aspect will be emphasized as the crucial element of sustainable (corporate) finance and a sustainable market economy. This paper, Sustainable finance as a connection between corporate social responsibility and social responsible investing, focuses on the development of terminology, concepts and instruments to introduce the concept of sustainable development into the financial practise and financial academic literature. Current developments on financial markets show an increasing interest for both socially responsible investments (SRI) and sustainable corporate responsibility (CSR). The primary goal of this study is the application of finance as a connection between CSR and SRI. The first part of this paper argues that finance urgently needs a 'sustainability approach' to connect the initiatives from the CSR companies with the investor preferences of the SRI capital market. This part is entirely devoted to the 'exchange syntax' of sustainable finance. The exchange syntax refers to the terminology of the distinguished sustainability concepts, their interconnections and the ethical values behind them. Traditional finance is used as a benchmark for describing new developments. The second part of the paper further develops the concept of sustainable corporate finance, defining it as a multi-attribute approach to finance the company in such a way that all of the company's financial, social and environmental elements are interrelated and integrated (see

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This paper focuses on the development of terminology, concepts and instruments to

introduce the concept of sustainable development into both financial practise and the

financial academic literature. Current developments on financial markets show growing interest for both socially responsible investments (SRI) and sustainable corporate responsibility (CSR). The primary goal of this study is the application of finance as a link between CSR and SRI. The first part of the paper argues that finance urgently needs a 'sustainability approach' to connect the initiatives from the CSR companies with the investor preferences of the SRI capital market. This part is entirely devoted to the 'exchange syntax' of sustainable finance, which refers to the terminology of the distinguished sustainability concepts, their interconnections and the ethical values behind them. Traditional finance is used as a benchmark for describing new developments. The second part of the paperdevelops further the concept of sustainable corporate finance (SCF), defining it as a multi- attribute approach to finance the company in such a way that all of the company's financial, social and environmental elements are interrelated and integrated. The core elements of SCFinclude the mission statement of the company, the relevant ethical framework, assumptions on human behaviour and the finance choices on the ownership of the company. The latter aspect will be emphasized as the crucial element of both sustainable (corporate) finance and a sustainable market economy. This study considers five regions[8,] i.e., South Asia, South-EastAsia, China, Middle Eastern countries, and European countries, and took their data for15 years. This study makes a significant contribution to the literature by examining the impact of green finance on environmental sustainability. Green finance development is represented by GDP, investment in renewable energy sources, investment in research and development (R&D) for eco-friendly projects, and public–private partnership investment in renewable energy projects. Green financing development in the chosen panel exhibits a distinct

[8] Khan, S., Akbar, A., Nasim, I., Hedvičáková, M., & Bashir, F. (2022). Green finance development and environmental sustainability: A panel data analysis. *Frontiers in Environmental Science*, *10*, 2134.

geographical cluster effect, with significant regional variances. The most important influencing elements are regional GDP, regional innovation level, and air quality, whereas the degree of financial development and industrial structure optimization are insignificant. The degree of financial development and industrial structure optimization are related to the amount of green finance development mostly via spillover effects. The degree of financial development has a positive spillover impact, but industrial structure optimization has a negative spillover effect. This study reveals that an increase in the production of energy from renewable sources, an increase in R&D, and the evolution of public–private partnership investment in renewable energy reduce CO2 emissions. It is evidenced that green finance in renewable energy sources is necessary to achieve environmental sustainability. There is a strong need to increase green finance in renewable sources to target the minimization of global CO2 emissions. There should be cross-border trade of renewable energy between regions/countries to mitigate CO2 emissions globally. Moreover, this study ranks the regions based on environmental sustainability, which may help researchers and decision-makers to entice foreign direct and private investment in these regions. The implications of the findings of the study suggest that environmental sustainability benefits greatly from green financing and investing in renewable energy sources through public–private partnerships, which represents one of the best ways to ensure environmental sustainability. While corporate sustainability[9] has been defined as an approach that creates long-term value with minimum environmental damage, there is still little understanding of the time horizon over which improved environmental performance leads to improved financial performance. We investigate the relationship between environmental and financial performance under

[9] Delmas, M. A., Nairn-Birch, N., & Lim, J. (2015). Dynamics of environmental and financial performance: The case of greenhouse gas emissions. *Organization & Environment*, *28*(4), 374-393.

increasing likelihood of environmental regulation. We leverage longitudinal data for 1,095 U.S. corporations from 2004 to 2008, a period of increasing activity for climate change legislation, in order to estimate the effect of greenhouse gas emissions on short- and long-term measures of financial performance. We find that during this period, improving corporate environmental performance causes a decline in an indicator of short-term financial performance, return on assets. Nonetheless, investors see the potential long-term value of improved environmental performance, manifested by an increase in Tobin's q. These results suggest that limited uptake of proactive strategies may in part be attributable to short-term financial performance targets that guide managerial decision making. The state of the planet calls for large-scale sustainability transitions[10] involving systemic adoption of markedly better environmental and social practices. The objective of this symposium is to better understand the role of corporations in promoting such systemic change. We present four case studies—representing diverse industries and change mechanisms—-to investigate corporate leadership in sustainability transitions. The cases examine a wide range of mechanisms used by corporations to progress toward sustainability, such as political coalition building and information strategies through eco-labels, socially responsible investing, and the public statements of CEOs. In this introduction, we discuss the challenges associated with both achieving and studying systemic change, explain the rationale for a case study approach, describe the findings from the case studies, and draw some general conclusions on mechanisms by which firms may be able to lead, or at least participate in, systemic change in the different phases of sustainability transitions.

[10] Delmas, M. A., Lyon, T. P., & Maxwell, J. W. (2019). Understanding the role of the corporation in sustainability transitions. *Organization & Environment*, *32*(2), 87-97.

This paper synthesizes the results from the model intercomparison exercise among regionalized global energy-economy models conducted in the context of the RECIPE project. The economic adjustment effects of long-term climate policy are investigated based on the cross-comparison of the intertemporal optimization models ReMIND-R and WITCH as well as the recursive dynamic computable general equilibrium model IMACLIM-R. A number of robust findings emerge. If the international community takes immediate action to mitigate climate change, the costs of stabilizing atmospheric CO2 concentrations at 450 ppm (roughly 530–550 ppm-e) discounted at 3% are estimated to be 1.4% or lower of global consumption over the twenty-first century. Second best settings with either a delay in climate policy or restrictions to the deployment of low-carbon technologies can result in substantial increases of mitigation costs. A delay of global climate policy until 2030 would render the 450 ppm target unachievable. Renewables and CCS are found to be the most critical mitigation technologies, and all models project a rapid switch of investments away from freely emitting energy conversion technologies towards renewables, CCS and nuclear. Concerning end use sectors, the models consistently show an almost full scale decarbonization of the electricity sector by the middle of the twenty-first century, while the decarbonization of non-electric energy demand, in particular in the transport sector remains incomplete in all mitigation scenarios. The results suggest that assumptions about low-carbon alternatives for non-electric energy demand are of key importance for the costs and achievability of very low stabilization scenarios.

One-fourth of the global population[11] is without basic drinking water and half of the global population lacks sanitation facilities. The attainment of water and sanitation targets is difficult due to administrative, operational, political, transborder, technical, and policy challenges. Conducted after 5 years from the adoption of sustainable development goals by the United Nations reviews the initiatives for improving access, quality, and affordability of water and sanitation. The bibliometric and thematic analyses are conducted to consolidate the outcomes of scientific papers on sustainable development goal 6 (SDG 6). Africa is struggling in relation with water and sanitation goals, having 17 countries with less than 40% basic drinking water facilities and 16 countries with less than 40% basic sanitation facilities. Globally, the attainment of water and sanitation goals will be depended on economic development, the development of revolutionary measures for wastewater treatment, and creating awareness related to water usage, water recycling, water harvesting, hygiene, and sanitation. Behavioral changes are also required for a new water culture and the attainment of water and sanitation goals by 2030. Sustainable banking had unprecedented importance in the modern world, especially after the subprime crisis of 2007[12] and this research paper presents a systematic review analysis of sustainable banking. In this systematic review, 55 articles in 38 peer-reviewed journals, related to sustainable banking (1999-2019) had been reviewed from the source of Scopus and Web of Science. This review had focused its research on four major themes of determinants of sustainable banking, sustainable lending practices, evaluation of sustainable banking, and reporting of bank sustainability. This research is concluded by identifying themes of determinants of sustainable banking, sustainable lending practices, and evaluation of sustainable banking as the most promising niches for future research in the area of sustainable banking.

Chapter 3: Growth and development of EF Courses

Environmental finance is a field that on the surface is unfamiliar to most practitioners. However, most are familiar with some of the tools or products of environmental finance such as emissions trading and land trusts for conservation. This field essentially takes a financial look and methodology to address environmental issues. The first environmental finance collegiate course has been attributed to economist, Richard L. Sandor, in 1992 at Columbia University. The economics and market analysis associated with finance is used towards funding conservation initiatives, improve the impact of businesses on the environment without sacrificing profitability and improve quality of life for a community. Globalization has opened various investment opportunities across business sectors as interest expands among investors. Environmental finance is leading the shift from isolated environmental regulation control to market-driven economies.

Environmental finance is used across multiple sectors including business/corporate, governmental agencies, non-profit organizations and individual households. For example, businesses implement green practices that are economically viable. The growth of comprehensive environmental management systems illustrate the merging of environmental /sustainable and financial practices. Cost benefit analysis is a common method employed to ensure economic feasibility when multiple high priority community projects compete for available funding. Emissions trading (also called carbon trading) have been introduced

[11] Singh, S., & Jayaram, R. (2022). Attainment of water and sanitation goals: a review and agenda for research. *Sustainable Water Resources Management*, *8*(5), 146.
[12] Singh, S., & Jayaram, R. (2021). Sustainable banking: A systematic literature review. *International Journal of Sustainable Society*, *13*(2), 116-128.

through regulations and agreements. Even mitigation adopted language from the financial sector by implementing wetland mitigation banks.

Environmental impacts are avoided first before considering other alternatives. Once it has been determined that avoidance is not feasible, the next step is to minimize environmental impacts. Trading and banking are tools used to minimize and mitigate environmental impacts. An example would be changing shipping schedules, so it uses less energy. It could also mean reducing inventory and capitalizing just-in-time delivery that may reduce emissions required to fabricate the product.

Public sector agencies across the world, including the United States, rely on environmental finance. The United States Environmental Protection Agency (EPA), Indonesia, Mongolia and multiple European countries have an environmental finance center or an environmental funding centre. Most colleges and universities have a designated environmental finance centre. Some colleges and universities offer environmental finance degrees that focus on economic and policy analysis, finance and analytics, science and technology, and markets and regulation.

The EPA's environmental funding centre targets state and local governments, tribes and businesses. Their purpose is to educate about the myriad of methods to lower environmental costs, evaluate financial options and improve financial capacity so the agency or business moves toward sustainability. Traditionally the total cost of a process, procedure, policy or product focused only on areas where money exchanged hands through invoices. Environmental finance expands the traditional organizational operations to include, or at least become aware of, the hidden costs that were largely ignored during the go/ no-go process including cost benefit analysis and return on investment calculations. For example,

the cost benefit analysis could include regulatory costs such as permitting, monitoring, energy expenditure along the entire supply chain, auditing costs, carbon footprint of the company or product and socioeconomic costs. Companies that already have an environmental management system (EMS) in place can expand to include the total environmental impacts and costs.

Development Finance for Climate and Environment[13]

Development finance from bilateral and multilateral institutions supports climate change mitigation and adaptation, as well other environmental objectives such as biodiversity. Succinct analysis of the latest trends of bilateral climate finance is available below, together with the full dataset on climate-related development finance, a data explorer tool and methodological documents. The table 3.1 depicts the country-wise details of the developmental finance for climate and environmental change:

Table 1: Country-wise Development finance for climate and environmental change

Country	Total Climate-related development finance - Commitment – 2021 ($' 000)
Australia	66,411
Austria	1,19,389
Belgium	1,02,365
Canada	3,82,910
Czechia	1,099
Denmark	3,12,119
Estonia	1,356
EU Institutions	1,05,149
Finland	88,029
France	33,37,533
Germany	2,70,006
Hungary	11,671
Iceland	4,439
Ireland	34,918

[13] https://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/climate-change.htm

Italy	3,09,502
Japan	32,30,668
Korea	5,97,918
Liechtenstein	600
Lithuania	1,111
Luxembourg	11,060
Monaco	6,366
Netherlands	2,99,179
New Zealand	35,502
Norway	12,18,457
Poland	958
Portugal	2,397
Slovak Republic	4
Slovenia	332
Spain	39,055
Sweden	3,41,374
Switzerland	1,84,334
United Arab Emirates	0
United Kingdom	5,75,116
United States	10,29,551

Source : OECD Climate Change: OECD DAC External Development Finance Statistics, 2022.

COP 28 and EF

Financing Net Zero[14], *Environmental Finance*'s first COP-focused special report covers the latest developments in transition finance and net-zero investment opportunities. It features in-depth analysis from *Environmental Finance*'s editorial team on the major themes surrounding transition bonds, taxonomies, regulation, and voluntary carbon markets, alongside data from *Environmental Finance Data*.

Expert insights are provided from S&P Global Ratings on their newly integrated Shades of Green methodology from CICERO, analysis from Barclays on the urgent need to scale the

[14] https://www.environmental-finance.com/content/downloads/environmental-finance-cop28-financing-net-zero.html

financing of climate technologies, and a call for action from Climate Advisors for investors to capitalise on the opportunities in nature-based solutions and climate-smart tech opportunities in Brazil.

SDGs: Impact of Environmental Finance

Fundamental changes are being made to the international development agenda. The global community's adoption of the Sustainable Development Goals (SDGs) serves as a universal compass, stressing the necessity of systematic and collective action for the sustainable, equitable, and inclusive development of all people on this planet. The 2015 Addis-Abeba Financing for Development Conference underscored the necessity of mobilizing and changing financial flows, both public and private, towards sustainable development. All nations and stakeholders are required to take action to stop climate change, according to the Paris Agreement reached at COP21. The impetus for climate action has become irreversible since the Agreement entered into force in 2016.

DFIs play a critical role in scaling up and directing climate finance, as well as shaping the policies and laws required to transition to low-carbon, climate-resilient development, including achieving net zero emissions by the second half of this century. National, regional, international, and multilateral development banks are among the main contributors of public money for sustainable development. They may facilitate and speed the implementation of the Paris Agreement by elevating their aspirations continuously.

Members of the Multilateral Development Banks (MDBs) and the International Development Finance Club (IDFC) play a crucial role in directing capital toward sustainable investments by highlighting the opportunities and potential returns as well as lowering the risks involved. In

accordance with their mandates, IDFC members and MDBs can actively contribute to mainstreaming the climate change and sustainable development agendas across all sectors. Over the past few years, they have grown and are still increasing their total yearly climate finance commitments.

Members of the IDFC and MDBs are expanding their climate mitigation and adaptation financing. They also continue to: mobilize external investments for climate action; jointly lead on the transparent tracking and reporting of climate finance flows and impacts; support the implementation of NDCs; and facilitate activities that transition development to low-carbon and climate-resilient pathways.

The variety of money available to be deployed (and co-invested in blended structures) for sustainable effect is an essential and distinguishing element of the sustainable finance industry. These include donations, foundation assets used as program-related investment (PRI), and other types of investments. Mission-related investments (MRI), submarket and market return impact investments.

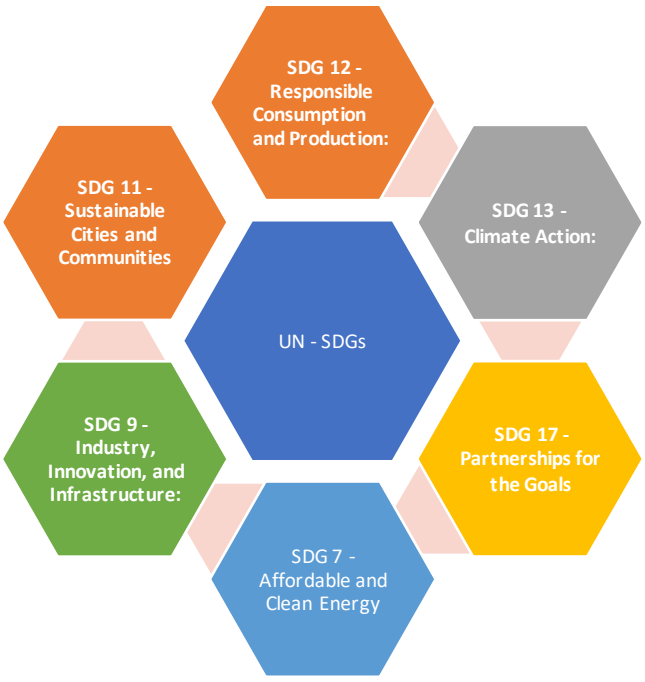
SDG interventions in EF

Environmental finance (EF) and the United Nations' Sustainable Development Goals (SDGs) are interconnected[15], as they both address the broader agenda of sustainability, albeit from different perspectives. The SDGs are a set of 17 goals adopted by the United Nations to address global challenges and promote sustainable development across economic, social, and environmental dimensions. Environmental finance plays a crucial role in supporting and

[15] https://www.unep.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/green-financing

achieving several of these SDGs. The following figure depicts SDGs which support the initiatives of the EF. The details of the areas of SDGs are discussed below:

Figure 1 : Areas of SDGs



SDG 7 - Affordable and Clean Energy: Environmental finance can contribute to SDG 7 by supporting investments in renewable energy projects, such as solar, wind, and hydropower. Financing mechanisms like green bonds and sustainable investment funds can channel funds toward clean energy initiatives.

SDG 9 - Industry, Innovation, and Infrastructure: EF can facilitate investments in sustainable infrastructure projects that align with SDG 9. This may include financing for projects that promote resource efficiency, sustainable transportation, and resilient infrastructure.

SDG 11 - Sustainable Cities and Communities: Environmental finance can support urban sustainability by funding projects related to energy-efficient buildings, green urban spaces,

and sustainable transportation. Financing mechanisms may include green mortgages, green bonds, and municipal bonds for sustainable projects.

SDG 12 - Responsible Consumption and Production: EF contributes to SDG 12 by promoting sustainable consumption and production practices. Investments in circular economy initiatives, waste reduction projects, and sustainable agriculture can be supported through various financial instruments.

SDG 13 - Climate Action: One of the key areas where environmental finance plays a vital role is in addressing climate change (SDG 13). Funding for renewable energy projects, climate resilience initiatives, and carbon reduction programs can help achieve the goals outlined in SDG 13.

SDG 14 - Life Below Water and SDG 15 - Life on Land: Environmental finance can support conservation efforts and sustainable management of marine and terrestrial ecosystems, contributing to the goals of SDG 14 and SDG 15. This may involve financing for biodiversity conservation projects and sustainable forestry practices.

SDG 17 - Partnerships for the Goals: EF can facilitate public-private partnerships and collaborations to achieve various SDGs. Financial institutions, governments, and businesses can work together to mobilize funds for sustainable projects, fostering partnerships in line with SDG 17.

Environmental finance is a critical enabler for achieving the Sustainable Development Goals by providing the necessary financial resources to implement projects and initiatives that address environmental challenges and promote sustainable development across various sectors. The alignment between EF and the SDGs underscores the importance of integrating

environmental considerations into financial decision-making for the benefit of both the planet and society.

Integrated Environmental, Social, and Governance Finance

The various aspects of Integrated Environmental, Social governance and finance

Grants: Grants, which are used to structure blended sustainable finance arrangements as concessionary capital, have a -100% expected return because they are never returned. The $75 billion market size is based on 5% of total foundation assets worldwide. This is a legal necessity in the United States, but not elsewhere.60 This amount does not include government grants to social enterprises, which might be large. Since 2010, the UK government, for example, has invested more than £1 billion in public funds to assist the development of the social entrepreneurship sector and impact investing infrastructure.

Program-Related Investment and Mission-Related Investment: A foundation's overall invested assets include PRI and MRI because they use endowment money to produce impact. PRIs frequently use loan money to finance programming activities, frequently in conjunction with grants, and they might generate a profit.62 PRIs are eligible for the yearly 5% allocation of "grant" capital in the US. 63 MRIs can be in the form of debt or equity and typically seek to advance the goals of the foundation while generating a respectable rate of return. 64 Potentially, the total assets of all foundations, or around $1.5 trillion globally, would equal the size of the potential market for MRI investments.

Impact Investing: According to the GIIN (2020) study, 67% of the sample investors desired market-rate returns, 18% desired returns that were close to market-rate returns, and 15% were content with below-market returns that were nevertheless close to capital preservation.

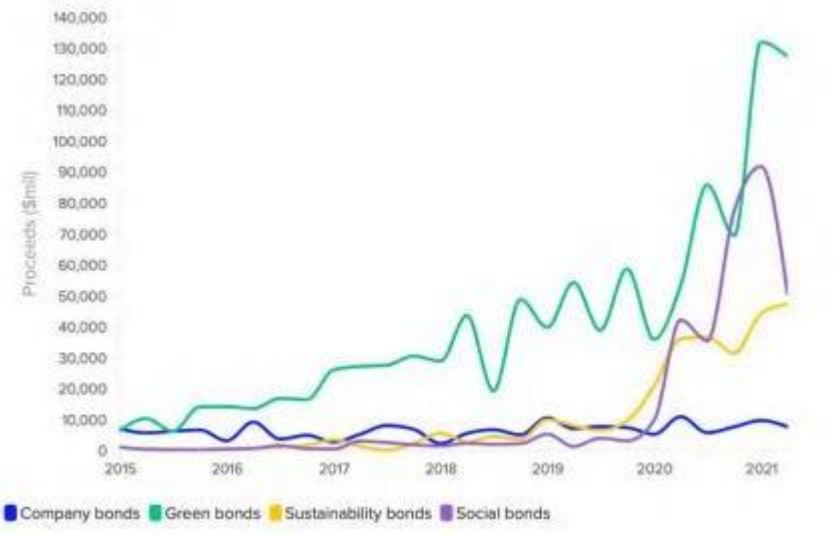
Based on the fund/deal structure and investor expectations, this data implies that impact investing can either be effect first (with sub-market returns) or finance first (with market returns). In terms of anticipated financial returns, family offices, not-for-profit asset managers, and foundations tended to put "impact first" and would accept some investments at below-market rates. On the other hand, DFIs, insurance firms, pension funds, and for-profit asset managers put "finance first" and typically anticipated a market return.

Development Finance: Development financing is becoming increasingly recognized as a type of sustainable finance.68 This sector includes multinational organizations like the Asian Development Bank (ADB), the Inter-American Development Bank, and the International Finance Corporation (IFC), as well as regional organizations like the European Bank for Reconstruction and Development and national organizations like the Centers for Disease Control and Prevention (CDC) in the United Kingdom. There is no single data set for all development finance, however the IFC (2019) stated that the 25 signatory DFIs to the Harmonized Indicators for Private Sector Operations may be viewed as impact investors with $742 billion in assets under management.

Sustainable bonds are the main component of the market for positive/integrated ESG finance. Since 2015, the market for sustainable bonds has expanded significantly, mostly due to green bonds. By the second half of 2021, the amount of sustainability bonds issued had increased by 131% from the same period in 2020 to $91 billion. Green financing could be promoted through changes in countries' regulatory frameworks, harmonizing public financial incentives, increases in green financing from different sectors, alignment of public sector financing decision-making with the environmental dimension of the Sustainable Development Goals, increases in investment in clean and green technologies, financing for sustainable natural

resource-based green economies and climate smart blue economy, increase use of green bonds, and so on.

Figure 2 : Sustainable Bonds from 2015 - 2021



Source: Growth of Sustainable Bonds, 2015-2021

Several significant opportunities exist to accelerate the growth of the sustainable finance market. Building the market's supply-side, intermediation, demand-side, or infrastructure might be classified as one of these. Four theme groups emerge from these categories. the climate issue will necessitate significant additional investments in adaptation (such as improved flood and fire defences), mitigation (to reduce carbon intensity and pollution), and development (to create new carbon capture technologies).

These concerns will be most serious in flood-prone countries like Bangladesh, the Philippines, Thailand, and Vietnam. In these circumstances, the issuance of sovereign sustainable bonds could provide a new source of large-scale impact finance to solve social and environmental challenges.

Chapter 4: Role of Corporations in promoting EF and other related instruments

The field of finance is often divided into three branches such as managerial or corporate finance, primarily concerned with the investment and financing derisions of corporations and other business organizations investments, which seek to achieve the greatest return for a given level of risk and financial institutions and markets, dealing with issues specific to the management of financial institutions and/or the operation of financial markets. As a discipline, finance works towards maximising value while managing risk and value are two sides of the same coin (decreasing risk increases value and vice versa) particularly with regard to environmental amenities, is the source of much function between economists and environmentalists. Finance is often defined as a form of applied economics relying heavily on information collected in accounting. Many environmental amenities are not traded in markets, either because property rights are not well defined. The discipline of economics offers numerous methods for dealing with both problems and provides techniques for valuing non-marketed environmental assets. Projects to ascertain the contribution of natural and human or social capital in the national income accounts have been undertaken by national governments, the United Nations, the World Bank, and others (cf. Ahmad et al., 1989; Peskin, 1991; IBRD, 1995). The link between finance and the environment ultimately rests on one's definition of capital, or endowments used in the generation of income. Classical economists recognized two forms of capital: land and labor (Costanza and Daly, 1992). Environmental finance concerns itself with the impact of environmental issues on financial decision-making, which is essentially a three-step process. The first step is to identify sources of risk and/or opportunities to create value. This requires a better understanding of the interconnections between ecology and economics, which is a good thing. 'Knowledge on the whole is an

environmentally neutral asset that we can contribute to the future', remarks economist and Nobel laureate Robert Solow (Solow, 1991).

Environmental Finance or Green Finance

In today, environmental finance is more typically described as “green finance”. The green finance market is dominated by debt products, notably green bonds. Green Finance instruments can be developed by tweaking existing financial instruments to service environmental preservation. Popular instruments try to attract investments by offering a positive (fiscal) return on investment; a valuable promise that justifies investment from a business point of view.

Instruments of Green Financing

The instruments are classified as Positive and negative instruments. The relevance of both the positive and negative instruments is discussed below:

Positive Environmental Finance : Positive environmental finance typically focuses on innovation and new technologies that address the climate crisis as well as issues of pollution and public health. These investments are typically aligned with climate change mitigation and adaption, environmentally sustainable management of natural resources, biodiversity conservation, renewable energy, energy efficiency, the circular economy, clean transportation, and pollution prevention and control.38 Such green bonds may not reduce carbon footprints, but do generate other environmental improvements in water management or biodiversity. This is the case for at least a fifth of the stock of green bonds by value. More recently, there has been a growing interest in blue bonds and blended finance models that are focused on the “ocean economy” and issues of biodiversity and marine sustainability.

Negative environmental Finance : Negative Environmental finance typically focuses on investments in companies that are aiming to reduce their carbon emission, have a structurally low carbon footprint, or that operate in low-carbon sectors. Consequently, many of these investments do not make a direct contribution toward mitigating the climate crisis or addressing other environmental issues. For example, in 2019, some carbon-intensive or high-polluting companies have raised green "transition" bonds to fund decarbonizing projects and Enel, an Italian electricity firm, issued a green bond index that is linked to increasing the share of renewables in its generation capacity. Related to this form of green finance has been the move towards divestment from carbon-intensive companies. The various instruments that are issued by the corporation include:

1. Green Bonds: A green bond refers to debt security issued by an organisation or the government to raise funds from investors exclusively for projects that have positive environmental or climate benefits. They help mobilise capital from a range of investors, including institutional investors, retail investors and impact investors. Green bonds can back the transition to a low carbon economy by providing funding for renewable energy projects, energy efficiency improvements and other climate-friendly investments. It was introduced by the European Investment Bank in 2007. In 2008 the World Bank started issuing green bonds to fight climate change, since then the market for green bonds has constantly expanded. At present upwards of fifty countries issue green bonds and according to the Climate Bonds Initiative global green bond issuance in 2021 was estimated to be USD 522.7 billion.

Value of green bonds issued worldwide from 2014-2021

In 2015, SEBI introduced guidelines to issue green bonds in India, since then many Indian companies have issued green bonds. JSW, Hydro, GreenKo and Adani Green are some of the

biggest issuers of green bonds in India. The domestic green bond market in India is very small – pegged at at USD 20 billion and accounts for only 3.8 percent of the country's overall corporate bond market.

It is important to note that Indian green bond proceeds are disproportionately concentrated in the energy sector, there is a need for green bonds to diversify its operation bases in India. Issuing authorities often complement interest payments on green bonds with tax incentives (tax exemption or tax credits) to attract investment. Despite clear opportunities for investors the lack of a concise definition on the demarcation between a conventional bond and a green bond can dissuade investors. There is a need to develop a clear definition of green bonds and institute transparency mechanisms to allow investors clarity on how their investments are being used and quantify the environmental impact of the investment. A safe bet can be to invest in green bonds issued by the sovereign government. The Government of India joined the Sovereign Green Bonds Club in January 2023; there is an increased demand for these state issued green bonds allowing the RBI to obtain a greenium i.e, cheap green financing.

2. Green Loans: A green loan helps individuals, businesses and governments secure the necessary funding to finance environmentally sustainable projects and enterprises. Green loans can be a lucrative source of finance for both businesses and households. The interest rates on green loans are often more generous than on traditional loans.

Green loans can incentivise households to install solar panels, purchase electric vehicles and build rainwater tanks; green loans offer consumers an opportunity to improve the quality of their lives and reduce expenses (by migrating to environmentally sustainable practices) in the long run at low interest rates. Businesses are often constrained by a misconception that transitioning to green, low carbon pathways always comes as an added cost, and at the

expense of profits. A green loan can help companies (including MSMEs) embed sustainability at the core of the business and not as an annual ESG requirement. Businesses with green loans can signal to their customers and investors alike that they care about the environmentalimpact of their businesses and win a competitive advantage in the market and attract investments from socially responsible investors.

Despite the clear promises made there is currently no documentation or market standard linked with the Green Loan Principles on what constitutes a green loan, leaving it to the borrower and financier to arrive at a mutually agreeable definition. In the absence of a sustainability taxonomy, it becomes easier for businesses to greenwash their practices, which in the long run undermines the value of truly sustainable projects.

In India, according to RBI guidelines, the Renewable Energy sector falls under Priority Sector Lending**;** the RBI uses the PSL category to nudge commercial banks to support the development of identified sectors. India banks are keen to extend more green loans to consumers and businesses and have requested the RBI to include loans for EVs and green hydrogen to be included under the PSL category.

3. Green Venture Capital (VC): Green VC can finance projects and companies that are developing sustainable technologies to ensure environmental conservation and battle climate change. It can provide sectors such as energy, waste and mobility much needed access to finance to develop cleaner technologies. Technology based green startups can often find it difficult to secure funding from traditional sources given the high risk on investment, VC funding can help offset these risks.

While climate technology markets as of 2022 constitute upwards of 25%of all VC led investment, there exists a mismatch in capital need and availability among the sectors.

Mobility and transport sector which accounts for 16% (2016) of global emissions has a disproportionate share of 61% of climate tech investments (2021). Sectors such as built environment, sustainable agriculture and manufacturing are underfunded and require access to green finance to decarbonise their processes. Channelling funding to these underserved sectors could help earn a first mover's advantage and a potential green patent, which would reap heavy dividends in the future – both for the climate goals and for the enterprises in the sectors.

Government intervention is crucial for securing the trust of investors; traditional policy schemes subsidising non-renewable energy and the lack of tax incentives for green startups can signal low commitment towards managing climate change and discourages VC backed investments. In India, there is no clear regulatory framework for green investments, which creates uncertainty for large institutional investors. To drive green VC in India the government needs to do two things – first, set standards on what constitutes a green sector and second, ensure there is continuous capital flow into these sectors to keep the projects financially sustained. India is behind other countries like the US and China where the finance ministries have rolled out generous tax exemptions and tax credits to push entrepreneurship in green industries.

4. Green Grants: Green grants are aimed at empowering communities and businesses to implement projects that allow them to mitigate (or adapt to) climate change, manage their local natural resources and innovate ways to preserve the natural environment. Green grants are offered by governments, philanthropic organisations, private foundations and green NGOs that promote sustainable development. Green grants can also be extended to research facilities and universities to fund research work on climate change and sustainable

development. They can help close the funding gap for financially unprofitable projects i.e. projects on which there is no financial return on investment.

Global Greengrants Funds, one of the leading organisations, believes in a bottom-up approach; they provide green grants to grassroot led efforts in an attempt to empower local communities to harness traditional knowledge and locally innovated strategies to deal with climate change. The Green Climate Fund instituted under the UNFCCC in 2010, has committed USD 12 billion to climate change management, with a special focus on sanctioning grants to least developed countries, small island developing states, and African states.

5. Green Insurance: Green insurance attempts to incentivise sustainable consumption and production by offering lower premiums to green businesses and purchases. Globally financial institutions are increasingly giving priority to sustainability linked insurances post the release of the Principles for Sustainable Insurance manual by the UNEPFI which delineates how insurance companies must contribute to the sustainable development agenda by helping green project insurers quantify risks and thereby mitigate climate risks better.

One of the challenges while issuing green loans is the lack of a cohesive definition on what constitutes a green product, this makes it difficult for banks to offer green insurance. For instance, while it is universally acknowledged that EVs are less polluting than traditional fossil fuel run automobiles, they do have a negative impact on the environment. The lithium-based EV batteries are difficult to dispose of and as the numbers of EVs on the road increases, it will get increasingly difficult to manage a large volume of e-waste. Thus, even with green products-there are shades of green, which makes the task of identifying green products a complex one. While rolling out insurance policies banks need to beware of fraudulent green claims by organisations and should provide the green premium post inspection.

At the same time, such insurance is vital for encouraging green products in India due to its vulnerability to weather risks and has poor adaptive capacity for climate change. Agriculture, a source of livelihood for half the country, is vulnerable to climate change, floods and droughts. Green insurers encourage sustainable agriculture among small farmers by providing generous crop insurance premiums for sustainable agriculture. The RBI saw value in Green Insurance in 2016, when it advocated that Green Insurance will encourage companies to internalise the costs of environmental damage, and thereby better manage their negative environmental externalities.

6. Carbon Markets: At the Glasgow COP26 Climate Change Summit in 2021, participating nations agreed to set up a global trading market for carbon credits. One carbon credit allows a company to emit up to one tonne of carbon dioxide in the atmosphere. Polluting companies are awarded credits that allow them to pollute up to a certain level (cap), and the credits offered are reduced every year, nudging businesses to turn climate friendly.

In the presence of a carbon market, firms are be incentivised to sell their unused carbon credits and earn revenue, which can be reinvested in R&D to grow sustainable technologies. Currently there are two types of carbon markets– compliance markets (carbon credits) and voluntary markets (carbon offsets). The former is created by a sovereign and is a regulatory requirement, while the latter refers to issuance and buying of carbon credits on a voluntary basis.

The terms Carbon Offsets and Carbon Credits are often used interchangeably despite the two instruments serving different purposes. For every tonne of CO2 that an activity manages to absorb, avoid or otherwise reduce, a carbon credit can be issued. A carbon credit is a tradeable permit that allows a polluting company to emit one tonne of CO2 and can sold or

purchased depending on the volume of CO2 the company emits. A carbon credit may be created by the government or awarded when the equivalent of one tonne of carbon dioxide (CO2 -e) is removed from the atmosphere and stored in the land or is prevented from being released into the atmosphere. Both, carbon offsets and carbon credits are instruments sold in the carbon market.

Carbon credits provide an opportunity to developing countries to advance socio-economic development while transitioning to a low carbon economy. Awarding carbon credits/offsets is a smart way to nudge companies to transition to cleaner energy systems. Once a majority of companies have made the transition, supply of carbon credits/offsets will exceed demand, rendering the credits less valuable, but the tool will have served its purpose.

7. Crowdfunding: Crowdfunding is a process wherein a business/individual obtains funding from a large pool of interested backers, each of whom provides a small amount of money directly, without the aid of any standard financial intermediary. The contribution can be purely philanthropic, or the funder might be expecting a social/environmental return. In the absence of access to traditional financing mechanisms crowdfunding can allow green businesses to kickstart their operations.

For Crowdfunding platforms (CFP) to be successful they must be able to clearly communicate their climate goals and plan for the funds to potential funders; this would especially be the case for donation-based funds. For equity-based crowdfunding and lending-based crowdfunding, green enterprises would need to be able to materially demonstrate expected financial and environmental returns based on their activities to assuage the fear of risk in the minds of investors. Relying on CFPs can, however, be risky; CFPs have different levels of management ability and operational standards, and with multiple CFPs in place it is difficult

for the investor to figure out which is a viable agency. Crowdfunding also lacks the promise of a steady source of capital and is extremely vulnerable to an economic shock.

In India, despite crowdfunding emerging as a popular way of mobilising capital, state support for the instrument has been rather bleak. The Central Government has expressed no intent to introduce legislation on crowdfunding, instead, it warned citizens that crowdfunding activities are not regulated under the Companies Act 2013. Introducing a manual on crowdfunding could potentially help augment donor trust in the fiscal instrument and allow more grassroot campaigns and enterprises to raise funds for their projects.

Two main goals of green finance are to internalize environmental externalities and to reduce risk perceptions. Promoting green finance on a large and economically viable scale helps ensure that green investments are prioritized over business-as-usual investments that perpetuate unsustainable growth patterns. Green finance encourages transparency and long-term thinking of investments flowing into environmental objectives and includes all sustainable development criteria identified by the UN Sustainable Development Goals (SDGs).

Green finance[16] covers a wide range of financial products and services, which can be divided into investment, banking and insurance products. The predominant financial instruments in green finance are debt and equity. To meet the growing demand, new financial instruments, such as green bonds and carbon market instruments, have been established, along with new financial institutions, such as green banks and green funds. Renewable energy investments, sustainable infrastructure finance and green bonds continue to be areas of most interest within green financing activities.

[16] https://www.greenfinanceplatform.org/page/explore-green-finance

Sustainable finance is the financing of investment in all financial sectors and asset classes that integrate environmental, social and governance (ESG) considerations into the investment decisions and embed sustainability into risk management for encouraging the development of a more sustainable economy. Various actors in the investment value chain have been increasingly including ESG information in their reporting processes. As ESG reporting shifts from niche to mainstream and begins to have balance sheet implications, investors are raising challenging questions on how ESG performance is assessed, managed, and reported. Indeed, ESG factors are critical in the assessment of the risks to insurers' assets and liabilities, which are threefold: physical risk, transition risk and liability risk. For banks, ESG risks exert an influence on banks' creditworthiness. Banks can then provide sustainable lending by incorporating environmental outcomes in risk and pricing assessments. Institutional investors can incorporate ESG factors in portfolio selection and management to identify risks and opportunities.

Most importantly, a harmonized definition of "green" and a taxonomy of green activities are needed to help investors and financial institutions efficiently allocate capital and make well-informed decisions. The definition of green finance needs to be more transparent to prevent "greenwashing". And a common set of minimum standards on green finance is essential to redirect capital flows towards green and sustainable investments as well as for market and risk analysis and benchmark. Standards and rules for disclosure would help develop green finance assets. Voluntary principles and guidelines for green finance, complemented with regulatory incentives, need to be implemented and monitored for all asset classes.

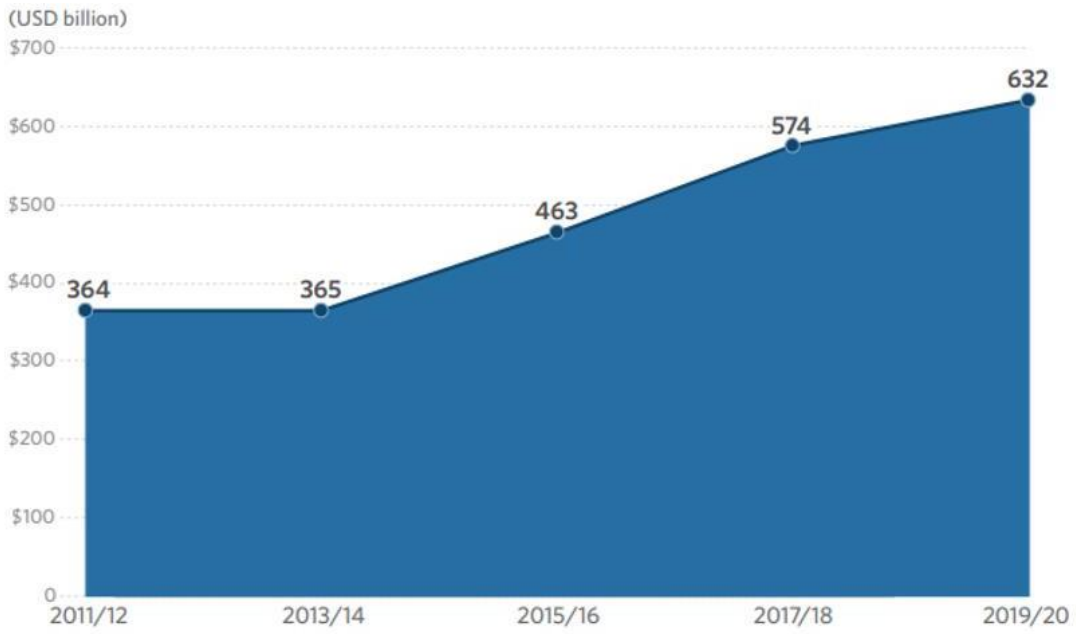
The Green Finance Platform and the United Nations Environment Programme's (UNEP) Inquiry into the Design of a Sustainable Financial System ("the Inquiry") have launched the

Green Finance Measures Database – a global compendium of green finance policies and regulations across over 100 developed and developing countries to support the development of green finance. According to OECD (2017), with an estimated €6.3 trillion of investment in climate infrastructure required by 2030 to limit global warming to 2 degrees, these measures help clarify the responsibilities of financial institutions with respect to environmental factors within capital markets, such as clarifying the relevance of ESG issues within the context of fiduciary duties of pension funds, and strengthen flows of information relating to environmental factors within the financial system, for instance requirements for public disclosure of climate-related risks to investment portfolios.

Green Finance Market

According to the Climate Policy Initiative's Global Landscape of Climate Finance 2021, climate finance has steadily increased over the last decade, reaching USD 632 billion in 2019/2020 but flows have slowed in the last few years. This is a concerning trend given that COVID-19's impact on climate finance is yet to be fully observed. The increase in annual climate finance flows between 2017/2018 and 2019/2020 was relatively low, 10% compared to previous periods when it grew by more than 24%.

Figure 3: Global climate finance flows between 2011-2020, biennial averages

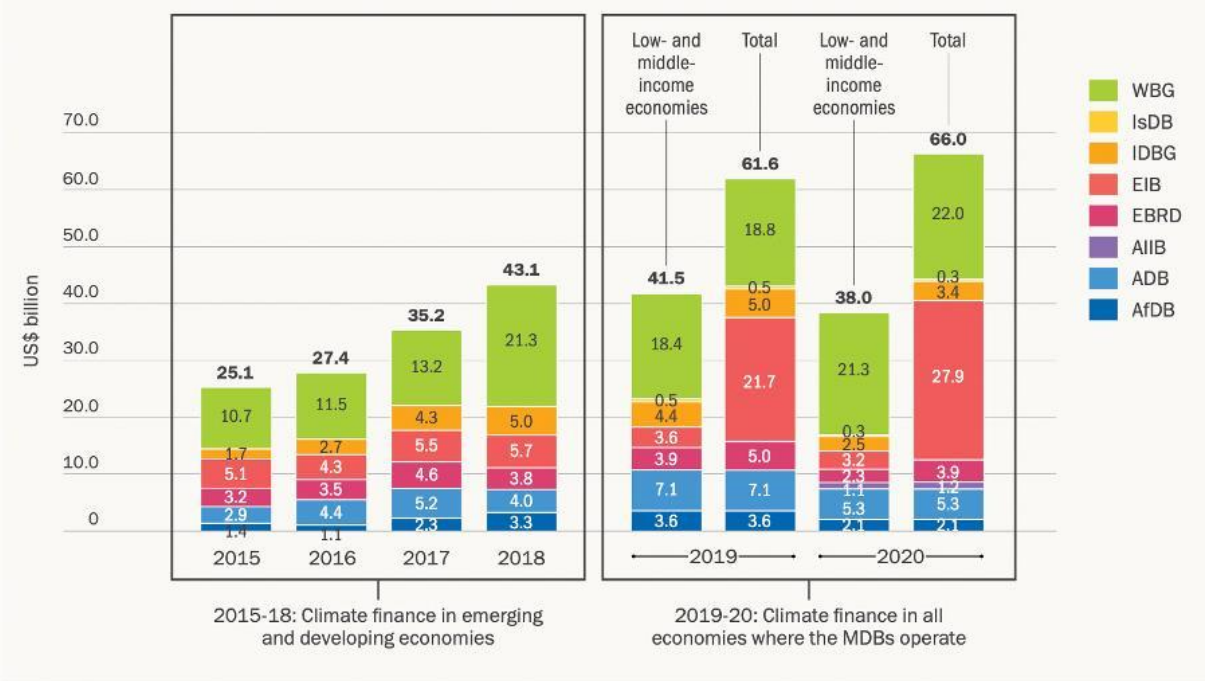


Source: Global Landscape of Climate Finance 2021, CPI, 2021

Multilateral development banks: MDBs have deep institutional expertise in providing and catalysing investments in sustainable development and are taking steps to align their activities with the 2030 Agenda, including by scaling up climate finance, designing new SDG-related financial instruments and advancing global public goods in areas such as combatting climate change.

In 2020, climate financing by the world's largest MDBs accounted for US$ 66 million, with US$ 38 billion or 57.6 per cent of total MDB commitments for low-income and middle-income economies.

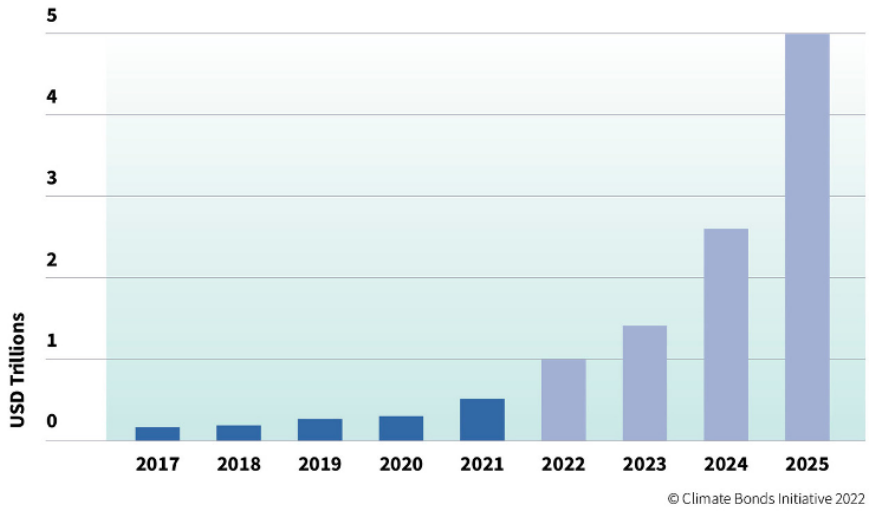
Figure 4 : MDB's Climate finance commitments, 2015-20 (in US$ billion)



Source: 2020 Joint Report on Multilateral Development Banks' Climate Finance

Climate Bonds: According to Climate Bonds Market Intelligence, it is observed that the continued acceleration of green issuance drove the green bond market to just over half a trillion (USD517.4bn) in 2021. This represents a 50% increase from USD434.5bn in 2020 when the market saw its largest growth and diversification spurt (and up a huge +343% on the 2019 figure of USD98.2bn), in part driven by pandemic bonds, a subset of the social bond label. Climate Bonds Initiative estimated that the current growth trajectory could land the first annual green trillion in 2022 – a long-held milestone for green finance.

Figure 5: Green Bond Issuance (USD Trillion)



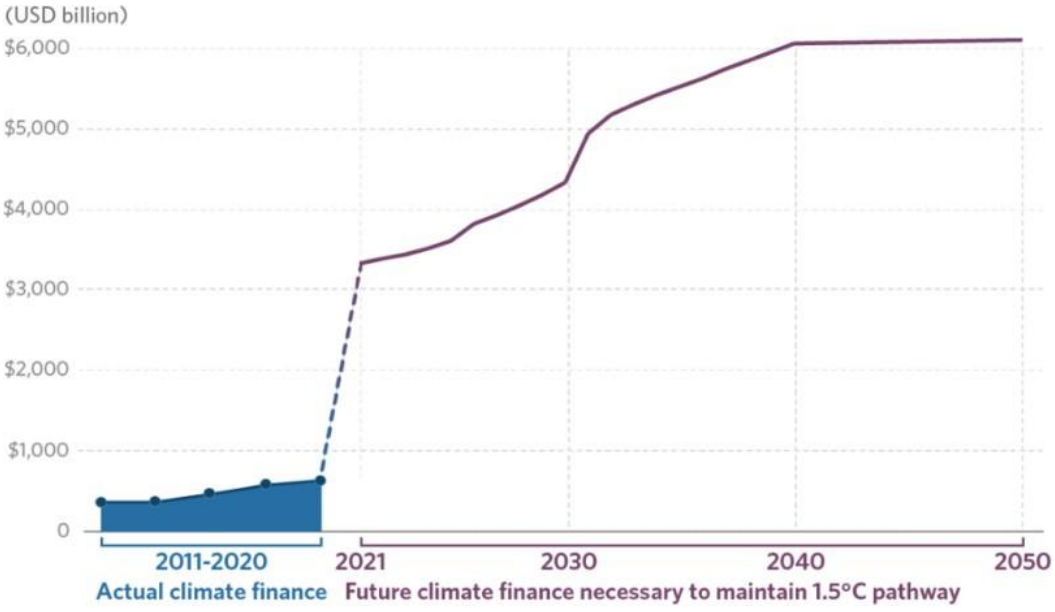
Source : https://www.greenfinanceplatform.org/page/explore-green-finance

Scaling-up the private sector: According to Climate Policy Initiative, private corporations committed USD 310 billion per year in 2019/2020, and it was a 13% rise compared to 2017/2018. CPI's new database adds categories for state-owned enterprises (SOE), state-owned financial institutions (SOFI), and public funds which are now considered as public actors. In 2019/2020, public finance actors and intermediaries have become larger actors, accounting for USD 321 billion per year in climate finance.

However, climate finance flows still appear to be far below the level needed to achieve the Paris goals and there is also uncertainty over the mid to long-term prospects of climate finance due to the COVID-19 pandemic. According to Climate Policy Initiative, an increase of at least 590% in annual climate finance is required to meet internationally agreed climate objectives by 2030 and to avoid the most dangerous impacts of climate change. Also, average annual modelled investment requirements for 2020 to 2030 in scenarios that limit warming

to 2°C or 1.5°C are a factor of three to six greater than current levels (IPCC Report on Climate Change 2022 Mitigation of Climate Change). Over USD 1.6 to 3.8 trillion in new climate investment is required yearly for the supply side of the global energy system until 2050 (IPCC Special Report on Global Warming of 1.5°C). To reach this target, current investment trends need to significantly shift towards low emissions and carbon resilient development. Ambitious and innovative policies for sustainable COVID-19 recovery and even greater collaboration among public and private actors will be needed to achieve climate goals.

Figure 6: Global tracked climate finance flows and the average estimated annual climate investment through 2050



Source: Global Landscape of Climate Finance 2021, CPI, 2021

Framework for guiding sustainable and sustainability-linked financing:

IFSCA has released a framework to encourage sustainable and sustainability-related financing by Banking Units (IBUs) and Finance Companies (FCs). The framework is meant to encourage IBUs/FCs to lend to green and sustainable projects.

Infrastructure

Infrastructure establishes the framework for a financial jurisdiction. Being an offshore jurisdiction, IFSC has the distinct benefit of offering financial services throughout capital markets, banking, and insurance. Important institutions that were formed at the IFSC complement the enabling rules and provide the essential framework for a healthy financial sector.

Competitiveness: IFSC is an offshore jurisdiction created within India's borders. This allows Indian entities that use foreign financial services outside of India to obtain access to these services within India. Among the major international jurisdictions, IFSC exchanges and clearing houses are regarded as efficient and cost-effective, giving a cost advantage and quick access to global financial markets.

Strategic Partnership: International cooperation and collaboration are critical for achieving common goals such as climate change and international standards. IFSCA collaborates with worldwide institutions for the growth of the financial market, such as the enforcement mechanism and regulatory framework. As a regulatory body, IFSCA has signed MoU with the following foreign financial sector regulators:

- Commission de Surveillance du Secateur Financier, Luxembourg
- Financial Supervisory Authority, Sweden
- Dubai Financial Services Authority
- Qatar Financial Centre Authority
- Financial Services Regulatory Authority of Abu Dhabi Global Market
- Monetary Authority of Singapore

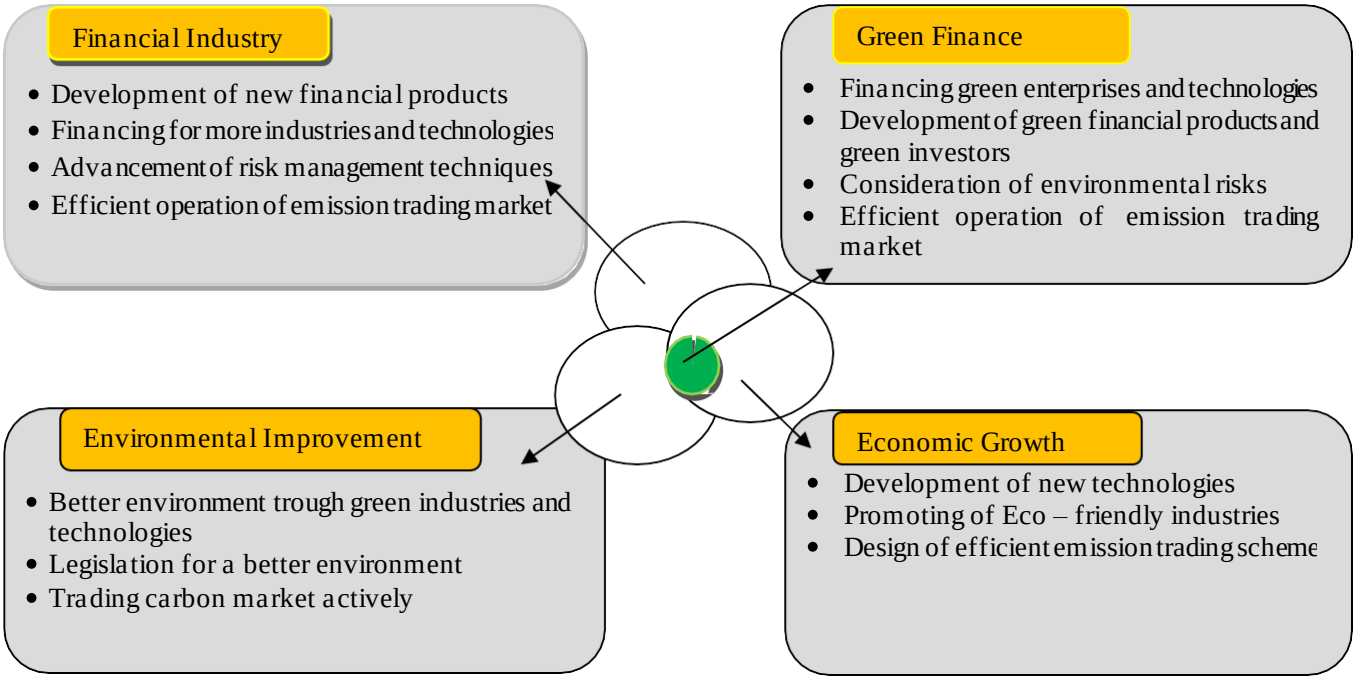
Table 2: Policy Measures Promoting the Environmental or Green Finance

Policy Measures	Description
Environmental requirements are reflected in statutes for investment, lending, credit rating, accounting, etc.	Require financial institutions to address environmental concerns: fiduciary and lender's liability on the environment. Reflect environmental factors in credit rating and accounting procedures
Corporate disclosure of environmental information	Put environmental information as a requirement for listing and disclosure. Shift from voluntary to mandatory disclosure gradually Finance institutions in industrialized countries already are required to disclose comprehensive environmental information pursuant to voluntary guidelines, such as the Global Reporting Initiative
Certification of green Technology, enterprise, and industry to guide investment and lending	Introduce green business certification programs, which are specific to the industry, technology, business type, and size. Leading financial institutions, such as Goldman Sachs, rate environmental performance; for example, categorizing green and non-green businesses
Green indices	Develop a green enterprise index to promote green investment. Develop a green (carbon) risk index to promote investment in green bonds. JPMorgan and Innovest co-developed the JPMorgan Environmental Index-Carbon Beta (JENI-Carbon Beta Index), the world's first bond index that reflects climate change risk of businesses
System for Green Information Provision	Build a mechanism to access essential green information. Information for financial institution's credit and investment decisions: license and approvals from the environment ministry and other authorities, regulatory compliance, green enterprise designation, participation in voluntary agreements, etc.
Green enterprise rating agency	Promote green company rating agencies. Three major rating agencies that specialize in corporate environmental performance are Innovest (US), EIRIS (UK), and SAM (Switzerland)
Green financial professionals	Train professionals for research, review, and investment to provide green financial services. Introduce professional training programs and promote expertise

Green financial consumer education	Initiate public and consumer education to promote awareness of: The need for green growth or Green bubbles, environmental risks, and other issues
Conference on green finance in Asia	Organize an annual conference on green finance in Asia. One example is the Conference on Sustainable, Responsible, Impact Investing in North America (also known as SRI in the Rockies)

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

Figure 7: Green Finance Interface



There is no internationally agreed definition of green finance. The term describes a broad range of funding for environment-oriented technologies, projects, industries, or businesses. A narrower definition of green finance refers to environment-oriented financial products or services, such as loans, credit cards, insurance or bonds 9 (Geneva, 2007). Green investing recognizes the value of the environment and its natural capital and seeks to improve human well-being and social equity while reducing environmental risks and improving ecological integrity (Nairobi, 2011). Other terms used to describe green finance include

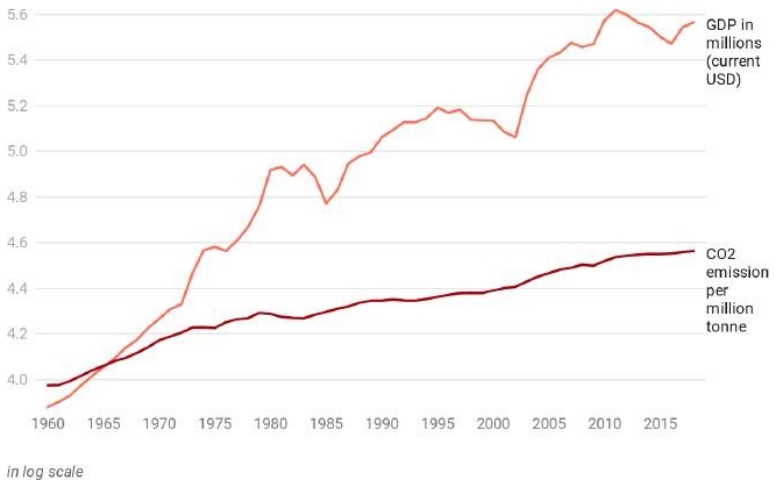
“environmentally responsible investment” and “climate change investment”. How it works Green industries and technologies are all at different levels of maturity, thus, requiring different levels of funding from different sources of capital. There are generally three sources: domestic public finance, international public finance, and private sector finance. Domestic public finance refers to the direct funding by a government while international public finance refers to funding from international organizations and multilateral development banks; private sector finance consists of both domestic and international funding sources. Green financing can be packaged in different ways through various investment structures. Green finance is a core part of low-carbon green growth because it connects the financial industry, environmental improvement, and economic growth . “One missing link between ‘knowing’ and ‘doing’ in the transition to the green industry is ‘green finance’. All green industrial propositions cost money, and many green industry business models are often untested or unconventional. Therefore, traditional finance may find it difficult or commercially unattractive to finance these green industrial propositions y (Manila, 2009).

ESG activities and perspectives on sustainable financial instruments

Financial institutions are becoming more and more acknowledged for their participation in this area as a means of atoning for what is thought to be environmental neglect. As it became obvious by the late 1980s that the pre-existing industrialization methods assigned to the "developing world" entailed severe environmental disregard, the development agenda underwent a critical reconsideration. There must be a significant push for green initiatives if the 2030 Sustainable Development Goals (SDGs) are to be achieved. Green bonds have the potential to unlock the financial sector's potential since they will strongly encourage banks and investors to shift money from unsustainable to sustainable businesses.

The function of financial institutions in this arena is becoming more widely accepted as a method to redeem the perceived environmental disrespect. Fossil fuels continue to dominate global energy investment, endangering the spread of green energy to fulfill climate and clean air targets. This, along with some major and emerging nations' unwillingness to abandon pro-coal policies, keeps the goals of reducing CO2 emissions at odds. Financial institutions are critical for any form of infrastructure project, and they prefer traditional energy due to the numerous risks associated with new technologies, not to mention the poor initial rates of return.

Figure 8: Global Emissions v/s Global GDP (From 1960) for Promoting Green Finance

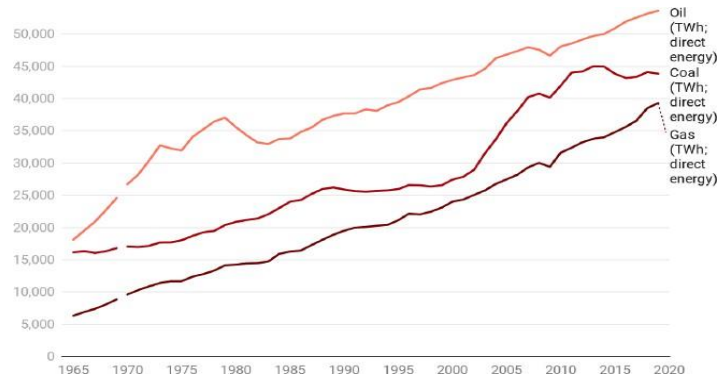


Source: World Bank and Global Carbon Report

To move forward with achieving the 2030 Sustainable Development Goals (SDGs), there is a significant push needed for green projects and boosted funding for environmentally friendly investments through mechanisms like green bonds, green banks, carbon credits, and community-based green funds, among others, collectively referred to as "green finance."

Green finance is mostly comprised of financial instruments such as loans and equity. While equity financing is an investment in the business stock for an ownership stake, known as stocks or shares, debt financing is used to generate funding for a company's projects later in its growth. Debt and equity funds are the most common investment instruments in environmental financing. Because less than 15% of necessary capital flows towards environmental conservation, a substantial portion of it is given by charitable organizations rather than companies, resulting in a $70 billion financial gap in climate finance accounting. Utilizing healthy approaches to protect healthy ecosystems and supporting initiatives in renewable energy and energy efficiency are critical since green finance is a necessity for the world's ailing economy. However, what this environmentally friendly finance solution does is reduce the perception of risks to stimulate investments in environmentally friendly projects and internalization of environmental externalities. Another concern is 'greenwashing,' which is the practice of diverting green bond proceeds to projects or activities with minor or negative environmental benefits.

Figure 9 : Global Fossil Fuel Consumption



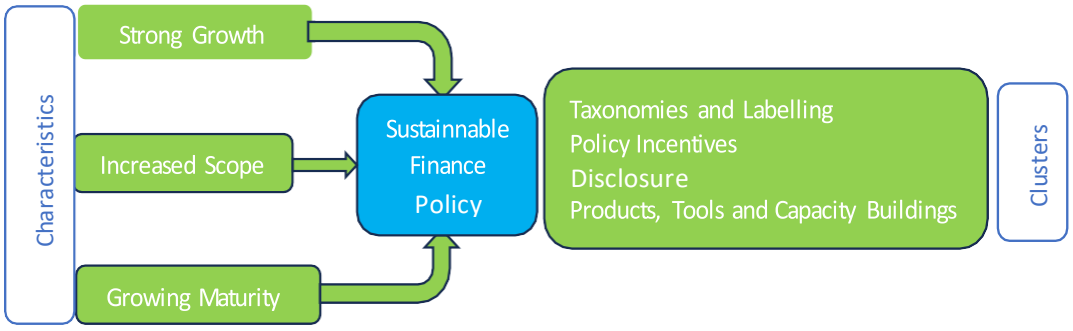
Source: BP Statistical Review of World Energy

The global use of fossil fuels is currently on a track that threatens to raise global temperatures by 4-6 degrees Celsius over pre-industrial levels, making the sustainable growth goal still seem

overly ambitious. Governments have not yet taken any concrete steps toward developing a low-carbon energy system, despite a pledge to keep global warming below 2 degrees made under the Paris Agreement in 2015.

Assessing Market Development and Sustainable Finance Policy Trends

Figure 10: Framework on Sustainable Finance Landscape



The 2017 Green Finance Progress Report proposed a core framework for understanding sustainable finance development. It emphasized three mutually reinforcing trends: (i) increasingly systematic state action, (ii) expanded international collaboration, and (iii) enhanced individual and collective market leadership. According to the 2017 study, the convergence of these tendencies resulted in a considerable rise in green financing flows. While the 'triple helix' remains a valuable lens for understanding the complex dynamics of scaling sustainable finance[17], 2018 has been a year in which momentum produced by sub-national initiatives has been prominent alongside national advancements.

[17]The UN Environment Inquiry Green Finance Progress Report 2017 provides more context on the 'triple helix'. http://unepinquiry.org/wp-content/uploads/2017/07/ Green Finance_ Progress_ Report_2017.pdf

The Financial Centres for Sustainability (FC4S) network, the Sustainable Insurance Forum[18], megacities (such as the C40 Cities initiative)[19], and states (such as the Global Action Climate Summit hosted by the Governor of California) are a few examples of initiatives that are gaining traction[20].

Strong growth: Policy's final impact is not proportional to the number of measures adopted. Nonetheless, the number of measures taken across a growing number of countries has increased significantly. Globally, the number of sustainable finance measures more than quadrupled between 2013 and the end of 2017, from 131 to 267. The overall number of nations implementing sustainable finance policies, including all G20 members, currently stands at 53[21].

Increased scope: Over the last few years, there has been mounting evidence of expanding breadth on various fronts. While no one statistic can effectively reflect such changes, significant indicators include: (i) a clear increase at the national level in the number of system-level efforts relative to measures focusing on sub-sectors of the financial system. System level measures increased from 10% of total measures implemented in 2013 to become the single most significant type of measure by the end of 2017, accounting for more than 25% of all measures[22], (ii) a rapid increase in the prevalence of regional and international measures over

[18]Sustainable Insurance Forum. https://www.sustainableinsuranceforum.org/
[19]C40 Cities Initiative. https://www.c40.org/about)
[20]Global Climate Action Summit. https://www.globalclimateactionsummit.org/

[21]UN Environment Inquiry (2018). Greening the Rules of the Game. How Sustainability Factors are being Considered into Financial Policy and Regulation. http://unepinquiry.org /publication /greening-the-rules-of-the-game/
[22]UN Environment Inquiry (2018). Greening the Rules of the Game. How Sustainability Factors are being Considered into Financial Policy and Regulation. http://unepinquiry.org /publication/greening-the-rules-of-the-game/

the last few years, quadrupling globally between 2013[23] and 2017, (iii) evidence of the rapid emergence of sustainable finance as numerous interconnected strands of work increase in number within a single organization like the G20[24] (iv) Evidence that a growing spread of sub-national, regional, and international initiatives, including many G20 members, are crowding in a broader range of stakeholders, including the private sector and civil society[25].

Growing policy and market maturity: There are indications of rising policy and market maturity' along a continuum. An innovation curve to track development can begin with discourse at one end of the spectrum, move through policy and/or market innovation and implementation, then to monitoring and evaluation, and finally to various types of feedback loops at the other end. In comparison to the previous year's data, there is evidence of increasing maturity at many various levels and stages. There are more and more instances of activities at the more adult end of the spectrum. Examples of these include an assessment of an international financial center (the Global Green Finance Index, 2018)[26], an assessment of a national financial system (China Green Finance Progress Report, 2017)[27], an assessment of the financial architecture (Progress report on Central Banks and Financial Supervisors

[23]UN Environment Inquiry (2018). Greening the Rules of the Game. How Sustainability Factors are being Considered into Financial Policy and Regulation. http://unepinquiry.org/publication /greening-the-rules-of-the-game/

[24]Examples include both the EU HLEG and Task Force on Climate-related Financial Disclosures processes. More information can be found online at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/ sustainable-financier and https://www.fsb-tcfd.org/

[25]Strands of work within the G20-related to sustainable finance include the Sustainable Finance Study Group, the Financial Stability Board's Task Force on Climate-related Financial Disclosures, the Green Finance Study Group, the Global Principles for Financial Inclusion, the finance aspects of the Climate and Sustainability Working Group, and the Eminent Persons Group on Global Financial Governance (using the 2030 Agenda as its 'fit-for-purpose' test).

[26]Global Green Finance Index (2018) http://www.finance-watch.org/press/press-releases/1541

[27]International Institute of Green Finance (IIGF) of the Central University of Finance and Economics (CUFE) and UN Environment Inquiry (2017). Establishing China's Green Financial System: Progress Report 2017. http://unepinquiry. org/wp-content/uploads /2017/11 /China_ Green_Finance_Progress_Report_2017_Summary.pdf

(NGFS)[28], 2018 or Sustainable Stock Exchange Progress Report, 2018)[29], and an assessment of a process (the first status report of the Task Force on Climate-related Finance)[30],and a variety of product-level innovations that promote transparency and create constructive feedback loops (creation and application of green bond assessment tools in the debt markets and evaluations of listed stock)[31].

Looking beyond the features of the evolving sustainable finance policy environment, a broad clustering of forms of sustainable finance policy appeared in 2018. Many sustainable financial policy initiatives may be classified into four basic groups. These are (i) taxonomy and labelling, which help to prevent 'green washing' or 'SDG washing.' (ii) regulatory incentives, which help mobilize private resources; (iii) transparency, which can help overcome information asymmetry; and (iv) goods, tools, and capacity building, which can meet product demands and aid in capacity building. Section 4 provides specific instances of each[32].

Innovative financial solutions are rapidly developing.

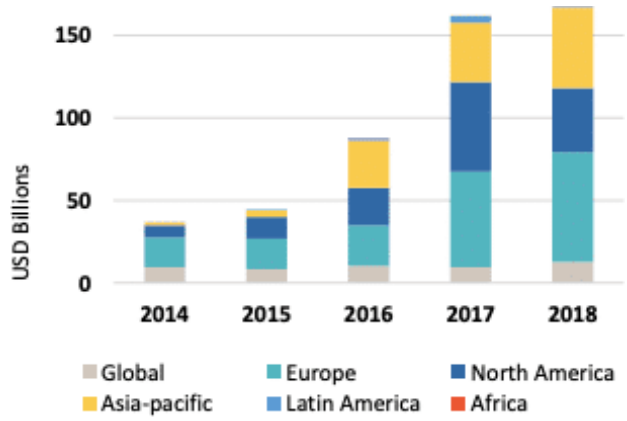
Issuing green bonds, i.e. bonds whose proceeds are earmarked for funding climate and environmental-friendly projects, is an effective and increasingly popular way to achieve this end. In just over a decade, annual green bond issuance grew over 100 times in terms of total

[28]NGFS (2018). NGFS: First Progress Report. https://www.banque-france.fr/sites/ default/files/ media/2018/10/11/818366ngfs-first-progress-report-20181011.pdf
[29]Sustainable Stock Exchanges Initiative (2018). 2018 Report on Progress. http:// www.sseinitiative.org/wp-content/ uploads/2018/10/SSE_On_Progress_Report_FINAL.pdf
[30]Task Force on Climate-related Financial Disclosures (2018). https://www.fsb-tcfd.org/wp-content/uploads/2018/09/ Press-Release-TCFD-2018-Status-Report_092518_FINAL.pdf
[31]Task Force on Climate-related Financial Disclosures (2018). https://www.fsb-tcfd.org/wp-content/uploads/2018/09/ Press-Release-TCFD-2018-Status-Report_092518_FINAL.pdf

[32]United Nations Environment Programme (UN Environment), 2019

value: from USD 1.5 billion in 2007, to USD 167 billion in 2018. Increasingly, bond issuers in Asia are picking up the practice: whereas China had still not issued a single green bond in 2015, in 2016 it accounted for 40.9% of global green bond issuance (followed by 24.6 % in 2017 and 23.0% in 2018). Furthermore, India financed part of its 2022 renewable energy targets through the issuance of green bonds by public institutions and corporations. Additionally, whereas ASEAN's green bond issuance was USD 2.3 billion in 2017, its green bond issuance cumulatively stood at over USD 5 billion in 2018, of which 39% was issued in Indonesia. The largest underwriter of green bonds globally, Bank of America Merrill Lynch, expects Asia's total green bond issuance to be around USD 600 billion in the upcoming five years, while the former head of the United Nations Framework Convention on Climate Change (UNFCCC), Christina Figures, aims for USD 1 trillion globally by 2020. Hence, though green bond issuance may have started in Europe, a vastly growing number of public and private organizations in Asia are embracing this instrument for their sustainable development.

Figure 11 : Sustainable Bonds from 2014 – 2018 across world



Source : Climate Bond Issuance 2014-2018

Essentially, the key motivations for issuers to issue with a green label is that green bonds can help attract new investors while highlighting the sustainability ambitions of the issuer. Today,

a growing amount of research also shows that a green premium exists for most markets, issuers, locations, and currencies.[6] This premium is the result of the existence of a greater demand for green bonds than total green bond issuance at the moment. This trend is clearest in secondary markets. Additional benefits include increased visibility and attention to the issuer's sustainability credentials, as well as the issuer being considered an early adopter, giving demonstration effects to other organizations.

Some commentators disagree with the fundamental necessity of labelled financial instruments, whether they be green, sustainable, social, or other. Their main argument is that rather than creating labelled financial instruments as a niche market, the best way to finance sustainable projects is to make organizations more sustainable so that any bond issued will automatically be green. This would have to go hand-in-hand with increased sustainability disclosure requirements and third-party verification, to prove the sustainability characteristics to investors. Whereas in the long-term this might be a satisfactory solution, the development of sustainable finance instruments is critical in the short- and medium-term to finance sustainable development in the coming years.

Providing a practical guide for issuing green bonds, the International Capital Markets Association (ICMA) launched the Green Bond Principles (GBPs) in 2014. While being only abstract principles briefly explained in a five-page document, the GBPs are a common reference point, used by most regulators and issuers across the world. The GBPs covers the use of proceeds, project selection and evaluation, management of proceeds, and reporting.[7] These principles were launched once the green bond market had reached 10 billion USD, and hence became big enough for corporations to also issue green bonds which enhanced fears of 'green washing'.

A growing toolbox of sustainable finance instruments[33]

The green bond, however, is no longer the only debt-finance instrument used to raise private funds for sustainable development in Asia. In addition to the sustainable-debt market growing rapidly in size (by 26% between 2017 and 2018, reaching 247 billion USD worth of issuance of sustainable debt products),[8] this market has also diversified over the past four years, with the introduction of four additional instruments: sustainability bonds, social bonds, green loans, and sustainability-linked loans (or sustainability-improvement loans, or ESG-linked loans). The growth of the market in absolute terms, and the diversification of sustainable finance instruments, as shown in figure 1 below, should be seen as a testament to the vast increase in market demand for sustainable finance products. As the majority of these instruments could be employed as a means to achieve financing for sustainable projects that Asia requires, their characteristics, market size, and the development stage of corresponding regulatory frameworks should be considered before concluding that green bonds are the most mature, and therefore the most appropriate financing tool to achieve sustainable development in Asia.

Sustainability Bonds

As an alternative to green bonds, the first sustainability bond was issued in 2014 by Unilever (GBP 250 million). The International Capital Market Association (ICMA) defines sustainability bonds as bonds whose proceeds are applied exclusively to finance or re-finance a combination of green and social projects,[9] i.e. projects with clear environmental and socio-economic benefits.[10] For this reason, the Sustainability Bond Guidelines (SBG) published by the ICMA in June 2018 have the same four core elements as ICMA GBPs.[11] Such

[33] https://greenfdc.org/a-growing-toolbox-of-sustainable-finance-instruments/

standardization of practices between sustainable finance instruments facilitates the development of new instruments and reduces the transaction costs for issuers who first issued green and then sustainable, or vice versa. In 2018, total sustainable bond issuance was roughly USD 12 billion. This was the first year that issuance surpassed USD 10 billion.[12] In addition, in 2018, the European Investment Bank (EIB) issued a EUR 500 million sustainability awareness bond, aiming to expand the benefits of impact reporting and transparency beyond climate change and using the proceeds to fund high-impact water projects.[13] Considering the accompanying demonstration effect and organizational scale, increasing issuance by such multilateral development banks (MDBs) could expand market issuances by others in the future.

Social Bonds

The second sustainable-debt financing innovation came about in 2015 with the issuance of the first social bond. The International Capital Market Association (ICMA) defines social bonds as bonds whose proceeds are used exclusively to finance or re-finance social projects, i.e. projects with clear socio-economic benefits.[14] The principal attempt to establish norms for social bond issuance came about with the ICMA's release of the Social Bond Principles (SBPs) in June 2017. One of the largest social bonds issued to date is the EUR 500 million Korean Housing Finance Corporation Social Covered Bond, which, which was verified by Sustainalytics to be in line with the SBPs. In 2018, social bond issuance totalled at roughly USD 11 billion as social bond issuance for the first time exceeded USD 10 billion per annum.[15]

Sustainability in the Loan Market

More recently, labelled sustainable debt-financing products that focus on raising funds in a sustainable fashion outside of capital markets have been invented. This development was

mostly a consequence of insufficient green bond issuance to meet the demand of sustainable investors.[16] Instead, green and sustainability-linked loan structures have been invented in order to accomplish sustainability aims.[17] While the bonds listed above are mostly relevant to larger organizations with a size and credit rating sufficient to be active in debt capital markets, different forms of sustainable loans can also serve small- and medium-sized enterprises, special purpose vehicles, individuals, and other smaller entities. There is, however, an attribute of sustainability loans that can compromise their impact. Essentially, unlike bonds green loans, sustainability loans are private, and for this reason, the level of reporting in the public domain is less rigorous than for bonds.[18] While it is possible for the creditor and debtor to disclose the terms of the sustainability-linked loans, this is not required. Green bonds on the other hand are almost always exclusively publicly listed with details on external verification.

Green Loans

The labelled green loan market began in 2016 with Lloyds Bank's USD 1.27 billion earmarked loans for greener real estate companies in the United Kingdom. Yet, outside the official concept of a green loan, banks have always been giving loans to projects with environmental benefits. For example, China has been measuring its green loan proportion since 2007, which has, at present, exceeded 10%. The sustainability-character of green loans is based on the fact that their proceeds are used exclusively for environmentally beneficial activities. Therefore, green loans follow a similar framework as the green bond. In fact, the Loan Market Association (LMA) and the Asia Pacific Loan Market Association (APLMA) issued the Green Loan Principles (GLPs) that, like the Sustainability Bond Guidelines, are based on the GBPs, and share the four aspects of the GBPs. Frasers Property imported the syndicated green loan

structure to Asia for the first time in 2018, helping to increase the firm's environmental, social, and governance (ESG) rating, and thereby improving its odds of issuing a green bond in the future. Despite their rapid growth, green loans constituted the smallest share of the sustainable debt market in 2018, as total green lending remained around USD 6 billion.

Sustainability-Linked Loans

The predominant sustainable loan structure is the sustainability-linked loan (or sustainability improvement loan, or ESG-linked loans). In a sustainability-linked loan (SLL), also known as sustainability improvement loan or ESG-linked loans, the terms of the loan is linked to how borrowers score on predetermined sustainability factors such as environmental, social, governance (ESG) rating or ESG-related indicators. The ESG rating for a company is typically determined by an independent ESG-rating party such as Sustainalytics, The ESG concept is chosen as a framework given its long history of being applied for research on correlation between ESG variables and financial performance. Based on the ESG concept, the variables chosen for this type of loan differs by the nature of the borrower, as tailored to a specific industry. If the borrower achieves its ESG-rating targets over a specified time period agreed upon by the lender and the borrower in advance, then the latter receives an improvement on the loan terms agreed upon in advance, which in most cases is a reduction in interest rate. In some cases, the reverse is also true: If the ESG-rating of the borrower decreases over the duration of the loan, the interest rate increases.

Hence, unlike in the case of green, sustainability and social bond issuance, or the green loan, where the primary quality is the appropriate expenditure of its proceeds on specific green, sustainable or social projects, sustainability-linked loans are uniquely linked to a borrower organization's ESG-rating overall. In this sense, such loans can be a first step towards

increasing sustainability performance of organizations with a limited part of their activities belonging to what is commonly labelled as 'sustainable'.

However, the sustainability linked loan's focus on overall ESG-rating is also the instrument's weakness. Roumpis and Cripps of Environmental Finance warn that although lenders are often happy to announce that they lend out sustainability improvement loans, the criteria on which the interest rate hinges can remain vague. – especially in comparison to the way in which all other sustainable finance instruments have an ESG-impact: on the basis of appropriate use of proceeds on a predetermined set of eligible activities. For this reason, for the sustainability linked loans to become a more effective low-threshold entrance to sustainable finance, the criteria of how ESG-improvement is measured should be formalized and disclosed publicly.

The concept of a sustainability-improvement loan was pioneered by ING and Sustainalytics. The pioneering loan of EUR 1 billion to Philips in April 2017 was structured by ING and supported by a consortium of 15 other banks. Even though the practice of giving out sustainability improvement loans has only begun recently, this sustainable debt financing instrument was the story of 2018, as yearly sustainability-linked lending increased by 677% between 2017 and 2018 reaching an impressive USD 36 billion.[19] While the above cases were carried out without a set of guidelines, in March 2019 the LMA issued the Sustainability Linked Loan Principles to provide guidance and a common framework for creditors, debtors, and verifiers.[20]

Comparing Sustainable Finance Instruments

While more sustainable debt financing products are entering the market, and as additional sustainable finance instruments grow their market share by the year making it likely that the

green bond's market share will further decrease in the future, the green bond remains the most mature sustainable financing tool in 2018. This is the case for three reasons: Green bonds dominated the sustainable debt market even in 2018, the regulatory environment for green bonds is the most developed compared to other sustainable finance instruments, and the sustainable-effects of green bonds are easier to verify as those of sustainable debt-financing products in the loan market. In fact, whereas the entire global market grew by 26% to a total of USD 247 billion in sustainability-themed debt instruments raised during the year, green bond issuance still made up over 73% of the market (USD 182.2 billion in yearly issuance).[21] In addition, green bond issuance goes back to 2007, whereas the first sustainability bond was only issued in 2014, the first social bond in 2015, the first green loan in 2016, and sustainability-linked loan in 2017. As a consequence, regulatory initiatives for green bonds such as guidelines and taxonomies are at advanced stages of development, especially in the European Union (EU) and China, and to a lesser extent in Japan, India, and ASEAN. Finally, because the loan market is private, in general the correct application of the green loan and the sustainability-improvement loan is more difficult to verify. The sustainability linked loan has the additional weakness – that the ESG-criteria on which the sustainability improvement loans interest rate is dependent remain vaguer than the standard way in which to ensure environmental benefits: the use of proceeds in eligible categories. Hence, in spite of the rapid growth of all sustainable finance instruments, green bonds are the most mature and suitable debt financing tool that Asian governments, institutions, and corporations can employ to achieve the sustainable investment that Asia requires.[22]

Table 3: Comparison of sustainable finance instruments

Financial Instrument	Year of first application	Sustainability impact via	Use of Proceeds	ICMA/LMA Guidelines	Total Issuance 2018 (USD)[23]	Market Share (in 2018)	Growth (2017 to 2018)
Green Bond	2007	Use of Proceeds	Green	Green Bond Principles (GBP)	2014	182.2 billion	73.8%
Sustainability Bond	2014	Use of Proceeds	Green and Social	Sustainability Bond Guidelines (SBG)	2017	12 billion	4.8%
Social Bond	2015	Use of Proceeds	Social	Social Bond Principles (SBP)	2017	11 billion	4.4%
Green Loan	2016	Use of Proceeds	Green	Green Loan Principles (GLP)	2018	6 billion	2.3%
Sustainability-Linked Loan	2017	Sustainability performance	General Corporate Purposes*	Sustainability Linked Loan Principles (SLLP)	2019	36.4 billion	14.7%
	Total	247 billion		26%			

Chapter 5: International institutions / Centres offering Courses on Environmental Finance and its allied areas.

Multiple universities and states have created environmental finance centres. New Mexico's Environmental Finance Centre is focused on asset management, which includes the identification of assets and the determination of the total life cycle. Environmental finance ranges the gamut from specific uses, such as with New Mexico, to broad applications such as funding research to determine methodologies for merging financial instruments with environmental needs.

Table 4: Institutions, courses, and the outcomes of EF and related areas

Course Name	Duration of the Program	Fees Structure	University / Institute Name	Outcome	Demand
Environmental Economics & Sustainable Development	3 – 4 credits	2500 Pounds	London School of Economics and Political Science	This course aims to provide students with a sound knowledge and understanding of the major results of environmental economics. Its intention is to deliver the fundamentals of rigorous economic analysis for continued undergraduate studies at a higher level, or graduate studies of environmental economics.	Very High
Introduction to Sustainable Finance and Investments	4 credits	Noncredit: $1500 Undergraduate: $1880 Graduate: $2900	Harvard University	This course studies finance and sustainability as integrated subjects beginning with an introduction of financial and investment principles and moving through	Sustainable finance is a main topic on the international agenda.

				financial analysis, financing, and valuation. The course covers diverse aspects of sustainable investments and offers tools for effective financial valuation and risk assessment.	
Environmental Finance and Social Impact			NYU Wagner	This course will provide students a thorough understanding of how key environmental challenges can be addressed through innovative financing and investment strategies.	Very High
MSc in Renewable Energy & Environmental Finance	One Year full time / Two-year part-time	It is highly regarded within the energy and renewables industry. Our graduates go on to occupy positions in both the public and private sectors.	UCD Michael Smurfit Graduate Business School, Carys fort Avenue, Blackrock, Co. Dublin.	Aimed at those wishing to pursue a career in industries connecting financial markets with the United Nations' Sustainable Development Goals (including environmental finance, impact investment, renewable energy, responsible investment, or sustainable finance), this course is designed to advance understanding of financial markets, with specific focus on SDGs and emerging legislation on environmental matters. It also nurtures the development of creative and analytical	Graduates of the programme can expect to pursue. a career in the following positions/areas from Private and public sectors

				approaches to problem-solving in the environmental finance sphere and enhances interpersonal and leadership skills.	
Governing Sustainable Finance	4 Units		Asian Development Bank Institute	Fundamentals of sustainable finance, climate risk assessment, and the integration of environmental, social, and governance (ESG) factors into investment strategies	
Environmental Finance	2 Units / One Semester		The University of Queensland, Australia	The course will begin with an overview of the implication of Climate Change for Accounting and Finance. It will offer a brief reprise of the basic ideas of finance and accounting (building upon the introductory course. A financial Management for Decision Makers, showing how climate change is altering the accounting and finance landscape.	
Sustainable Finance	8 weeks online, 6–8 hours per week	£2,200	The University of Cambridge	From the course will learn the pressures and trends affecting the current financial system and investigate the strategic business implications of these social and environmental challenges.	
International Sustainable Finance	24 – 34 hours		International Sustainable Finance	Have a detailed understanding of the SDGs in theory and legal practice. Have learnt to apply key	

				legal concepts across a variety of legal areas, from lending, derivatives, capital markets, project finance, restructurings and funds investment	
International Finance and Environmental Economics	2 years		Heriot-Watt University	This programme aims to develop a solid understanding of the finance and economic issues involved in environmental economic development and will improve students' expertise and transferable skills in finance and environmental economics.	
MSc in Climate Change & Sustainable Finance	4-6 months			To assess the consequences of financial decisions in the light of climate-change and to address the challenges of the financial industry's adaptation to climate change.	
Sustainable Finance and Accounting MSc	Full time 1 year / Part time 2 years	£22,500.00 (23,12,645) per year	University of Sussex Business School	In this course students will understand the role of accounting and finance in meeting the key challenges surrounding sustainability development goals, climate finance, environmental reporting and corporate governance	
MSc Climate Change, Management & Finance	1 year	£30,700 both UK and internatio	Imperial College Business School, UK	It provides graduates with the interdisciplinary skills required in business	Priority area (Graduation level)

		nal students		on issues relating to climate change and sustainability. Learn about the challenges and opportunities to companies across strategic planning, operations, marketing, and accounting and finance	
Environmental Finance	15 weeks		MACQUARIE University, Sydney, AUS	Apply finance techniques and theory to make sound energy finance and related investment decisions, how markets react to the new standards of sustainable finance and investment	Already established course
MSc Renewable Energy & Environmental Finance	Full time 1 year Part time 2 years	€ 18,205.00 per year; Domestic € 19,900.00 per year; International	University College Dublin, Michael Smurfit Graduate Business School	The course will advance understanding of finance theory and the application of sustainability factors to financial markets. The programme canbe undertaken on a part-time basis, thus enabling current professionals with the relevant background to combine working life with study; however, this is dependent on students' employment commitments	The course having highly demand regular as well as part time
Introduction to Sustainable Finance	3 Modules		UN Climate Change Learning Partnership (UN CC: Learn) United Nations	Describe, understand and discuss current developments and trends in the area of sustainable finance; Distinguish between different types of sustainable finance	Very high

			Institute for Training and Research (UNITAR)	products and relevant eligibility criteria; Discuss opportunities, challenges, and enabling conditions for countries tobenefit from growing sustainable investment opportunities; Identify opportunities for the public and private sectors to issue green bonds and green loans; Apply sustainable finance mechanisms to a real-life investment case study	
Sustainable Finance Foundation Course	5 days	£5,000 private sector £3,750 public sector	The Smith School of Enterprise and the Environment, University of Oxford	Through the course participants will develop a foundational knowledge in the emerging theories and practice of sustainable finance and investment	Good Programme
UK Green Finance Programme			The Smith School of Enterprise and the Environment, University of Oxford	The course was designed to provide participants with a foundational knowledge of green finance and arm them with sufficient understanding to navigate some the key aspects and developments, as well as how to engage with senior overseas government and private sector representatives on the imperatives and benefits of green finance and the	Good Programme

				benefits of collaborating with the UK	
Climate-related Financial Risk Course		£3,750 private sector, £2,625 public	The Smith School of Enterprise and the Environment, University of Oxford	Our courses are designed to equip participants with essential foundational knowledge of core principles and concepts in sustainable finance, as well as an advanced understanding of the very latest developments. They are the ideal preparation for current and emerging professional examinations in sustainable finance and related areas	Good Programme

(Source: Compiled from various sources)

Table 5 : Courses in India

Institute	Course title	Course design	Course fees
IIT Kanpur	Masters in Climate Finance and Sustainability (2 years full-time)	course is designed to provide in-depth training and exposure to carbon management, ESG, and green finance in a one-year, fully online programme. The flexible curriculum and self-paced learning opportunities are salient features suitable for working professionals	800000

Indian Institute of Management Ahmedabad (IIM)	Sustainable finance (online) 15 days	provides in-depth training and exposure to carbon management, ESG, and green finance	64000
IIBF in collaboration with International Finance Corporation	E-learning and certification program on 'Climate Risk and Sustainable Finance' - Foundation Course	to equip individuals with the fundamental knowledge of climate finance and its importance in the financial services industry	-
NTPC School of Business and Climate Policy	Post Graduate Diploma in Energy Management (PGDM-E)	energy management courses are designed to enrich management learning and practice at all levels of decision making in the energy domain with implications for holistic development of the Indian economy	1600000
The Center For Sustainable Finance	Management development program for 2 days	help accelerate the greening of the financial system,	-

Source: Compiled from various sources

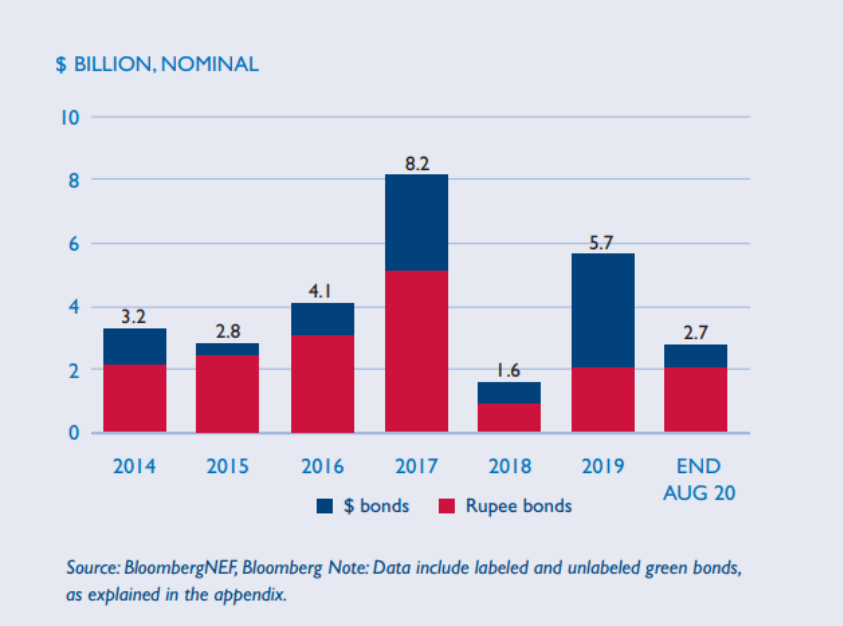
Investment companies and banks, such as Wells Fargo, are entering the environmental market. Wells Fargo has announced plans to continue to grow in this arena. They invested $2.8 billion in 2011 with plans to increase it to a total of $30 billion by the year 2020. Wells Fargo investments cover a wide range of environmental and sustainable projects including alternative energy sources, energy-efficient infrastructure, and community development grants.

There is a tremendous possibility to increase the impact of funds through leveraging foundation assets. Typically, foundation assets are not invested for impact. There is a chance to shift the Double Delta model to a positive/integrated one to boost the impact of negative/exclusionary ESG financing. For instance, if 50% of this investment were used to raise more money to support the SDGs, the existing funding gap would be eliminated. The number of millionaires in Asia has increased by 180% since 2016, reaching 8.1 million in 2019. If these high-net-worth investors adopt the millennial investing trends, they will have the chance to make big new sustainable investments. There is also a prospective role for faith- based finance, particularly Islamic finance, to contribute more to sustainable effect. Foundations and institutions that finance international development may do more to strategically use their grants and guarantees to expand the market. They could act as outcomepayers in bonds with a positive impact on the environment and society.

Indians Green Finance initiatives

The Ministry of New and Renewable Energy (MNRE) originally estimated that additional investments of $300 billion would be required but later increased that number by another $80 billion. Therefore, access to scalable, long-term, low-cost debt capital from institutional investors is critical to the growth of the sector and for India to reach its renewable energy goals. The U.S. Agency for International Development (USAID) partnered with the MNRE to explore innovative financing mechanisms that could overcome the market's financial limitations. The graph depicts the details of the money raised from 2013- 2017 with the USAID in promoting Green bonds in India.

Figure 12: India annual green bond issues, 2014 to August 2020



Source : BloombergNEF, Bloomberg Note: Data included and unlabelled green bonds

With the support of USAID to financing renewable energy in India, an Issue Paper: Green Bonds in India, was released which covered the types of bonds, bond pricing, rapidly growing green allocations by investors, and policy recommendations. This report identified financial instruments that could provide long-term, low-cost financing while diversifying away from banks toward money markets in India and abroad. The Securities and Exchange Board of India endorsed the Green Bond Principles, which are voluntary guidelines that promote transparency through disclosures and reporting. In India, bond issuers and renewable energy sector developers showed a preference for conventional bonds to avoid the administrative costs of verifying green eligibility criteria and certifying use of proceeds.

In 2016, USAID co-sponsored the inaugural India Forum of the Green Infrastructure Investment Coalition hosted by the London Stock Exchange, which brought together European institutional investors, Indian green infrastructure developers and financiers,

development banks, and government representatives. The Forum introduced investors to investment-grade opportunities in India generated by the low-carbon transition, while giving project developers and financiers a chance to discuss their pipelines. Twelve Indian project developers and financiers presented their five-year infrastructure pipelines to investors, outlining plans to issue $18 billion worth of green bonds in the next five years, mainly to raise capital for renewables and energy efficiency projects. USAID also organized two institutional investor roundtables in Mumbai and Delhi. The events were high-level dialogues between developers, financing institutions, municipalities, ministries, and regulators on how to increase green bond investment in India.

70 percent of renewable energy project costs in India have been funded through conventional term loans. Domestic banks and nonbanking finance companies (NBFCs) were the major sources of debt in India. International development banks funded renewable energy, but mostly through credit lines to banks and NBFCs. After the introduction of policy and regulatory reforms, as well as new financing approaches such as green bonds, India was able to ramp up renewable energy investments. Prior to 2015, there were no large-scale issuances. Today, India has increased capital for renewable energy projects and has become the world's second-largest market for green bonds, with $28.2 billion worth of bonds issued. Since USAID first introduced green bonds and helped issue the first bonds through IREDA, the private sector, led by independent power producers who steer the deployment of renewables in India,

The following table depicts the various types of bonds that are issued in India since 2017 in various sectors. The tenure for these bonds range between 5 to 10 years while the coupon

rate is ranging between 6.46 % to 8.74%. The major sectors in which the bonds are made available are finance, power generation, energy, infrastructure, and electricity.

Table 6: Green Bonds in India

Sr. No.	Issuer	Date of Issue	Date of Maturity	Amount (Rs. In crs.)	Coupon (%)	Tenure	ISINs	Sector
1	L&T Infrastructure Finance Company Ltd	29-06-2017	18-11-2024	667	7.59%	7.39	INE691I07DZ9	Finance
2	Tata Cleantech Capital Limited	18-12-2018	18-12-2023	180	8.74%	5	INE857Q07216	finance
3	Indian Renewable Energy Development Agency Limited	03-01-2019	03-01-2029	275	8.51%	10.01	INE202E07260	Power Generation / Distribution
4	Indian Renewable Energy Development Agency Limited	17-01-2019	17-01-2029	590	8.47%	10.01	INE202E07278	Power Generation / Distribution
5	Ghaziabad Nagar Nigam *	31-03-2021	06-04-2025	150	8.10%	4.02	INE0GVF24014	
6	Yarrow Infrastructure Private Limited	01-07-2021	01-07-2024	581	6.49%	3	INE001W07011	Energy
7	Priapus Infrastructure Limited	01-07-2021	01-07-2024	16	6.49%	3	INE964M07011	Mining and quarrying

8	Rattanindia Solar 2 Private Limited	01-07-2021	01-07-2024	227	6.49%	3	INE935V07012	Energy
9	Malwa Solar Power Generation Private Limited	01-07-2021	01-07-2024	197	6.49%	3	INE999X07014	Energy
10	Citra Real Estate Limited	01-07-2021	01-07-2024	19	6.49%	3	INE969M07010	Energy (Utilities)
11	Sepset Constructions Limited	01-07-2021	01-07-2024	197	6.49%	3	INE961M07017	Infrastructure (Construction)
12	Fermi Solarfarms Private Limited	28-02-2022	28-02-2025	337	6.75%	3	INE404X07015	Energy
13	Clean Sustainable Energy Private Limited	28-02-2022	28-02-2025	334	6.75%	3	INE00JT07017	Electricity, Gas & Water Companies (Utilities)
14	Avaada Sataramh Private Limited	28-02-2022	28-02-2025	270	6.75%	3	INE0CSU07013	Energy
15	Avaada Solarise Energy Private Limited	28-02-2022	28-02-2025	499	6.75%	3	INE07H107012	Energy

Financial institutions and government agencies have used the instrument since 2015. Indian green bond issuances have reached a total of $21 billion as of February 2023. The private sector was responsible for 84% of the total. The largest green bond issuer in India Greenko Group is funding hydro, solar, and wind power projects in several Indian states with its green

bond proceeds. Ghaziabad Nagar Nigam, a civic body in Uttar Pradesh, is the first Indian local government to have issued a green bond (USD eq 20 million in 2021). Indore Municipal Corporation issued USD 87 million in green bonds in 2023.

Indian issuers have issued a greater amount of green bonds ($21 billion) than other emerging markets in Asia, excluding China. With the foray of the Government of India into the green bond market, we can look forward to more investments in green and climate-friendly projects and activities that will contribute towards India's transition towards green, resilient, and inclusive development. The World Bank Group is working with India to maximize finance for climate transition and green growth. The Rewa Ultra Mega Solar Power Project in Madhya Pradesh, one of the world's largest solar power plants, for instance, combines a World Bank loan for infrastructure, IFC funding to mobilize local currency investments and advisory services to establish public-private partnerships and attract private capital.

Figure 13 : Green Bond Investments in various sectors

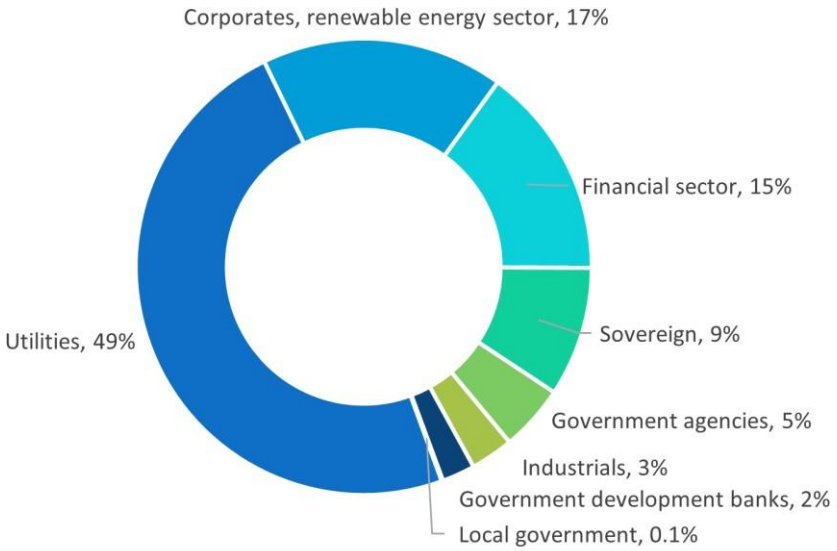


Exhibit 1: Rewa Ultra Mega Solar Power Project

Rewa Ultra Mega Solar Limited (RUMSL) was formed in 2015 and is a Joint Venture Company of Madhya Pradesh UrjaVikas Nigam Limited (MPUVN), and Solar Energy Corporation of India (SECI). RUMSL has been designated as Solar Power Park Developer (SPPD) by Ministry of New and Renewable Energy (MNRE) to develop large-scale solar parks in the state of Madhya Pradesh. RUMSL is developing solar parks under MNRE's Ultra Mega Renewable Energy Power Projects (UMREPP) scheme. The project would address the Electric mobility that is gaining momentum around India. Several Indian States, including Madhya Pradesh, have crafted future looking Electric Vehicle Policies to promote cleaner and greener transportation. Adoption of Electric Vehicles (EVs) would help in mitigating climate change concerns, provided they (EVs) are charged using clean energy sources. The World Bank's Sustainable Finance and ESG Advisory Services provided technical assistance to the Government of India to establish the sovereign green bond program. This work is part of the World Bank's efforts to leverage its expertise to help emerging markets mobilize private capital to meet large financing gaps for sustainable development.

Source : https://blogs.worldbank.org/climatechange/india-incorporates-green-bonds-its-climate-finance-strategy

The following table depicts the various green bonds that were issued in European nations. The table provides the details of the issuing company, value of the bond, date of issue and maturity date along with service provider information.

Table 6: Green Bonds in Europe

Bond ID	Entity	Amount Issued	Currency	Issue Date	Maturity Date	SPO Provider
1310900006001	Statkraft AS	500,000,000	EUR	Dec-23	Dec-31	CICERO
1310900007001	Statkraft AS	500,000,000	EUR	Dec-23	Dec-26	CICERO
1023200013001	Region Skane	1,000,000,000	SEK	Dec-23	Dec-28	CICERO
1478200001001	ASR Nederland NV	600,000,000	EUR	Dec-23	Dec-28	Sustainalytics
1002900004001	Unibail-Rodamco-Westfield SE	750,000,000	EUR	Dec-23	Dec-30	ISS ESG
1003400004001	TD Bank	500,000,000	USD	Dec-23	Dec-26	DNV
1375800013001	PSP Swiss Property	150,000,000	CHF	Dec-23	Dec-26	Moody's
1475900003001	Volkswagen Financial Services NV	650,000,000	SEK	Dec-23	Dec-25	ISS ESG
1475900001001	Volkswagen Financial Services NV	550,000,000	SEK	Dec-23	Dec-26	ISS ESG
1475900002001	Volkswagen Financial Services NV	300,000,000	SEK	Dec-23	Dec-26	ISS ESG
1277600002001	RTE SA	500,000,000	EUR	Dec-23	Dec-31	Vigeo Eiris
1477200001001	Akita Prefecture	7,000,000,000	JPY	Dec-23	Sep-28	
1384100020001	Credit Agricole CIB Financial Solutions SA	1,000,000	EUR	Dec-23	Dec-31	ISS ESG
1002700012001	HAT Holdings I LLC	550,000,000	USD	Dec-23	Jun-27	
1384100019001	Credit Agricole CIB Financial Solutions SA	1,000,000	EUR	Dec-23	Dec-28	ISS ESG

1384100018001	Credit Agricole CIB Financial Solutions SA	30,000,000	EUR	Dec-23	Dec-33	ISS ESG
1478700001003	New York Transportation Development Corporation	25,705,000	USD	Dec-23	Jun-42	Kestrel

Legal and Regulatory framework to promote the EF and other related instruments:

Regulation could be implemented to liberate idle bank accounts to support sustainable finance wholesalers, modelling it after Big Society Capital in the UK and Big Society Capital in Asia's ROK and Japan. To increase the transparency and effectiveness of the market for sustainable finance, government players could utilize regulation to compel the disclosure of nonfinancial and impact data.

Common guiding principles and standards for global accreditation for the bonds. They are divided into four categories. ICMA Green Bond principles, EU Green Bond standards, ASEAN Green Bond standards, and Climate Bond initiatives. The details of all four categories are depicted below:

Table 7 : Categories of Green Bond

ICMA Green Bond Principles: Principles-based (i.e., not prescriptive requirements) Widest use among issuers Climate Bonds Initiative	**Proposed EU Green Bond Standard:** Voluntary standard published by the European Commission Political agreement reached on the EU Green Bond Standard Of funds raised by the bond, 85% are allocated to economic activities that align with the EU Taxonomy Regulation
ASEAN Green Bond Standard Voluntary standard for Southeast Asian countries	**Climate Bonds Initiative** Certification scheme Detailed sector-specific eligibility criteria

Developed based on ICMA principles. Provides additional guidance on the application of financial instruments (green, social, sustainability, etc.)	Project eligibility is determined by alignment with goals of the Paris Agreement.

(Source: Green bonds: Financial instruments for accessing capital and financing the energy transition July 2023)

Finally, new flows of sustainable finance could support the development of consolidated impact data sets to improve the efficiency of capital allocation in the sustainable finance market, as well as sponsor the establishment of regional impact stock markets by leveraging existing networks such as the Asian Venture Philanthropy Network and IIX. The table depicts these prospects in terms of developing the supply-side, intermediation, and demand side of the sustainable finance sector, as well as other opportunities such as research.

The following are various challenges that were identified to improve the efficiency and effectiveness of the bonds.

Market Efficiency: A lack of investable deals in various sectors continues to be a problem on the supply side, and creating a pipeline of investees is also difficult. Although there are probably opportunities in green financing, the demand-side environment of deals for the SDGs is less clear. Grants and angel financing are required to support early-stage businesses, and grants are also required to improve investment readiness and the capacity to manage investment and growth.

Because of the lack of a comprehensive effect performance evidence base and data, as well as the complexity of blended transactions, there are currently substantial transaction costs in putting together numerous deals and funds in terms of market infrastructure. All markets function best when performance data is plentiful and reliable. However, there is no

"Bloomberg" for effect in sustainable investing. To some extent, many sustainable investing fund managers are currently building their own performance data sets as they go along, learning from testing supply-side investor preferences and frequently building the demand-side in collaboration with others to find good deals and build pipelines.

Standards and Data: In connection with the issue of the absence of financial success data, the market for sustainable investments also lacks established standards or regulatory frameworks for impact measurement or disclosure. However, several projects are actively tackling this problem and leading the way toward an agreement on standards, especially in a process of consolidation with related standards like the GRI, PRI, and SASB. 2019 saw the development of a set of guidelines for investment under the SDG Impact initiative by the UNDP in partnership with the Impact Management Project. With SDG bonds and enterprise guidelines to follow, the first of these has focused on private equity. The prices of transactions should decrease when new data sets result from these standards.

Developments in Sustainable Finance: Addressing climate change requires unprecedented global cooperation across boundaries. Governments, regulators, and non-profit organizations have all played significant roles in designing taxonomies, disclosures, and solutions to close the investment gap through sustainable finance.

Taxonomies: Countries are developing taxonomies that encourage investments toward sustainable economic activity to satisfy climate and energy objectives and to mobilize funding. The EU created the EU Taxonomy in 2020, which is essentially a framework to assist investors, businesses, issuers, and project promoters in steering towards a low-carbon, resource-efficient economy through a single categorization system of what is green and sustainable.

India is developing its own sustainable finance taxonomy, which will greatly increase market standardization and discipline.

Non-Financial Disclosures: While ESG disclosure standards like the GRI and SASB have a broader emphasis, the TCFD is primarily concerned with climate change. The UK became the first G20 nation to require obligatory TCFD reporting for its top companies and FIs in April 2022. Based on the TCFD guidelines, regulators in other regions, including the EU, Brazil, Hong Kong, Japan, Singapore, and Switzerland, have also released the required guidance. The first law requiring banks to disclose their policies on climate change was approved in New Zealand.

Sustainable Finance Products: Over the past few years, sustainable financial tools have become more popular. Innovative products including green/sustainable bonds, sustainability-linked loans, green deposits, blended financing mechanisms, and risk-sharing facilities continue to increase the amount of money going to sustainable initiatives.

Indian regulations and policies promoting sustainable financing

Since 2007, India has placed a greater emphasis on green/sustainable financing. In 2007, the RBI issued a rule titled "Corporate Social Responsibility, Sustainable Development, and Non-financial Reporting — Role of Banks[34]," emphasizing the relevance of global warming and climate change in the framework of sustainable development. The NAPCC (National Action Plan on Climate Change) was formed in 2008 to develop a broad policy framework for minimizing the effects of climate change. The CCFU (Climate Change Finance Unit) was founded inside the Ministry of Finance in 2011 as a coordinating body for India's many green finance organizations.

[34] Corporate Social Responsibility, Sustainable Development and Non-Financial Reporting – Role of Banks, RBI/2007-08/216 DBOD. No.Dir. BC. 58/13.27.00/2007- 08, December 20, 2007

Since 2012, the SEBI has required the top 100 listed companies on the BSE and NSE based on market capitalization to produce yearly corporate responsibility reports, which it has periodically updated. SEBI released rules for green bond issuing detailing disclosure criteria in May 2017. SEBI requires that the top 1000 listed businesses by market capitalization disclose major ESG risks and opportunities, the financial consequences, and their plan to reducing or adapting to the risks through BRSR in their annual reports beginning in the fiscal year 2022-23. Furthermore, SEBI recently suggested guidelines requiring ESG fund managers to invest at least 80% of their total assets in sustainability-themed securities by October 2022[35].

- Opportunity for GIFT-IFSC: There is a substantial investment gap and the need for more legislative actions to mobilize money towards sustainable industries. A considerable amount of this investment shortfall must be funded via foreign capital. This has offered a significant potential for GIFT-IFSC, and it may therefore serve as the focal point for mobilizing sustainable financing in India and abroad.
- GIFT-IFSC: A global Sustainable Finance Hub has been able to establish itself as a potential worldwide centre of sustainable finance because to the dynamic environment, best-in-class regulatory framework, competitive tax regime, and government backing. This is also reflected in the Union Budget of the Government of India for 2022–2023 where it was stated that "Services for Global Capital for Sustainable & Climate Finance in the Country will be Facilitated in the GIFT City." The GIFT-IFSC (Gujarat International Finance Tec-City - International Financial Service Centre) has the potential to serve as an entrance point for foreign funding into India for a range of sustainable infrastructure projects, such as electric cars, renewable

[35] Consultation Paper on introducing disclosure norms for ESG Mutual Fund Schemes, Reports for Public Comments, Oct 26, 2021

energy, and energy efficiency. The following are some of the pillars essential to establishing GIFT-IFSC as a global hub for sustainable finance[36].

Policy and Regulations

An enabling ecosystem for the creation of an international sustainable finance center at GIFTIFSC would be greatly enhanced by effective rules, policies, and guidelines. Comparable and uniform rules, in line with global best practices, will foster a favorable environment for foreign capital to pass through IFSC for future deployment into climate mitigation and adaptation initiatives in India and abroad. The committee noted that even though IFSCA has already announced rules and guidelines on sustainable financial goals, it is crucial for IFSCA to be current with developing worldwide standards. IFSCA, as a single regulatory body, may benefit market players by fostering synergies throughout the financial markets. Below are a few of the regulations that IFSCA has listed to facilitate sustainable finance.

Regulations for Listing ESG-Labelled Debt Securities

The IFSCA (Issuance and Listing of Securities) Regulations, 2021, a uniform framework for listing various types of securities on the IFSC exchanges, have been notified. The IFSCA's Listing Regulations include a provision dedicated to the issue and listing of ESG debt instruments such as Green Bonds, Social Bonds, Sustainable Bonds, and Sustainability-linked Bonds (SLBs).

Sustainability Reporting by companies listed on IFSC Exchanges: To encourage sustainability reporting, IFSCA has mandated that every IFSC-listed firm (with a market capitalization of $50

[36] Economic Survey, 2022-23

million or more) must annually publish to stock exchanges a sustainability report addressing ESG aspects. The sustainability report must be based on the following:

- GRI, SASB, TCFD, and other globally recognized reporting frameworks; and
- Standards established by MCA, GoI from time to time.

Fund Regulations

IFSCA has included a chapter on ESG to the IFSCA (Fund Management) Regulations 2022 to encourage FMEs to consider sustainability-related risks and opportunities when making investment decisions. Large FMEs (AUM more than $3 billion) are required by the regulations to meet the extra ESG factor-related criteria listed below.

Table 8 : Extra ESG factor-related Criteria

Governance	Establish policy on governance around material sustainability-related risks and opportunities.
Risk management	Disclose how the fund manager identifies, assesses, and manages material sustainability-related risks
Investment Strategy	Establish and disclose the process of factoring sustainability-related risks and opportunities into the fund manager's investment strategies.

Chapter 6: Challenges and opportunities

The financing gap to achieve the SDGs is estimated to be $2.5 trillion per year in developing countries alone (UNCTAD, 2014). The COVID-19 pandemic has caused unprecedented events as more and more countries have been facing debt crises and fiscal deficiency. Due to the pandemic, the SDG financing gap has magnified by 70% to $4.2 trillion (OECD 2021), calling for collective action to address both the short-term collapse in resources of developing countries as well as long-term strategies.

The transition to a low-carbon economy requires substantial investments, which can only be financed through a high level of private sector involvement. The adoption of ESG considerations in private investments is evolving from a risk management practice to a driver of innovation and new opportunities that create long-term value for business and society. However, mobilizing capital for green investments has been limited due to several microeconomic challenges; for example, there are maturity mismatches between long-term green investments and the relatively short-term time horizons of investors. Moreover, financial, and environmental policy approaches have often not been coordinated. To scale up and crowd in private sector finance, governments can team up with a range of actors to increase capital flows and develop innovative financial approaches across different asset classes, notably through capacity-building initiatives.

Most importantly, a harmonized definition of “green” and a taxonomy of green activities are needed to help investors and financial institutions efficiently allocate capital and make well-informed decisions. The definition of green finance needs to be more transparent to prevent “greenwashing”. A common set of minimum standards on green finance is essential to redirect capital flows toward green and sustainable investments as well as for market and risk

analysis and benchmarking. Standards and rules for disclosure would help develop green finance assets. Voluntary principles and guidelines for green finance, complemented with regulatory incentives, need to be implemented and monitored for all asset classes.

The Green Finance Platform and the United Nations Environment Programme's (UNEP) Inquiry into the Design of a Sustainable Financial System ("the Inquiry") have launched the Green Finance Measures Database – a global compendium of green finance policies and regulations across over 100 developed and developing countries to support the development of green finance. According to OECD (2017), with an estimated €6.3 trillion of investment in climate infrastructure required by 2030 to limit global warming to 2 degrees, these measures help clarify the responsibilities of financial institutions with respect to environmental factors within capital markets, such as clarifying the relevance of ESG issues within the context of fiduciary duties of pension funds, and strengthen flows of information relating to environmental factors within the financial system, for instance requirements for public disclosure of climate-related risks to investment portfolios.

A material weakness of India's sustainable financial market is the incomplete green bond framework, that focuses on the management of proceeds, but does not include a profound definition of the term green aligned to climate targets and provides only little guidance to emitters for pre-and post-issuance reporting requirements, conditions as to project size, qualified external verifications and the assessment of the project's environmental life cycle and accordingly, the exclusion of investments that fall under a sustainable category but cannot be marked green due to environmental damages. The green bond framework does, therefore, not meet the stipulations for sustainability reporting, not fulfil the satisfy the demands of all stakeholder groups and information asymmetries between actors remain.

The majority of the green bond has so far been emitted by the government and domestic banks, but the latter lack the capabilities to function as multipliers in the domestic market and face continual duration mismatches, provoking tightness in the market liquidity. Moreover, sustainable projects have been slanted towards the energy sector in a way that other environmental goals are flouted, thus, the expansion of both the issuer and investor base has been identified as a main area of improvement. The shortage of investor incentives and education makes Indian financiers unversed with and indifferent towards green assets.

References:

- Ahmad, Y.J., El Serafy, S. and Lutz, E. (Eds) (1989) Environmental Accounting for Sustainable Development, The World Bank Washington
- Benjamin Sovacool Handbook of Environmental and Sustainable Finance Chapter 15 - Environmental Finance 2016, Pages 307-333
- Costanza, R and Daly, H. (1992) Natural capital and sustainable development, Conservation Biology, 6,374.
- Cunha, F. A. F. D. S., Meira, E., & Orsato, R. J. (2021). Sustainable finance and investment: Review and research agenda. *Business Strategy and the Environment*, *30*(8), 3821-3838.
- International Bank for Reconstruction and Development (IBRD) (1995) Monitoring Environmental Progress: a Report on Work in Progress, The World Bank, Washington.
- Mark A. White (1996), 'Environmental Finance: Value and Risk in an age of Ecology", Business Strategy and the Environment, Vol. 5, pp: 198-206 Compendium Introduction "Environmental Finance: Value and Risk in an Age of Ecology"
- Nisanci, D. A. (2021). FSB Task Force on Climate-related Financial Disclosures. In *World Scientific Encyclopedia of Climate Change: Case Studies of Climate Risk, Action, and Opportunity Volume 3* (pp. 3-8).
- Peskin, H.M. (1991) Alternative environmental and resource accounting approaches. In: Ecological Economics: the Science and Management of Sustainability/ (Ed. R. Costanza), Columbia University Press, New York; 176- 193
- Solow, R.M. (1991) Sustainability: an economist's perspective. Reprinted in: Economics of tk Environment: Selected Readings, 3rd edn (Eds R. Dorfman and N. S. Dorfman), W.W. Norton, New York 1993, 179-187.
- Taghizadeh-Hesary, F., & Yoshino, N. (2019). The way to induce private participation in green finance and investment. *Finance Research Letters*, *31*, 98-103.
- Though equity issues in green technology companies are also used. https://www.nasdaq.com/solutions/green-equity-indexes.
- United Nations Environment Programme Finance Initiative, Green Financial Products and Services: Current Trends and Future Opportunities in North America (Geneva, 2007) 'www.unepfi.org/fileadmin/documents/greenprods_01.pdf (accessed 26 January 2012)'
- United Nations Environment Programme, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication (Nairobi, 2011)
- Victor Zhikai Gao, Green Finance for Green Industry and Green Economy (Manila, 2009) 'www.unido.org/fileadmin/user_media/UNIDO_Header_Site/Subsites/Green_Industry_Asia_Conference_Maanila_/Gao_pres.pdf (accessed 13 February 2012)'
- http://en.wikipedia.org/wiki/Environmental_finance
- http://www.umich.edu/~nppcpub/resources/compendia/FINpdfs/FIN_Environmental_Finance.pdf
- https://carbontracker.org.
- https://neufin.co/blog/green-financing-instruments/
- https://www.alpha-sense.com/insights/top-rated-esg-stocks.
- https://www.climatebonds.net/market/green-bond-database-methodology (important report)
- https://www.economist.com/finance-and-economics/2020/09/19/what-is-the-point-of-green-bonds.

- https://www.economist.com/finance-and-economics/2020/09/19/what-is-the-point-of-green-bonds.
- https://www.epa.gov/waterfinancecenter
- https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/June-2019/Mapping-SDGs-to-Green-Social-and-SustainabilityBonds06-2019-100619.pdf.
- https://www.issgovernance.com/esg/ratings/environmental-social-qualityscore/.
- https://www.johnson.cornell.edu/Center-for-Sustainable-Global-Enterprise/Students/Curriculum
- https://www.mdpi.com/2071-1050/15/9/7119
- https://www.oecd.org/environment/cc/Green%20bonds%20PP%20%5Bf3%5D%20%5Blr%5D.pdf.
- https://www.oecd-ilibrary.org/environment/reframing-financing-and-investment-for-a-sustainable-ocean-economy_c59ce972-enand
- https://www.weforum.org/agenda/2019/06/world-oceans-day-blue-bonds-can-help-guarantee-the-oceans-wealth/. With support from the World Bank, in 2018, the Republic of Seychelles launched the world's first sovereign Blue Bond raising a total of $15 million to advance the island's blue economy.
- www.unep.org/greeneconomy/Portals/88/documents/ger/ger_final_dec_2011/Green%20EconomyReport_Final_Dec2011.pdf (accessed 26 January 2012)