

Nationally determined contribution (NDCs) and green finance in India: an overview.

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ABSTRACT

To achieve India's Nationally Determined Contribution (NDCs) under the Paris Agreement, India need approximately Rs. 162.5 lakh crores(USD 2.5 trillion) from 2015 to 2030 or approximately 11 lakh crores (USD 170 billion) per year. To bridge the gap between the requirement of funds and availability of fund to achieve the India's NDCs, concept of Climate finance or Green finance developed. In a broader term 'Green Finance' can be defined as funding for the environmental friendly technologies, product, services, industries, businesses and for environmental friendly initiatives. Green finance includes all the actions and initiatives such as developing, implementing and promoting projects that have sustainable impacts. Considering the importance of 'Green Finance' in the light of India's NDCs, it is important to study the a) India's journey towards the fulfilment of India's NDCs by 2030 b) benefits and challenges of Green Finance and c) current status of Green Finance flows in India. From the study it is found that India is taking the issue of climate change very seriously from long past and there is a huge gap between the requirement of funds and availability of the fund to achieve India's NDCs. Green finance in India is mostly (about 85 %) supplied domestically and again in domestic fund (about 60%) are supplied by the private players. If we look into the growth of total global climate finance, growth of climate finance from private sources and growth of climate finance from public sources during the period 2011-12 to 2019-20, we will find a CAGR of 11.67%, 8.84% and 14.87 % respectively. There are different advantages of green finance such as leading to low carbon economy, sustainable environment and sustainable development, ultimate better human life without destroying nature. It has also some challenges such as high borrowing cost of green bond in comparison to other corporate and Government bonds in India, false claims of environmental compliance made by the different corporates and government agencies.

Key Words: Green Finance, Climate finance, Sustainable finance, Nationally Determined Contribution (NDC), Panchamrita, Green Bonds, Green Mortgage.

RESUMEN

Para lograr la Contribución determinada a nivel nacional (NDC) de India en virtud del Acuerdo de París, India necesita aproximadamente Rs. 162,5 lakh crores (USD 2,5 billones) de 2015 a 2030 o aproximadamente 11 lakh crores (USD 170 mil millones) por año. Para cerrar la brecha entre el requisito de fondos y la disponibilidad de fondos para lograr las NDC de la India, se desarrolló el concepto de finanzas climáticas o finanzas verdes. En un término más amplio, "Finanzas verdes" puede definirse como la financiación de tecnologías, productos, servicios, industrias y negocios respetuosos con el medio ambiente y de iniciativas respetuosas con el medio ambiente. Las finanzas verdes incluyen todas las acciones e iniciativas tales como desarrollar, implementar y promover proyectos que tengan impactos sostenibles. Teniendo en cuenta la importancia de las 'Finanzas verdes' a la luz de las NDC de la India, es importante estudiar a) el viaje de la India hacia el cumplimiento de las NDC de la India para 2030 b) los beneficios y desafíos de las finanzas verdes y c) el estado actual de los flujos de finanzas verdes En India. Del estudio se desprende que India se está tomando muy en serio el tema del cambio climático desde hace mucho tiempo y que existe una gran brecha entre la necesidad de fondos y la disponibilidad de fondos para lograr las NDC de India. La financiación verde en la India se proporciona principalmente (alrededor del 85 %) a nivel nacional y, de nuevo, los fondos nacionales (alrededor del 60 %) son proporcionados por actores privados. Si observamos el crecimiento del financiamiento climático global total, el crecimiento del financiamiento climático de fuentes privadas y el crecimiento del financiamiento climático de fuentes públicas durante el período 2011-12 a 2019-20, encontraremos una CAGR de 11.67%, 8.84% y 14,87 % respectivamente. Hay diferentes ventajas de las finanzas verdes, como conducir a una economía baja en carbono, un medio ambiente sostenible y un desarrollo sostenible, en última instancia, una vida humana mejor sin destruir la naturaleza. También tiene algunos desafíos, como el alto costo de endeudamiento de los bonos verdes en comparación con otros bonos corporativos y gubernamentales en India, afirmaciones falsas de cumplimiento ambiental hechas por las diferentes corporaciones y agencias gubernamentales.

Palabras clave: Finanzas verdes, Finanzas climáticas, Finanzas sostenibles, Contribución determinada a nivel nacional (NDC), Panchamrita, Bonos verdes, Hipoteca verde.

INTRODUCTION

According to the Paris Agreement, each country requires to prepare and communicate their post 2020 climate action. This climate action is popularly known as Nationally Determined Contribution (NDC). India had submitted its NDCs to the UNFCCC during October 2015. As per NDCs, India committed to reduce its emission intensity by 45% of its GDP by 2030 from its 2005 level and will meet about 50% of its energy requirements from renewable energy or non-fossil fuel based energy by 2030. 17 Sustainable Development Goals (SDGs) established by the United Nations General Assembly in 2015 which aims to achieve better and

more sustainable future for people and our planet by 2030. SDG no. 13 deals with the climate action. The official mission statement of this goal is "Take urgent action to combat climate change and its impacts". SDG no. 13 has five targets which are to be achieved by 2030. According to SDG no. 13, greenhouse gas must be reduced to half by 2030 and net zero by 2050. To fulfil these objectives strong and bold actions must be taken by the policy making bodies of any country and active participation must be accompanied by the industries, business and citizens of the world. To achieve the India's NDCs Prime Minister of India Mr. Narendra Modi proposed five-fold strategies in Glasgow in 2021 at COP26. These five-fold strategies are popularly known as 'Panchamrita' means five 'ambrosia'. These five-fold strategies are as follows-

1. India will reach its non-fossil energy capacity to 500 GW by 2030.
2. By 2030, India will meet 50% of its energy requirements from renewable energy.
3. India will reduce the total projected carbon emissions by one billion tonnes from now onwards till 2030.
4. India will reduce the carbon intensity of its economy by less than 45% by 2030.
5. India will achieve the target of Net Zero emission by 2070.

But, to achieve all these targets as proposed in 'Panchamrita' provisioning of finance to the tune of Rs.11 lakh crores per year from 2015 to 2030 is required. The fund which is used for funding all these environment friendly initiatives is known as Green Finance. So in this situation it is important to discuss about the different aspect of Green Finance particularly from the India's view point.

According to the SEBI, funds are classified as 'green' only if the funds raised are utilized for eight broad categories that include renewable energy, clean transportation, sustainable water management, biodiversity conservation, etc. In a narrow term Green Finance may be defined as the provision of environment friendly product or services such as green cards, green loans, green bonds etc. In a broader term it can be defined as funding for the environmental friendly technologies, product, services, industries, businesses and for environmental friendly initiatives. Green finance includes all the actions and initiatives such as developing, implementing and promoting projects that have sustainable impacts. Green finance is known as environmentally responsible investment and climate change investment that leads to better environment. There are three sources of green finance namely, domestic public finance, international public finance and private sector finance. Domestic public finance is the finance which is made directly by the Government of a home country. International Green finance is the finance which is made by the international organization and multilateral developments banks. On the other hand, private sector green finance is made by both domestic and international private players. Green finance can be broadly classified in the following four categories (Jin Noh Hee, Financial Strategy to Accelerate Innovation for Green Growth (2010)-

a) Retail green finance

i) Green mortgage

ii) Green home equity loan

- iii) Green commercial building loan
- iv) Green car loan
- v) Green credit card
- b) Corporate green finance
 - i) Green project finance
 - ii) Green securitization
 - iii) Green venture capital and Private equity
 - iv) Technology leasing
 - v) Carbon finance
- c) Green insurance
 - i) Auto insurance
 - ii) Carbon insurance
 - iii) Green insurance
 - iv) Catastrophe insurance
- d) Green Assets Management
 - i) Fiscal fund (Treasury fund)
 - ii) Eco fund, carbon fund
 - iii) Natural Disaster Bond
 - iv) Eco ETF

1.2 Some important concept related to Green Finance:

a. Green Mortgages- In green mortgages a bank offers some preference to the borrower in the form of lower interest rate for the loan or high loan amount if the purchasing property meets some specific environmental standards. In this mortgage incentives are given for purchasing green building or renovating an existing house to a greener house.

b. Green Loans

In this case loans are given for supporting sustainable and environmental friendly initiatives such as installing household solar panels on the roof of a house, purchasing electric automobiles, developing energy efficiency projects etc.

c. Green Banks

Green bank provides low cost capital for environmental friendly initiatives, sustainable and low carbon emitting projects.

d. Green Bonds

It is also known as climate bond. It is fixed income securities issued to raise finance for climate and environmental projects. Green bond may offer tax incentives to attract investors. 2. Review of Literature:

Sarangi K. Gopal (2018): The objectives of the study was to identify the challenges of securing necessary finance for investment in renewable energy sector, as India is trying to increase the quantity of renewable energy in energy mix. He points out different challenges for financing in renewable energy sector such as short tenure of loans, high capital cost, lack of adequate debt financing etc. He also pointed out that India is taking different necessary steps to solve these problems by establishing green banks, issuing green bonds, infrastructure debt bonds, sourcing crowd funding etc.

Shabu, K. & Vasanthagopal, R., (2020): The objectives of the study was to make a comparison between India and China about the different policies relating to green finance, instruments used for green finance and application of different green practices and to provide suggestions regarding the scope of improvement in green practices. They conclude that both the countries are doing well in terms of green banking, green IPOs and green practices. But, India is lagging behind China in term of green funds, green rating system and green insurance. They also found that India has well-structured government policies in the field of green finance but its implementation and reach among the end users is very poor.

Kumar, N., Vaze, P., & Kidney, S. (2019). The objective of the study was to explore the initiatives taken by both private and public sector undertaking or banks in the field of green finance and to identify the different challenges in promoting green finance in India They conclude that the government should have a transparent investment policy for a long term period in the field of green finance to create trust and confidence among the investors. They also conclude that the green finance instruments should be designed in such a manner that it should attract both local and international investors as large amount of investment is required from both the domestic and international investors.

Jha,B, & Bakhshi,P., (2019): The objective of the study was to identify the recent trends, future opportunities of green finance in India and the role of the Govt. in removing the barriers in green finance. They concluded that there are number of challenges in promoting green finance in India such as technology related risk, currency risk, lack of awareness among the investors about the green finance and lack of structured green

finance policy etc. They also suggested that there must be clear and transparent green finance policy framed by the Govt. to remove the challenges of green finance in India.

RESEARCH GAP

From the past study it is observed that no details study has conducted in India about the India's effort towards the fulfilment of India's Nationally Determined Contribution (NDCs). It is also observed that no study in India has conducted in detail about the current status of green finance flows in India covering the benefits and challenges of green finance. So, considering the gap of the earlier research following objectives were formulated for the present research.

OBJECTIVES OF THE STUDY

Considering the importance of Green Finance in the context of fulfilment of NDCs by 2030, following objectives are set for the study-

1. To study about the India's journey towards fulfilment of India's NDCs by 2030.
2. To identify about the benefits and challenges of Green Finance and
3. To study about the current status of Green Finance flows in India.

METHODOLOGY AND DATA SOURCES

The study is descriptive in nature. For this study only secondary data have been used and the data have been collected from the different websites, Journal, newspapers, books etc. For analysing the data very simple methodology percentage, CAGR etc. have been used. All the data used in this study is annual average data of two years.

INDIA'S JOURNEY TOWARDS THE FULFILMENT OF INDIA'S NDCS BY 2030

India is considering the climate change very seriously not only from the period of 2015 but also taking it very seriously from a number of years back. Some of the important milestones which lead to introduction of the concept of Green Finance are as follows-

Year	Activities
2007	Reserve Bank issued a notification on “Corporate Social Responsibility, Sustainable Development and Non-financial Reporting – Role of Banks”
2008	The National Action Plan on Climate Change (NAPCC) was formulated with a vision to outline the broad policy framework for mitigating the impact of climate change.
2011	The Climate Change Finance Unit (CCFU) was formed within the Ministry of Finance as a coordinating agency for the various institutions responsible for green finance in India.
2012	Implementation of the sustainability disclosure requirements. Security and Exchange Board of India (SEBI) made it mandatory for top 100 listed entities based on market capitalisation at BSE and NSE to publish annual business responsibility reports since 2012.
2017	<p>a) SEBI issued guidelines for green bond issuance specifying the disclosure requirements.</p> <p>b) Ministry of Corporate Affairs imposed mandatory reporting of the progress on Corporate Social Responsibilities (CSR) under the Companies Act, 2013.</p> <p>c) Report of the Committee on Corporate Governance has proposed that the board of directors shall meet at least once a year to specifically discuss strategy, budgets, board evaluation, risk management, ESG and succession planning.</p>
Budget 2022-23	<p>Several measures were announced by the Finance Minister of India to help the country transition to a low-carbon economy.</p> <ol style="list-style-type: none"> 1. Allocates ₹19,500 crore for Production Linked Incentive (PLI) scheme for the domestic manufacturing of solar power components which will help in installing 280 GW solar capacities by the year 2030. 2. Proposal for co-fire 5-7% biomass pellets in thermal power plants which will result in carbon dioxide reduction. 3. Announced battery swapping policy for giving impetus to Electric Vehicles (EV) eco system. 4. Announce to develop Energy Service Company (ESC) business model in large commercial building to increase energy efficiency in large commercial building.

5. Announce to introduce Sovereign Green Bonds in 2022-23.
6. Announce to reduce GST rates on Electric Vehicles (EVs) and their parts.

Several announcements were made by the Finance Minister of India to facilitate the transition of the economy into low-carbon and green economy.

Budget 2023-24

1. Announce the National Green Hydrogen Mission, and allocates of Rs 19,700 crore to facilitate the transition of the economy into a low-carbon intensity and green economy and reduce dependence on fossil fuel imports.
2. Announce to notify Green credit program under the Environment Protection Act for responsive actions by individuals and companies to encourage environment-friendly behaviour.
3. Allocates Rs 35,000 crore for priority capital investment towards energy transition, net-zero carbon emission objective and energy security.

India is also giving several fiscal and financial initiatives to fulfil the commitments made under the 2015 Paris Agreement to reduce greenhouse gas emission intensity 45% of GDP below 2005 levels and to achieve 50% of installed electric power capacity from non-fossil fuel sources by 2030. Government of India (GOI) offers subsidy to institutional and residential sectors 30 % to 70% of installation cost rooftop solar panels.

CURRENT STATUS OF GREEN FINANCE FLOWS IN INDIA

Current status of green finance flows in India has been analysed on the basis of the various reports namely Global Landscape of Climate Finance and Landscape of Green Finance in India published by the Climate Policy Initiative. According to the United Nations Environment Programme there are certain difference among the sustainable finance, green finance and climate finance.

Sustainable finance is the broadest term which includes all financing activities that contribute to the sustainable development. It includes environmental, social, governance and economic aspects.

Green finance includes climate finance but excludes social and economic aspect.

Climate finance is a subset of green finance.

Table 1. Global Climate finance flows between 2011-2020 (biannual average in USD bn)

Year	USD bn	Sources				
		% of Growth	Private	% of Growth	Public	% of Growth
2011-12	364	-	203	-	161	-
2013-14	365	0.27	220	8.37	145	-9.9
2015-16	463	26.9	249	13.1	215	48.27
2017-18	579	25.0	326	30.9	253	17.67
2019-20	632	9.1	310	-4.9	322	27.27

Sources: Various Report on Global Landscape of Climate Finance by Climate Policy Initiative (CPI)

Table 1 shows the position of global climate finance flows between the period 2011-2020 segregating it into flows from private and public sources. It is found that overall flows of climate finance shows a positive growth during the period but growth of climate finance from private source and public source show a negative growth in the year 2019-20 and 2013-14 respectively. Highest growth rate of climate finance shows in the year 2015-16. It is also found that CAGR from 2011-12 to 2019-20 for overall climate finance flows is 11.67%, CAGR of climate finance flows from private sources is 8.84% and CAGR of climate finance flows from public sources is 14.87%.

Table 2. Green Finance flows by instruments in India during the period 2019-2020

Types of Instruments	Amount (INR thousand Crore)	Percentage (%)
Balance sheet financing (Debt- portion)	89727	29%
Balance sheet financing (Equity- portion)	74257	24%
Govt. Budgetary Expenditure	58787	19%
Low cost Project debt	49505	16%
Project level equity	6188	2%
Project level market rate debt	12376	4%
Grant	18564	6%
Total	3,09,404	100%

Sources: Report on Landscape of Green Finance in India 2022 by Climate Policy Initiative

Table no.2 shows the green finance flows instruments wise (What mixes of financial instruments are used?) in India during the 2019-20. It is found from the table that debt accounted for 49% of the total finance flows, equity accounted for 26% of the total finance flows, Govt. budgetary expenditure accounted for 19% and grant accounted for 4% in the total finance flows.

Table 3. Sector wise flow of green finance for Climate mitigation in India during the period 2019-20

Sectors	2019-20	
	Amount (INR'000 Crores)	%
Clean Energy	1,29,824	42
Clean transportation	60,719	20
Energy efficiency	1,18,861	38
Total	3,09,404	100

Sources: Report on Landscape of Green Finance in India 2022 by Climate Policy Initiative

Table 3. shows flow of green finance for climate mitigation sector wise. It is found that clean energy sector attracts maximum percentage of green finance followed by energy efficiency and clean transportation sector respectively.

Table 4 Sector wise finance flows to Clean Energy sector during the period 2019-20

Sectors	Amount (INR,'000 Crores)	Percentage (%)
Bio fuel	973	0.75
Energy storage	3,432	2.64
Hydro energy	25,899	19.95
Renewable energy multiple	21,592	16.63
Rooftop solar PV	9,300	7.16
Solar PV	44,899	34.58
Wind onshore	22,787	17.55
Others	942	0.74
Total	1,29,824	100

Sources: Report on Landscape of Green Finance in India 2022 by Climate Policy Initiative

Table 4 shows the green finance flows sector wise within the clean energy production sector. It is found from the data that Solar PV sector attracts maximum (34.58%) followed by hydro energy (19.95%), wind onshore (17.55%) and renewable energy multiple (16.63%).

Table no. 5 shows the sources of finance flow to clean energy sector. It is found from the table that Public Sector Undertakings (PSUs) (34.60%) % is the main source of finance flow to the clean energy sector followed by Commercial FIs (26.76%), corporation (12.59%) and Union and State Govt. budgets (11.43%).

Table 6. shows the green finance flows for climate adoption policy during the period 2019-20. Total green finance flows to climate adoption sectors was Rs.74000 Crores during the two years 2019 and 2020 and on an average Rs.37000 crores per annum. It is found that maximum green finance flows for flood and cyclone mitigation (66.33%) followed by drought management (20.80%) and disaster preparedness and capability

building (11.65%). Out of total green finance flows for climate adaption sector 94 % (34,836 crores) was from domestic sources and 6% (2,087 Crores) was from international sources.

Table 7 shows the segregation of green finance flows to the mitigation sector into private and public sources. It is found that about 60% finance are from private source and balance is from public source. It is also observed that in energy efficiency sector share of private source is maximum and in clean energy sector share of public source is maximum.

Table 5 Sources of finance flow to clean energy sector during the period 2019-20

Sources	Amount (INR,'000 Crores)	Percentage (%)
Commercial FIs	34,740	26.76
Corporation	16,339	12.59
Bilateral	2,011	1.55
Multilateral	3,616	2.79
FDI	8,978	6.92
PSU	44,922	34.6
Union & State Govt. budgets	14,843	11.43
Residential, commercial and institutional	4190	3.23
Philanthropy	185	0.13
Total	1,29,824	100

Sources: Report on Landscape of Green Finance in India 2022 by Climate Policy Initiative

Table 6. Green finance flows to Climate adaption sectors during the period 2019-20

Sectors	Amount of Investment (INR,'000 Crores)	Percentage (%)
Disaster, Monitoring and Emergency Response System(DMER)	277	0.75
Flood and Cyclone mitigation	24,492	66.33
Drought Management	7,682	20.80
Disaster preparedness and Capability building	4,303	11.65
Disaster Risk Reduction	169	0.47
Total	36,923	100

Sources: Report on Landscape of Green Finance in India 2022 by Climate Policy Initiative

Table 7. Domestic green finance flows to mitigation sectors (INR thousand crores)

Sectors	Private	Public
Clean Energy	46,196	59,765
Clean transportation	2,302	41,957
Energy efficiency	1,08,473	4,999
Total	1,56,971	1,06,721

Sources: Report on Landscape of Green Finance in India 2022 by Climate Policy Initiative

Table 8 shows the instruments used for flowing finance from domestic sources and classification of instruments into public and private sources for the year 2019 and 2020. It is observed that in both the years' private source dominates the public source.

Table No. 8 Instruments of Green Finance flows by domestic sources (INR thousand Crores)

Sources	%		Nature
	2019	2020	
Commercial FIs Corporation	39	32	Private
Residential, Commercial & Institutional	10	3	
PSU	15	20	Public
Union & Sate Govt. Budgets	17	21	
Total	19	24	
	100	100	

Sources: Report on Landscape of Green Finance in India 2022 by Climate Policy Initiative

Table 9. Instruments of Green Finance flows by International sources (INR thousand Crores)

Sources	%		Nature
	2019	2020	
FDI	24	17	Private
Commercial FIs Corporations	9	18	
Philanthropy	5	6	
Bilateral DFIs	1	1	Public
Multilateral DFIs	35	36	
Total	26	22	
	100	100	

Sources: Report on Landscape of Green Finance in India 2022 by Climate Policy Initiative

Table 9 shows the instruments used for flowing finance from international source and classification of instruments into public and private source for the year 2019 and 2020. It is interestingly observed that in both the years' public source dominates the private source.

BENEFITS OF GREEN FINANCE

- a. Helps in development of environmental friendly technologies and infrastructure.
- b. Leads to low carbon economy.
- c. Leads to sustainable environment and sustainable development.
- d. Leads to ultimate better human life without destroying nature.
- e. Creates new green business opportunities and new jobs.
- f. Encourages sustainable business.
- g. Lower transition risk for the investors for investment in green finance.
- h. It helps the government and companies to meet ambitious climate targets.

CHALLENGES OF GREEN FINANCE

- a. High borrowing cost of green bond in comparison to other corporate and government bonds in India.
- b. 'Greenwashing' or false claims of environmental compliance made by the different corporates and government agencies.
- c. Lack of particular and details disclosures requirement for issuing green bonds by SEBI.
- d. Maturity mismatches between long term green investment and short term investors interest.
- e. Limited capital and limited awareness about the environmental issues and financial markets.
- f. Gap in adequate regulatory and technical infrastructure to measure, assess and analyse green business strategies and financing.

CONCLUSION

As per estimation, approximately Rs.162.5 lakh crores(USD 2.5 trillion) is required up to 2030 and approximately Rs.716 lakh crore (USD 10.1 trillion) required to achieve net zero emission by 2070. But, present tracked green finance is only about 25% of the total requirement of the green finance to achieve India's NDCs. Domestic sources has played a very vital role in supplying green finance in India but to achieve the target more flow in the form of green finance is required from the international sources as well. It is also understood that public source as well as private source have to play a vital role in supplying green finance in India. Green finance flows has increased 150% in 2019-20 in comparison to 2017-18 but this not sufficient to achieve the target or to reach the ambition. Flows of finance from public source has increased by 179 whereas from private sources has increased by 130% in 2019-20 in comparison to 2017-18 but growth in flow from private source must be outpace the public source in years to come to fulfil our NDCs. To increase the flow of green finance there must be a clear, transparent and structured guidelines relating to the different aspect of green finance. Relating to issue of green bonds SEBI must issues proper guidelines and detail disclosures requirement.

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