

Examining International Green Finance Flows for Renewable Energy in India



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I. State of Green Finance in India

The world is grappling with an economic slowdown due to reasons such as the Russia-Ukraine war, stagnant economic growth, as well as the COVID-19 pandemic. India is no outlier in this trend. However, the Government of India (GoI) has focused on the revival of the economy through a host of efforts including monetary policies to contain inflation and strategies to improve the sovereign credit ratings.^{1,2} The Indian policymakers are prioritising economic growth for the coming decade³ as the country has also pledged notable climate commitments at the global fora such as increasing its share of non-fossil fuel electricity generation capacity to 500GW by 2030 and net-zero emissions by 2070.⁴ These climate commitments must be leveraged to bring about the desired economic growth in the coming decades. It will send a positive signal to the world that India is firm in its fight against climate change and prudent policies, regulations, and financing mechanisms are being developed to meet these targets.⁵

Realising this behemoth task will require mobilisation of more than USD 2.5 trillion between 2015 and 2030 in investment in the Renewable Energy (RE) and allied sectors for climate action.⁶ In addition, it is estimated that meeting the net-zero target by 2070 will require investments to the tune of USD 10 trillion.⁷ The global green finance sector will play a vital role in succoring India to meet its climate commitments.

Between 2016-2018, the green finance flows into India stood at USD 38 billion, and of this, only 15 percent (USD 5.7 billion) were from international sources.⁸ Though the inflow of green finance has been steadily growing in India, there exists a massive demand and supply gap in the green funds required to meet India's climate commitments.⁹ Furthermore, it has been well established that domestic finance will not be able to meet the requirement and there is a need for international investment to play a central role. The pledge of developed economies to provide USD 100 billion every year to developing countries for climate action must see the light of day at the earliest¹⁰. This can be channeled via financial markets, international development finance, institutional investment, and more.

A. Green Finance Taxonomy and Regulation in India

Green finance is essentially a financial arrangement that includes a host of equity and debt instruments that have been designed for environmentally sustainable or climate change-related projects.¹¹ India's green finance sector is still at a nascent stage and a working group has been established under the Ministry of Finance (MoF) to develop green finance taxonomy in the country.¹² There are a few initiatives taken around green finance in India such as the release of 'Disclosure Requirements for Issuance and Listing of Green Debt Securities' by the Securities and Exchange Board of India (SEBI), the inclusion of RE projects in the Priority Sector Lending (PSL) by Reserve Bank of India (RBI), among others.^{13,14} Also, there is a growing participation of Indian entities in global flagship programs like the Principles for Responsible Investment (PRI). Around 25 signatories

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- 1 See: <https://economictimes.indiatimes.com/news/economy/indicators/rbi-to-increase-rates-but-hikes-need-not-be-end-less-says-shaktikanta-das/articleshow/91823101.cms>
 - 2 See: <https://economictimes.indiatimes.com/news/economy/finance/moodys-upgrades-indias-ratings-outlook-to-stable-from-negative-on-receding-downside-risks/articleshow/86784379.cms?from=mdr>
 - 3 See: <https://www.livemint.com/news/india/moody-s-downgrades-india-s-sovereign-rating-to-baa3-outlook-negative-11591021116588.html>
 - 4 See: <https://pib.gov.in/PressReleasePage.aspx?PRID=1795071#:~:text=50%20per%20cent%20of%20its,net%20zero%20emissions%20by%202070.>
 - 5 See: <https://www.indiatoday.in/science/story/budget-2022-climate-change-action-solar-clean-energy-narendra-modi-net-zero-cop26-1907221-2022-02-01>
 - 6 See: <https://shaktifoundation.in/wp-content/uploads/2020/09/Landscape-of-Green-Finance-in-India.pdf>
 - 7 See: <https://www.weforum.org/agenda/2022/01/green-finance-bolster-india-transition-net-zero/>
 - 8 See: <https://www.climatepolicyinitiative.org/publication/landscape-of-green-finance/>
 - 9 See: <https://shaktifoundation.in/wp-content/uploads/2020/09/Landscape-of-Green-Finance-in-India.pdf>
 - 10 See: <https://www.oecd.org/newsroom/statement-by-the-oecd-secretary-general-on-future-levels-of-climate-finance.htm#:~:text=The%20annual%20goal%20for%20developed,to%20be%20sustained%20to%202025.>
 - 11 https://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/04AR_2101202185D9B6905ADD465CB7DD280B88266F77.PDF
 - 12 See: <https://carboncopy.info/indias-proposed-sustainable-taxonomy-lessons-to-remember-worries-to-address/>
 - 13 See: https://www.sebi.gov.in/legal/circulars/may-2017/disclosure-requirements-for-issuance-and-listing-of-green-debt-securities_34988.html
 - 14 See: https://www.rbi.org.in/Scripts/BS_ViewMasDirections.aspx?id=11959#Renewable_Energy

have been part of this initiative till 2021, increasing from eight signatories in 2019¹⁵. Another notable mention is the publishing of Environment Social Governance (ESG) indices by the two major stock exchanges in India i.e., the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE).

Considering the huge green investment potential in India, there is an urgent need to standardise the definition of green finance, establish eligibility criteria, and map the sectors that would fall under the taxonomy of green finance. This would help attract international capital by reducing the risk perception as well as reducing information asymmetry about how and what is labelled as green finance.¹⁶ In addition, this will help streamline the investments in environmentally sensitive sectors.

As stated earlier, the sector is currently regulated by various government agencies including the Climate Change Unit within the MoF, RBI, and SEBI, as well as other line ministries such as the Ministry of Power (MoP). Such a regulatory environment creates uncertainty and enhances risk perception amongst investors. To address this, India has joined the International Platform on Sustainable Finance (IPSF) to develop domestic green finance regulations. The enabling governance framework would facilitate the flow of green investment in India and enhance capital flow to the climate change sectors.

B. Instruments for International Finance Flows in India

The conjunction of both international and domestic finance is necessary to meet the climate targets set by India at the global fora. Of this, the former will have to be the bigger contributor to accomplish sustainable growth¹⁷. There are a host of financial instruments to facilitate international capital inflows for green projects, including the RE sector, as discussed below:

Debt: This includes instruments such as green loans and green bonds extended to RE projects. This instrument contributed close to 92 percent of the total international financial inflows into India until 2020, making it the largest source of capital despite costing between 24-34 percent higher in India compared to the USA or Europe.

Green Bonds

Green bonds are another vital green finance instrument. These are fixed-income financial instruments that adhere to certain criteria on the use of proceeds and raise funds for environmentally beneficial projects. To date, India has issued USD 18.8 billion worth of green bonds¹⁸. Of this, close to 60 percent were directed towards the financing of RE projects in India. This has risen substantially from USD 3.2 billion in 2015-17 with the issuance of green bond regulations by the Security and Exchange Board of India (SEBI) in 2017¹⁹.

Equity: Equity can be contributed through various channels including public-private partnerships, joint ventures, private equity, etc. Equity investments involve risk and profit-sharing. In addition, skills, resources, and management responsibilities may also be shared among the contracting parties. As of 2020, equity investments accounted for around 6 percent of total international investment in RE projects in India.

Grants: These are budgetary allocations made by the foreign development financial institutions to support the external costs or technical assistance components of the project. These accounted for merely two percent of total international investments in RE space in India till 2020.

Crowdfunding: This is a relatively novel method of gathering funds from small private investors. However, it has proven to be an effective method of funding decentralised RE projects in India. Even though the quantum of funding is not substantial, it can still improve the lives of people at the grassroots level.

15 See: <https://www.unpri.org/signatories/signatory-resources/signatory-directory>

16 See: <https://carboncopy.info/indias-proposed-sustainable-taxonomy-lessons-to-remember-worries-to-address/>

17 See: <https://www.adb.org/sites/default/files/publication/446536/adbi-wp863.pdf>

18 See: <https://www.climatebonds.net/market/data/#country-map>

19 See: https://www.sebi.gov.in/sebi_data/meetingfiles/1453349548574-a.pdf

In addition to these, there are several other financing instruments such as green indices, green venture capital, green insurance, green banking, sustainability bonds, social bonds, green loans, sustainability-linked loans, and more.²⁰ However, only around eight out of 18 green financial instruments found across the world are present in India²¹.

II. International Aid for Renewable Energy

A. India's Partnership Initiatives with the World

Global climate finance flows have increased over the past decade. Despite an upward trend, the rate of increase in climate finance has not been commensurate to the inflow requirements. Realising international targets by 2030 requires climate finance flows to increase by a massive 590²² percent, which translates to an estimated USD 4.35 trillion²³. India's Nationally Determined Contributions (NDCs) are estimated to require USD 2.5 trillion up till 2030, averaging about USD 170 billion annually. Specific to RE projects, the financial projections by prominent agencies are predicted to be between USD 220 to 250 billion²⁴ ²⁵ from now until 2030. Government predictions estimate that an investment of USD 18.7 to 25 billion²⁶ is required annually to achieve India's 2030 RE targets, however, the current annual investments stand at USD 9.3 billion, amounting to less than 50% of the requirement. In this regard, global collaborations are critical to raising investments to aid India to achieve its climate goals. Table 1 is a snapshot of the major partnerships India has forged with other countries to raise investments in RE technologies.

Table 1: India's Global Partnerships and Initiatives for Climate Action

Partner	Initiative	Objectives
United States	Strategic Clean Energy Partnership; Climate Action and Finance Mobilisation Dialogue	<ul style="list-style-type: none"> • Mobilise green finance and accelerate clean energy deployment. • Demonstrate and scale sustainable technologies needed to decarbonise sectors including industry, transportation, power, and buildings. • Build capacity to measure, and adapt to the risks of climate-related impacts.
United Kingdom	Climate Finance Leadership Initiative	<ul style="list-style-type: none"> • Strengthen private capital by fostering an enabling environment with support from the Indian Government and the multilateral community. • Partnering with local stakeholders to mobilise capital through existing or new financing models suitable to market needs

20 See: <https://greenfdc.org/a-growing-toolbox-of-sustainable-finance-instruments/>

21 Prerana Sarma & Arup Roy, 2021. "Green financial instruments in India: a study on its current status and future prospects," International Journal of Business Innovation and Research, Inderscience Enterprises Ltd, vol. 26(2), pages 194-218

22 See: <https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2021/>

23 See: <https://indiaclimatecollaborative.org/wp-content/uploads/2022/04/climate-finance-infographic12.pdf>

24 See: <https://www.nrdc.org/experts/sameer-kwatra/financing-pathways-clean-energy-roadmap-india>

25 See: <https://about.bnef.com/blog/financing-indias-2030-renewables-ambition/>

26 Standing Committee Report on Energy (2022-23)

European Union	Clean Energy and Climate Partnership; International Platform on Sustainable Finance	<ul style="list-style-type: none"> • Mobilisation of private capital towards environmentally sustainable investments. • Developing sustainable finance regulatory measures. • Promote best practices, compare various initiatives and identify barriers and opportunities for sustainable finance
France	International Solar Alliance	<ul style="list-style-type: none"> • Mobilise USD 1,000 billion of investments in solar energy solutions by 2030. • Delivering energy access to 1,000 million people using clean energy solutions and resulting in the installation of 1,000 GW of solar energy capacity. • Mitigate global solar emissions to the tune of 1,000 million tonnes of CO2 every year.
Japan	Clean Energy Partnership	<ul style="list-style-type: none"> • Tapping into low-carbon sunrise sectors and exploiting new technologies and business models to reduce carbon emissions. • Five trillion yen proposed investment in India with a major chunk marked towards climate finance.
Australia	India-Australia Energy Dialogue	<ul style="list-style-type: none"> • Drive down the cost of technologies that will help reduce global emissions. • Signed Letter of Intent to support the aims of the Technology Investment Roadmap and the Long-Term Emissions Reduction Plan.
United Arab Emirates	Memorandum of Understanding (MoU) on Climate Action	<ul style="list-style-type: none"> • Establish a framework to facilitate and enhance bilateral cooperation on climate action and also contribute towards implementing the Paris Agreement. • Bilateral cooperation to include public-private partnership across renewable power deployment, agriculture efficiency, green hydrogen, sustainable finance, and carbon market development.

B. International Finance Trends for Renewable Energy in India

Year-Wise Investment: The period between 2015-20 saw a total investment of USD 7.2 billion. As can be observed in Figure 1, investments in 2016 were the highest at USD 2.2 billion. These investments see a common trend in the alternate years, where 2016 and 2018 have higher investments averaging USD 2 billion, and the remaining years averaging just USD 874.6 million. The decline in investment observed in 2020 can be attributed to the COVID-19 pandemic.

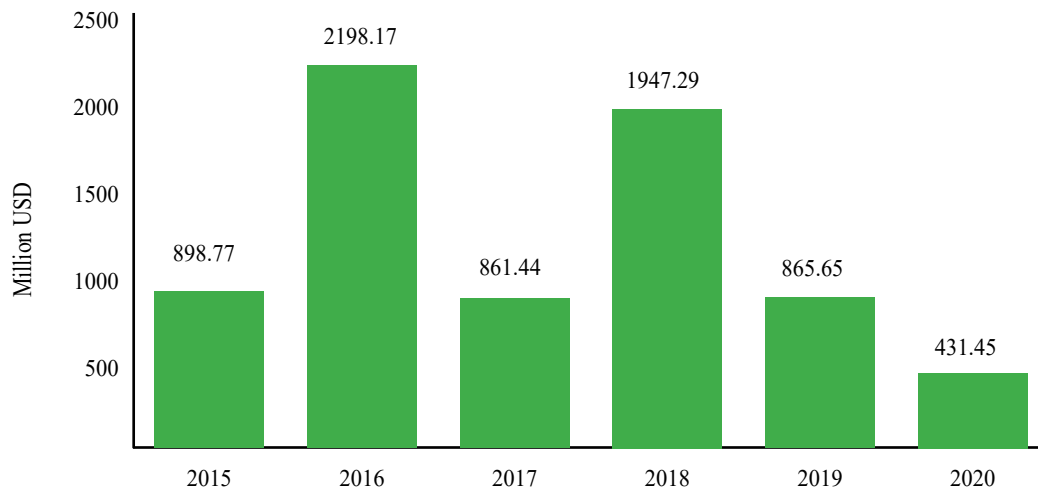


Figure 1: Year-Wise International Investment for RE in India²⁷

Major Investors: Since 2015, India has received investments from 24 unique donors operating through 43 unique agencies. Over the five years up until 2020, we look at the quantum of investment received from the top five donor countries and the top five contributing agencies towards India’s RE development. As observed in Figure 2, among the donor countries, Germany and the USA have been the largest investors contributing over a billion USD each. The International Finance Corporation (IFC) stands as the highest contributing multilateral agency with investments exceeding USD 1.3 billion.

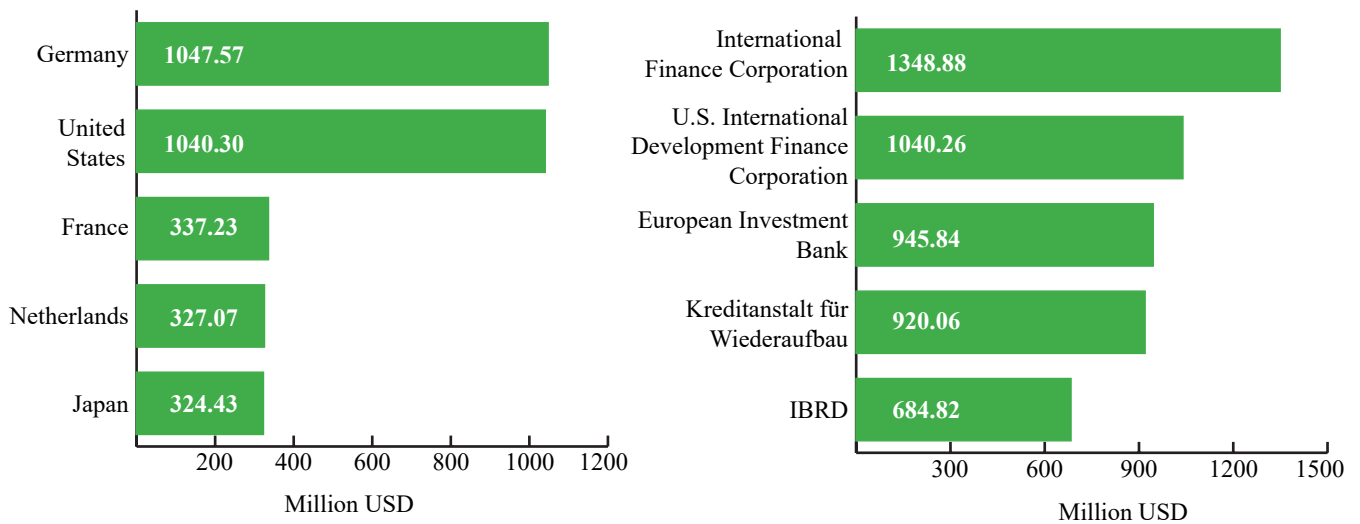
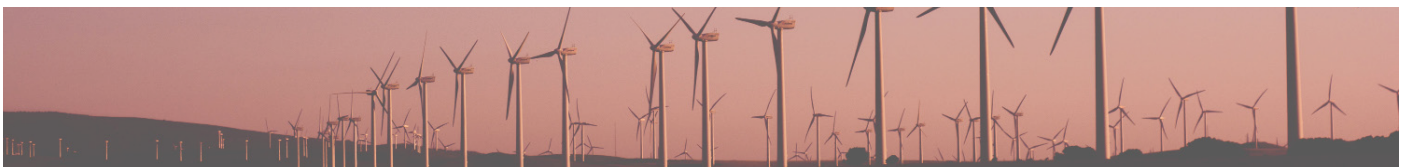


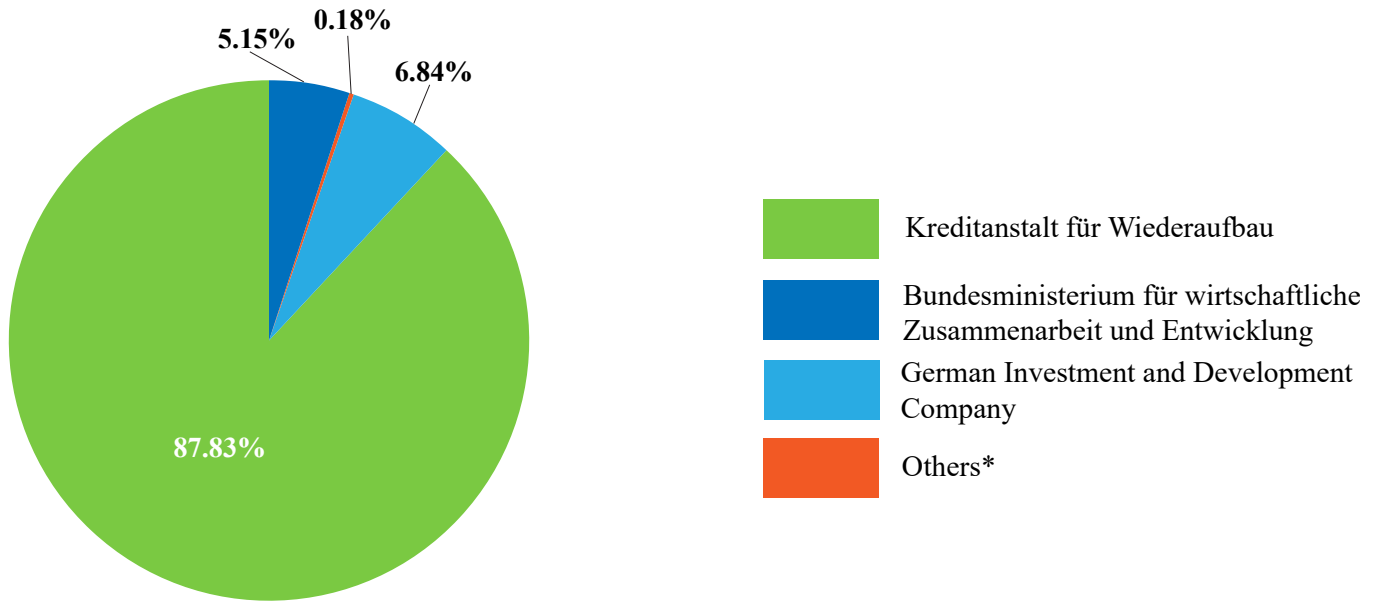
Figure 2: Top-5 Donor Countries and Agencies Contributing to RE Investments in India²⁸

The agencies through which Germany and the USA have primarily invested in India’s RE projects have been shown in Figure 3. Kreditanstalt für Wiederaufbau (KfW) has contributed close to 87.8 percent of Germany’s total investments in India. Similarly, almost all the investments from the USA have been made through the US International Development Finance Corporation.



27 See: <https://www.irena.org/Statistics/View-Data-by-Topic/Finance-and-Investment/Investment-Trends>

28 See: <https://www.irena.org/Statistics/View-Data-by-Topic/Finance-and-Investment/Investment-Trends>



*Others include German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety, German Federal Ministry of Education and Research, and UK Foreign Office.

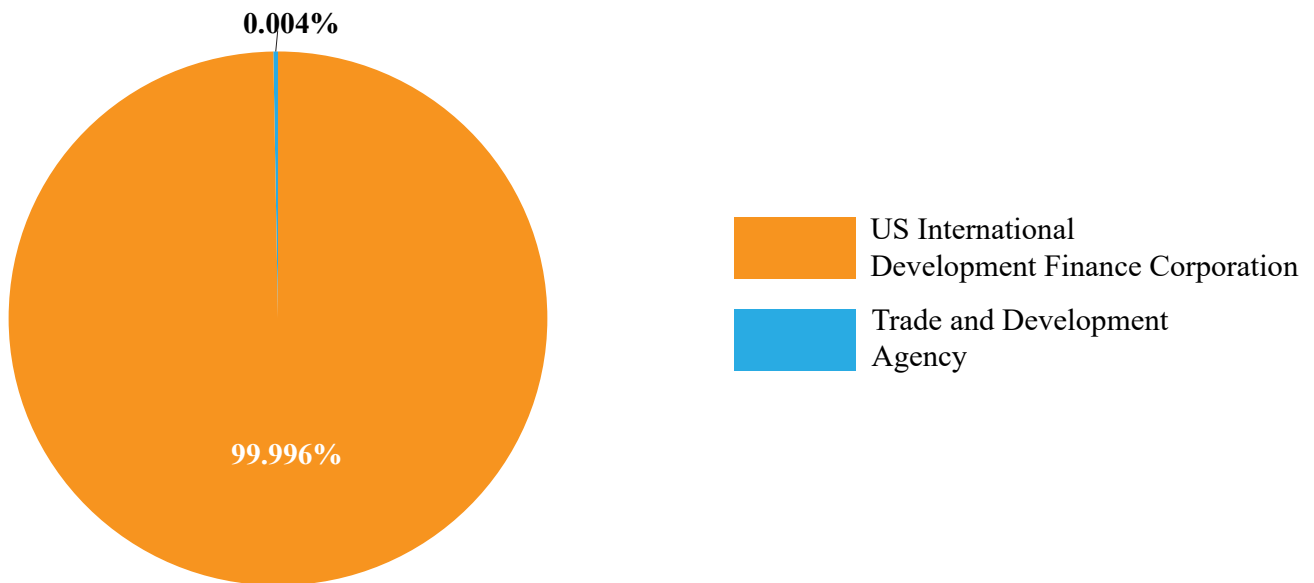
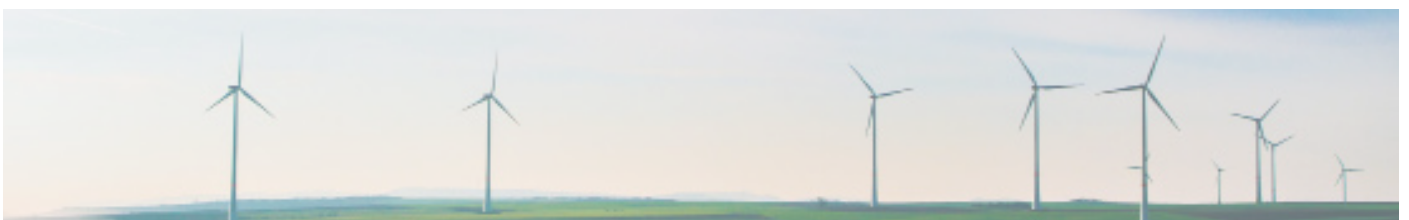


Figure 3: Agency-Wise Investment Distribution from Germany and the USA

The top five donor countries have invested periodically from 2015 until 2020 and their share of contribution over the years has been provided in Figure 4. The quantum of investment, however, varies on an annual basis. In the case of Japan, it is observed that 99.37 percent of its investment was made in the year 2018.



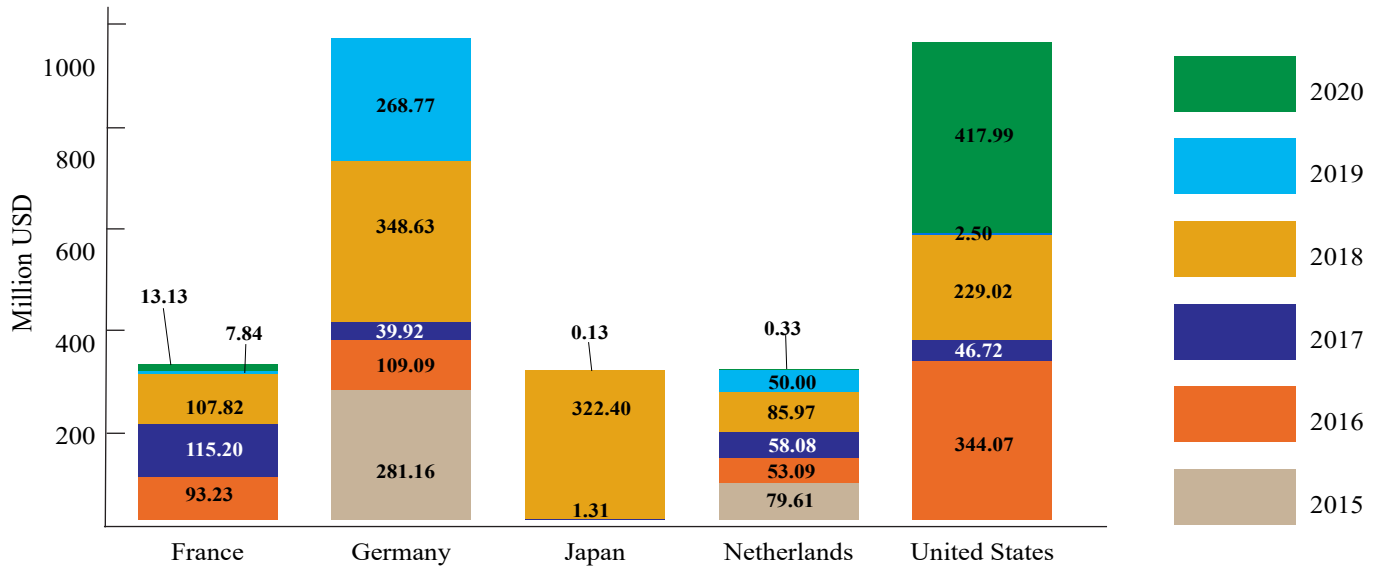


Figure 4: Top-5 Donor Year-Wise Investment

Among the 43 unique agencies, there have been four entities that have periodically engaged in investments between 2015 and 2020. The combined investments routed through these four agencies amount to 41 percent²⁹ of the total RE investments in India. Two agencies – FMO (Dutch Development Bank) and the Japanese International Cooperation Agency (JICA), though absent from the top-5 list, have been consistent contributors as well. Figure 5 represents the quantum of investment made by these agencies over the period in consideration.

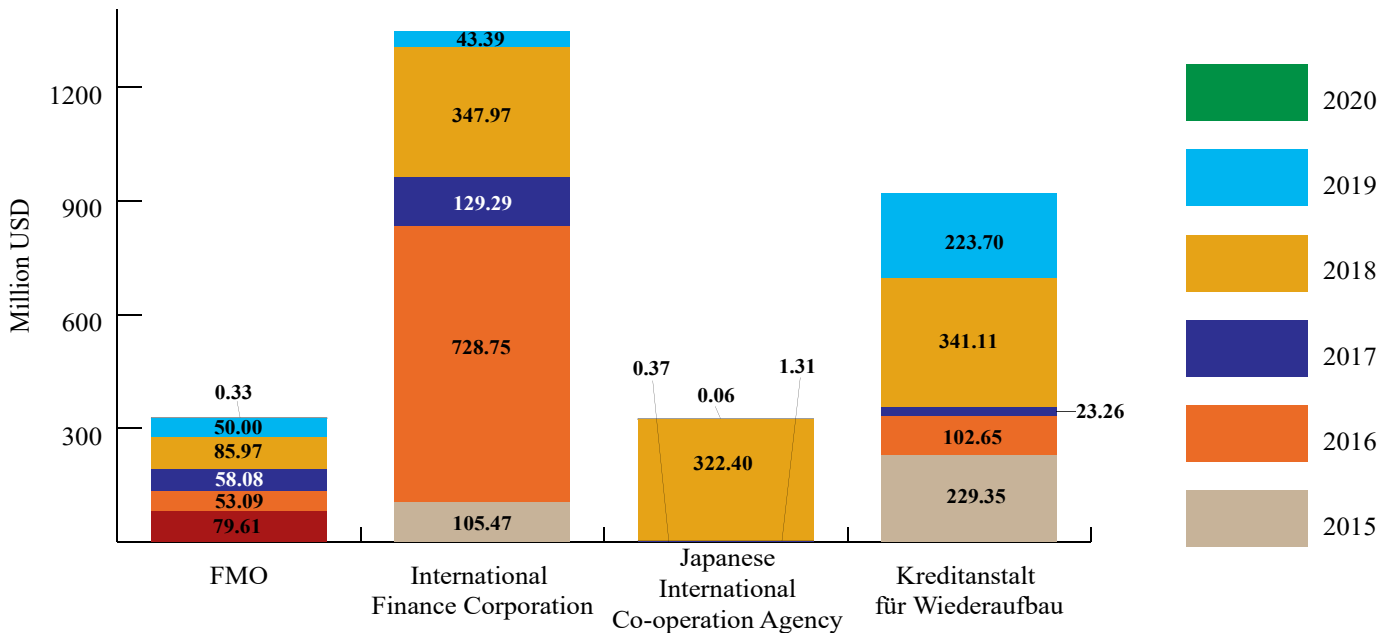


Figure 5: Consistent Investing Agencies from 2015-2020

Finance Group Trend: Among the host of financial instruments to facilitate international capital inflows for the RE projects, a major chunk of investments is through debt instruments. As observed in Figure 6, debt instruments have been constant over the 2015–20 period and are on average 15 times³⁰ larger in quantum than the second-largest finance instrument i.e., equity. Other instruments include *Guarantees* and other *Mezzanine Finance*, which have appeared sporadically over the five years.

29 Vasudha Analysis

30 Vasudha Analysis

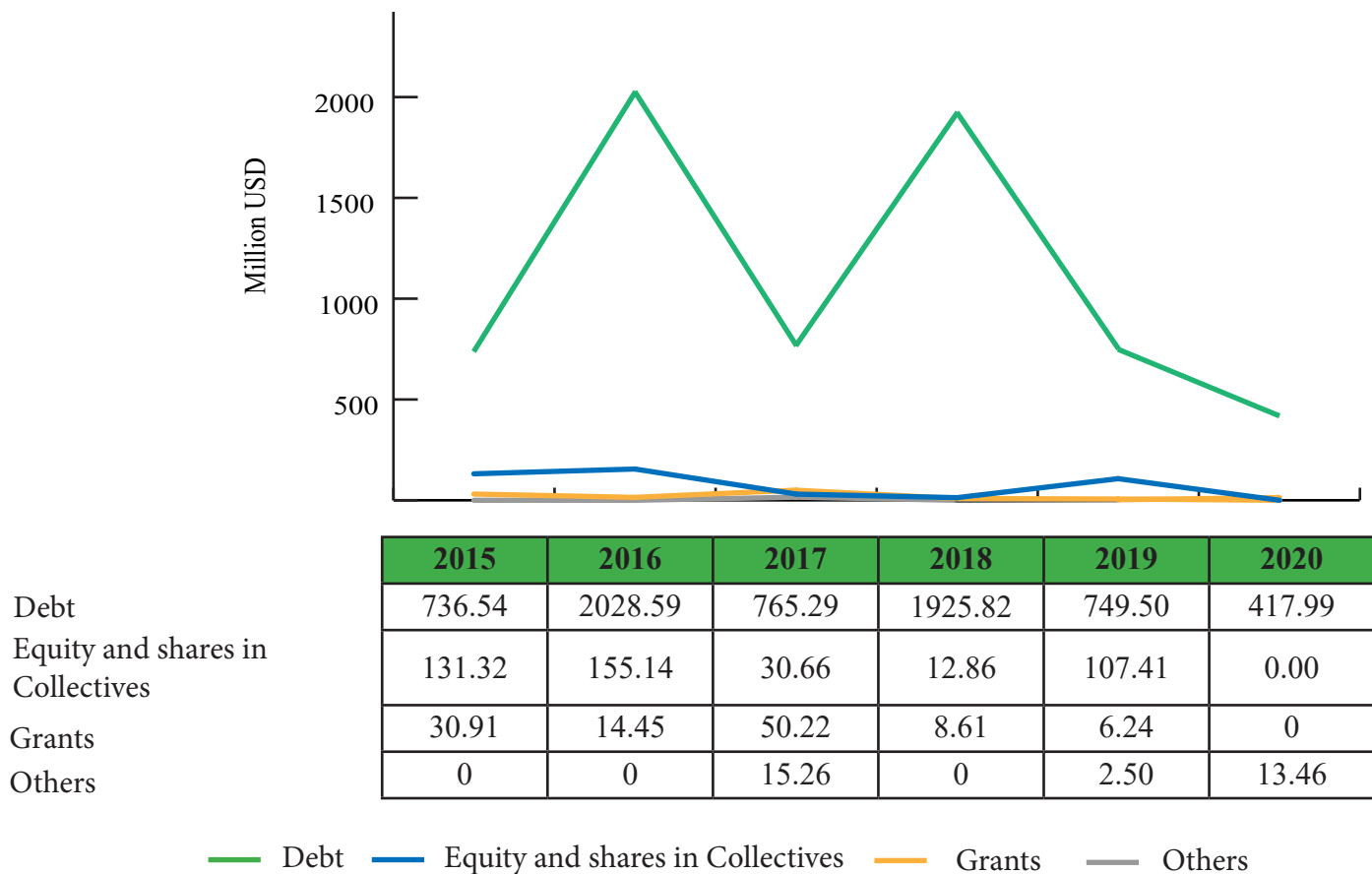
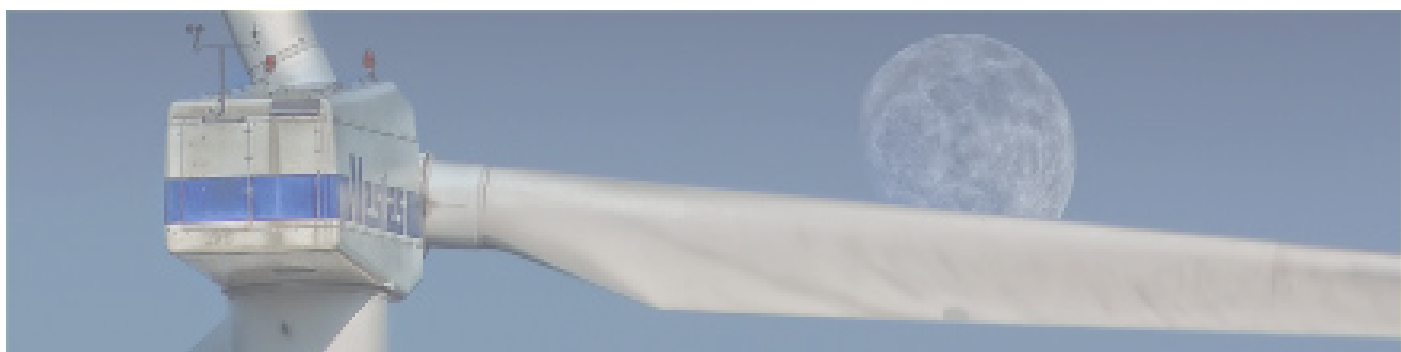


Figure 6: Investment Trend by Type of Finance Group³¹

III. Quantum of International Finance Provided for Various RE Technologies

Over the last decade, India's energy policy has concentrated on establishing favorable conditions for the commercialisation and cost reduction of RE technologies. As a result, the cost of RE sources like solar photovoltaic (PV) and on-shore wind has dramatically decreased. Interestingly, in India, these RE technologies are currently less expensive than both new coal-fired electricity and even a large portion of existing coal-fired generation.

International investments in India have played a key role in registering a growth of RE capacity addition, as shown in Figure 7. In the year 2015-16, investments increased significantly owing to policy incentives and an increase in demand for RE. This resulted in increased deployment in the subsequent years. During the years 2017-19, investments averaged around USD 1.2 billion, and a proportionate increase in RE deployment is observed as well. However, 2020 saw a significant dip in investments due to the COVID-19 pandemic.



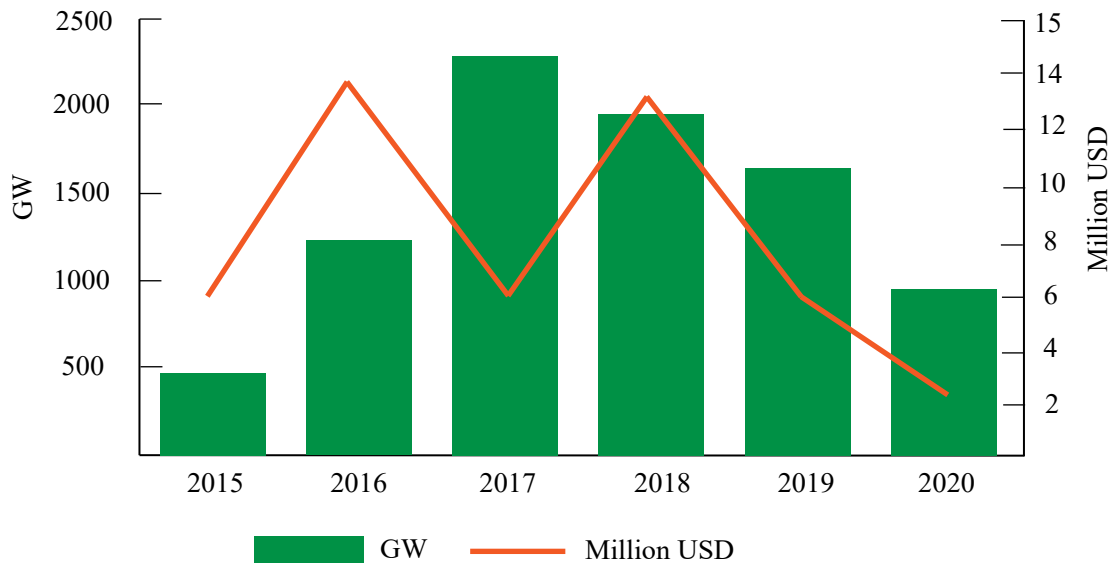


Figure 7: Year-Wise RE Capacity Addition vs International Investment Inflow

Over the past seven years, solar and wind energy have established their business cases in India and obtained access to mainstream international financing. However, other RE technologies continue to face obstacles. As Figure 8 shows, from 2015 to 2020, solar accounted for 47.4 percent or around USD 3.4 billion of the total international investments of USD 7.2 billion in India for RE³². In non-solar projects, wind accounted for 8.5 percent of the investment.

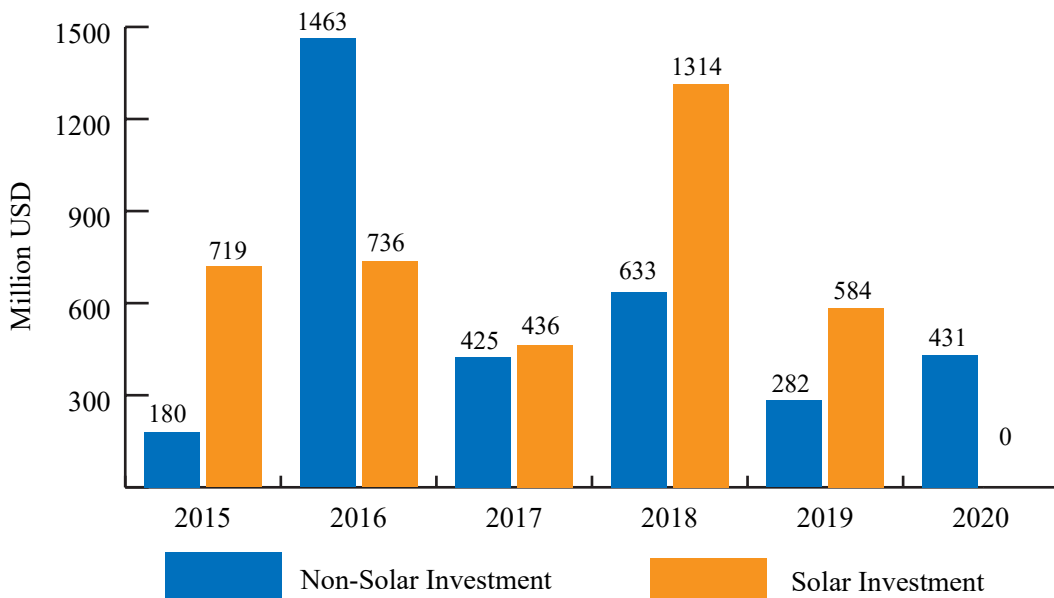


Figure 8: Solar v/s Non-Solar International Investment Trends³³

From Figure 9, it can be observed that there has been a significant gap in the investment trends for solar and wind. The core reason for this gap is the policy and regulatory uncertainties prevailing in the wind energy sector. Further exacerbating this situation is the imposition of a tariff cap on each auction. Also, since optimum wind availability varies by region, reaching the expected tariff rate becomes challenging for the developers.

32 See: <https://www.irena.org/Statistics/View-Data-by-Topic/Finance-and-Investment/Renewable-Energy-Finance-Flows>
 33 International Renewable Energy Agency, 2022

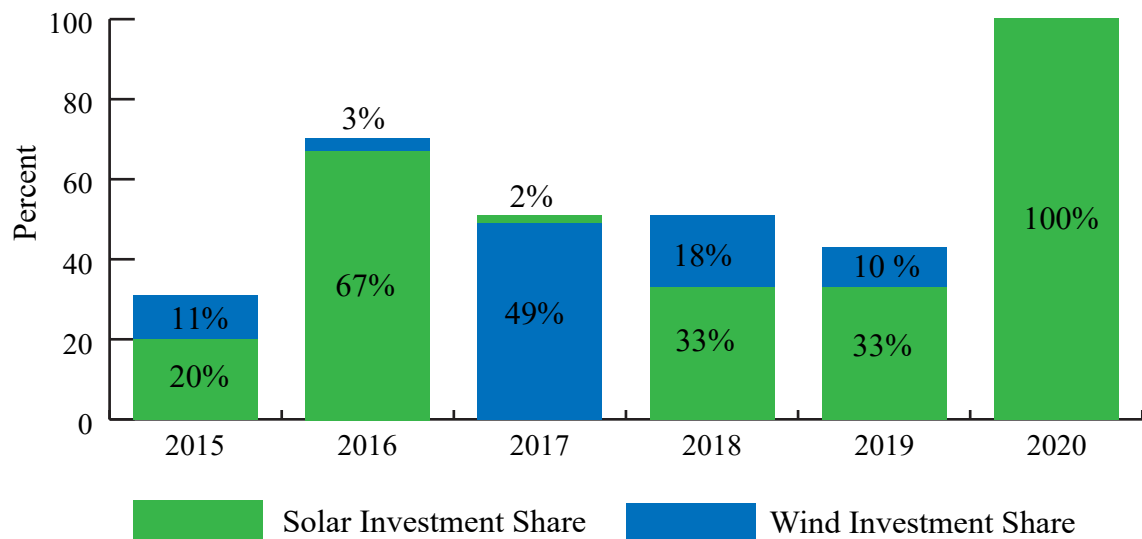


Figure 9: Solar and Wind Percent Investment Share Against Total Yearly Investments

IV. Challenges and Opportunities

As can be inferred from the discussion thus far, the flow of international green finance in India is subdued. This is due to several reasons. First, as stated above, there is no overarching green finance regulation in place to direct stakeholders in the ecosystem. This forces the stakeholders to stick to the conventional financial practices that are detrimental to the growth of green finance. Second, there are continuous policy and regulatory flip-flops that deter investors. This is further aggravated by the lack of coordination between state- and central-level efforts. Third, as RE comes under the ambit of the larger power sector value chain, the debilitating financial health of the distribution utilities and their inability to pay RE developers on time puts the entire ecosystem under stress and hinders the inflow of international investments. Fourth, there is an expectation mismatch between the long-term green investments and the relatively short-term time horizons of investors³⁴. Fifth, there is a disproportionate investment in some sectors and technologies. For instance, the wind energy sector, even though the oldest and most developed RE technology, attracts less international finance compared to solar PV. Lastly, there is a pervasive issue of data gaps in the financial ecosystem regarding the tracking of finance flows. Although now there are a few databases created to track the finance flows, there still exist anomalies in their reporting.

Though there are a few challenges in mobilising finance for RE, its prospects of driving significant economic growth are massive. Addressing climate change will not only mitigate associated risks of the financial institutions but will also present itself as a major opportunity that can aid economic growth and earn steady revenues. For instance, to achieve net-zero, carbon-intensive companies such as Browner and others, will require financing to help them transition to greener ways. For many businesses, it will mean a fundamental change in their operations that will require capital. This is underscored in the joint analysis of the International Energy Agency (IEA) and International Monetary Fund (IMF) which estimates clean energy transition to add 0.4 percent to global GDP each year.³⁵ If financial institutions fail to make a move in time, it can erode close to USD 23 trillion from the global economy by 2050.³⁶ According to the Climate Economics Index that ranks countries based on the GDP impact of the physical risks emanating from gradual climate change over time, India ranks 45 out of 48 countries in consideration. The percentage of lost GDP for 2048 for India based on the global temperature rise is shown in Figure 6. If the global temperature rise is well below 2°C the decline in India's GDP is around 5.7 percent by 2048, whereas when the global temperature rise is around 3.2°C, the decline in India's GDP will be around 35.1 percent by 2048. This underscores the economic importance of serious climate actions.

34 See: <https://www.greenfinanceplatform.org/page/explore-green-finance>

35 See: <https://www.iea.org/news/pathway-to-critical-and-formidable-goal-of-net-zero-emissions-by-2050-is-narrow-but-brings-huge-benefits>

36 See: <https://www.swissre.com/institute/research/topics-and-risk-dialogues/climate-and-natural-catastrophe-risk/expertise-publication-economics-of-climate-change.html>

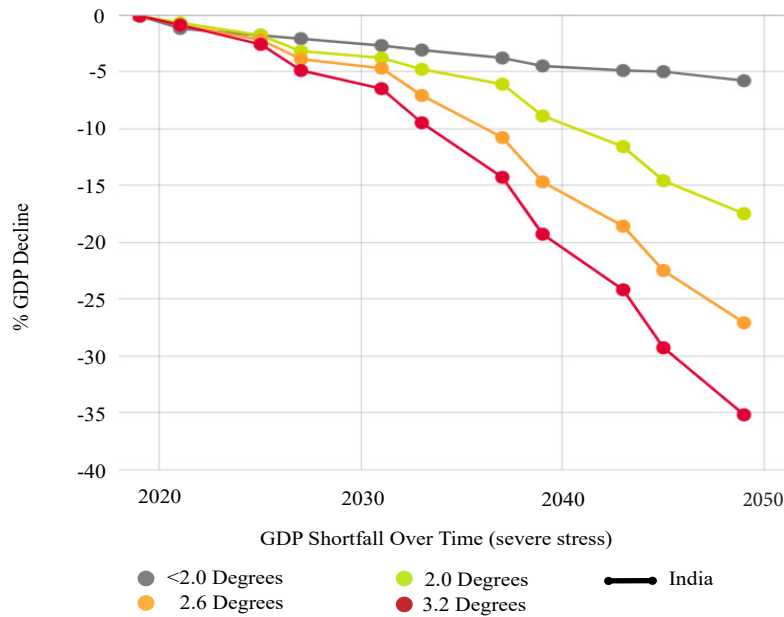


Figure 10: Percent GDP Loss by 2048 for Key Climate Scenarios

V. Key Recommendations

Based on the inferences gathered from the aforementioned sections, this section provides key recommendations to enhance international green finance flows to the RE sector in India.

1. Policy and Regulatory Interventions

- Develop policies and regulations in thorough consultation with all governmental tiers to ensure maximum coordination.
- Develop a pipeline of novel, tailor-made projects to facilitate enhanced financing via debt issuance in the capital markets.
- Devise ways to incorporate carbon pricing.
- Infuse competition amongst states to secure international green finance for RE projects.
- Create ways to increase the leveraging capacity of public finance.

2. Investor-Level Interventions

- Develop a deep understanding of the implications of India's clean energy targets and the associated sub-national and sectoral pathways.
- Financial institutions must upskill their staff to develop climate-related expertise.
- Strengthen Monitoring and Evaluation of the existing portfolio.

3. Enabling Interventions

- Enhance the creditworthiness of the electric utilities by the holistic implementation of the Revamped Distribution Sector Scheme (RDSS).
- As there are several other financing instruments active across the world, there is an urgent need to examine their prospects in the Indian context and subsequently introduce them to Indian financial markets.
- Ensure availability of data for investors to allow them to assess the project they intend to finance.³⁷
- Develop a national-level measurement, reporting, and verification platform for tracking international and domestic green finance flows.³⁸

37 Green Finance in India: Progress and Challenges, 2021

38 Jain, S. (2020), "Financing India's green transition", ORF Issue Brief No. 338, January 2020, Observer Research Foundation.



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About Vasudha Foundation:

Vasudha Foundation is a leading policy advocacy and clean energy market enabler with a not for profit motive. It is India's pioneering organisation promoting environment-friendly, socially just, and sustainable models of energy by focusing on renewable energy and energy-efficient technologies and lifestyle solutions.

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