17 Financing India's 2030 NDC Targets and Beyond

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Introduction

Indian Parliament in August 2022 approved the updated Nationally Determined Contribution (NDC) targets (PIB, 2022).[1] The updated targets are (i) reducing the emission intensity of the Gross Domestic Product (GDP) by 45% from the base 2005 levels and (ii) increasing the share of non-fossil installed generation capacity to 50% of the total energy mix by 2030. A major share of the proposed emissions' intensity reduction is expected to accrue from greening the electricity systems, which in 2018 contributed to over 40% of the country's annual emissions. Other measures include energy and process efficiency improvements in the industrial sector, contributing another 20% to the total emissions (India, 2021).[2]

As per the Central Electricity Authority's (CEA) optimal generation mix, which maps India's electricity system's least-cost pathway-based deployment till 2030, India would have 817 GW generation capacity by 203 (Central Electricity Authority, 2020)[3]. The expected capacity mix comprises 420 GW of installed renewable generation capacity with a share of 280 GW of solar and another 140 GW from the wind. The new additions to other technologies like biomass and waste to energy, excluding large hydro, take the total to 450 GW of renewables by 2030, also quoted as the target of renewable energy (RE) at some of the avenues by the Ministry of New and Renewable Energy (MNRE). The same report places the required addition of around 27 GW of battery storage for 4 hours, i.e., about 108 GWh of battery support by 2030. As of 30 September 2022, India had an installed wind and solar capacity of 107 GW, with 67 GW of solar and 40 GW of wind and almost no battery storage systems (Ministry of Power, 2022).[4]

Thus, the pathway needed to achieve these targets is very steep, with a requirement of almost 40 GW of average cumulative additions of wind and solar between now and FY30. However, the average addition to the renewable capacity ranges 9–15 GW between 2017 and 2022 (Shah, Sharma, Nair, & Garg, 2022).[5] However, the battery and other storage technologies required for higher integration of RE do not yet have established business models limiting their uptake. India is moving away from simple solar and wind projects to hybrid tenders with or without storage. In the first half of the year FY23, of the total 6.7 GW procured, 36% was under hybrid project models (Shah, Bibhudatta, & Nair, 2022).[6]

In light of these targets, this chapter analyses the financing required, the current finance at play, and how the country could mobilise the required financing using both short- and long-term measures.

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Finance Requirements

The buildup of the electricity systems will be a capital-intensive activity. The capital expenditure (CAPEX) for the buildup of the generation, transmission, and distribution between 2020 and 2030, as per CEEW-CEFs estimate, will cost US$ 523 billion (Singh & Sidhu, Investment Sizing India's 2070 Net-Zero Target, 2021).[7] The report shows that most of these investments, worth US$ 382 billion, would be required in generation capacity alone. A report from the Parliamentary Standing Committee estimates that the investments required for the renewables capacity target of 450 GW alone at Rs. 1.5 lakh crore to 2 lakh crore (US$ 18–24 billion) annually (Singh & Sidhu, Investment Sizing India's 2070 Net-Zero Target, 2021).[8] The financing flows towards renewables, according to the same report, over the last few years are Rs. 75,000 crore (US$ 9.1 billion) per annum – far below the average capital required to set up the capacities required for the target of 450 GW by 2030.

The Parliamentary Committee report also indicates that India fell far short of the 2022 rooftop solar target of 40 GW. One of the identified reasons beyond the policy inconsistency and others is the reluctance of the banks and non-bank finance companies (NBFC) to extend credit to small-scale borrowers, and even the performance of dedicated debt schemes has not been up to the mark.[9]

Finance at Play

Being an asset of the infrastructure class, most of the capital expense for setting up the RE, particularly solar and wind projects, is financed by debt. Given the long-term nature of finance, debt financing is usually left to patient capital such as pension funds.

A project's debt level is to the tune of 75% to 80%. Thus, the country would need almost US$ 150–160 billion of debt to be raised for setting up these projects until 2030 of the US$ 200 billion required for setting up the solar and wind capacity alone.[10]

According to RBI data, the exposure of all scheduled commercial banks for the entire power sector on 25 March 2022 stood at Rs. 6.1 lakh crore (US$ 75 billion). Power Finance Corporation (PFC), Rural Energy Corporation (REC), and the Indian Renewable Energy Development Authority's (IREDA) total exposure, which is largely towards the power sector, summed up to Rs. 3.1 lakh crore (US$ 39 billion), Rs. 3.8 lakh crore (US$ 47 billion) and Rs. 33,931 crore (US$ 4 billion), respectively, as on 31 March 2022.[11] Cumulatively, a total of US$ 165 billion is the exposure of the country's major banks and NBFCs.

It is thus evident that the current lending exposure of the banking system versus the financing requirements until 2030, pegged at US$ 523 billion for the entire power sector, is pretty high and highlights the RE's financing challenge. Banks and NBFCs take most of the construction and initial operational risks. Most of them have reached their internal exposure limits to the power sector or other concentration limits, e.g., group exposure limits, etc.

As we advance, the banks and NBFCs will find it challenging to meet the financing requirements of the sector. Also, India does not have many alternative options like the fledgling Infrastructure Debt Funds (IDF) and other similar platforms of scale to support the banking systems in the country for the RE buildup.

An independent study found that electricity production, energy-intensive manufacturing (chemicals, petroleum, primary metals, and cement), mining and quarrying

Table 17.1 Breakup of the cumulative green, social, sustainability (GSS) bond issuances by Indian players

Particulars	*Green*	*Sustainability*	*Social*	*Total*
Size of market (USD)	18.3 billion	0.6 billion	0.5 billion	19.5 billion
Number of issuers	72	1	2	75
Number of currencies	3	1	2	3

Source: India Sustainable Debt, State of the Market (2021).

(including coal), and gas refineries, which comprise 60% of emissions, account collectively for around 12% of all domestic currency bank lending and 40% of bank lending to large corporates (Bhattacharya, Kumar, & Lonikar, 2022). Beyond domestic capital, external commercial borrowings (ECBs) are one of the routes to finance the RE CAPEX. But the associated tenure issues, current high rates of interest rate, the world over, and other constraints like the lack of private debt players to take over the construction risk under this route is an issue. However, the recent ECB issuance data, visible from the RBI monthly ECB exposure publication, showcases an improved investor sentiment towards this route.

International green bond issuances are the other debt capital stream that has worked well for RE developers. In FY22, Indian RE developers raised almost US$ 5.1 billion worth of green bonds, practically equivalent to all the combined historical issuances in the years before (Garg, 2021). This route, in the past, has allowed a lot of refinancing of existing bank loans and allowed a freeing up of the bank capital, which is deployable back to new greenfield RE projects. By June 2022, the cumulative volume was US$ 25 billion since 2015 (Bhattacharya, Kumar, & Lonikar, 2022).[12] Climate Bonds Initiative database had a total of US$ 25 billion cumulative green, social, sustainability (GSS) debt issuances.

Accessible finance leads to a constant lowering of the costs of winning bids at utility-scale renewable energy auctions in India. Refinancing loans for these projects has resulted in green `bond issuance from developers and financial institutions. The raising of interest rate domestically and by the US Federal Reserve over the current fiscal year has dampened the refinancing of green bonds in 2022.

Green Bonds as the Prominent Tool for Refinancing RE Worldwide

Global Landscape

Globally, the rise of sustainable finance, and the successful uptake of green bonds in particular, has made them a prominent tool for mobilising and directing capital towards climate investment opportunities and driving policy action on climate change. The market stands at over US$ 2 trillion of global issuance till date. The year 2021 saw 80% growth on 2020 – all from just a few billion in 2013. In 2022, the global issuance of green, social, sustainability, and sustainability-linked (GSSS or sustainable) bonds was down 13% from a year earlier and down 10% from the second quarter of 2023, according to the report by Moody's Investor Service. This downward trend is aligned with the slowdown of the broader market which is down nearly 27%, according to the report,

but notably thematic bonds have gone down by a more modest 17%. The fundamental drivers of long-term growth in sustainable bonds remain in place and the issuance would pick up when market conditions become more favourable.

Indian GSS Debt Papers

Indian GSS debt issuance increased more than sixfold to reach US$ 7.5 billion in 2021 following a pandemic-induced decline in issuance in 2020 (Shah, Sharma, Nair, & Garg, 2022).[13] Three-quarters (75%) of the cumulative-labelled bond volume in India originates from the private sector. Non-financial corporates comprise the largest issuer type by volume (US$ 12.6 billion) and the number of deals (40 of 77). That is followed by government-backed entities (US$ 4 billion) and financial corporates (US$ 2 billion).

USD is the preferred currency for raising GSS debt in the Indian market. 87% of the cumulative amount issued, and 37 of the 75 deals, are USD denominated. The two recent GSS local currency deals suggest that issuers will continue to consider local currency for raising future GSS debt. The only other currency used so far is the EUR. One EUR-denominated deal was completed in 2021: a Climate Bonds Certified 7-year, EUR 300 million green bond from Power Finance Corporation Ltd with proceeds earmarked for solar and wind energy projects.

The domestic corporate bond market which totals around Rs. 39.5 lakh crore (US$ 487 billion) has seen only two issuances over the last couple of years from Indian RE developers.[14] The issuances were small and were securitised against cash flows from the project portfolio, summing up to 350–555 MW against an issue size Rs. 1,237 crore (US$ 151 million) and Rs. 1,440 crore (US$ 175 million).[15,16] Also, these bonds have a tenor of 3 years versus the loans of 16 years that each refinanced.

It is safe therefore to assume that only two sources of debt capital, i.e., domestic banks and foreign bonds, for refinancing existing loans are accessible or are working from the debt funding perspective.

Presently, the domestic bond markets and the foreign institutional debt beyond the bond markets, e.g., foreign banks, are not accessible to RE developers. The fiscal tightening by regulators worldwide is leading to higher interest rates, and Indian RE developers have not used the international green bond markets to raise capital in the current fiscal year. Thus, solutions would have to be worked around if the scale of India's RE ambition is to be met; otherwise, access to capital could prove to be a massive bottleneck if things continue the way they are.

Equity

A look at the balance sheets of the major renewable energy players operating in utility-scale projects and with some scale reveals that most major players have a concrete runway and strong ownership of sovereign wealth and pension funds for equity. Also, the profile of the RE projects, marked by 25 years of power purchase agreements with sovereign counterparties like Solar Energy Corporation of India (SECI), low operating costs, and returns in the low double digits, is well pretty suited for such investments (Dutt, Arjun; 2021).[17]

Another report by the CEEW-CEF, which maps over 160 solar and wind projects, found that most of the solar projects in 2021 are investment grade, while none were in 2012. And almost 60% of solar projects rated in 2021 had a rating of A and above. The trend showcases that the sector is maturing, as are the contract structures, and indicates a low probability of default by the RE projects in the country.

Solutions

India needs to harness diverse instruments and structures to supplement existing banking system by refinancing loans and allowing banks to make loans to new projects and take the construction risk or co-lend with them. We discuss several approaches including structures and instruments that, if deployed under platforms, could allow a greater flow of capital to projects in line with the requirements of the RE targets.

Instruments

Partial Guarantee for Banks and Non-banks to Extend Credit for New Technology and Small-Scale Applications

Using partial, first-loss guarantees or a combination of guarantees at the portfolio level can help banks and non-banks extend credit for small-scale solar deployments. Such a facility could also help derisk technology-related lending risk, e.g., for the battery energy storage at both the grid and distributed scale. Once a track record of operations and credit history for such projects is created, financial institutions like banks and non-banks could optimally price risk and extend credit to such projects.

Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) by the Small Industrial Development Bank of India (SIDBI) and the Government of India (GoI) *is one such example of a guarantee structure unlocking capital for the non-collateralised lending* by banks and non-banks to small and medium enterprises in India. In FY22, guarantees worth Rs. 56,172 crore against over 7 lakh successful applications were sanctioned. A similar approach could be used for unlocking project debt for small, new-tech RE projects in India.

Figure 17.1 showcases one structure for the facility to work a bilateral loss-sharing facility between the trust and lenders. Under the structure, a facility manager extends the guarantee to the lending institutions per the trust rules and trustee guidance.

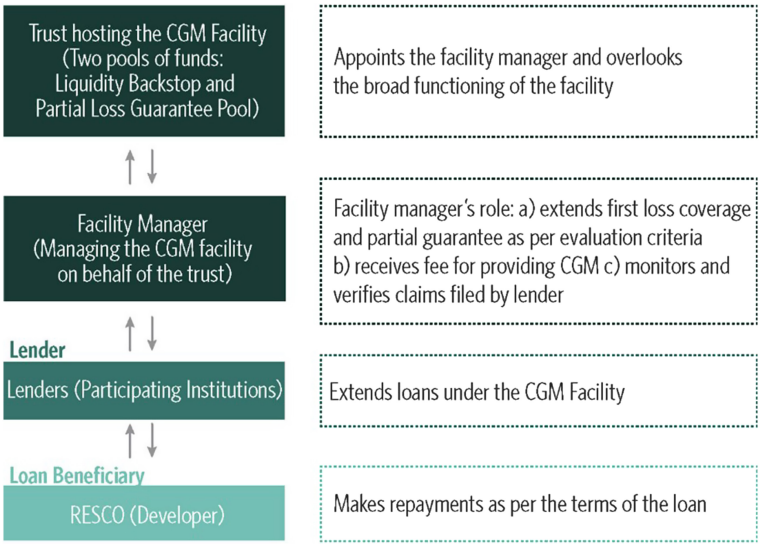

Figure 17.1 A potential structure for the partial guarantee facility (CGM Facility).

Source: Singh et al. (2018).

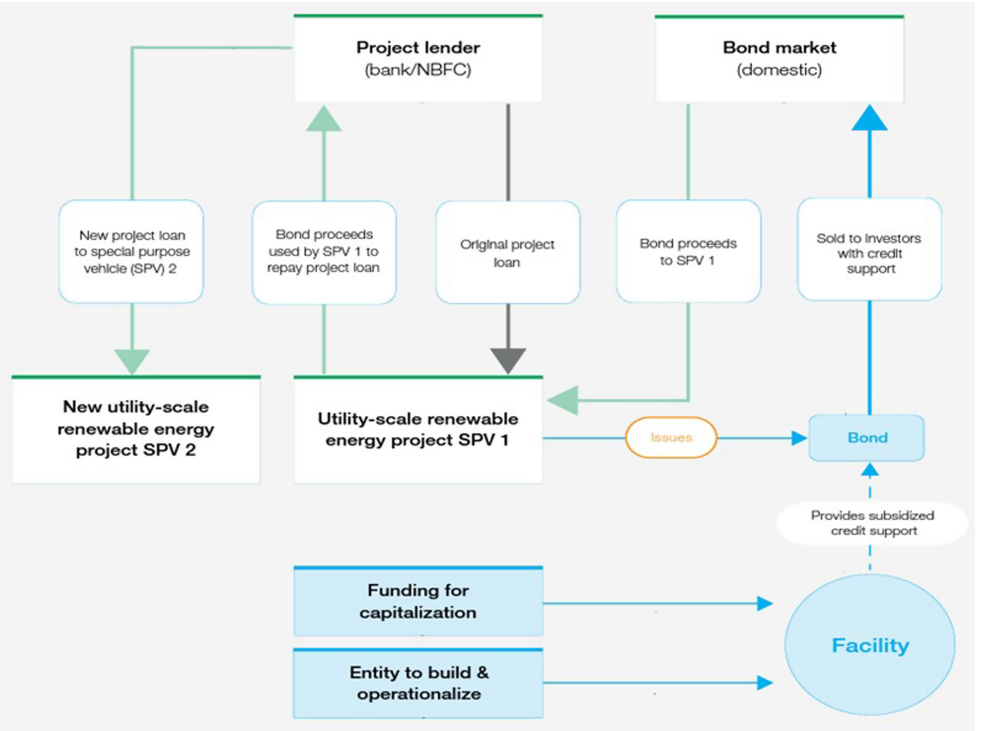

Figure 17.2 A potential structure for subsidised credit enhancement solution.
Source: CEEW-WEF Community Paper.

Guarantees – For Bonds

Indian corporate bond market is largely confined to bonds with ratings of AA and above.[18] The domestic market can be a refinancing option for the project loans and allow financial institutions like NBFCs to offload the assets and make new loans to the projects. The guarantees could provide a small nudge as most of the existing utility-scale projects are rated investment grade. The available credit guarantee products are usually not viable, given their costs and lack of depth (CPI, 2019). In this case, a limited-period subsidised credit enhancement could help open the bond market for RE developers in the country. The structure could use public money to subsidise the costs per a CEEW-WEF Community Paper. The paper shows a capital of US$ 10 million would be sufficient to raise bonds worth US$ 150–190 million. Once a track record is established, this may allow existing bond market players accustomed to RE-backed securities by the developers and the NBFCs.

Platforms/Institutional Structures for Debt Funding the 2030 RE Targets

Beyond the guarantee structures, the platforms like Alternate Investment Funds (AIF), Infrastructure Debt Funds (IDFs), and Investment Trust (InvIT) could play a role in extending credit and refinancing portfolios of the RE assets. The following text discusses each of these structures' main features and advantages.

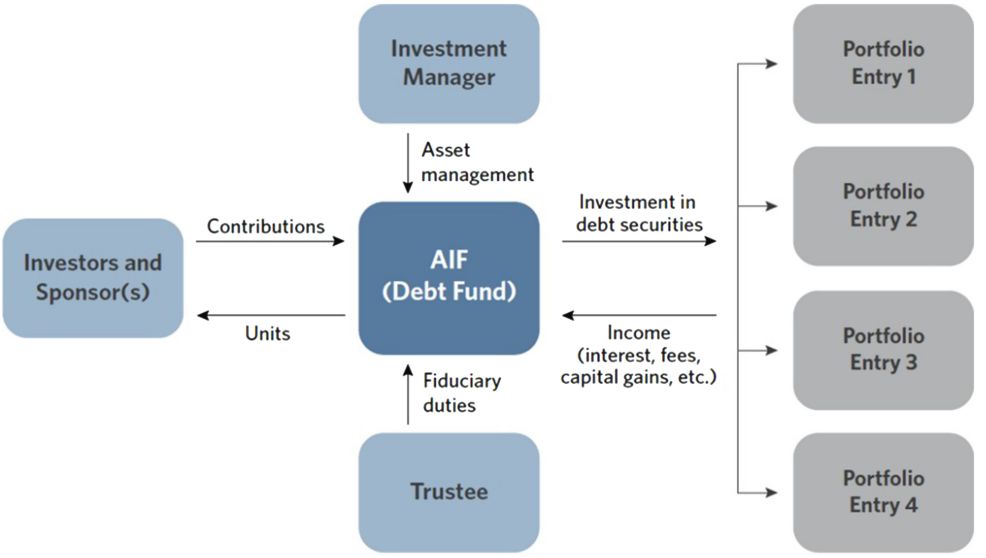

Figure 17.3 Workings of a debt AIF purchasing debt securities backed by portfolios of the non-banks.

Source: CPI (2019).

Alternate Investment Fund – An AIF, as defined by Securities and Exchange Board of India (SEBI), is a fund that collects money from investors for investing under its investment policy. India has over 1,000 AIFs listed with the SEBI.[19] Listed as a debt fund, an AIF which invests in both listed and non-listed debt securities could be of great use in the medium to the short term for financing RE (Singh, Purkayastha, & Shrimali, 2019).[20] The non-banks could use such a fund to offload their portfolios securitised as bonds, whose units the AIF subscribes to, and thus lenders make fresh lending to the new RE projects. AIF structures could provide early-stage venture capital for new and emerging businesses in the green energy space and help fund new companies and ideas in the RE space. According to announcements by IREDA, the NBFC is looking at the AIF route to deleverage the book and extend credit to parties who have reached exposure limits – simultaneously bringing in more investors to participate as investors in the fund (Das, 2022).[21]

Infrastructure Debt Fund (IDF) – India, in 2011, set out to develop its infrastructure debt fund market. An IDF in India may be listed as a Non-bank Finance Company or a mutual fund (RBI, 2022).[22] It is possible to fund the infrastructure and refinance existing bank loans, co-fund the infrastructure of the bank, or take equity positions under the mutual fund route and even take the construction risk. One of the benefits of the IDF listed under the NBFC route is the possibility of long-term fixed loans, which could be well suited for RE projects with a fixed tariff under the power purchase agreements (PPA).

However, one of the concerns is the excess liquidity of the banking system through enormous cash deposits at their end could outcompete the majority of the IDF loans and probably point to a lack of growth in the investment portfolios in the RE space in the

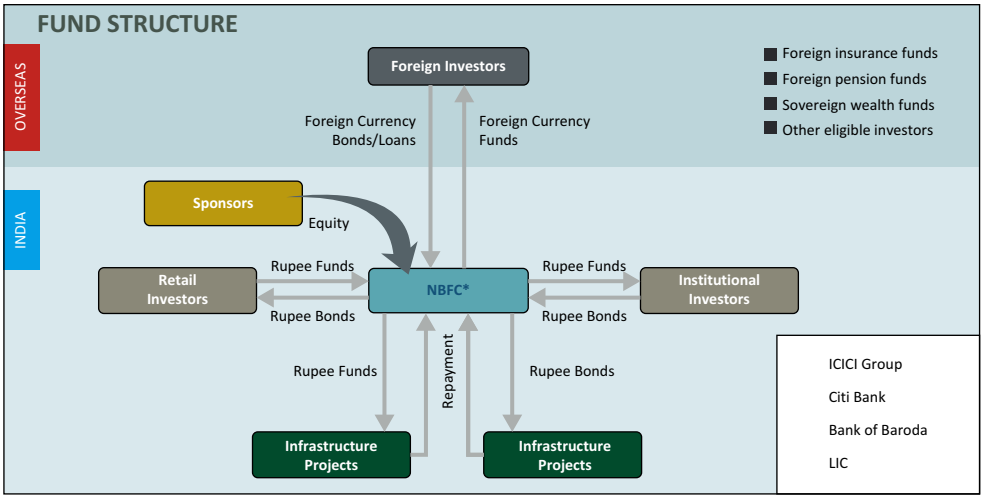

Figure 17.4 A typical IDF structure with foreign and domestic investors.
Source: IJGlobal (2013).

recent past. Also, the preference of RE developers to continue with banking and other channels is likely to continue in the future. But given the constraints of the banking system to extend the amount of credit the RE sector may require, the IDFs can provide recycling for established routes like utility-scale projects.[23] With some innovations wherein the cost of foreign capital is bought down, the IDFs could be easily used to refinance the RE infrastructure in the country (Lambert, 2014).[24]

NIIF Infrastructure Debt Limited, launched in 2014, is listed and has been helping the RE financing space. The financing platform combines NBFC Infra Debt Fund and an NBFC Infra Finance Company. The IDF supports two RE companies apart from investing in other suitable investment opportunities. The debt platform is expected to raise enough resources to extend debt support of Rs. 1 lakh crore to projects by 2025.[25]

Infrastructure Investment Trust (InvIT)

Under an InvIt structure, the renewable energy developer spins off the operative assets from the balance sheet to a special purpose vehicle/trust to develop, finance, and implement the new projects. In a typical InvIT structure, the entity/sponsor transfers the operative/semi-finished assets into a new company/trust. InvIT invests in the project either directly or through Special Purpose Vehicles (SPVs) (50% holding at the SPV level). The trustee holds the investment on behalf of the trust, which lists units through share/unit issues. The unit holders claim a minimum of 90% of the distributable cash flow. Sponsors must maintain over 25% ownership of the trust with a minimum lock-in period of 3 years.

As RE projects mature, the InvIT could provide a way to move the projects off the balance sheets and allow the developers to take on new projects while the investors

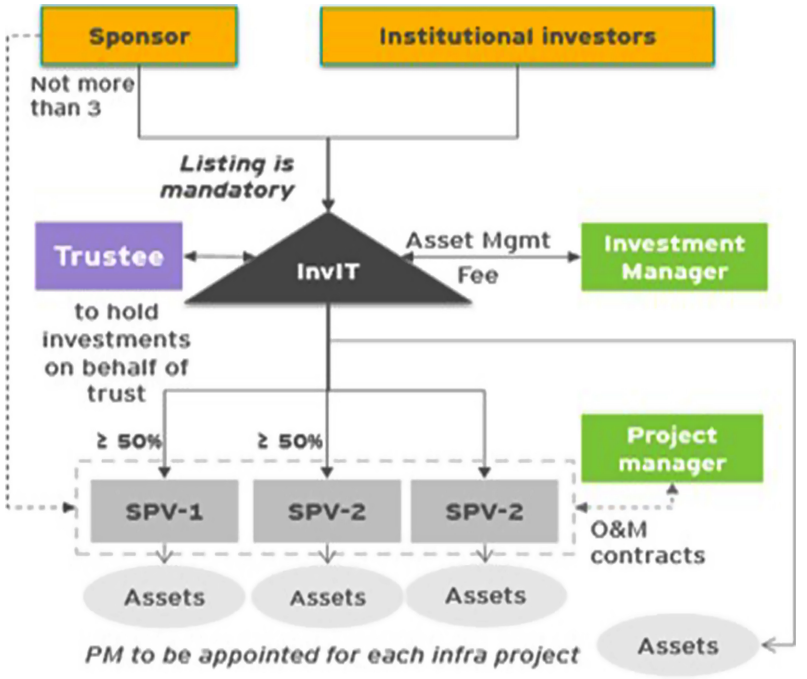

Figure 17.5 Typical InvIT framework.

Source: Kaushik Aruna (2018).

looking at stable returns may look at subscribing to the units of an InvIT. India has 15 InvITs under different infrastructure sectors. In early 2022, Virescent Renewable Energy Trust, an InvIT focused on RE with an operational portfolio of over 500 MW of RE, raised bonds worth Rs. 650 crore to fund the expansion and buying of more operational assets.[26]

Beyond using public capital to showcase solutions and solving short-term issues using guarantees, we would need the platforms hosting the structures like the AIFs, IDFs, and InvIT over the medium to long term.

These instruments and structures are new, and Indian debt markets are yet to adopt these instruments for wide-scale usage for RE financing and refinancing. A few examples exist, as cited above. There is considerable scope for growth if the government would consider the blending of public capital, which could help create a track record and create additionality by attracting more private capital in future. The role of multilateral institutions and philanthropies will be critical for some initial pilots of the platforms discussed earlier as soon as policymakers work to remove the barriers to widespread adoption.

Beyond these solutions, India would need a greening of the financing institutions in the long term. Such greening is essential to ensure a consistent and regular flow of finance for mitigation-related activities like setting more RE under the target.

Financing Credible Net-Zero Transition

As per estimates by CEEW-CEF, the transition to net zero until 2070 could cost US$ 10.1 trillion, of which almost US$ 1.6 trillion will have to flow into industrial decarbonisation between now and 2070, i.e., an average flow of US$ 32 billion annually over the next 50 years. India is also aiming to mobilise resources to have around 5 million tonnes of green hydrogen production annually for decarbonisation domestically and abroad by 2030.[27] Also, many technologies to be adopted for net zero are at the developmental stages and would require substantial R&D investments and the initial scale-up.

We explained the sources of finance, instruments, and structures that can augment the flow of finance to decarbonise the Indian economy. The scale and the pace required for this also depend on a clear classification of the activities that align with decarbonisation targets and pathways. It is a crucial step to understanding what activities the funders can fund and be in line with the long-term developmental trajectory requirements. International standard-setting bodies such as the Climate Bonds Initiative have set out a framework that aligns with the Intergovernmental Panel on Climate Change (IPCC) trajectory for net zero by 2050. It classifies activities into near zero, the pathway to zero, interim, and stranded, as depicted Figure 17.6:

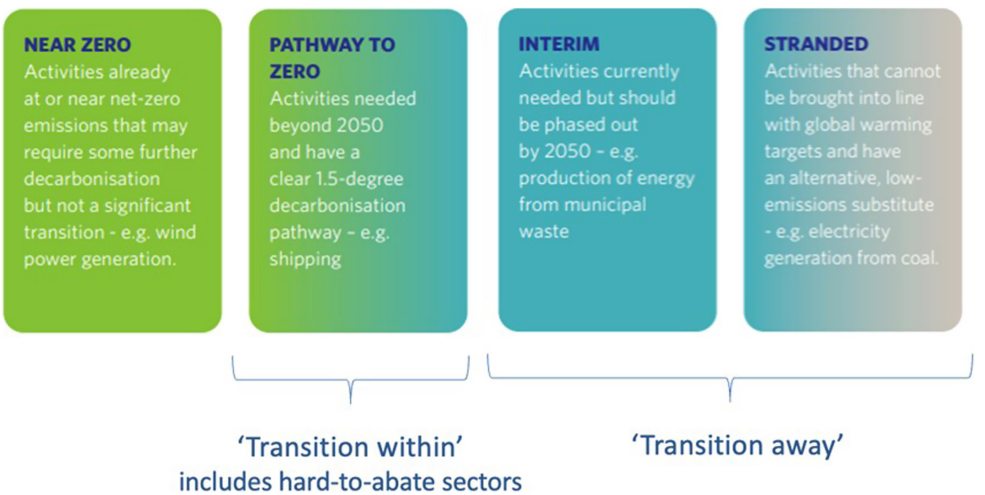

Figure 17.6 Classification of activities and their alignment to net zero by 2050 and beyond.
Source: Climate Bonds Initiative.

The activities within each category need to be supported by clear criteria (See Appendix 17A) so that alignment to IPCC net zero by 2050 and the national targets are remain credible. This allows for setting the right ambition, being inclusive (beyond pure-play green) and charting out a clear action plan to achieve a reasonable transition to net zero. This will also necessitate that the various financing instruments such as green bonds, sustainable bonds, sustainability-linked bonds (mostly used by issuers in hard-to-abate sectors), etc., are also true to label and are backed by targets and plans that can be

validated and verified to be credible. There is an immense scope to grow this market in India. Globally, this has already reached nearly US$ 3 trillion.

Role of Sustainable Finance Taxonomy in Financing the Decarbonisation in Line with the NDC Targets and Beyond

As a founder member of the International Platform for Sustainable Finance (IPSF), India has argued for standardised and interoperable taxonomies. It has also constituted a Sustainable Finance Task Force anchored by the Ministry of Finance. The task force's report on the "Taxonomy of sustainable activities" is due for a release and can streamline many interrelated aspects of creating a robust, sustainable finance market, and ecosystem.

Research by the Climate Bonds Initiative reveals specific features necessary for a powerful taxonomy, as articulated by domestic and international investors. Most international investors profess a preference for existing internationally adopted frameworks, and all investors consider the development of national taxonomies as a positive signal to the market and a signal of leadership. But, they like to see interoperability and alignment to international frameworks as it saves them the opportunity cost. Domestic Investors noted that regulators like Securities and Exchange Board of India (SEBI), RBI, and Pension Fund Regulatory and Development Authority (PFRDA) could use the taxonomy to guide capital. Whilst acknowledging that such themes could be harder to quantify, they also welcomed the inclusion of social considerations and Sustainable Development Goals (SDGs) in India's taxonomy.

Both international and domestic investors emphasised the need and opportunity to finance transition in hard-to-abate sectors and indicated that this would be a more inclusive choice for the taxonomy to consider. Another feature of importance is issuer integrity. There are some pure-play issuers whose green bonds are easy to buy, for example, in the renewable space. However, many larger entities will have a renewable business issuing green bonds while at the same time being involved in controversial activities, e.g., coal or a controversial dam. Investors are becoming discerning about these organisational exposures. Even if a portfolio is meant to be focused on green bonds, the issuer needs to meet the strictest essential and valuation characteristics (the bonds' maths need to add up). Thus, most portfolios had some exclusion rules, e.g., no coal or violators of UN Global Compact norms. Investors were willing to engage and be slightly more lenient with green bond issuers coming from emerging markets concerning the application of standards (e.g., level of commitment to net-zero/1.5-degree alignment). However, this is temporary and always comes with a heavy appetite for engagement with the issuer. The same is for the quality of post-issuance reporting.

It is evident that there is a shortage of dedicated Asia/Emerging Market (EM) green bond or sustainable debt portfolios. The most significant portion of assets that could potentially invest in Indian green bonds was vanilla EM or Asian debt portfolios that would normally buy vanilla Indian sovereign debt, but if a green bond opportunity became available, they would definitely consider it. All investors are developing green/transition/ESG portfolios and, in many cases, with a geographical focus on EM, further growing the market.

For industries such as steel, which are pretty hard to abate, the technology for their decarbonisation is only at the pilot stage or quite expensive. It will benefit significantly from the availability of such transitionary steps for the building infrastructure, such as

energy efficiency within existing capacity or financing infrastructure like green steel-based capacities that are expensive. Without clear definitions and metrics, not only the risk of greenwashing would persist, but it will also blunt the actions that financial firms and regulators, and real economy actors can take to identify and manage transition risks on the one hand and ramp up investment and lending to meet the 2030 targets.

The Reserve Bank of India's paper published in July 2022 takes cognisance of climate-related financial risks (broadly classified into physical and transition risks)[28] and focuses on actions that regulated entities can undertake to tackle them, such as integrating it into their scenarios analysis and stress testing, as well as disclosures. These developments will influence the trajectory of the sustainable finance market and have implications for issuance and trading volumes.

Many central banks are now expanding risk disclosure requirements to encompass the physical and/or low-carbon transition risk of climate change. Disclosure is intended to redress potential mispricing of financial assets by improving information about the risk–return ratio. While risk disclosure highlights areas where financial institutions should ideally reduce their exposure, sustainable finance taxonomies highlight areas where they should preferentially direct capital. Both these aspects will be critical and will determine the volumes of capital flow to fund the transition.

Conclusions

This chapter provides an overview of the requirements for financing India's 2030 transition and discusses both the existing state of play and the deployment of innovative structures and instruments for the same. Structures like the AIF, IDF, InvIT, and others to finance the RE capacity deployment, banks, and bonds will be required for the country to finance or refinance and meet the 2030 NDC targets. These innovative structures, with the support of regulators and platforms ready to host them, would be essential to increase the flow of finance towards RE in the country. The pilots would need some policy impetus and a blending with public capital for an initial uptake and a wider adoption.

For a faster and more inclusive transition, there is a need to green the capital markets ecosystem by expanding labelling to include all financial instruments from equities to short-term borrowing across all sectors. Taxonomies that can be used by global and local investors seamlessly and with minimum transaction costs will facilitate the recognition and wider uptake of different green financial instruments.

Finally, the government needs to signal clear support by initiating a supportive policy environment for green transition and finance to flow. The steps would mean endorsing clear transition pathways, establishing the certainty of future demand for financeable projects, establishing the green taxonomy, and addressing risks through various instruments and structures outlined as solutions in this chapter.

Notes

1 https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1847812
2 https://unfccc.int/documents/268470
3 https://cea.nic.in/old/reports/others/planning/irp/Optimal_mix_report_2029-30_FINAL.pdf
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8 The note assumes an USD-to-Rs. conversion factor of 1 US$ = 82 Rs.
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10 https://www.ceew.in/cef/solutions-factory/publications/re-financing-india-energy-transition.pdf
11 Source: Author estimates based on Annual reports of the three entities.
12 Unpublished data Climate Bonds Initiative.
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14 https://www.rbi.org.in/scripts/FS_Speeches.aspx?Id=1322&fn=6#:~:text=In%20FY%202021%2D22%2C%20the,%E2%82%B95.88%20lakh%20crore%2011
15 https://bond.bseindia.com/PPMFiles/2021/JUN/PPM/578/4294.pdf
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18 In FY22 of the 1,235 securities worth Rs. 22.55 lakh crore rated in FY22. Of these issuances, 80% by value were rated AAA and 15% were rated AA. https://www3.weforum.org/docs/WEF_Mobilizing_Investment_for_Clean_Energy_in_India_2022.pdf
19 https://www.sebi.gov.in/sebiweb/other/OtherAction.do?doRecognisedFpi=yes&intmId=16
20 https://climatepolicyinitiative.org/wp-content/uploads/2019/07/Alternative-Investment-Funds-as-a-Potential-Pathway-for-Refinancing-Clean-Energy-Debt-in-India-1.pdf
21 https://www.ireda.in/images/cmdmessage/CMDSpeech35thFoundationDay.pdf
22 https://www.rbi.org.in/Scripts/FAQView.aspx?Id=90
23 Given India's announcement of sovereign green bonds, green SLR mandates could be used to help tap the excess liquidity in the banking systems and create a track record for such bonds.
24 https://www.adb.org/sites/default/files/publication/82273/south-asia-wp-029.pdf
25 https://www.niififl.in/about-use
26 https://bond.bseindia.com/PPMFiles/2021/NOV/PPM/619/4636.pdf
27 Draft of the India Green Hydrogen Mission.
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Appendix 17A

A Typology of Available Use of Proceeds (UoP) Bonds

In the thematic debt space, a plethora of instruments exists that could be used to fund the decarbonisation of the hard-to-abate sector. Specifically, there are Use of Proceeds (UoP) bonds, which are defined by the allocation of proceeds to specific environmentally or socially beneficial projects, assets, activities, or expenditures. This category includes the following labels

- Green Bonds – Proceeds allocated to climate and/or environmentally beneficial projects.
- Social Bonds – Proceeds allocated to socially beneficial projects.
- Sustainability Bonds – A hybrid of green and social bonds, proceeds are allocated to a mix of environmentally and socially beneficial projects.
- Blue Bonds – In the main a subset of green bonds, but with proceeds allocated to ocean-based projects.
- Climate Resilience Bonds – A subset of green bonds, with proceeds allocated explicitly to climate-related projects.
- Transition Bonds – In the main a subset of green bonds, often with proceeds allocated to decarbonising assets or projects.

- Pandemic Bonds – In the main, a subset of social bonds, with proceeds allocated to addressing pandemic-related social issues, such as healthcare or employment. But maybe allocated to projects with both social and environmental.
- Sustainability-Linked Bonds (SLBs) – Proceeds of SLBs are usually not allocated to specific projects, assets, or activities but used for general purposes. The sustainability angle comes from the issuing entity making forward commitments to the future delivery of sustainability outcomes, often in the form of the company level – key performance indicators (KPIs). In some cases, the cost of capital is linked to achieving those KPIs.
- Hybrid: Sustainability-linked green bonds (SLGBs) – A hybrid that ties the use of the proceeds model of a green bond with the performance-based structure of an SLB. The first SLGB was issued by the Japanese construction company Takamatsu in March 2021. There are expectations that this structure will gain traction rapidly over the coming years.

Appendix 17B

Ørsted's Farm-Down Model: Lessons for Indian Firms

Shantanu Srivastava

Ørsted, a Danish state-owned utility, transitioned from being one of the most coal-intensive utilities in Europe to a global leader in offshore wind energy. Ørsted's commitment to energy transition through long-term strategy realignment helped it change its business model fundamentally and, in the process, generate immense wealth for its shareholders. Since listing in 2017, the company's share price has increased by an impressive 150% till November 2022.[29]

An important aspect of Ørsted's transition was its capital management plan. The capital-intensive nature of renewable energy (RE) assets requires large financial capital outlays during project construction. Ørsted was able to scale up its RE capacity rapidly and aggressively bid for large projects due to its ability to deploy equity in under-construction projects when required. This was possible because of its unique asset rotation strategy known as the "farm-down model."

The model involves selling a part stake in the project (usually 50%) after the project's Final Investment Decision (FID) at a valuation close to the project's Net Present Value (NPV). A majority of the value creation in an offshore wind farm happens during the development (site selection, obtaining approvals, and licences) and construction phases, as the project de-risks while moving from development to construction to operations. After the FID, post the development phase, Ørsted brought in an equity partner, usually long-term patient capital from pension funds, and realised up to half of the project's value upfront while also earning a premium on the sale. It then recycled this capital into pipeline capacity. Thus, the company could keep bidding for new farms and expanding its pipeline of projects.

In 2010, Pension Danmark acquired a 30% stake in one offshore wind farm from Ørsted,[30] which was the first farm-down deal for the Danish company.

Consequently, it used this model extensively in the future to spread risks, secure co-financing for projects, and provide cash flows to invest in new projects.

An important factor underpinning the success of the farm-down model was the stable subsidy regime for the offshore wind business in jurisdictions such as Denmark, the United Kingdom, and Germany, where Ørsted operated. A large proportion of cash flows were fixed in nature due to these subsidy schemes for several years in the future. This cash flow visibility was desirable for financial yield investors such as pensions, who are long-term patient investors requiring stability and diversification of investments to minimise portfolio risk. India's long-term power purchase agreements (PPAs), signed between RE generators and state distribution companies (DISCOMs), offer similar long-term cash flow visibility.

The farm-down model is different compared to the traditional asset rotation strategies where the project manager typically exits after the stake sale. Ørsted's fully integrated model helps it continue earning operations and maintenance (O&M) revenues from the project even after the stake sale. This is possible because most of the farm-down partners are financial yield investors, having limited or no experience or even interest in operating offshore wind farms.

Several Indian companies, such as ReNew Power,[31] Adani Green Energy,[32] and Acme Solar,[33] have successfully recycled capital in operational projects in the past, helping them deploy capital into pipeline projects. Nevertheless, deals involving project-level equity or debt investments have been sparse, in an accelerating RE capacity addition trajectory. This is partly because state-level PPAs carry business risks due to past instances of state DISCOMs wanting to renegotiate existing PPAs.[34] Another issue hampering such deals is the rising inventory of unsigned power sales agreements (PSAs) with sovereign-backed entities, such as the Solar Energy Corporation of India (SECI).[35] These instances increase the risk premium attached to individual projects, which might make them unattractive as per the risk appetite of several long-term patient investors.

A slew of financial investors, like pension funds, sovereign wealth funds, and strategic investors such as oil and gas majors, are eyeing the Indian market for potential opportunities to park their capital or diversify their business. Indian RE assets make a compelling case for pension funds looking for long-term annuity-like returns. Strategic investors like oil and gas companies are looking for joint ventures or strategic partnerships with local RE developers in their quest to achieve their net-zero targets. Weeding out issues related to the sanctity of PPAs and marketing de-risked operational projects to global institutional investors will help Indian corporates recycle scarce capital for pipeline projects while also securing more funds to bid for new projects in the super-competitive RE market in the country.

Indian public sector undertakings (PSUs) such as National Thermal Power Corporation (NTPC) which have highly ambitious RE targets and equally strong balance sheets can also utilise the farm-down model. For such entities, farm down can help realise value upfront while also earning a premium on the sale as projects de-risk after operationalisation, helping increase the overall return profile of the project.