

Renewable Energy Financing Landscape in India

The Journey So Far and the Need of the Hour

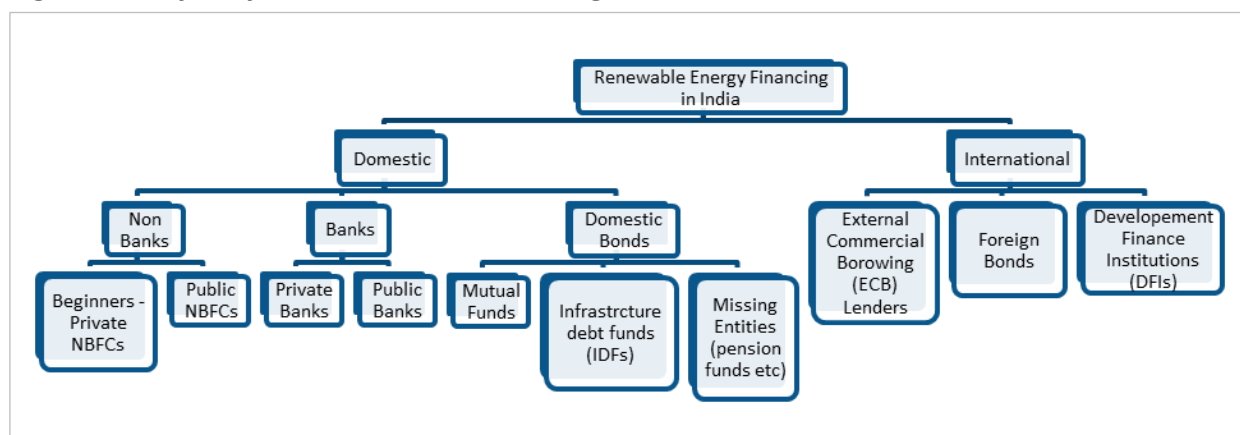
Executive Summary

The Indian renewable energy sector has witnessed unprecedented growth in the past decade, rivalling capacity additions anywhere in the world. The country has had the highest growth in renewable energy capacity addition among all global economies in the past seven or eight years, with capacity (including large hydro) increasing 1.97 times and solar energy increasing nearly 18 times.¹

The growth has been supported by an equally large amount of domestic and global capital, both in the form of debt and equity, invested in Indian RE infrastructure. Debt, the main fodder for RE projects, has come through various channels as the industry matured and as financiers from all quarters gained a better understanding of its risk return dynamics.

Private Non-Banking Financial Companies (NBFCs) were the first entities to test the waters by lending to renewable projects, when capital from other conventional sources such as banks, private or public, found it best to avoid exposure to a nascent and evolving technology. In addition, the long duration and large debt size typical of RE projects limited banking support, as did the banks' over-exposure to the greater power sector.

Figure 1: Key Players in RE Debt Financing in India



Source: IEEFA analysis.

¹ NewsOnAIR. India witnesses fastest rate of growth in Renewable Energy Capacity in last 7.5 years. December 2021.

Financing has transformed significantly since then, with the entry of varied sources of funding such as banks, bond market (domestic and global), international lenders and development finance institutions (DFIs) vying for a piece of the growing RE sector. Private NBFCs, the flag bearers at the start of the journey, have been overshadowed by larger banks, primarily the State Bank of India (SBI), then HDFC Bank, Axis Bank and, more recently, ICICI Bank – completely changing the renewable energy competition landscape.

Domestic bonds entered the market soon after the banknote demonetisation undertaken by the Government of India in 2016,² helping RE companies by providing lower rates, increasing lender competition, adding a new avenue for funding operating projects and helping companies reduce exposures with certain lenders where exposure norms were hit.

The biggest boon for the sector has been access to global bond markets for the incumbent players. The international bond market has demonstrated immense depth, proactiveness and boldness towards the sector, thanks to global understanding of the sector, high yield offerings and buoyed by the initial success and pedigree of large players.

After a wait-and-watch approach for most of the past decade, even foreign banks (led by the likes of Standard Chartered Bank) have also started taking substantial exposure in renewable energy projects.

With increasing complexity and project sizes, the meaningful presence of these different players bodes well for continued growth of the sector. For a capital-intensive area, a highly competitive funding landscape is arguably the biggest growth driver.

On the equity side, by virtue of the social, environmental and economic impact, renewables have – since the very beginning – evinced interest from multiple long-term investors. Deep investments have come from sovereign entities such as ENEL, CDPQ and Canada Pension Plan Investment Board (CPPIB). Global private equity players Goldman Sachs, KKR and Global Infrastructure Partners (GIP) joined in, as did oil and gas majors Total SE, Shell and Petronas and national conglomerate majors like Adani, Tatas and most recently Reliance Industries.³

Renewables have evinced interest from multiple long-term investors since the beginning.

India's ambitious RE targets clearly suggest an upward trajectory in renewable

² RBI. [Press release](#). November 2016.

³ IEEFA. [Capital Flows Underpinning India's Energy Transformation](#). February 2021.

energy. Momentum is accelerating, as is global investor interest, so the opportunities are huge for India, if planned successfully.

Critical factors for sustained financing solutions for the sector include continuous learning of the evolving renewable market by lenders, tapping the capital base of environment focused investors, building a dedicated infrastructure finance bank in India and careful evaluation and financial structuring of the technological shift towards Indian modules and inverters.

For lenders, there are still untapped opportunities in green field projects, hybrid, storage and round the clock bids, and household plus commercial and industrial (C&I) rooftop projects.

All these and more such opportunities will lead to more innovation, more aggression and more opportunities for all stakeholders in the sector.

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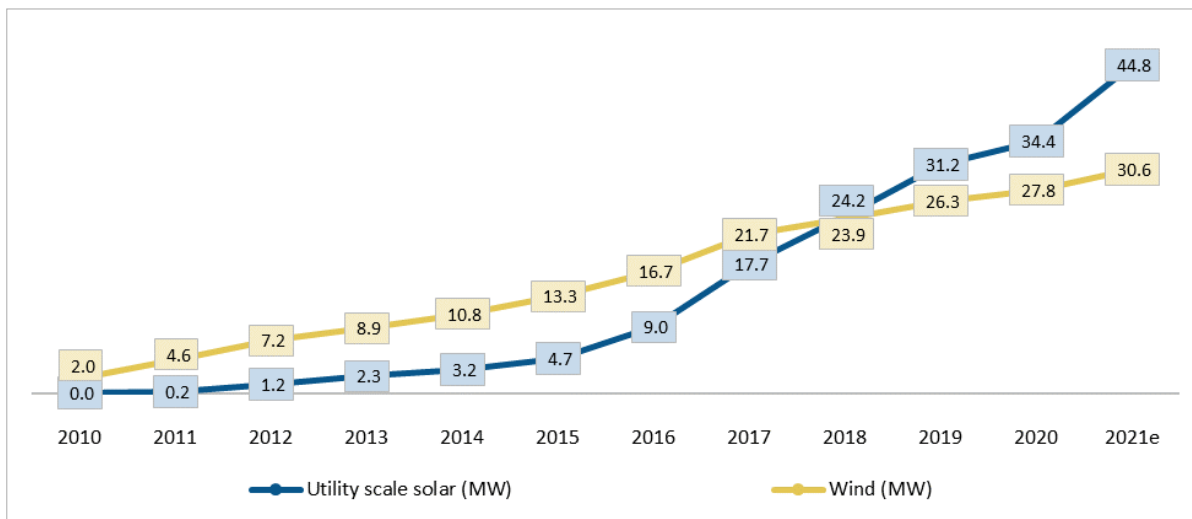
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Renewable Financing Solutions – A Retrospective View

The growth of renewable energy in India, in particular the solar sector, is possibly one of the most inspiring stories of the past decade. It is one of the few sectors where performance and delivery have surpassed budgets or estimates– which were extremely ambitious to begin with. In January 2010, the National Solar Mission (NSM) was launched with an initial target of 20 gigawatts (GW) of installed solar power by 2022 but the revised target, having been surpassed twice, now stands at 100GW of solar PV to be installed this year.⁴

In the first half of the previous decade, renewable power additions in India were dominated by wind power. In the Feed in Tariff (FiT) regime, and with abundant high wind sites, India witnessed sharp capacity additions in the sector.

Figure 2: India Wind versus Solar Capacity (in GW)



Source: JMK Research, IEEFA analysis.

Wind, however, will come a distant second to solar power in India owing to inherent weaknesses, such as resource availability, seasonal variability in generation and financial health of most original equipment manufacturers (OEMs). The core strength of solar assets – ease of construction and design, steady generation and scalability and relatively simple technology – are not shared by wind projects and on this basis solar has surpassed wind energy growth in the past couple of years. Growth in the wind sector in the second wave of renewable growth will be largely in the hybrid model, in which batteries complement and balance solar outputs.

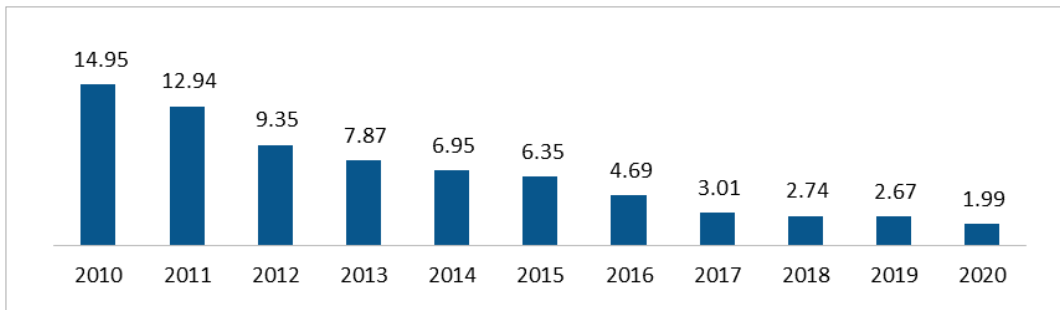
India meaningfully started its solar journey with a 250 megawatt (MW) solar park in Gujarat – Charanka, inaugurated in 2012.⁵ With base tariff of Rs15/kWh for solar

⁴ IEA. *Jawaharlal Nehru National Solar Mission (Phase I, II and III)*. August 2021.

⁵ The Economic Times. *India's first solar park at Charanka village in Gujarat*. June 2013.

power for the first 12 years, it seemed a costly and hardly scalable experiment; the only silver lining being that the future tariff was determined at Rs5/kWh– a healthy figure at that time.⁶ Today, more than 48GW later, we have witnessed the most aggressive bids at less than Rs2/kWh – Rs1.99/kWh (~US\$0.03/kWh) to be precise – then an unthinkable number.

Figure 3: Record Low Solar Auction Tariffs in India (Rs/kWh)



Source: *Bloomberg NEF - India's Mega PV Auction Amid Lockdown Shows Investor Faith, Mercom-New Solar Tariff Record of Rs2/kWh, Towards a renewable energy boom in India!-TERI*

Single bids often happen at mega scale nowadays, with Solar Energy Corporation of India Limited (SECI) and NTPC coming up with multiple 2,000 MW bids at a time. Innovative and more grid friendly bids such as Round the Clock (RTC), peak power bids, hybrid bids and energy storage bids are gaining momentum. For a world seeking greener power solutions and sustainable development, these are welcome sights.

That brings us to solar financing in India, which unsurprisingly has followed a similar narrative. When the Charanka solar project was first evaluated, the developer faced the Herculean task of finding lenders to provide non-recourse financing. Reluctant lenders cited all sorts of risks as the journey was in relatively unknown territory.

Concerns ranged from technology (evolving and relatively unproven at that time) to political, foreign exchange (as majority of project equipment was and still is imported) to role and responsibility (managing displacement of people and people related issues is never easy in populous democratic countries). Other doubts were about promoters (the vast majority of projects were being executed by first-time promoters or those with limited or no solar experience) and interest rate risks – in 2012, the Indian Renewable Energy Development Agency Limited (IREDA), the specialist lender in renewable energy space, was charging in the range of 12.5% to 13.5% for majority of private lenders. The same stands today at 9.45%-9.7% on the upper side, with the lowest rate at ~8%.⁷

Access to debt capital is one of the most important factors for the success of a renewable energy project. Solar projects had earlier started at a cost of

⁶ ADB. *CDM Assessment Report for the Charanka Solar Park, Gujarat, India.*

⁷ IREDA. *Interest Rate Matrix.* December 2021, CERC. *Statement of Objects and Reasons.* 2012.

~Rs180m/MW (US\$4m/MW).⁸ The Charanka Solar Park, with 250MW capacity, would have cost close to Rs45bn (US\$1bn) and would have entailed debt over Rs30bn (US\$0.7bn) – a big ask at that time. Now with 100GW renewable capacity in operation, solar is immensely attractive from a scale point of view for lenders, particularly as it is supported by very long dated centre government power purchase agreements (PPA). Add the opportunity to refinance an equally high amount of debt and the sector seems poised for innovation and explosive growth.

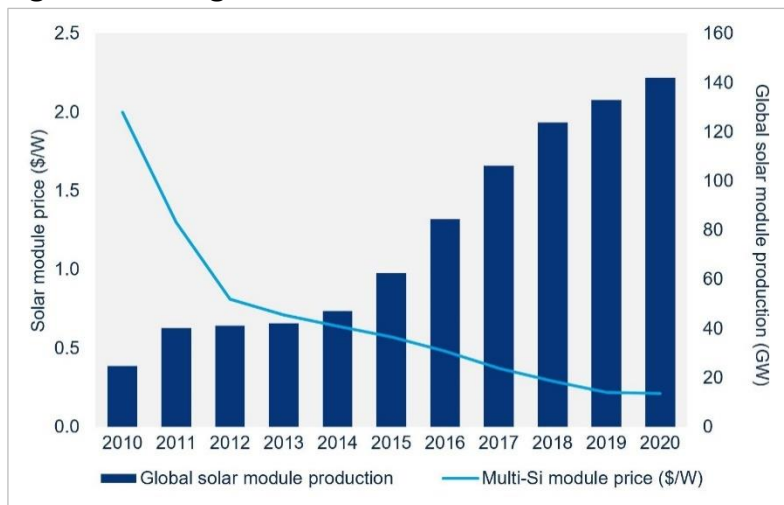
The sector has added advantages of (mostly) positive global and government support, ease of installation (simpler technology and significantly shorter construction period), land availability (the sector largely makes use of barren, uncultivable land – adding value for all stakeholders) and replicability. Owing to the socio-economic impact, the world's biggest investors vie for a stake in the sector, among them multiple sovereign funds and global pension funds.⁹

Surprisingly though, the sector's initial growth has been punctuated by limited banking support, making the growth story a unique one, from finance point of view.

Reasons for Muted Participation of Banks

(i) Technology Evolution – In the initial years, solar technology was fairly costly and evolving, with efficiencies improving year on year. It was difficult for traditional banks to lock on to a particular asset, not knowing how the existing technology would fare commercially and technically over time.

Figure 4: Change in Solar Module Prices



Source: *Wood Mackenzie*.

(ii) Tenors – In the early days, almost none of the traditional Indian banks were accustomed to long term financing. A 10-year loan was considered long-term and

⁸ The Economic Times. [India becomes lowest-cost producer of solar power](#). May 2019.

⁹ IEEFA. [Global capital mobilizing for India's \\$500bn renewable energy infrastructure opportunity](#). February 2021.

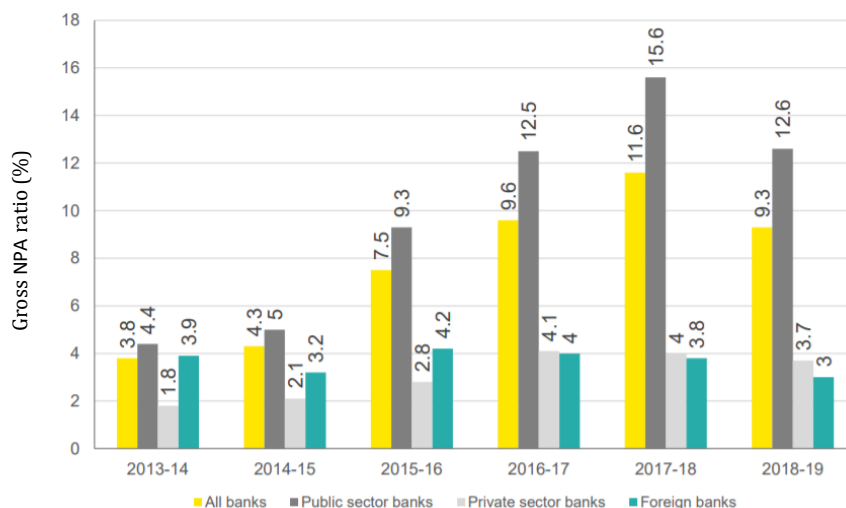
longer tenors were barely provided. The viability of renewable projects comes at 20-year tenors for debt, more aligned to match the revenues of 25-year PPAs. Asset Liability Management (ALM) issues further limited banks' ability to move aggressively.

(iii) "High" Per MW Project Cost – Thermal projects were being implemented at Rs50m/MW¹⁰ and offered 85-90% plant load factor (PLFs – fallacious as this has proved in hindsight, with the thermal fleet averaging PLFs of 55-60% over the past four to five years). For solar projects, a cost of Rs150-180m/MW (US\$3.4-4m/MW) with a PLF under 20% was not attractive for banks to consider.

(iv) Recourse vs Non-Recourse – As most of the promoters were new, banks wanted recourse financing for the projects. Given the high project debt, providing recourse was a difficult task for even the country's largest players.

(v) "Sector" Issues – A lot of banks were grappling with the initial signs of stress in the thermal power sector – and as renewable energy was not considered (and is still not considered) a separate sector, the exposure issues of many banks came as a clear hindrance for them to take exposure to solar.

Figure 5: Banking Sector Gross Non-Performing Asset (NPA) Trends



Source: E&Y - Stressed assets in Power Sector - Clear and Present Danger.

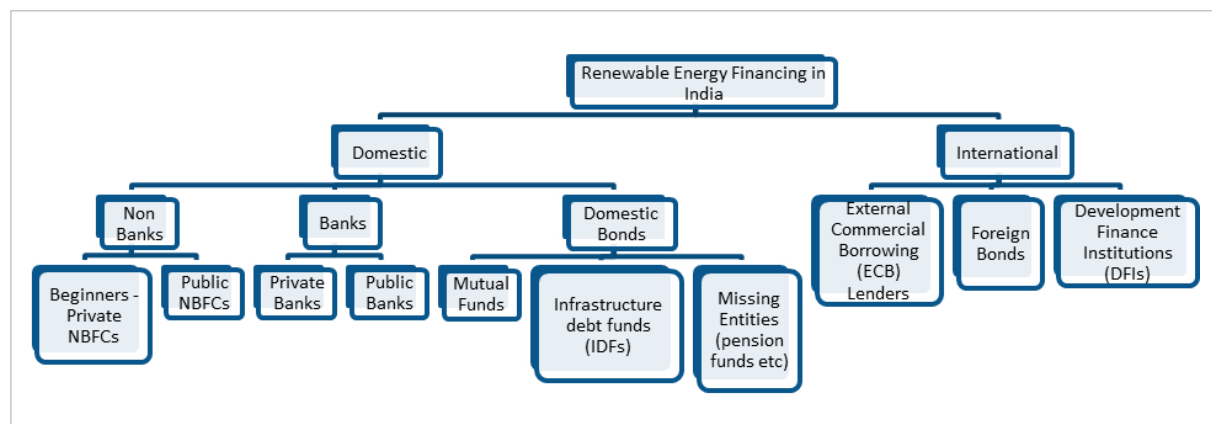
¹⁰ CERC. Benchmark Capital Cost (Hard cost) for Thermal Power Stations with Coal as Fuel. June 2012.

Figure 6: Banking Sector's Power Sector Exposure (March 2017)

Items	Gross Loans and Advances (in Rs crores)	Gross Loans and Advances (in US\$ million)	Gross Non-Performing Assets (GNPAs) at End of Period (in Rs crores)	Gross Non-Performing Assets (GNPAs) at End of Period (in US\$ million)
Electricity (Generation)	471,334	72,748	31,194	4,815
Electricity (Transmission)	25,358	3,914	2,102	324
Electricity (Distribution)	51,386	7,931	1,008	156
Total	548,078	84,593	34,304	5,295

Source: Ministry of Power 37th report of the Standing Committee on Energy.

(vi) Size – In the first stage of development, developers often won 10MW-20MW projects at a time, with debt in the range of Rs0.5-1bn and the largest Rs2bn. Banks chasing scale went for larger projects of Rs10bn-plus and the sector went under their radar.

Figure 7: Key Players in Renewable Energy Debt Financing in India

Source: IEEFA analysis.

Domestic Debt Funding

Arguably, the biggest contributors to renewable energy financing for the first five years were private non-banking financial companies (NBFCs), followed by public sector undertaking (PSU) NBFCs. The likes of L&T Infra Finance, Infrastructure Development Finance Company (IDFC), Aditya Birla Capital and Tata Cleantech were among early movers into the sector and came out with the first framework for financing renewable projects.

The private NBFCs made full use of the abstention of the banks and dominated the sector in its initial years of growth. They were quick to spot the inherent strengths

of solar/wind projects with lower construction risk, shorter construction period, simpler design and no dependence on external fuel. Public NBFCs were not too far behind – entities such as IREDA were focused on renewable power from the very beginning. The likes of Power Finance Corporation (PFC) and Rural Electrification Corporation (REC) entered with big cheques much later but provided the required impetus as the developers felt the need to diversify lenders.

Among private banks, Indusind Bank and Yes Bank were among the few to take large calls at various times. Yes Bank was the strategic and financial advisor to Greenko Energies for acquiring SunEdison’s solar portfolio in India. The bank also issued India’s first Green Infrastructure Bonds in 2015 for Rs10bn¹¹ but organisational difficulties resulted in a “stop-start” relationship with the sector. The larger public and private banks worked with a select set of large corporates and old business houses – Tata Power, Mahindra Solar, Hero Group, CESC and Emami – often on a relationship basis rather than following a focused approach. The growth in their renewable exposure was attributed to one-off large deals rather than a systematic approach. In terms of depth and coverage of the space, the private NBFCs and public NBFCs were far ahead till 2018-19.

NBFCs continued to innovate. Following encouragement from the Reserve Bank of India (RBI), Infrastructure Debt Funds (IDF) appeared as a new category of NBFCs, to thrive in the burgeoning renewable debt market. The tax efficiency built in by the government – the IDF bill made it a tax-exempt entity – meant the funds were able to pass on rate benefits to borrowers and allowed them to compete with banks.¹²

**Infrastructure Debt Funds,
as tax-exempt entities,
could pass on rate
benefits to borrowers.**

Domestic bonds entered the market soon after the banknote demonetisation undertaken by the Government of India in 2016.¹³ Now flush with unprecedented funds, the Indian Mutual Funds forayed into high rated renewable bonds, helping RE companies by providing lower rates, increasing lender competition and opening a new avenue for funding operating projects. This also helped companies reduce exposures with certain lenders where exposure norms were hit. Some of the largest bond issuances include those by ReNew Power Limited at the holding company level as well as for its subsidiaries in co-obligor structure. Additionally, there were credit enhanced bonds with IIFCL as the credit enhancing agency for bonds of ReNew Group. Other large bond issuers were GIC-backed Greenko and Sembcorp Group. Then the flow came to a standstill, hit by the IL&FS¹⁴ and DHFL¹⁵ debacles when the two NBFCs delayed and defaulted on their debt repayments to their lenders, and

¹¹ Yes Bank. Yes Bank annual report FY2017.

¹² Infradebt.in. [Press Release - Infrastructure Debt Fund](#).

¹³ RBI. [Press release](#). November 2016.

¹⁴ Business Standard. [What is IL&FS Crisis](#).

¹⁵ Moneycontrol. [DHFL crisis: A look at the story so far](#). June 2019.

later by the Franklin Templeton Fiasco, where six debt schemes of the mutual fund were frozen amid unprecedented redemptions when the COVID-19 crisis hit India.¹⁶

In the past two years, larger banks have returned life to the landscape. After a lag of seven to eight years, the State Bank of India (SBI), followed by HDFC Bank, Axis Bank and more recently ICICI Bank, have completely changed renewable energy competition. HDFC more than doubled its RE financing book in FY2020/21 from the previous year to Rs85.6bn (US\$1.1bn), further swelling to Rs108.7bn (US\$1.5bn) in FY2021/22.¹⁷ SBI still leads – the cumulative amount deployed in RE was upwards of Rs330bn (US\$4.4bn) as of September 2021.¹⁸

Large private banks such as Axis Bank and to a lesser extent ICICI Bank (which focuses on operational projects) have largely avoided the stressed thermal power sector and done some marquee renewable energy deals. SBI has also rejigged its credit matrix to allow for more competitive funding of further renewable projects. The interest rates as a result are at an all-time low, preference is given to the sector and the coverage has improved substantially. The biggest thing that large banks bring to the table is price competitiveness, so much so that some larger NBFCs have had up to 50% book shrinkage in renewable assets over the past 12-18 months – the assets changing hands from NBFCs to banks soon after commissioning. Sustained banking interest is critical in providing competitive debt financing to boost innovation and enable growth, in turn lowering the cost of renewable power to benefit Indian consumers.

International Debt Funding

International banks have followed a cautious approach to investing in RE – weighing up risks, political motivation and finally the evolution of the sector over the past decade, following the sustained increase in equity investments by global pension funds.

Today, large banks such as Standard Chartered Bank (SCB) and Rabo Bank have large exposures. SCB was one of the largest lenders in 2021 – among its underwritings was nearly a billion dollars for the Adani Group.¹⁹ Societe Generale and others have expanded their customer base, to be joined in time by other global majors.

The story of international bond market has been starkly different. Proactive and bold, with a global understanding of renewables, bond buyers moved in early attracted by high yield offerings and buoyed by the initial success and pedigree of large players. They took large calls as early as 2014²⁰ and continued the momentum with multiple large issuances. Almost all the global and domestic big names have

¹⁶ Mint. [Lessons at the Crux of Franklin Templeton Fiasco](#). February 2021.

¹⁷ HDFC Bank. HDFC Bank annual report FY2021.

¹⁸ SBI. SBI Analyst presentation Q2 2021.

¹⁹ Adani Green Energy Limited. [Adani Green Energy Raises USD 1.35 Billion In One Of Asia's Largest Project Financing Deals](#).

²⁰ Climate Bonds Initiative. [Indian clean energy player Greenko issues \\$550m, 5 year, high-yield \(B\) corporate bond](#). August 2014.

explored the international bond market – led by Government of Singapore Investment Corporation (GIC) and Abu Dhabi Investment Authority (ADIA) backing Greenko, Goldman Sachs-backed ReNew and International Finance Corporation (IFC) & Caisse de dépôt et placement du Québec (CDPQ) backed Azure. All of these have had multiple, large international bond issuances and even refinances. Among others are Adani, Hero Futures and Morgan Stanley-backed Continuum.²¹

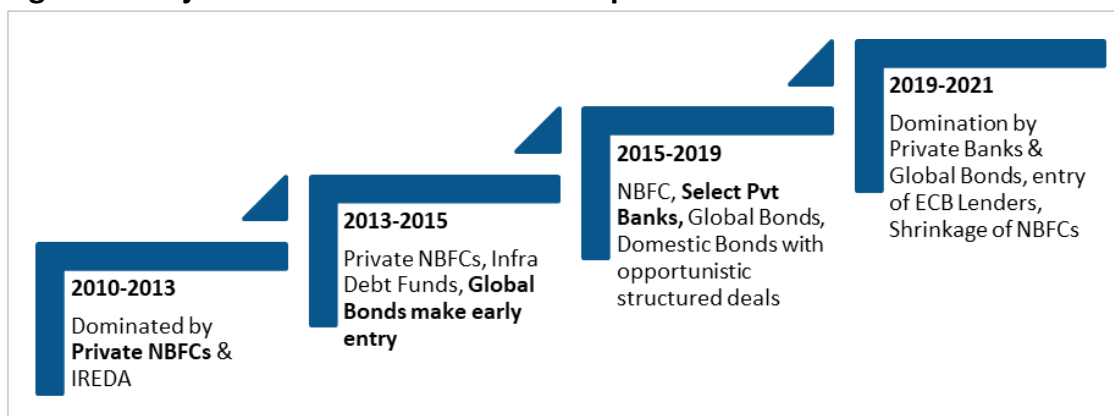
Proactive and bold, with a global understanding of renewables, bond buyers moved in early.

The international bonds have followed a broader matrix, structuring the deals attractively for the issuer while also protecting the investors through investment and near investment ratings. Such has been the reliability and influence of the positive structuring of the bond markets that, despite being instruments only for commissioned projects, they are built into developers' financial models at the bid stage. The international bonds seem to be path breakers for renewable financing, and their innovation and direction seem to be the most exciting aspects of renewable financing.

The last significant players in the international space are the development financial institutions (DFIs) such as Asian Development Bank (ADB), Asian Infrastructure Investment Bank (AIIB), IFC and their consortiums. In terms of structure, they are the only set of lenders that provide a 20 year-plus structure for renewable energy projects with negligible interest rate fluctuation risks – providing what can really be termed long-term money.

For pure-play “build and hold” infrastructure projects, these lenders provide the ideal financing package. If these DFIs were to start focusing on long term refinance of operational projects, as with domestic lenders, it could be a real game changer – helping to build bond-friendly structures for long-term as well as attracting interest from previously elusive provident and insurance funds.

²¹ Refinitiv. Bonds Guide. December 2021.

Figure 8: Major Lenders for Indian RE Companies

Source: IEEFA analysis.

A Glimpse Into the Investor Base – The Equity Story

Simplistically speaking, the equity story of renewable energy has witnessed deeper and more mature interest. By the virtue of its social, environmental and economic impact, from the beginning RE has attracted interest from multiple long-term investors. Plainly, renewable projects are best handled by patient investors.

On the list of sovereign entities are ENEL, CDPQ and Canada Pension Plan Investment Board (CPPIB), the largest global pension fund, as are GIC, Temasek, IFC, CDC, National Investment and Infrastructure Fund (NIIF) and, more recently, Norfund. Major investment has come from almost all the global PE players, among them Goldman Sachs, KKR, Global Infrastructure Partners (GIP), Actis, Morgan Stanley, ADIA and JP Morgan. A third set of investors (some of them more recent) includes oil and gas majors such as Total SE, Shell, Petronas and Malaysian and Thai fossil-fuel companies for which renewables provide a sustainable hedging solution as the world tries to go greener. Further investment has come from the national conglomerate majors like Adani, Tata and most recently Reliance Industries.²² Such variety and depth of investors bode well and already have driven aggressive growth.

The Nasdaq listing of ReNew Power was followed by the first power sector infrastructure investment trust (InvIT), Indigrid, backed by KKR, then another KKR-backed RE focussed InvIT, Virescent. These open up immense opportunities for infrastructure investments – providing the strongest pillar as we move towards the 500GW goal for renewables.

Renewable Sector – Future Growth Potential

India's renewable energy potential stands at more than 1 terawatt (TW), led by solar (nearly 749GW), then wind (302GW at 100m hub heights), bioenergy (25GW) and small hydro (21GW).²³ This effectively means that once the hybrid, peak power,

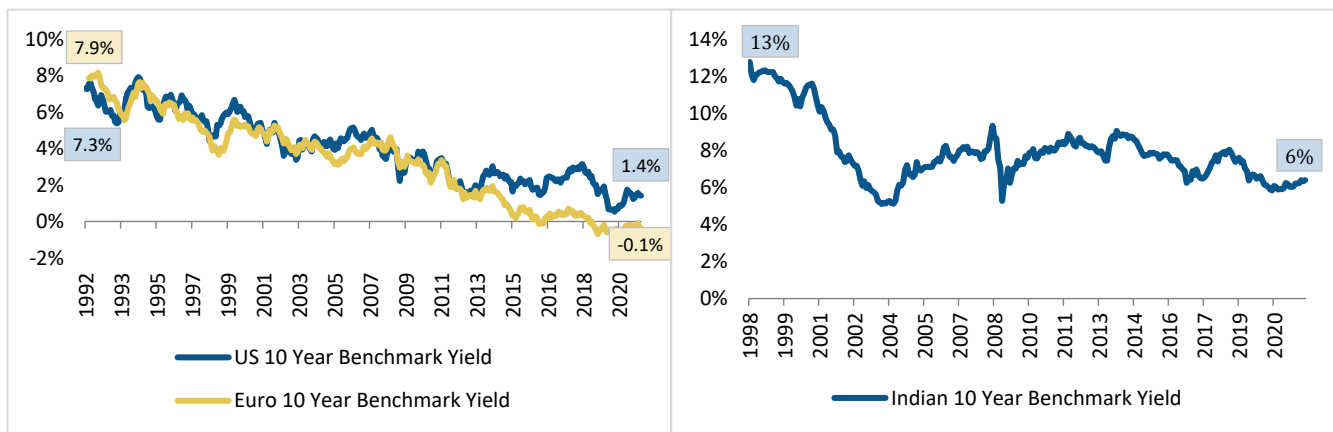
²² IEEFA. *Capital Flows Underpinning India's Energy Transformation*. February 2021.

²³ Care Ratings. Knowledge Paper - Roads & Renewables.

battery and other storage technologies evolve at utility scale, almost all of India's energy demand growth has the potential to be met by domestic, zero-emissions renewable power sources.

India, having set ambitious RE targets for 2030, took a step further at the Glasgow summit and mandated net-zero emissions by 2070. Renewable energy will bring ongoing deflationary gains and the massive strategic opportunity to curtail India's dependence on fossil fuel imports.

Figure 9: Interest Rate Trajectory of Developed World versus India



Source: Refinitiv, IEEFA analysis.

Further, for most developed world economies, interest rates have been on a downward trajectory over the past 15-20 years. If India were to become a developed economy, then benchmark interest rates should follow a similar course. This in turn would lead to higher internal rate of return (IRR) for debt fuelled RE infrastructure projects and make these more attractive from lenders' point of view.

Putting things to perspective, near zero to 100GW renewable capacity in 10 years is an exceptional journey so far. The challenge will be to maintain focus on the path from 100GW to 500GW and meet its demand for both greater detail in planning and much greater national cohesion. Momentum is accelerating, as is global investor interest, so the opportunities are huge for India.

Critical Factors for Sustained Financing Solutions

- Continuous research of the evolving renewable market – covering storage, peak power, hybrid, battery and thermal/hydro combinations and structuring green solutions. With multiple tenders floated by entities such as SECI in hybrid²⁴ and BESS technologies,²⁵ there are opportunities galore for lenders to study and exploit the risk-return dynamics.

²⁴ Mercom. [SECI to Tender 1.2GW of ISTS-Connected Solar Wind Hybrid Projects](#). April 2021.

²⁵ EQ International. [SECI invites EoI for 1GWh Battery Energy Storage System](#). October 2021.

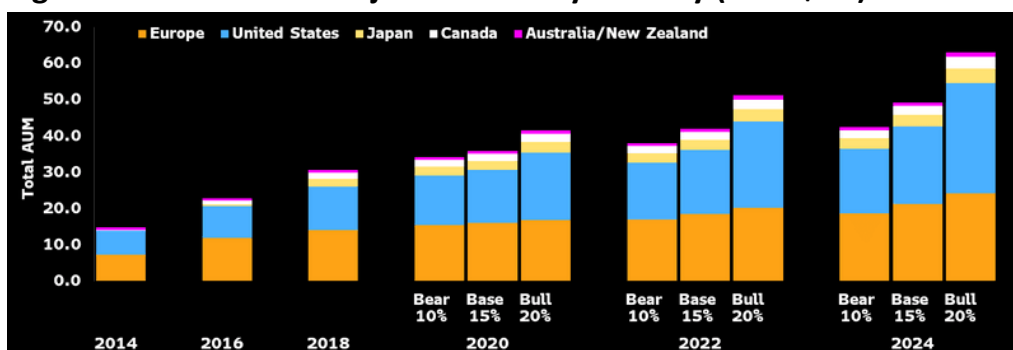
Figure 10: Energy Storage Systems Pick Up Pace in India

- SECI tender for 2,000 MWh standalone energy storage systems, the largest in India
- NTPC EoI for 1,000 MWh of grid-connected BESS on the premises of its power projects
- Rs181bn (~US\$2.5bn) allocated under production-linked incentive (PLI) program to set up battery manufacturing capacity
- NREL finds Jammu and Kashmir, Gujarat, and Karnataka having more than 10GW of battery storage capacity by 2030

Source: Mercom, IEEFA analysis.

- Tapping capital base of environment focused investors, domestic and international, to bring cost competitiveness to renewable financing by adoption of global environmental, social and governance (ESG) frameworks and principles. Sustainable finance bonds totalled a record US\$552bn in the first half of 2021 and sustainable lending totalled US\$321bn in the same period, more than tripling year-on-year.²⁶ Bloomberg estimates ESG assets may hit US\$53 trillion by 2025, a third of global assets under management (AUM).²⁷ HSBC and SCB have a clear roadmap to stop exposure to carbon emitting projects – HSBC in December 2021 released its new roadmap to exit coal based and high emission projects.²⁸

Figure 11: ESG Global Projected AUM by Country (In US\$ tn)



Source: Bloomberg.

- Building a dedicated infrastructure finance bank – or the National Bank for Financing Infrastructure and Development (NBFID)²⁹ as announced in the

²⁶ Refinitiv. The Green Bond Guide. October 2021.

²⁷ Bloomberg. ESG assets may hit \$53 trillion by 2025, a third of global AUM. February 2021.

²⁸ The Economic Times. HSBC says clients must have plan to exit coal by end-2023. December 2021.

²⁹ Mint. Govt tables National Bank for Financing Infrastructure and Development Bill. March 2021.

budget 2021 by the finance minister. The bank could be a thought and product leader, aiding and leading policy advocacy, deal structuring and setting groundwork for sustained growth (including but not limited to credit enhancements, guarantees, removing finance bottlenecks etc).

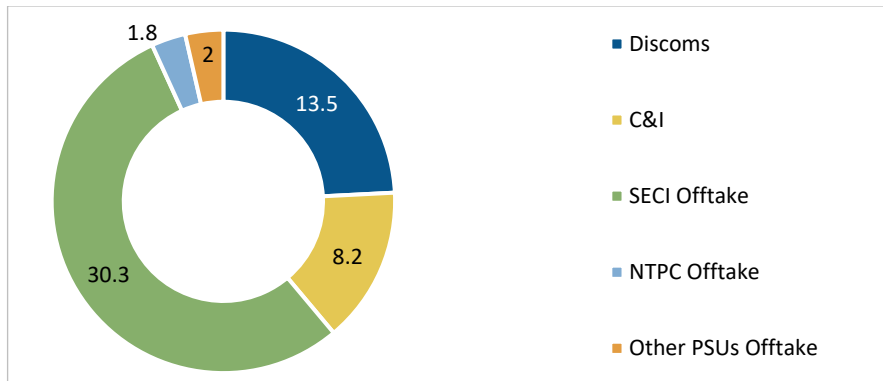
- As the shift towards Indian modules and inverters takes place, it is important to have technical upgrades via specialised lenders' independent engineers (LIE), SCADA-integrated automatic monitoring, bi-facial modules, dual axis tracking and studies to carefully evaluate and financially structure the technological shift to avoid systemic risks arising out of these changes.

Gaps and Opportunities in the Market

There are still clear gaps in cost-effective RE financing that lenders have yet to tap.

First, in the rush to acquire the debt of de-risked operational projects, greenfield projects still receive limited interest as the majority of newer investors take a cautious approach. Funding for most of the time-bound renewable energy projects under development is still from relatively costlier lenders. The gap is even wider for “non-central government” projects, i.e., state projects and third-party offtake projects for which private banks adopt a very cautious approach.

Figure 12: Utility Scale Solar Pipeline Capacity (in GW)



Source: Bridge to India.

Further, the project size and debt amounts are going to grow substantially as hybrid, storage and round-the-clock bids increase. In SECI's recently concluded auction for 100MW solar with 40MW battery energy storage system (BESS), the net project cost was ~Rs92m/MW compared to Rs25-30m/MW for solar projects.³⁰ The debt for ReNew Power's RTC project of 1.3GW is pegged at nearly US\$1bn.³¹ Such projects should ideally be funded by the country's largest lenders but most private and large banks are reluctant to make the first move for newer technologies and structures.

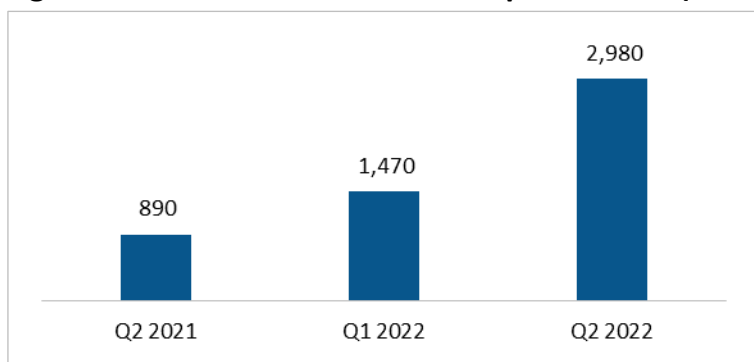
³⁰ Mercom. [SECI Seeks ₹4 Billion Term Loan to Finance its Floating Solar and Energy Storage Projects](#). November 2021.

³¹ Business Standard. [ReNew Power to invest \\$1.2 bn for country's 1st round-the-clock RE project](#). August 2021.

Time is ripe for like-minded banks and FIs to join consortiums to fund these projects competitively.

In parallel, with increased awareness, the “retailization” of solar projects is gaining pace. India has an ambitious (but till-now well behind schedule) target of achieving 40GW of green energy from rooftop solar by 2022. The country is already among the most cost-effective in generating rooftop solar energy.³² Household plus commercial and industrial (C&I) rooftop projects, as these also accelerate, will bring opportunities for large fintech companies to thrive.

Figure 13: Tata Power Solar Rooftop Revenues (Rs mn)



Source: Tata Power analyst presentation Q2 2022.

All such opportunities will lead to more innovation, more aggression and more opportunities for all stakeholders. In 2010, renewables were considered a sunrise sector. In 2021, it is clear the sun – literally – will shine on this massive growth area for a long time ahead, building India’s energy security while driving both system deflation and decarbonisation. What’s not to like about that?!

³² Mint. [India most cost effective globally in rooftop solar power: report](#). October 2021.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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