

Financing India's Energy Transition

A Guide on Green Bonds
for Renewable Energy and
Electric Transport

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Arjun Dutt, Abhinav Soman, Kanika Chawla,
Neha Kumar, Sandeep Bhattacharya, and Prashant Vaze





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The CEEW Centre for Energy Finance (CEF) acts as a non-partisan market observer and driver, to monitor, develop, test, and deploy financial solutions to advance the energy transition. It aims to help deepen markets, increase transparency, and attract capital in clean energy sectors in emerging economies. It will achieve this by comprehensively tracking, interpreting, and responding to developments in the energy markets, while also bridging gaps between governments, industry, and financiers. CEF is an initiative of the Council on Energy, Environment and Water (CEEW), one of South Asia's leading think-tanks.

The Climate Bonds Initiative is an international investor-focused not-for-profit organisation working to mobilise the USD100tn bond market for climate change solutions. The Climate Bonds Initiative carries out market analysis, policy research, market development; advises governments and regulators; and administers a global green bond Certification Scheme. For more information, please visit www.climatebonds.net.

About CEEW Centre for Energy Finance

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Responding to a growing need for enabling an efficient and timely energy transition in emerging economies, CEF will focus on developing fit for purpose market responsive financial products. A robust energy transition also requires deep markets, which need continuous monitoring, support, and course correction. By designing financial solutions and providing near-real-time analysis of current and emerging clean energy markets, CEF will build confidence and coherence across key actors, reduce information asymmetry, and bridge the financial gap.

Financing the energy transition in emerging economies

The clean energy transition is gaining momentum across the world with cumulative renewable energy installation crossing 1000 GW in 2018. Several emerging markets are now seeing renewable energy markets of significant scale. However, these markets are young and prone to challenges that could inhibit or reverse the advances made in the recent past. Also, the absence of well-functioning markets in emerging economies make investment in clean technologies risky and prevent capital from flowing from where it is in surplus to regions where it is most needed. CEF will address the urgent need for increasing the flow and affordability of private capital into clean energy markets in emerging economies.

CEF's Focus: Analysis and solutions

CEF has a twin focus on markets and solutions. CEF's market analysis will cover energy transition-related sectors, both on the supply (solar, wind, energy storage) and demand side (electric vehicles, distributed renewable energy applications). It will create open source data sets, salient and timely analysis, and market trend studies.

CEF's solution-focused work will enable the flow of new and more affordable capital into clean energy sectors. These solutions will be designed to address specific market risks that act as roadblocks to capital flows. These will include designing, implementation support, and evaluation of policy instruments, insurance products, incubation funds, etc.

About CEEW

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About Climate Bonds Initiative

Climate Bonds Initiative (CBI) is an investor focussed, not for profit, dedicated to mobilizing the \$100 trillion bond market for climate change solutions. It promotes investment in the projects and assets that are necessary for a rapid transition to a low-carbon and climate resilient economy.

CBI's open source for-public-good work falls into three work streams:

- Market tracking and demonstration projects; CBI is a premier source of market information, and provides base data for use by multiple indices, such as MSCI and S&P DJI. It publishes the annual State of the Green Bond Market report and country briefings.
- Developing trusted standards: CBI established the Climate Bonds Standard & Certification Scheme, which provides trusted green definitions and standards, and certification for compliant green bonds. The aim is to help investors identify, and invest in, green investments.
- Providing policy models and advice: CBI has been providing policy supports for governments in various regions/countries including Europe, US, China, India, Brazil and Mexico. Our partners include UNEP Inquiry, OECD, the European Commission and C40.

The CBI strategy is to develop large, liquid Green/Climate Bond markets that will help drive down the cost of capital for climate projects in developed and emerging economies.

CBI has a strong international network of almost 100 Climate Bond Partners, including more than 25 supportive institutional investors with some USD 13 trillion of assets under management and most leading international green bond underwriters. These Partners are critical sources of forward-looking and region-specific market and policy information.

CBI is also playing a central role in the EU's push for sustainable finance, with CBI's CEO Mr Sean Kidney serving first as a member of the High-Level Expert Group on Sustainable Finance (HLEG) and now of the Technical Expert Group advising the European Commission on its Action Plan for Financing Sustainable Growth. CBI taxonomy has proven one of the main guiding documents, apart from the work of the European Investment Bank, to inform the EU's HLEG and TEG.

Climate Bonds Initiative has a world-leading role in advising about green bonds to governments, investors, issuers and underwriting banks. It is a key advisor to China's central bank on the creation of their green bond market, and is playing active role in nurturing nascent green bond markets in Australia, Brazil, Colombia, Germany, India, Mexico, the Netherlands, Nigeria and across the Nordics.

In India, CBI collaborated with the Federation of Indian Chambers of Commerce and Industry (FICCI) in 2016 to establish the India Green Bonds Council. It is a platform of market participants that comprises issuers, investors, financial institutions and underwriting banks, stock exchanges, rating agencies. IGBC is a vital sounding board for promoting green bonds work in India, and features regular participation of regulators, government representatives, international organisations, NGOs and think tanks.

CBI is also the secretariat for the India-UK Green Finance Dialogue – an emergent partnership between FICCI and the City of London, UK. It has hosted two editions of investor-issuer interactions between potential issuers from India and European investors in London. CBI's current areas of focus in India include scaling up investment in clean energy, mobilising capital at scale for sustainable and resilient agriculture, unlocking green capital flow at the level of states and cities; and providing support to policy and regulatory development on green finance.

About the authors



Arjun Dutt

arjun.dutt@ceew.in

Arjun Dutt is a Programme Associate at CEEW. His work spans renewable energy finance, policy and markets, and is geared towards analysing risks constraining renewable energy investments and enhancing the flow of finance to the renewable energy sector. Prior to his association with The Council, Arjun worked for over three years in equity research. He has a BE in Electronics and Communication Engineering from Delhi College of Engineering, and an MBA from Management Development Institute, Gurgaon.



Abhinav Soman

abhinav.soman@ceew.in

Abhinav focuses on sustainable mobility research at The Council. His research interests include strategies to decarbonise the transport sector and enable equitable access to mobility services. As part of his Master's thesis, he designed an intervention based on behavioural economics to increase uptake of public transportation in the UK. In the past, he has worked with SMEs in Bangalore with adopting sustainable practices. Abhinav holds a Masters in Sustainable Development from the University of Cambridge where he was a Chevening scholar.



Kanika Chawla

kanika.chawla@ceew.in

Kanika Chawla is a policy specialist working at the intersection of renewable energy and financial markets. She is the Director of the CEEW Centre on Energy Finance and also manages The Council's research and outreach in renewable energy policy, regulation, markets, and socio-economic value. She is actively engaged with private and public enterprises within and outside India in designing and developing financial de-risking instruments. Kanika has an MSc in Economics and Development Economics from the University of Nottingham, and an undergraduate honours degree in Economics from Miranda House, University of Delhi.



Neha Kumar

neha.kumar@climatebonds.net

Neha Kumar is the India Programme Manager for Climate Bonds Initiative and is based in Delhi. She drives policy, strategy and partner programmes in the country to scale up the green bonds market and green financial ecosystem. She has over fifteen years of experience working on public policy, regulation and industry action in India on sustainability, responsible financing and environmental and political risks to national and international investments.



Sandeep Bhattacharya

sandeep@climatebonds.net

Sandeep is responsible for coordinating the Climate Bonds Initiatives program to support the development of the Indian Green Finance market and related media outreach. Sandeep has more than 15 years of experience related to bond markets in India and SE Asia, including roles in credit evaluation, business development, execution and structuring of bonds as well as ABS transactions. Previous management roles include periods with Deutsche Bank Group and Cagamas Berhad, a subsidiary of the Malaysian Central Bank - Bank Negara.



Prashant Vaze

prashant.vaze@climatebonds.net

Prashant Vaze is the Head of Government & Policy at Climate Bonds Initiative. He is an experienced policy analyst, public policy expert and environmental economist. He was a former senior civil servant in UK government, and a senior economic consultant and economist in the consumer movement. He has written and researched extensively about energy policy, climate change, green national accounting and is the author of two non-fiction and one fiction book on climate and energy issues.

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Abbreviations

2W	two-wheeler
3W	three-wheeler
4W	four-wheeler
ABS	asset-backed securities
ADB	Asian Development Bank
AFD	Agence Francaise de Development
AMC-MF	asset management company – mutual fund
AUM	assets under management
BMTC	Bangalore Metropolitan Transport Corporation
bps	basis points
BSE	Bombay Stock Exchange
C&I	commercial and industrial
CAGR	compounded annual growth rate
CDS	credit default swap
CICERO	Centre for International Climate and Environmental Research
CLPWF	CLP Wind Farms
CPSU	central public sector undertaking
CRR	cash reserve ratio
CSR	corporate social responsibility
DFI	developmental finance institution
DRE	distributed renewable energy
EPC	engineering procurement construction
EPF	Employees' Provident Fund
EPFO	Employees' Provident Fund Organisation
ESG	environmental social and governance
EV	electric vehicle
EVSE	electric vehicle supply equipment
EXIM Bank	Export-Import Bank of India
FAME	Faster Adoption and Manufacturing of Hybrid and Electric Vehicles
FPI	foreign portfolio investors
FY	financial year
GBP	Green Bonds Principles
GDP	gross domestic product
GEC	Green Energy Corridor
GHG	greenhouse gas
GIC Re	General Insurance Corporation of India
GSDP	gross state domestic product
GW	gigawatt

IBA	Indian Banks' Association
IBC	Insolvency and Bankruptcy Code
ICE	internal combustion engine
ICMA	International Capital Markets Association
IFC	International Finance Corporation
IIFCL	India Infrastructure Finance Company limited
IL&FS	Infrastructure Leasing & Financial Services
INR	Indian rupee
IPP	independent power producer
IRDA	Insurance Regulatory and Development Authority
IREDA	Indian Renewable Energy Development Agency
ISA	International Solar Alliance
IT	information technology
JICA	Japan International Co-operation Agency
KPI	key performance indicators
KREDL	Karnataka Renewable Energy Development Limited
kW	kilowatt
MF	mutual fund
MNRE	Ministry of New and Renewable Energy
MDB	Multilateral Development Bank
MFI	microfinance institution
MoP	Ministry of Power
MSCI	Morgan Stanley Capital International
MSME	medium small and micro enterprises
MW	megawatt
NBER	United States National Bureau of Economic Research
NBFC	non-banking financial company
NDC	nationally determined contribution
NEMMP	National Electric Mobility Mission Plan
NITI Aayog	National Institution for Transforming India
NPA	non-performing assets
NPS	National Pension Scheme
NSDL	National Securities Depository Limited
NSE	National Stock Exchange
NTPC	National Thermal Power Corporation Limited
OECD	Organisation for Economic Co-operation and Development
OEM	original equipment manufacturer
OPIC	Overseas Private Investment Corporation
PE	private equity
PFC	Power Finance Corporation
PFRDA	Pension Fund Regulatory and Development Authority
PPA	power purchase agreement

PSU	public sector undertaking
PTC	pass-through certificate
PV	photovoltaic
RPO	renewable purchase obligations
RE	renewable energy
RBI	Reserve Bank of India
REC	Rural Electrification Corporation
S&P	Standard & Poor's
SBI	State Bank of India
SDG	Sustainable Development Goals
SDL	state development loan
SEBI	Securities and Exchange Board of India
SECI	Solar Energy Corporation of India
SHS	solar home system
SIAM	Society of Indian Automobile Manufacturers
SLR	statutory liquidity ratio
SMEV	Society of Manufacturers of Electric Vehicles
SPV	special purpose vehicle
STU	state transport undertaking
TCO	total cost of ownership
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USD	United States dollar
USICEF	US-India Clean Energy Finance



Executive summary

India's ongoing energy transition, led by a buoyant renewable energy market and increasing activity in the electric mobility sector, is characterised by consistent and strong high-level policy targets and ambition. The country's policy environment is enabling increased private sector activity in both clean energy deployment and electric mobility. The scale of the ambition and the size of the market in these sectors provides both an opportunity and a challenge. The ambitious targets provide an advance market commitment, encouraging market activity by private players. However, the quantum of capital required to realise these targets are mammoth. Constraints on access to capital—both in terms of adequacy and affordability—are impeding the pace and efficiency of the energy transition.

Bank debt has been the primary source of domestic currency capital for India's infrastructure projects. With competing demands on this limited pool of capital, which is highly regulated by the Reserve Bank of India (RBI), the bond market could be a critical source of debt finance for the energy transition. Identifying this potential, this report presents a detailed analysis of the case for green bonds as a complementary source of debt capital. Green bonds are a category of bonds, the proceeds of which can only be used in specific clean energy and climate-change-related end uses, including renewable energy and electric mobility. The report considers green bonds as a tool to address the capital raising needs of both the private sector, as well as sub-sovereign government (in this case state governments), for the renewable energy and electric mobility sectors.

Investment flows in RE capacity deployment have averaged USD 10 billion annually, over the period 2013-2017. However, to meet its Nationally Determined Contribution under the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement, India needs annual investments of USD 30 billion over the period 2018-2030. Similarly, the scaling-up of electric vehicle (EV) sales from less than 0.1 per cent of annual vehicle sales today to realise the ambition of 30 per cent of annual vehicle sales by 2030 will require considerable increase in investment flows. Apart from this, investments will also be needed for supporting infrastructure such as transmission infrastructure and solar parks for renewables and charging infrastructure for electric mobility.

In the face of such large credit requirements, the bond market could complement the traditional sources of debt, especially through refinancing of primary debt. Refinancing through bonds presents several advantages, including the lowering of the cost of capital and access to institutional investors such as insurance, pension, and mutual funds. Further, bond market investors favour longer term investments with fixed coupon rates, making them a better fit for renewable energy and electric mobility projects, creating more certainty over debt repayments, in contrast with shorter-tenor bank loans with floating rate interest rates.

The bond market has been critical for the advancement of the global energy transition. Labelled green bond issuances stood at USD 167.3 billion in 2018. However, India's nascent corporate bond market still needs significant policy support to propel it towards market maturity. Several planned and ongoing initiatives could increase the depth of the bond market, broadening its range of market participants and enhancing the use of debt for renewable energy and electric mobility refinancing. These include the implementation of the Insolvency and Bankruptcy Code (IBC), which could help address concerns pertaining to creditor protection in the event of default by bond issuers. The IBC has been characterised by improved outcomes, as compared to the pre-existing regime for creditor protection. Further, the introduction of instruments geared towards liquidity management (tri-party repo) could enable greater participation from institutional investors.

Measures have also been taken to encourage greater participation of large companies and institutional investors in the bond market, in order to boost volumes. These include regulatory developments disincentivising bank borrowing by large companies and mandating the fulfilment of a portion of their debt capital requirements through bonds; the lowering of minimum credit-rating requirements for pension funds; and tax incentives aimed at enhancing returns from asset-backed securities. Measures aimed at enhancing foreign portfolio investments and for helping reduce the transaction costs of bond issuance are also under consideration.

Given the bond market opportunity for accessing capital for renewable energy and other climate-linked green activities, India has become the twelfth largest green bond issuer in the world, with total cumulative issuance between February 2015 and December 2018 standing at USD 7.15 billion. However, it is important to note that a bulk of these issuances have been in foreign bond markets to avoid the challenges of the domestic market.

Green bond issuances have been used by project developers to refinance renewable energy projects, and by banks and non-bank financial institutions to raise capital for lending to renewable energy projects. The electric mobility sector could also make use of green bonds. A quick win would be using existing financing mechanisms such as asset-backed securities (ABS), which are already used for auto-loans, to start financing purchase of EVs or hybrids for commercial and private use. Under green ABS, cash flows from existing internal combustion engine (ICE) vehicle leases may be packaged with those associated with EV loans, which enables diversification of risks for the portfolio. In addition, creditworthy original equipment manufacturers (OEMs) could issue standalone green bonds to refinance existing loans. While start-up companies could find it challenging to issue green bonds, convertible green bonds could offer a solution for these companies.

While corporate bonds address the debt capital needs of private sector entities, state governments also regularly access the bond market. States could also, therefore, issue green bonds to finance investments undertaken by state entities to support the scaling up of renewable energy and electric mobility. These could take the form of either green sub-sovereign bonds or those issued by a state-backed corporate entity. The state-backed issuer could be a new special purpose green financing corporation or dedicated green financing operations or 'green windows' set up at existing entities. The readiness of a state to issue green bonds depends upon the availability of a pipeline of projects and the commercial viability of these end uses (which determines the expected returns for investors). Besides the viability of the assets themselves, the general creditworthiness of the issuer is an additional factor that lowers risks for investors and increases the attractiveness of any potential issuance. Being sub-sovereign entities, states are highly creditworthy entities as bond issuers, with market participants factoring in an implicit sovereign guarantee on their issuances. However, issuances by state-backed corporate entities are not characterised

by a sovereign guarantee. Their creditworthiness would vary depending on the extent of backing provided by the corresponding state government but would ordinarily not exceed the standalone creditworthiness of the corresponding state. From the perspective of assessing the creditworthiness of such an entity set up for the purpose of issuing green bonds, this report develops a framework for assessing states' standalone creditworthiness, incorporating parameters pertaining to its economic strength and both short and long-term debt management.

States' suitability for issuing green bonds depends on the availability of suitable current and potential end uses, for the deployment of these proceeds, and the ability to recover proceeds to service and repay the debt raised. Resource availability, in case of RE, and the presence and effectiveness of suitable policy and regulatory measures geared towards lowering risks for investors determine the attractiveness of a state for investments in renewable energy and electric mobility, and thereby the utilisation and viability of the supporting infrastructure which states invest in.

For the renewable energy sector, the report identifies planned investments in green transmission infrastructure, the development of solar parks, and working capital loans for utilities as the range of present end uses for the deployment of green bond proceeds by states. Resource availability, measures for mitigating offtake and transmission risks, the effectiveness of its regulatory regime in minimising construction and regulatory risks, the scale of its renewable purchase obligations (RPO), and compliance rates have been identified as determinants of the attractiveness of a state's RE ecosystem.

For the mobility sector, the report identifies the acquisition of EVs by state transport undertakings, the deployment of public charging infrastructure, and investments in setting up EV manufacturing clusters as the range of end uses for green bond proceeds by states. The existence of technical feasibility studies for electric buses, current and planned on-road EV deployments, and the scale of private sector investments in EV manufacturing have been identified as determinants of the attractiveness of the EV ecosystem in a state.

Based on a comparison using the state readiness framework between the states of Uttar Pradesh and Karnataka (used as examples), Karnataka is found to represent superior creditworthiness and readiness to issue green bonds to support both RE and EV deployment. The report also presents a toolkit (section 6.4) for prospective green bond issuers. The toolkit provides a step-by-step guide of the green bond issuance process, in order to facilitate operationalisation of the intent to issue green bonds for state governments.

While India has witnessed some initial momentum in green bond issuance, certain limitations of its green bond market need to be addressed in order to scale up finance flows through this route. There is a clear imperative to strengthen existing measures by adopting a granular, standardised taxonomy for disclosures by investors and by adding clear standards to define what is, and what is not, 'green' in order to generate transparency and confidence among investors with respect to the end use of green bond proceeds. Additional steps from the supply side include building a pipeline of green assets that may be refinanced through green bonds by tagging green assets on banks' balance sheets. This must further be complemented by improving awareness about the benefits of green bond issuances.

- For issuers, these benefits include diversification of the investor base, increased visibility in the market, and improved corporate governance.
- For investors, a certified green bond reduces due diligence requirements and potentially offers higher returns vis-à-vis conventional bonds.

- For policy makers, green bonds offer systemic benefits both to the financial sector, and to the advancement of the energy transition. These include more comprehensive risk identification in the form of climate change-related considerations that conventional bonds do not capture, building stronger sustainability awareness and capacity in the financial sector and the effective identification and allocation of capital to the low-carbon transition.

In order to maximise the advantage of mobilising capital through green bonds, it is essential to take steps to systemically lower the cost of capital for issuers of green bonds. Through measures such as aggregation, securitisation and credit enhancement, green bonds could become a potential source of capital for underserved markets such as distributed renewable energy, and parts of the electric mobility value chain. Greater support at the policy level is needed in order to identify and operationalise such measures needed to facilitate finance flows to financially underserved segments. A combination of the large capital appetite of the clean energy markets, as well as the overall ongoing and planned bond market reforms could see green bonds spearheading a surge in India's bond market, while also paying for its energy revolution.



1. Introduction

Combating anthropogenic climate change is a top global priority, with the Paris Agreement formalising nations' commitments towards the target of keeping global warming under 2° C. While greenhouse gas (GHG) emissions need to be reduced across the board, two particularly important sectors are electricity and heat production (42 per cent of global GHG emissions¹) and transportation (24 per cent²). The decarbonisation of these two sectors is complementary since the gains from the decarbonisation of electricity generation can also be extended to the transportation sector through the deployment of electric vehicles.

As part of its Nationally Determined Contribution (NDC), India is aiming for a 40 per cent share of its power generation capacity from non-fossil fuel sources by 2030.³ By 2022, the country intends to achieve 175 GW installed renewable energy (RE) capacity.⁴ However, with around 75 GW of installed RE capacity⁵, India still has a long way to go to achieve its 2022 target and even further in order to achieve the targeted deployment under its NDC.

In the transportation sector, India is in mission mode for electric mobility with the objectives of climate change mitigation and of curbing local pollution as well as its dependency on crude oil imports. The National Electric Mobility Mission Plan 2020 (NEMMP), launched in 2013, had set an annual sales target of 6-7 million hybrid and electric vehicles starting in 2020 and cumulative sales of 15-16 million between 2013 and 2020. However, the cumulative sales of hybrids and EVs by 2018 were merely 263,607⁶. Recent statements from the Ministry of Power indicate that the government is working towards a policy framework for more than 30 per cent of annual vehicle sales to be electric by 2030⁷. EVs currently account for less than 0.1 per cent of annual vehicle sales in India.

These are ambitious targets that will need significant acceleration and scaling up of finance for the RE and electric mobility sectors. The financing requirements of these sectors are debt-heavy, but traditional sources of debt capital--banks and non-banking financial companies (NBFCs)--may not be able to supply funds at the required scale. Not only do sector lending limits and asset-liability mismatches limit the flow of capital to these

1 IEA, CO₂ Emissions from Fuel Combustion, 2018.

2 ibid

3 UNFCCC NDC Registry, "India's Intended Nationally Determined Contribution", <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf>, Accessed on 27-12-2018

4 ibid

5 As of 31-1-2019, source – Central Electricity Authority

6 National Automotive Board, "DIDM Dash Board", <https://www.fame-india.gov.in/dashboard.aspx>, Accessed on 20-12-2018

7 PIB, "Shri RK Singh Launches National E-Mobility Programme in India; Congratulates EESL for Installation of 50 Lakh LED Street Lights," <http://pib.nic.in/newsite/PrintRelease.aspx?relid=177134>, Accessed on 20-12-2018

segments, the Indian banking sector is also under tremendous strain due to mounting non-performing assets (NPAs). Further, recent concerns over the creditworthiness of NBFCs in the wake of a bond default by a prominent infrastructure lender in the middle of 2018 have translated into at least short-term constraints for NBFCs in accessing capital from their traditional sources, namely banks and the bond market.⁸⁹

Bond financing can help augment debt capital for the RE and EV segments, primarily through the refinancing of loans from banks and NBFCs. Moreover, the use of bonds for refinancing operational projects, characterised by lower risks than those in pre-operational stages, helps lower the cost of capital for issuers. Though the corporate bond market is still in its nascent stages in India, key reforms in the financial sector and regulatory measures taken to accelerate bond market development bode well for the increasing emphasis on bonds as a means of raising capital, including for the emerging sub-segment of green bonds. Green bonds are tradable debt instruments just like normal bonds, that finance specified green uses with the issuer establishing processes to ensure that funds are spent as specified in the prospectus.

This report focuses on the potential of green bonds as an effective instrument to finance India's transition from fossil fuels to renewable resources. In order to do so, it first presents a landscape analysis of investments needed to achieve the ambitious RE and EV targets India has set itself (Chapter 2), the current sources of finance and the constraints in mobilising additional capital (Chapter 3). The report then presents an analysis of the state of the Indian bond market and assesses the role of the emerging green bond segment in refinancing bank and NBFC debt (Chapter 4).

Shifting gears, the report subsequently dives into analysing the state of the market for green bonds in India (Chapter 5), argues for a greater and more direct role of states in green bond issuances to scale up capital flows to the RE and EV sectors and proposes a framework for 'state readiness' and provides step-by-step guidance for green issuances by states (Chapter 6). The report concludes by highlighting several measures that are needed to stimulate growth of the green bonds market in India to make them widely accessible (Chapter 7).

8 The Economic Times, "Continued liquidity stress may have deeper impact on NBFCs", <https://economictimes.indiatimes.com/markets/stocks/news/continued-liquidity-stress-may-have-deeper-impact-on-nbfc/articleshow/66215214.cms>, Accessed on 27-12-2018

9 The Economic Times, "Challenge grows for NBFCs as banks turn tight-fisted", <https://economictimes.indiatimes.com/industry/banking/finance/banking/challenge-grows-for-nbfc-as-banks-turn-tight-fisted/articleshow/66140232.cms>, Accessed on 27-12-2018

2. The investment opportunity: where the money needs to flow and how much

► Key takeaways from the chapter

- India's commitments under the Paris Agreement will require USD 31 billion in annual RE investments from 2018 to 2030. The attainment of the 2022 RE targets, a subset of the envisioned RE deployment by 2030, requires at least USD 13.5 billion in annual investment flows between FY 2018-19 and FY 2021-22. These investment figures refer to investments in generation capacity alone, excluding investments in supporting grid infrastructure and solar park development.
- Annual investment flows into the RE sector in India have averaged USD 10 billion from 2013 to 2017. Thus, there is a need to ramp up investment flows in order to meet India's RE ambitions.
- While the realisation of India's RE ambitions requires the flow of capital to both utility-scale and distributed RE projects, only commercially viable end uses (profitable in the absence of subsidy support) are suitable for financing via the green bond route. Thus, the report does not deep dive into segments that are currently characterised by fledgling business models such as solar irrigation systems and microgrids. These models will need developmental efforts to link them to debt capital markets.
- INR 42, 411 crore (USD 6 billion) will need to be invested in domestic production of electric four and two-wheelers to meet current EV sales targets for 2020. Analysing sales data till date indicates that only about INR 81 crore (USD 11.6 million) has been invested so far, highlighting a significant gap which will only widen in the pursuit of the larger EV target for 2030.

2.1 Renewable energy

India's 2022 RE target of 175 GW is largely focused on solar and wind energy generation, which are expected to contribute 100 GW and 60 GW respectively. This report assesses the challenges and opportunities in raising debt capital for these two critical RE segments.

While the original solar target of 100 GW comprised 60 GW of utility-scale and 40 GW rooftop solar, the Ministry of New and Renewable Energy (MNRE) has signalled greater emphasis on utility-scale deployment—with a plan to tender 77 GW of utility-scale projects from December 2017 to March 2020.¹⁰

¹⁰ Mercom, "MNRE to Tender 17 GW of Solar and Over 3.5 GW of Wind Projects by March 2018", <https://mercomindia.com/mnre-tender-solar-wind-projects-march-2018/>, Accessed on 25-11-2018

The scale of planned RE deployment also requires considerable investment in order to address transmission and land-related constraints. Transmission infrastructure needs to be expanded and upgraded to facilitate grid connectivity and to minimise instances of curtailment of generation. Availability of land can be addressed partially through concentrated zones of RE deployment such as solar parks, which provide land and evacuation infrastructure to project developers. State and private sector entities are involved in different facets of the RE ecosystem, as described in the following lines. The clean energy transition requires adequate flow of finance to all such actors in the ecosystem.

Utility-scale solar and wind represent the most mature RE sub-segments with cumulative installed capacities of 22.5 GW¹¹ and 35 GW respectively.¹² Their commercial viability has been firmly established, with auction-determined solar and wind tariffs now comparable with thermal tariffs. This has led to most of the generation capacity now being developed by the private sector.

Both solar and wind developers set up projects on either leased or acquired land, and also have to develop the supporting evacuation infrastructure to connect their plants to the grid. MNRE's solar park scheme (the states of Gujarat and Rajasthan also have solar parks that pre-date this) supports project developers by providing readily available land and evacuation infrastructure in exchange for a fee.¹³

Though solar parks may be developed by a variety of actors, including states, central public sector undertakings (CPSUs), Solar Energy Corporation of India (SECI) (on behalf of states), and private developers, states have been the major investors. Most solar parks have been developed by either state nodal agencies themselves or in joint ventures with private entities or SECI.¹⁴

Interstate and intrastate transmission infrastructure are developed by central and state transmission utilities respectively. While most transmission infrastructure is common for RE and non-RE generation, a dedicated Green Energy Corridor for the transmission of RE-based electricity is also being set up.

Finally, state distribution utilities (discoms) constitute the largest buyers of electricity generated from RE generators through long-term power purchase agreements (PPAs). State discoms are mandated to purchase a fixed proportion of their electricity purchases from renewable sources to meet their renewable purchase obligations (RPOs).

The attainment of India's clean energy ambitions is contingent upon the adequate flow of finance to all of these components of the RE ecosystem (including distributed renewable assets – Box 1).

11 As of August 2018, Source: Mercom,

12 As of October 2018, Source: IWTMA

13 MNRE, "Administrative sanction for implementation of the Scheme for Enhancement of capacity from 20,000 MW to 40,000 MW for Development of Solar Parks and Ultra Mega Solar Power Projects", <https://mnre.gov.in/file-manager/UserFiles/Scheme-for-enhancement-of-capacity-to-40GW-Solar-Parks.pdf>, Accessed on 28-11-2018

14 *ibid*

Box 1 Distributed renewable energy (DRE)

Distributed renewable energy (DRE) systems such as rooftop solar, solar powered irrigation systems and micro-grids represent other avenues for solar PV deployment. Such systems (whether grid-connected or otherwise) are particularly important for enhancing access to electricity in areas characterised by poor grid supply. The competitiveness of rooftop solar generation for commercial and industrial consumers has also driven its uptake in areas with reliable grid supply.

Rooftop solar

Rooftop solar is characterised by smaller system size and disaggregated portfolios as compared to utility-scale systems. There are two primary business models operating in this space: the opex model in which the developer owns the asset and the consumer simply pays for the electricity consumed and the capex model in which the consumer of electricity also owns the generation asset. Though the capex model has dominated the market with a 75 per cent share in cumulative installed capacity as of March 2018, the share of the opex model in new capacity installation is growing, as this precludes upfront capital investment for the consumer.¹⁵

Rooftop solar deployment has lagged behind the utility-scale segment considerably with only around 2.4 GW of installed capacity.¹⁶ The lack of bankability of projects stemming from the small and disaggregated nature of rooftop solar assets and the lack of creditworthiness of residential and small commercial and industrial (C&I) offtakers are some of the major reasons for this sluggishness. The C&I segment accounts for around 64 per cent of cumulative installed capacity with the shares of residential and public sector segments much lower at 20 per cent and 16 per cent respectively.¹⁷ The uptake of rooftop solar systems has mainly been in the C&I segment, driven by the relative competitiveness of rooftop solar tariffs compared with grid electricity and the superior creditworthiness of large C&I offtakers. This is not true for residential tariffs for small consumers, as these are subsidised, which lowers the attractiveness of rooftop solar for residential consumers. Finally, the uptake of rooftop solar has been driven by the private sector, with public sector entities accounting for the smallest share of installed capacity.

Solar-powered irrigation systems

Irrigation in India is largely carried out through electric and diesel pumps¹⁸. Out of the nearly 30 million irrigation pumps in use, around 70 per cent run on grid electricity, 30 per cent on diesel, and only 0.4 per cent are powered by solar energy¹⁹. While electric powered irrigation systems are the most cost effective, solar pumps present both an environmentally friendly and potentially cost-effective alternative to diesel powered systems.

The deployment of solar pumps has largely been driven by the individual ownership model, whereby the cultivator owns the system. The central and the state governments together support their deployment with subsidies of up to 86 per cent.²⁰ Alternative models such as community ownership and water-as-a-service can circumvent the need for individual ownership of systems and heavy subsidies, but these have not been deployed on a large-scale and their commercial viability remains untested.

Microgrids

Renewable-based microgrids are useful for enhancing electricity access in areas affected by the unavailability, poor quality or lack of reliability of grid electricity. Microgrids typically have capacities of up to 100 kW.²¹ Around 1.9 MW of micro grid capacity has been installed in India with the support of 30 per cent capital subsidy from the central government.²² The planned extension of grid electricity to every household under the Saubhagya scheme and improvements in the quality and reliability of grid supply, however, may affect the viability of microgrids^{23 24} and make them less attractive for bond finance. Grid-connected microgrids could potentially operate under this scenario, though this model has not been implemented at scale so far.

15 Bridge To India, India Solar Rooftop Map, March 2018

16 2.4 GW rooftop solar, as of August 2018, Source: Mercom,

17 *ibid*

18 Abhishek Jain, Tauseef Shahidi, Adopting Solar for Irrigation Farmers' Perspectives from Uttar Pradesh (CEEW, 2018)

19 *ibid*

20 *ibid*

21 The Climate Group, The Business Case For Off-Grid Energy In India

22 Mercom, "Sixty three Solar Micro Grids Installed in India So Far", <https://mercomindia.com/63-micro-grids-installed-in-india/>, Accessed on 3-1-2019

23 Rahul Tongia, Microgrids in India Myths, Misunderstandings, and the Need for Proper Accounting (Brookings India, 2018)

24 Abhishek Jain et al, Access to Clean Cooking Energy and Electricity Survey of States (CEEW, 2018)

2.1.1 Size of the RE investment opportunity

In order to meet its RE targets²⁵ India needs to deploy an additional 75 GW of solar and 25 GW of wind capacity by March 2021-22. In order to estimate the minimum required scale of finance flows and consistent with India's utility-scale heavy solar deployment, this new deployment is assumed to occur through utility-scale solar projects, which are characterised by lower capital costs compared to DRE systems.

Considering the stipulated project timelines under India's auction-based regime, the financial closure for this capacity deployment (and the associated investment flows) would be spread over a four-year period from FY 2018-19 to FY 2021-22. Since most solar tenders (before June 2018) stipulated commissioning within six months of financial closure (financial closure and commissioning within 7 and 13 months from signing of PPA respectively), most projects attaining financial closure in FY 2017-18 would already have been commissioned and included in the 22.5 GW utility-scale solar installed capacity figure (as of August 2018) mentioned earlier. Thus, around 75 GW of solar projects would achieve financial closure between FY 2018-19 and FY 2021-22.

Similarly, most wind tenders in FY 2017-18 were concentrated in the second half of the financial year. Considering the timelines applicable to these tenders (financial closure and commissioning within 7 and 18 months from signing of PPA respectively), it is reasonable to assume that financial closure for these projects (which constitute part of the 25 GW of pending deployment by 2021-22) will take place in 2018-19. In addition, the financial closure for the remaining projects pertaining to the pending wind deployment would also be spread over FY 2018-19 to FY 2021-22.

The remaining solar and wind deployment to meet the 2022 capacity targets would necessitate an investment of around USD 53.8 billion in project deployment alone²⁶ implying that around USD 13.5 billion will need to be mobilised annually between FY 2018-19 and FY 2021-22. The 2022 target is a subset of investments in RE generation needed to meet India's NDC. Much higher investments are needed for this - of the order of USD 404 billion between 2018 and 2030²⁷ or an implied figure of USD 31 billion annually over the 13-year period.

The average annual RE investments in India of around USD 10 billion over the five-year period 2013-2017 (Figure 1) are significantly lower than those needed to meet India's RE ambitions.²⁸

It is thus essential to considerably ramp up investments into RE to meet India's clean energy ambitions. Substantial investments would also be concomitantly needed to develop adequate supporting infrastructure – such as dedicated green transmission infrastructure and solar parks. This would include around USD 8 billion for the Green Energy Corridor Phases 1 and 2A, besides additional investments in setting up solar parks to support the MNRE's planned deployment of 40 GW of solar capacity through the solar park route^{29,30,31}.

25 While the original 100 GW target for solar comprised of 60 GW of utility-scale and 40 GW of rooftop solar projects, the MNRE now envisions 100 GW capacity from utility-scale solar alone, as per its planned tender trajectory, sourced from Mercom, "MNRE to Tender 17 GW of Solar and Over 3.5 GW of Wind Projects by March 2018", <https://mercomindia.com/mnre-tender-solar-wind-projects-march-2018/>, Accessed on 25-11-2018

26 Assuming capital costs of USD 800,000 per MW for wind and USD 450,000 per MW for utility-scale solar.

27 IFC, Climate Investment Opportunities in South Asia, 2017

28 BNEF, Global Trends In Renewable Energy Investment 2018

29 Power Grid Corporation of India Limited, Transmission Plan for Envisaged Renewable Capacity Vol-1, 2012

30 Power Grid Corporation of India Limited, Report on Green Energy Corridors – II Part – A

31 MNRE, "Administrative sanction for implementation of the Scheme for Enhancement of capacity from 20,000 MW to 40,000 MW for Development of Solar Parks and Ultra Mega Solar Power Projects", <https://mnre.gov.in/file-manager/UserFiles/Scheme-for-enhancement-of-capacity-to-40GW-Solar-Parks.pdf>, Accessed on 10-12-2018

India's RE ambitions can therefore be realised only through the enhancement of the flow of debt capital from either existing or new sources.

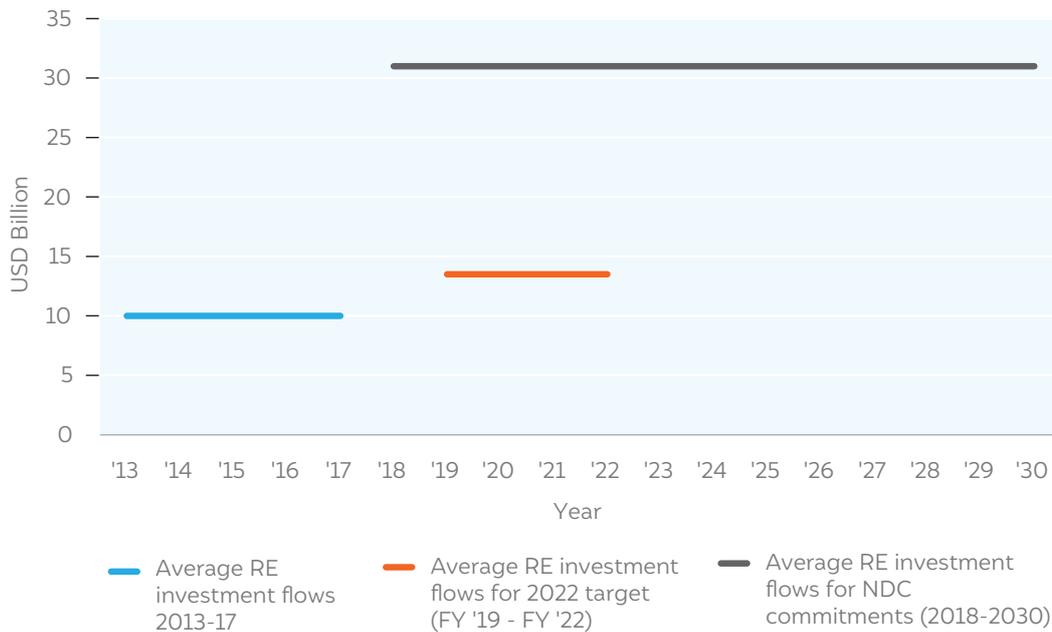


FIGURE 1:

RE investment flows in India

Sources:

Average investment flows for 2013-17: BNEF, *Global Trends In Renewable Energy Investment 2018*

Average RE investment flows for 2022 target (FY '19 - FY '22): Authors' Analysis

Average RE investment flows for NDC commitments (2018-2030): IFC

2.2 Electric mobility

The Indian automotive industry is the fourth largest in the world and contributes 7.2 per cent to India's GDP³². The Automotive Mission Plan 2026 has set a target to increase this contribution to 12 per cent in the next decade³³. The country's electric vehicle (EV) industry is at a fledgling stage at present. Globally, EVs seem to be benefiting from rapidly declining costs of batteries (79 per cent drop in prices between 2010 and 2017), policy push from governments to meet climate change targets and rising commitments from automakers - all of which are expected to transform the auto industry in the next 20 years towards a greater share of EV production³⁴. Building its capacities in the EV industry will play an important part in enhancing and maintaining India's global competence in auto manufacturing.

The central and state-level support to boost production and sales of EVs has gathered momentum recently. The Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) India scheme was launched under the National Electric Mobility Mission Plan (NEMMP) in 2015 with an initial outlay of INR 75 crore (USD 10.6 million) to support the early adoption of hybrid and EVs through subsidies³⁵. In March 2019, the Union Cabinet approved the FAME II scheme with a budgetary allocation of INR 10,000 crore (USD 1.43 billion) to succeed the previous FAME scheme. It will support the uptake of EVs and charging infrastructure³⁶. Most recently, six Indian states—Karnataka, Delhi, Maharashtra, Andhra Pradesh, Uttarakhand and Kerala—have come out with their state EV policies. At least three others—Telangana, Uttar Pradesh, and Gujarat—have EV policies in various stages of

32 IBEF, "Automobile Industry in India," 2018, <https://www.ibef.org/industry/india-automobiles.aspx>, Accessed on 20-12-2018

33 PIB, "Automobile Sector's Contribution to GDP," <http://pib.nic.in/newsite/PrintRelease.aspx?relid=169436>, Accessed on 20-12-2018

34 BNEF, "Electric Vehicles," Setting the Scene, <https://bnef.turtl.co/story/evo2018>, Accessed on 20-12-2018

35 PIB, "National Electric Mobility Mission Plan," <http://pib.nic.in/newsite/PrintRelease.aspx?relid=116719>, Accessed on 20-12-2018

36 Car and bike, "FAME II Scheme Gets Union Cabinet's Nod; ₹ 10,000 crore Allocated for EVs", <https://auto.ndtv.com/news/fame-ii-scheme-gets-union-cabinet-s-nod-rs-10-000-crore-allocated-for-evs-2001009>, Accessed on 02-03-19

development. Except for Delhi's EV policy, most state policies are geared towards supporting manufacturing of EVs and have a limited focus on demand incentives for increasing the uptake of EVs.

For EVs to take off in a big way, an ecosystem of products, services and customers will have to be in place as represented in figure 2. Besides policy support, a combination of private and public sector investment is needed to set up the ecosystem³⁷.

Majority of the investment in the manufacturing value chain is required to set up production facilities and source raw materials. The EV value chain spans batteries, components (such as electric motors, power electronics and chassis), charging infrastructure (EVSE or EV supply equipment), mobility service providers and vehicles. Charging points may be acquired for provision of public charging facilities or could be acquired by individuals or enterprises for captive use. Telematics devices are needed for real time monitoring of engine health, battery status, driving behaviour and communication of this diagnostic information³⁸. As telematics is interdisciplinary and involves the IT, telecom and auto industries working together, it is listed separately from other auto components. Mobility services pertain to either the utilisation of EVs or after sale services including maintenance and component recycling. Mobility service providers include fleet operators, state transport undertakings (STUs), cab aggregators and urban freight service providers.

At present, state investment in the ecosystem in revenue generating activities is limited to acquiring EVs for public transport, setting up charging infrastructure and manufacturing clusters for EVs. While private sector participation is present across all major components of the ecosystem, several components such as charging infrastructure, after-sales services and telematics, are yet to take off. While there are players in the mobility services space with established business models and operations, their deployment of EVs is limited. However, interest is picking up based on their attractive unit economics³⁹.

Several studies project that electrification will occur in the two-wheeler (2W) and three-wheeler (3W) segments before private cars (4W) in India^{40,41,42,43}. Given the high upfront costs of electric cars today, uptake will be driven by customer segments with an average distance travelled of more than 150 km per day⁴⁴. Such 'high asset utilisation' segments are typically taxis, corporate fleets, urban freight and public transport. Notably, this precludes private car owners, who on an average travel anywhere between 50-60 km in a day⁴⁵. There is an economic case for public transport, particularly city buses and last-mile connectivity to shift to electric vehicles on account of lower total cost of ownership (TCO) arising from high asset utilisation⁴⁶.

37 EY, Standing up India's EV Ecosystem - Who Will Drive the Charge? (EY, 2018)

38 Rajendra Saxena, "Car Telematics Devices: How These Are Useful - Livemint," 2018, <https://www.livemint.com/Industry/INPnMASNdcDn8Nk598qhPN/CAR-telematics-devices-How-these-are-useful.html>, Accessed on 20-12-2018

39 Factor Daily, "Economics of Electric Vehicle Very Good for Commercial Use," FactorDaily, Nove, <https://factordaily.com/alok-goyal-stellaris-venture-partners-on-electric-vehicles/>, Accessed on 20-12-2018

40 EY, Electrifying India: Building Blocks for a Sustainable EV Ecosystem, 2018

41 GNCTD, Draft Delhi EV Policy, 2018

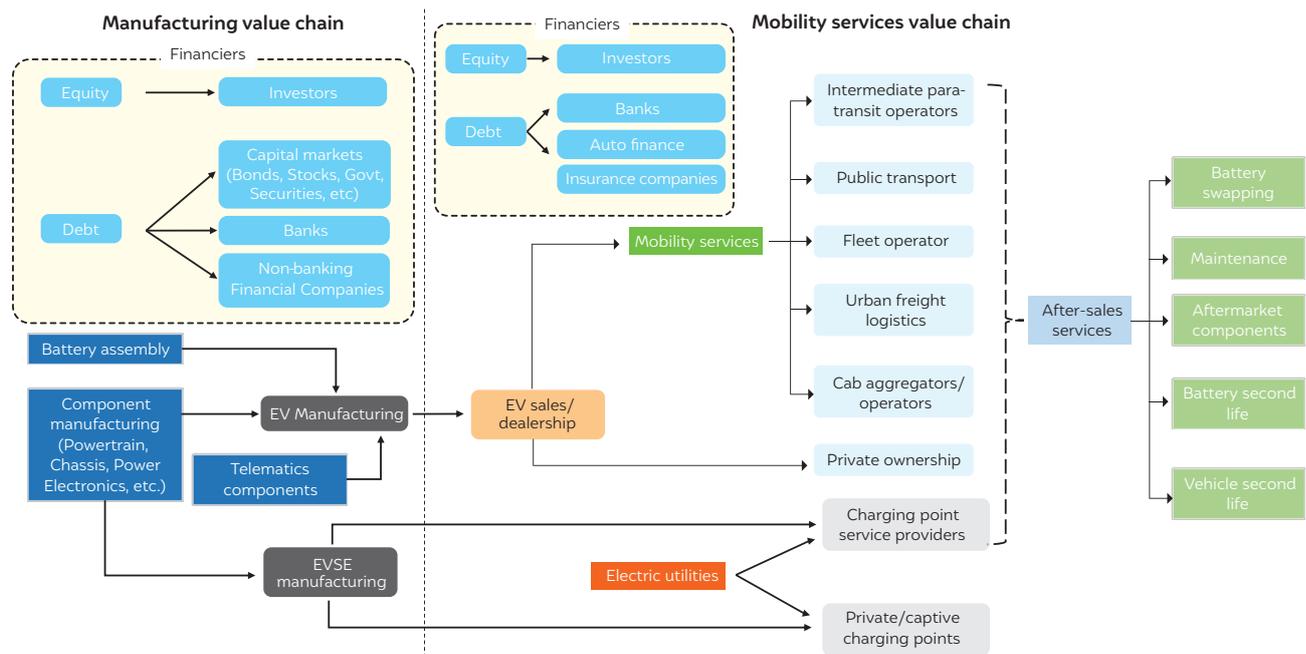
42 NITI Aayog and RMI, India Leaps Ahead: Transformative Mobility Solutions for All, 2017

43 TERI and Yes Bank, Electric Mobility Paradigm Shift, 2018

44 Engelmeier, Gaihre, and Anand, The Case for Electric Mobility in India | TFE Consulting, (TFE, 2018)

45 Business Today, "Tata Motors Says Electric Cars with More Mileage Will Be Unaffordable for Majority of Indians," <https://www.businesstoday.in/sectors/auto/tata-motors-electric-cars-mileage-tigor-ev/story/279730.html>, Accessed on 20-12-2018

46 Aditya Khandekar et al., The Case for All New City Buses in India to Be Electric, (LBL, 2018)



Mahindra Electric and Tata Motors, established Original Equipment Manufacturers (OEM)⁴⁷ majors, are the only domestic electric car manufacturers in India at present. Maruti Suzuki is slated to launch EVs in India in 2020⁴⁸.

The 2W and 3W EV segments, on the other hand, have seen participation from both OEMs as well as start-ups. Ather Energy, Tork Motorcycles, Okinawa Scooters and Ampere Vehicles are some examples. Start-ups focusing on electric 3W include Smart-E, Gayam Motor Works and Kinetic Green. Olectra Greentech Ltd. (formerly Goldstone Infratech Ltd.). Tata Motors, and Ashok Leyland are e-bus manufacturers who have won contracts for about 10 cities in India⁴⁹.

2.2.1 EV Investment Opportunity

The realisation of the government's ambition of 30 per cent of new electric powered vehicle sales in 2030 would translate into 12.4 million 2W, 3.6 million 4W and 55,000 commercial vehicle sales from EVs⁵⁰. As per Society of Manufacturers of Electric Vehicles (SMEV), sales of 1,200 4W and 54,800 2W electric vehicles were realised in 2018, while data on commercial vehicles was not available.

From a shorter-term perspective, the realisation of the 2020 NEMMP target of 6 million annual EV sales would require an investment of INR 42, 411 crore (USD 6 billion)⁵¹ for producing the required number of two wheelers and four wheelers alone. However, based on current sales data, the investments made as of end-2018 are estimated to be INR 81 crore (USD 11.6 million), highlighting a significant gap. This gap will only widen as a more ambitious target is pursued for 2030. In order to bridge the gap between present EV sales

47 OEM refers to manufacturers of electric vehicles

48 Cyrus Dhabhar, "Maruti Suzuki To Start Testing 50 Electric Cars In India Soon - NDTV CarAndBike," CarAndBike, 2018, <https://auto.ndtv.com/news/maruti-suzuki-to-start-testing-50-electric-cars-in-india-soon-1912914>, Accessed on 20-12-2018

49 Economic Times, "Goldstone-BYD, Tata Motors Grab E-Bus Contracts," 2018, <https://economictimes.indiatimes.com/goldstone-byd-tata-motors-grab-e-bus-contracts/articleshow/63406325.cms>, Accessed on 20-12-2018

50 Motiwal Oswal, "Batteries: Opportunities, but challenges too", <https://www.motiloswal.com/site/reports/636572194751252025.pdf>, Accessed on 31-1-2019

51 Based on 2018 investment figures.

FIGURE 2:

EV value chain

Source: Authors' analysis

and both short and long-term ambitions, considerable investments are needed across the EV value chain.

For this estimation, the report assumes that the NEMMP target is for battery electric vehicles only, although it is for hybrid and BEV. The following assumptions have been made with regards to capital required to produce various categories of electric vehicles – INR 5 lakh (USD 7000) per unit for 4W and INR 0.038 Lakh per unit for 2W^{52,53}. The NEMMP target of 6 million has been apportioned for different vehicle segments based on current share of two wheelers and four wheelers in sales as obtained from the Society of Indian Automobile Manufacturers (SIAM).

States are seeking to attract investments by 2022, particularly for setting up EV manufacturing facilities and deployment of EVSE infrastructure as detailed in Table 1 to meet the EV targets stated in their EV policies. These figures illustrate the scale of the investment opportunity within various states in India.

State	Investments required ⁵⁴
Karnataka	INR 31,000 crore (USD 4.4 billion)
Andhra Pradesh	INR 30,000 crore (USD 4.3 billion)
Telangana	INR 19,300 crore (USD 2.7 billion)
Maharashtra	INR 25,000 crore (USD 3.5 billion)

Note: These are five-year investment plans announced by state governments over the course of 2017 and 2018

TABLE 1:

EV investments sought by various states in India

The size of investments required by various segments of the EV ecosystem is not homogenous, as indicated by planned and realised investment flows over the course of 2017 and 2018. EV two-wheeler manufacturer Okinawa Autotech Ltd. has invested INR 34 crore (USD 4.8 million) for a manufacturing facility in Rajasthan, that can produce 90,000 units annually. Okinawa plans to invest another INR 270 crore (USD 40 million) in the next few years in research and development and expanding its business in India⁵⁵. Ather Energy has received total investments of around USD 66 million and is looking to raise INR 200 – 300 crore in the next year to expand to additional cities in India⁵⁶. Hero Electric is a market leader in electric 2W and has planned investments in the range of INR 500 crore in the next five years. It is further aiming to export its products to countries in Asia and Africa⁵⁷. SmartE, an electric vehicle fleet operator is planning to raise USD 20 million to acquire 1 lakh electric 3Ws and expand its operations to 20 cities in India⁵⁸.

52 Business Line, "Okinawa to Invest ₹270 crore to Expand E-Vehicle Business - The Hindu BusinessLine," 2018, <https://www.thehindubusinessline.com/companies/okinawa-to-invest-270-crore-to-expand-evehicle-business/article9497873.ece>; Accessed on 20-12-2018

53 Economic Times, "Mahindra Electric to Invest Additional Rs 400 Cr in Karnataka Plant," 2018, <https://economictimes.indiatimes.com/mahindra-electric-to-invest-additional-rs-400-cr-in-karnataka-plant/articleshow/62951850.cms>, Accessed on 20-12-2018

54 As stated in the respective state EV policies

55 Hindu Business Line, "Okinawa to Invest ₹270 crore to Expand E-Vehicle Business," 2017, <https://www.thehindubusinessline.com/companies/okinawa-to-invest-270-crore-to-expand-evehicle-business/article9497873.ece>, Accessed on 20-12-2018,

56 Malyaban Ghosh, "Advantage Hero MotoCorp as Ather Energy Looks to Raise ₹200-300 crore," <https://www.livemint.com/Auto/ZN6RQ16ENP0T7UjQsEW3h/Hero-MotoCorp-seen-gaining-from-Ather-Energy-funding-plans.html>, Accessed on 20-12-2018

57 Hindu Business Line, "Hero Electric to Invest ₹500 Cr in 5 Years to Expand Ops - The Hindu BusinessLine," 2018, <https://www.thehindubusinessline.com/companies/hero-electric-to-invest-500-cr-in-5-years-to-expand-ops/article22633303.ece>, Accessed on 20-12-2018

58 Economic Times, "SmartE Aims to Raise up to \$20 Million to Fund next Round of Expansion," 2018, <https://economictimes.indiatimes.com/industry/auto/auto-news/smart-e-aims-to-raise-up-to-20-million-to-fund-next-round-of-expansion/articleshow/66904361.cms>, Accessed on 20-12-2018

While the foregoing examples illustrate the typical scale of investments in the EV value chain across 2W and 3W segments, larger investments could be required for the 4W segment and for setting up charging infrastructure. However, the small size of investment needs across portions of the value chain could necessitate aggregation of portfolios in order to access the bond markets.

According to NITI Aayog, an aggressive transition to EVs can create a domestic market of USD 300 billion for batteries by 2030⁵⁹. For India to produce globally competitive lithium ion batteries, a plant size of 50 GWh will have to be established. Setting up such a facility would require an investment of INR 30,000 crore (USD 4.6 billion)⁶⁰. According to a report by Feedback consulting, a total investment of INR 1.8 lakh crore (USD 25.5 billion) will be required to set up charging stations and associated infrastructure in India⁶¹.

59 NITI Aayog and RMI, India's Energy Storage Mission: A Make in India Opportunity for Globally Competitive Battery Manufacturing, 2017

60 Tanmay Sarkar et al., CSTEP Policy Brief Indigenous Manufacturing LIB, (CSTEP,2017)

61 Hindu Business Line, "India's Electric Mobility Plan to Need ₹1.8-Lakh-Cr Investments", <https://www.thehindubusinessline.com/economy/policy/indias-electric-mobility-plan-to-need-18lakhcr-investments/article9807721.ece>, Accessed on 20-12-2018



3. Sources of RE and EV financing and their constraints

▶ Key takeaways from the chapter

- Utility scale RE is now a mature sector and developers are able to readily access partial recourse INR loans from banks and NBFCs.
- India's ambitious targets for rooftop solar and off-grid RE systems are hampered by high costs of funding and marginally viable business models in case of some off-grid sub-segments.
- Lenders are not confident about the performance of loans for new and unfamiliar assets such as charging infrastructure or business models associated with portions of the EV ecosystem.
- Loans for rooftop solar, DRE, or electric vehicles to households and small businesses will be small-value contracts, which substantially increase the transaction costs as a proportion of the principal.
- Mismatch between the long-term nature of infrastructure projects and short-term bank liabilities restricts the flow of capital.
- While INR loans are expensive compared with international loans because of the high rates of interest paid by the government for its borrowings, currency hedging raises the costs of international loans as well.
- Efficient recycling of capital from banks and NBFCs, which an active bond market enables, can mitigate the credit crunch to a fair extent.

The cost of finance is a critical determinant of the viability of new investment in the capital-intensive RE and EV sectors. Broadly, this investment is financed by a combination of the project promoter's own resources and either domestic or international loans. Such loans can be either denominated in INR or an international currency such as USD. The cost of borrowing in USD is typically at a much lower rate of interest, but RBI regulations require the loan to be fully hedged for currency risk, which erodes the cost savings. Thus, domestic debt has primarily been used to meet the debt requirements of the RE and EV sectors.

3.1 Utility-scale renewable energy

Indian RE is predominantly funded by commercial (public and private) banks and NBFCs. Commercial loans contribute 75 per cent of the investment value. Equity and mezzanine financing provide the rest. Lenders in India are now accepting greater leverage (75:25) for Indian solar and wind projects, while in the past the debt-to-equity ratio was a more risk-averse 70:30. The shift is on account of a reduction in risk perceptions pertaining to the segment.

A few years ago, RE could not be financed on purely commercial terms without credit enhancement. Concessional finance from international institutions such as the World Bank, International Finance Corporation (IFC), ADB and Germany's development bank KfW dominated the early growth phase of India's solar market.⁶²

As the market has proven its viability, local commercially-driven capital has stepped in and the role of multilateral banks (MDBs) has shrunk. MDBs' share in solar financing in India declined from almost 10 per cent in 2016 to as low as 2 per cent in 2017. However, re-financing support from overseas development funding continues, for example, Agence Francaise de Development's (AFD) 15-year line of credit for Euro 100 million to Indian Renewable Energy Development Agency (IREDA) without any guarantee from the Indian government, and a JPY 30 billion line of credit from Japan International Co-operation Agency (JICA) to IREDA for a period of 30 years⁶³.

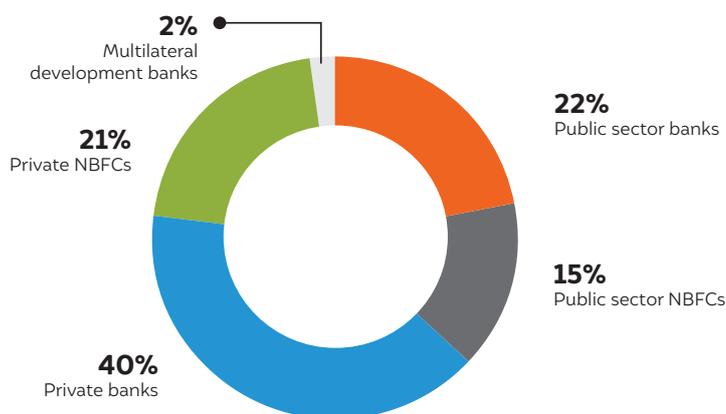


FIGURE 3:

Sources of debt finance for utility-scale wind and solar in 2017

Source: Bloomberg New Energy Finance

Note: The data is from all deals in 2017 captured on the Bloomberg Terminal and is not an exhaustive list

Domestic financing is driven by Indian commercial banks (both public and private) and NBFCs. In 2017, commercial banks and NBFCs accounted for 62% and 36% respectively of the debt flows to utility-scale solar and wind projects.⁶⁴

Some of the most active Indian solar market lenders are State Bank of India (SBI), the largest public sector lender, IndusInd Bank, Yes Bank and Axis Bank. These private banks have large solar investment portfolios. The Rural Electrification Corporation (REC) and the India Infrastructure Finance Company (IIFCL) are relatively new to the market but are well established even though their lending volumes are lower than commercial banks. Private NBFCs such as L&T Infrastructure Finance and Tata Capital are also actively lending to utility-scale RE Projects.

A notable but small source of long-term fixed rate debt for infrastructure projects are the infrastructure debt funds (IDF). These can be structured as NBFCs and mutual funds and have tax exemptions. NBFC IDFs have issued long term (15- 20-year) bonds. The existing NBFC IDFs are highly rated, making it relatively easy for long-term investors like insurance companies and retirement benefit funds to invest in them.⁶⁵ This segment is currently very small but has the potential to scale up.

⁶² TFE Consulting, India's Solar Leap: Financing a Mature Market, 2017

⁶³ Renewable Energy Sector Funding, Analysis and report by Resurgent India, <https://www.resurgentindia.com/wp-content/uploads/2017/11/Renewable-Energy-Sector-Funding.pdf>

⁶⁴ BNEF, *Cheaper Debt Lets Indian IPPs Flex Muscles in Indian Auctions*, 2017

⁶⁵ Infra debt funds gaining more investors, projects, <https://www.thehindubusinessline.com/money-and-banking/infra-debt-funds-gaining-more-investors-projects/article9608557.ece>

Mezzanine financing is senior to equity and subordinate to debt. It had a 5 per cent share of the investment volume in the RE market in 2016. Close to 60 per cent of developers used it, primarily for bridge financing, which helps when they can't access adequate loans to meet the full debt requirements of their project⁶⁶. Debt plus mezzanine financing allows as much as 90 per cent leverage, driving down the need for the promoter's equity. This allows promoters to use their scarce capital across several projects, thus supporting their scalability.⁶⁷ Market sources indicate that mezzanine financing comes primarily from private equity (PE) funds, with NBFCs and Developmental Finance Institutions (DFIs) such as DEG (a subsidiary of KfW) also being market participants.⁶⁸ Lately, a few private sector banks have invested in mezzanine debt. Mezzanine debt for RE may also be able to tap the bond markets through specialised mezzanine debt funds as high yield bonds become increasingly popular with high net worth Individuals and wealth managers⁶⁹.

3.2 Electric vehicles

The auto industry in India meets its debt needs through loans from banks and NBFCs as well as corporate bonds. At the same time, the auto-finance industry supports sales of vehicles by providing a range of financial products to customers (both commercial and individual) and even dealers that ultimately support vehicle purchase. Commercial and individual consumers benefit from accessing loans, leases and insurance.⁷⁰ The Indian auto finance market is one of the most developed markets in the Asian region and is poised to be worth USD 300 billion in 2026⁷¹. Historically dominated by banks and NBFCs, the auto finance market witnessed the emergence of captive financiers as key players in this space after the 2008 economic recession. Captive auto-finance companies are wholly owned by a parent OEM and offers services for customers buying their vehicles⁷².

The established OEMs, based on the strength of their balance sheets, are able to raise debt capital for their EV business along the lines of their regular vehicle business. This encompasses loans from banks and NBFCs. As a result of the nascent stage of the EV industry, greater granularity on OEMs' sources of primary debt for EV financing is not available. In addition, such OEMs have also refinanced existing loans from the bond market.

In the past OEMs such as Mahindra and Mahindra raised INR 500 crore (USD 71 million) through an unsecured bond in 2013 with a 50-year tenor at a coupon rate of 9.55 per cent. CRISIL assigned it an AA+/ stable rating⁷³. The proceeds were to be used to finance projects and refinance existing loans⁷⁴. Tata Motors Ltd. raised USD 750 million by selling bonds in Asia and Europe in 2014. This comprised bonds maturing in 5.5 years with a rate of 4.62 per cent and a 10-year bond priced at 5.75 per cent. The company stated that the proceeds would be used towards refinancing existing loans, additional capital expenditure and general

66 TFE Consulting, India's Solar Leap: Financing a Mature Market, 2017

67 ibid

68 Renewable Energy Sector Funding, Analysis and report by Resurgent India, <https://www.resurgentindia.com/wp-content/uploads/2017/11/Renewable-Energy-Sector-Funding.pdf>

69 https://www.business-standard.com/article/pf/real-estate-ncds-good-returns-but-with-high-risks-114031700030_1.html

70 EY, Building a Strategic and Profitable Auto Finance Portfolio in India, 2016

71 ibid

72 ETAuto, "Captive Financiers Expect to Grow 20% by 2020 in PV Loans - ET Auto," ETAuto.com, 2017, <https://auto.economicstimes.indiatimes.com/news/auto-finance/captive-financiers-expect-to-grow-20-by-2020-in-pv-loans/61234885>, Accessed on 20-12-2018

73 Hindu Business Line, "M&M Sells Rs 500-Cr Worth 50-Year Tenure Bonds", <https://www.thehindubusinessline.com/companies/mampm-sells-rs-500-cr-worth-50-year-tenure-bonds/article23105473.ece>, Accessed on 20-12-2018

74 Live mint, "Mahindra and Mahindra Plans India's First 50-Year Rupee Bond," [https://www.livemint.com/July-4-2013, https://www.livemint.com/Companies/1B0mWjcGrcq8npp431FPNM/Mahindra-and-Mahindra-plans-Indias-first-50year-rupee-bond.html](https://www.livemint.com/July-4-2013/https://www.livemint.com/Companies/1B0mWjcGrcq8npp431FPNM/Mahindra-and-Mahindra-plans-Indias-first-50year-rupee-bond.html), Accessed on 20-12-2018

corporate purposes⁷⁵. This is aligned with the usual practice by Indian companies of raising bonds to refinance existing debt or expanding their business overseas.

Given the nascent stage of the EV industry and its associated risks, start-ups cannot easily access debt capital and have to largely depend on private equity and venture capital. Some of the established automotive manufacturers have also invested in these start-ups. Ather Energy raised venture capital from marquee global investors such as Tiger Global along with investments from Hero Motorcorp⁷⁶. Hero Motorcorp, the largest two-wheeler manufacturer in India, does not produce any electric 2W but has invested INR 335 crore in Ather to own a third of the company⁷⁷. Smart-E, a 3W fleet operator, has raised USD 5 million in private equity and is seeking to raise another USD 20 million⁷⁸.

3.3 Constraints in financing

3.3.1 Cost of finance

Domestic financiers recognise solar and wind as an attractive infrastructure asset class. This is reflected in the trends in the cost of financing. Favourable repayment history and growing familiarity of banks with the new technologies has helped significantly reduce the interest cost for borrowers. Bloomberg's 2017 survey⁷⁹ found that the bank interest rates dropped from a 10.9-12.2 per cent range in 2014 to a tighter 9.3-9.7 per cent range in 2017. Another reason for this improvement in interest rates for RE has been a decline in options for infrastructure lending. Saddled with a growing non-performing-asset (NPA) burden, banks prefer to avoid real estate and industries that have experienced repayment strains.

The cost of financing RE is largely agnostic between solar and wind but varies according to the credit rating of the borrower. Also, banks in India offer lower interest rates on loans on a limited-recourse basis. Lenders receive guarantees from independent power producers (IPP) through guarantees or performance obligations from the IPPs' parent companies. Loans are typically not sanctioned solely on the basis of cash flows and the overall strength of the project—pure project or non-recourse-based financing is not very common in India. However, lenders' preference for recourse-based financing limits the ability of developers to take risks to undertake additional projects and leverage the balance sheets of their parent companies⁸⁰.

Over the past few years, banks have developed greater understanding of solar technology, of relative quality of components of different suppliers, project execution capabilities of EPCs (engineering, procurement, and construction companies) and developers and viability of tariffs. This has led to "limited-recourse financing", with recourse being used during the construction phase⁸¹ till commissioning. Further, in cases where projects have power

75 Joel Rebello, "Tata Motors Raises \$750 Million in Bond Sale," <https://www.livemint.com/>, October 25, 2014, <https://www.livemint.com/Companies/jkkjyRHEyDI1zAxnBOj7oN/Tata-Motors-raises-750-million-by-selling-bonds.html>, Accessed on 20-12-2018

76 ET, "Can Electric Scooter Maker Okinawa Sell a Japanese Dream to Petrol-Obsessed Indians? - ETtech," ETtech.Com, 2017, <http://tech.economictimes.indiatimes.com/news/technology/can-electric-scooter-maker-okinawa-sell-a-japanese-dream-to-petrol-obsessed-indians/60286482>, Accessed on 20-12-2018

77 Ghosh, "Advantage Hero MotoCorp as Ather Energy Looks to Raise 200-300 crore," Accessed on 20-12-2018

78 Sindhu Kashyap, "How Make in India Startup SmartE Is Transforming the Last-Mile Commute," YourStory.com, February 13, 2018, <https://yourstory.com/2018/02/make-india-startup-smarte-gearing-transform-last-mile-commute/>, Accessed on 20-12-2018

79 Cheaper Debt Lets IPPs Flex Muscles in Indian Auctions, Bloomberg New Energy Finance. December 21 2017

80 Renewable Energy Sector Funding, Analysis and Report, Resurgent India accessed at <https://www.resurgentindia.com/wp-content/uploads/2017/11/Renewable-Energy-Sector-Funding.pdf>

81 Construction phase typically happens after the design of the project is approved and agreed upon and before commissioning of the project.

purchase agreements (PPAs) with creditworthy offtakers (such as NTPC or SECI), banks get further comfort and are ready to provide non-recourse debt as well.⁸²

The cost of finance varies across type of lending institution. Public sector commercial banks lend at the most competitive rates but with structures that generally need support apart from project cash flows. Public sector commercial banks prefer recourse debt and of relatively shorter tenors, private sector banks are more amenable to partial recourse structures but at higher costs. NBFCs have greater appetite for risk and are more willing to give loans of longer tenor and are more flexible about support from the parent holding company. They are also more willing to lend to borrowers with shorter track records⁸³.

The cost of INR debt finance in India is still higher than the cost of debt in international capital markets. The cost of international dollar-denominated loans from multilateral development banks can be as low as 4 per cent (though including a counterparty fee and a sovereign guarantee to lend through an Indian bank), with commercial banks typically lending at slightly higher rates⁸⁴. However, Indian borrowers also have to meet the costs of currency hedging if they use USD-denominated debt. Under current RBI regulations any off-shore loans by an Indian project must have their entire currency exposure hedged over their whole duration. Depending on tenor, liquidity and timing of the issue, the cost of hedging varies between 3.5 per cent to 8.5 per cent.⁸⁵

3.3.2 Tenor of loans

Developers favour long-term loans to avoid constant re-financing. Utility-scale RE projects have PPAs with utilities that extend up to 25 years⁸⁶. This coupled with the fact that these assets have low variable costs and relatively low-risk revenue streams make them most suitable for long-term debt.

Banks usually prefer short tenors as their risk exposure is reduced. Most deposits and borrowings, which constitute the liability side of the bank, are short or medium-term and have an average tenor of 3-5 years.⁸⁷ However, the current share of renewable energy in any bank's assets is small, and disbursing more long-term loans should not cause large mismatches in asset liabilities.⁸⁸ Thus, for some eligible projects' banks have started lending in the 18-20-year loans, although on a limited basis and with reset clauses⁸⁹. The deposit base of banks has been steadily growing and therefore, there is a minimum deposit available for banks to consider for long-term lending and disbursement as required⁹⁰.

However, there is no denying the fact that the liabilities of banks are not long-term, and hence other institutions need to be involved.

Bank lending in India is structured as a floating rate, typically based on "Base Rate" (the minimum rate of interest below which banks cannot lend and calculated as per RBI

82 TFE Consulting, India's Solar Leap: Financing a Mature Market, 2017

83 ibid

84 ibid

85 Based on market intelligence

86 PWC, "Renewable energy's transformation of the Indian electricity landscape", <https://www.pwc.in/assets/pdfs/publications/2015/renewable-energys-transformation.pdf>, Accessed on 1-4-2019

87 Vinay Rustagi ET Energyworld "The time has come for formation of an Indian Green Bank", <https://energy.economictimes.indiatimes.com/energy-speak/time-has-come-for-formation-of-an-indian-green-bank/1733>, Accessed on 1-4-2019

88 Shakti Sustainable Energy Foundation, "Enabling Low cost Financing for Renewable Energy in India", <http://shaktifoundation.in/wp-content/uploads/2017/06/RE-Financing-Final-report.pdf>, Accessed on 1-4-2019

89 TFE Consulting GmbH, "India's Solar Leap- Financing a Mature Market", https://www.tfeconsulting.com/_website/wp-content/uploads/2017/12/TFE_Report-SolarFinancing_web.pdf, Accessed on 1-4-2019

90 Shakti Sustainable Energy Foundation, "Enabling Low cost Financing for Renewable Energy in India", <http://shaktifoundation.in/wp-content/uploads/2017/06/RE-Financing-Final-report.pdf>, Accessed on 1-4-2019

guidelines) + premium, and this rate keeps on changing as per the bank's cost of funds.⁹¹ The base rate is determined and declared regularly by each bank.

On the other hand, local bond markets are largely on fixed-rate basis, and thus allow a borrower to lock in a certain rate. This along with the longer tenors that bonds allow make it attractive for a corporate to "lock in" certain financing and avoid constant re-financing. While the Indian bond markets are dominated by issuances of 5-year tenor, there are instances of 50-year bond issuance as well⁹², and multiple instances of 20-year issuances as per National Securities Depository Limited (NSDL) data.

3.3.3 Sector credit limits

Banks have prudential exposure limits in lending to various sectors (and business groups). RE is categorized under the power sector exposure limit, which includes thermal power plants, transmission Infrastructure and utilities. Thus, it is conceivable that sector exposure could become a hurdle for debt flows to RE. In fact, in 2017, thermal power (coal-based generation) received 73 per cent of the lending to generation projects, driven by lending from government-backed financial institutions⁹³. This limits the capital available to the RE sector. Similar constraints apply to the electric mobility sector, as loans for electric mobility are subsumed under those for the automotive sector.

3.4 Problems in the banking and non-bank finance sector

As of September 2018, India's bank NPAs as a ratio of advances was 10.8 per cent⁹⁴, which is the sixth largest of any banking system in the world.⁹⁵ The Indian banking sector remains heavily burdened by NPAs, which are loans where interest or principal repayment has been suspended for 90 days or more. The infrastructure sector accounts for 35.5 per cent of bad loans or NPAs. As of September 2018, 20.1 per cent of these loans were delinquent.

Measures to provision for and restructure these bad debts are eroding banks' capital and restricting their capacity to lend. This restricts growth in credit, as NPAs affect banking sentiment, making lenders wary of funding corporate expansion plans⁹⁶, especially those of infrastructure firms—including those in the power sector. Interactions with bankers suggest the notable exception is lending to RE utility-scale assets, which are seen as good quality assets even in the face of overall negative sentiments towards corporate lending.

Private NBFCs (L&T Infrastructure Finance, IL&FS, Tata Cleantech Finance and Ckers Finance) and public sector NBFCs (Power Finance Corporation, Rural Electrification

91 Proptiger, "Prime Lending Rate" <https://www.proptiger.com/guide/post/prime-lending-rate>, Accessed on 1-4-2019

92 50-year bond issue fetches M&M Rs. 500 cr, <https://www.thehindu.com/business/Industry/50year-bond-issue-fetches-mm-rs-500-cr/article4873976.ece>

93 Mercom India, "Indian Public Sector Banks Issued More Loans to Coal than Renewables", <https://mercomindia.com/public-sector-banks-loans-coal/>, Accessed on 1-4-2019

94 RBI (December 2018) "Financial Stability Report" https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/6C_HAPTER2DEC181D8E9C7915894C8291E39D4D4E1EBA3E.PDF

95 The Hindu Business Line, "India's NPAs and the global scenario", <https://www.thehindubusinessline.com/opinion/indias-npas-and-the-global-scenario/article24145872.ece>, Accessed on 1-4-2019

96 Quartz India "India Inc is borrowing more, but the big bucks are still missing", <https://qz.com/india/1182735/bank-credit-growth-indian-corporates-return-to-borrow-but-the-big-bucks-are-missing/>, Accessed on 1-4-2019

Corporation, IREDA⁹⁷) are major lenders to green projects, particularly utility-scale RE. However, they are currently facing a liquidity crisis.

The background is that IL&FS, a prominent NBFC financing infrastructure projects including RE, was found to have liquidity issues. Set up in 1987, IL&FS and its listed subsidiaries have played a significant role in India's infrastructure development—financing landmark projects—and raised billions of dollars from the country's corporate debt market⁹⁸. IL&FS was rated AAA and accounted for 2 per cent of outstanding commercial paper, 1 per cent of debentures and as much as 0.7 per cent of the banking system loans.⁹⁹ Since August 2018, some of its subsidiaries have defaulted, prompting a rating downgrade and government intervention. This incident has led to a credibility crisis and squeezed liquidity, making it difficult for NBFCs to raise funds in general. This may adversely affect their lending to the RE sector as well. The largest flow of funds for NBFCs in FY 2018 has been from Scheduled Commercial Banks (44 per cent of total funds received by NBFCs), followed by AMC-MFs (33 per cent) and insurance companies (19 per cent)¹⁰⁰.

97 India's Solar Leap: Financing a Mature Market <https://www.tfeconsulting.com/indias-solar-leap-financing-a-mature-market/989/>

98 How credit rating agencies missed the IL&FS crisis <https://www.livemint.com/Companies/kDBrz7DB4Ti4Pz2TdxG85N/How-credit-rating-agencies-missed-the-ILFS-crisis.html>

99 How credit rating agencies missed the IL&FS crisis <https://www.livemint.com/Companies/kDBrz7DB4Ti4Pz2TdxG85N/How-credit-rating-agencies-missed-the-ILFS-crisis.html>

100 RBI, "Financial Institutions: Soundness and Resilience", <https://rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=902>, Accessed on 1-4-2019

Box 2 DRE financing

Rooftop solar deployment has been supported by concessionary finance. A USD 660 million Line of Credit to SBI by the World Bank currently makes finance available at below-market rate primarily to large RE developers. There are a few other announced sources. Asian Development Bank is to provide INR 31.5 billion to (USD 0.5 billion) to Punjab National Bank, New Development Bank (the BRICS bank) has provided -INR 15.7 billion (USD 0.2 billion) credit line to Canara Bank, and KfW is to issue low interest loans of USD 1,193 million till 2023 for India's rooftop solar projects. However, the penetration of rooftop solar remains limited beyond projects financed by large developers and with creditworthy offtakers (in context of the opex model).

The flow of finance to the broader rooftop solar sector is constrained by the lack of bankability of projects stemming from their small size (leading to higher transaction costs for financiers), the lack of creditworthiness of medium small and micro enterprises (MSME) and residential offtakers and a limited track record on technology performance. Challenges on account of the small and disaggregated nature of assets and lack of creditworthiness of borrowers also affect other DRE assets.

Some of the risks pertaining to these challenges can be addressed through financial aggregation. In simple terms, financial aggregation is a mechanism that bundles together assets of small sizes to build a sizeable portfolio in an entity / special purpose vehicle (SPV), which helps reduce both transaction costs, achieve risk diversification and lower the cost of financing. Financial aggregation and securitisation can also potentially enable access to the bond market for rooftop solar, as well as enhance the flow of finance to other DRE segments.

Aggregation of rooftop solar assets has facilitated bond issuance in developed financial markets¹⁰¹. While no such transactions have occurred in India, market participants are working towards these solutions¹⁰² and a few players have pledged support. Credit enhancement interventions such as first-loss guarantees would be needed to expand the market, especially for projects promoted by less creditworthy developers or with poorly-rated offtakers.

Aggregation and securitisation of receivables to finance solar PV-powered devices (Solar home systems (SHS) such as lanterns, TV sets, inverters and coolers) presents another potential option for DRE bond financing. A number of institutions such as Onergy, SELCO, Boond, and Simpa Networks have financed or arranged for financing for SHS through individual loans, group loans, payment in installment to the seller and Pay-as-you-Go (PAYG) models.¹⁰³ Most of these loans are disbursed by microfinance institutions (MFIs). A few firms, such as SIMPA Networks, who are largely into PAYG, have entered into re-financing/co-financing arrangements with banks.

As volumes and the quantum of loans on the books of financial institutions rise, the stage will be set for linkage to the capital markets. MFIs, which already have a well-established link to the markets, will need to be sensitised and enabled to grow their SHS loan portfolios so that refinancing them becomes desirable.

101 TMF Group "Investors turning to solar securitisations for green growth", <https://www.tmf-group.com/en/news-insights/articles/2018/march/solar-securitisations-for-green-growth/>, Accessed on 1-4-2019

102 Sankalp "Breakout Sessions 2: How Much Money Does It Take To Change A Light Bulb?", <https://globalsummit2018.sankalpforum.com/agenda>, Accessed on 1-4-2019

103 PAYG- In this model, the systems are sold against a small upfront payment and regular 'top-ups' or payments linked to usage, usually sent via low-cost mobile money services. It is usual that devices can be switched off remotely in case of non-payment

4. Green bonds as a source of debt capital and Indian corporate bond markets

▶ Key takeaways from the chapter

- Green bonds can address some of the funding constraints by diversifying the sources of capital, introducing greater liquidity and tradability, addressing tenor mismatch, promoting greater transparency in the use of proceeds and by providing certainty over interest rates. The green bond segment would benefit greatly by reforms in the Indian corporate bond market.
- Key reforms in the financial sector and regulatory measures specific to bonds could transform the corporate bond market into a viable complement to banks and NBFCs as a source of debt capital. India's corporate bond market is relatively underdeveloped, constraining the use of bonds despite their advantages such as lower interest rates through the refinancing of operational projects, potentially longer tenors and larger ticket size than bank loans.
- More government bond issuances corresponding to longer tenors (15 years or more) could facilitate the establishment of reliable benchmarks for pricing longer tenor bonds.
- Effective implementation of the Insolvency and Bankruptcy Code (IBC), implemented in 2016, would help both lower and simplify the pricing of credit risk, thereby facilitating investments in lower-rated securities and deepening of the market. IBC's aim is to firm up investor protection norms, build a regime based on time-bound resolution of insolvency cases and expedite recovery.
- Regulators have facilitated the development of markets for repo transactions, which could enable investors to manage asset-liability mismatches, translating into improved liquidity.
- RBI's 2016 guidelines disincentivise banks from lending to large companies, SEBI has mandated large corporate borrowers to raise a fourth of their incremental borrowings through corporate bonds from 2019-20 onwards, and India's pension fund regulator has changed regulation permitting pension funds to invest in lower rated ('A' rated) bonds.
- Regulators have facilitated the creation of incentive structures to push borrowers and investors towards accessing the bond market.

The corporate bond market represents an important complement to commercial banks and NBFCs for raising debt capital for (re)- financing renewables and EVs. With the capacity of the banking system constrained by high levels of bad debt, companies have increasingly been tapping the bond market.¹⁰⁴ *Green bonds* can address the constraints of the current sources of finance. Green bonds are a type of bond instrument where the proceeds are exclusively applied to finance or re-finance, in part or in full, new or existing eligible green projects.

4.1 Uses and advantages of bonds over loans

Investors in green or vanilla¹⁰⁵ bonds are looking for stable, non-volatile revenue flows. Until the project has been fully commissioned, revenue streams remain risky. For this reason, green bonds are issued in the operational phase for refinancing, where the risk profile is more suited to the relatively risk-averse investor base.¹⁰⁶ The act of refinancing frees up banks' balance sheets, enabling the flow of cash into fresh projects. Figure 4 shows the role of green bonds in the spectrum of green versus traditional and long- versus short-term finance.

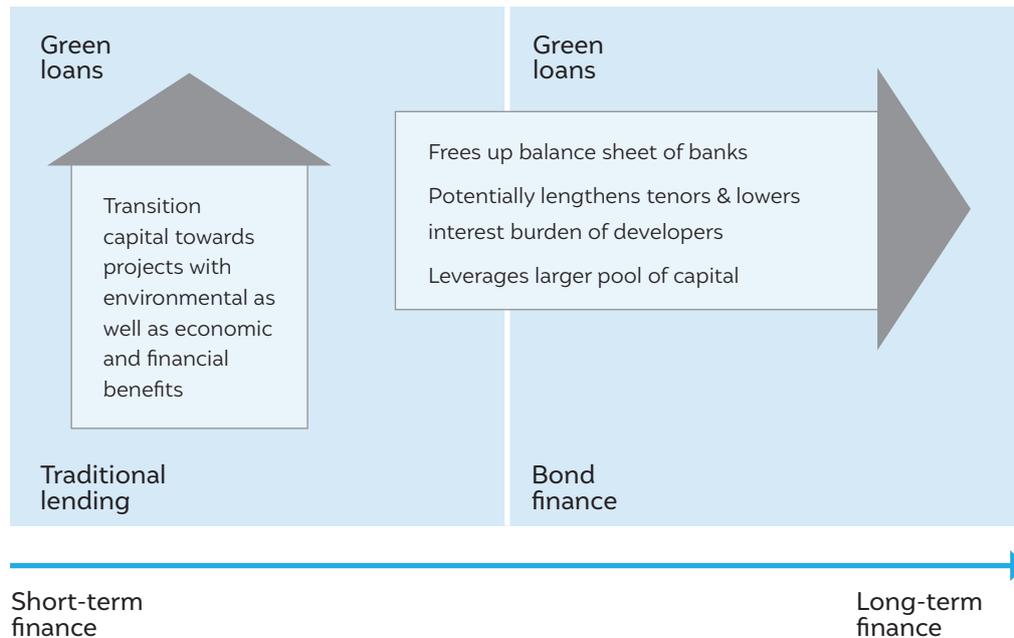


FIGURE 4:
Refinancing loans with green bonds

Source: Adapted From “New markets for green bonds: A guide to understanding the building blocks and enablers of a green bond market” by Williams et al

Green bonds offer a number of advantages over loan finance.

Diversified sources of capital: Bank and NBFC lending is constrained by RBI capital adequacy norms, which are based on the Basel III international bank resilience standard.¹⁰⁷ Prudential limits on sector-based exposure further constrain lending by these institutions. Bonds access a much wider pool of domestic investors from the debt capital markets including banks, pension companies, insurance companies and mutual funds. Bonds can also be issued off-

104 Mint, “Indian corporates find saviour in bonds as loans dry up”, <https://www.livemint.com/Money/fXTztFG7JX4fvH5Ptzk9vI/Indian-corporates-find-saviour-in-bonds-as-loans-dry-up.html>, Accessed on 5-11-2018

105 Vanilla bonds are conventional bonds without additional green features (You may also refer to the table in the section explaining the issuance process (toolkit)

106 PIMCO, “What makes a bond a bond?” “<https://global.pimco.com/en-gbl/resources/education/everything-you-need-to-know-about-bonds>, Accessed on 1-4-2019

107 Guidelines on Implementation of Basel III Capital Regulations in India https://rbidocs.rbi.org.in/rdocs/content/pdfs/FBSEII020512_1.pdf

shore in INR denomination (Masala bonds) for investors comfortable with the exposure to currency risk, or in an international currency like USD to attract international investment, especially when there is a specific green mandate. This diversifies funding sources and greatly augments the pool of investors.¹⁰⁸ International capital thus allows much bigger-sized bonds to be issued. This is particularly important as India needs to increase the annual rate of investment threefold to meet its RE deployment targets. There is evidence to show that in some cases this has resulted in a more competitive price. However, in order to realise this potential benefit, the green bond has to conform to international standards.

Greater liquidity and tradability: Loans are usually illiquid, making it difficult for investors to vary or unwind their position before the end of a loan's term. Also, covenant requirements of different banks usually vary, making it difficult to trade debts or combine loans from multiple banks. Bonds usually have a high degree of consistency in the terms, which enhances liquidity in the secondary market. This liquidity is attractive to long-term investors allowing them to increase or reduce their holdings in an issuance according to their fund's evolving strategy. Another important advantage of bonds for issuers is that issuances are often unsecured while a loan has greater security requirements.¹⁰⁹

Transparent use of proceeds: A defining feature of green bonds is that the issuer has to specify how the proceeds are to be spent and put in place a system of governance for selecting suitable assets. A regular practice for green bond issuances is to provide annual reports on the environmental performance of the assets. This helps investors assess whether projects are proceeding as planned. This aspect attracts international investors, especially those unfamiliar with the Indian market, as it provides them comfort that their capital will not be misdirected.

Addressing tenor mismatch: Most energy infrastructure projects have design lives of more than 25 years and would ideally borrow money and agree repayment terms over comparable time frames. In contrast, bank loans are usually for shorter tenors. Bond markets could bring in pension and insurance funds whose investment horizons are more suited than banks to match the long-term funding necessary for RE.

Certainty over interest rates: Bank lending in India is structured as a floating rate, which is linked to the bank's cost of funds.¹¹⁰ This rate is determined separately by each bank. The INR bond markets are largely on fixed-coupon basis and thus allow borrowers to issue bonds with "lock in" rates for certain financing and to avoid the need for frequent refinancing.

In order to enhance the use of green bonds in India, it is vital to address the challenges that hinder the growth of the bond market itself. Reforms in the financial sector along with a policy and regulatory push for developing India's corporate bond market could transform the landscape of debt capital for renewables and EVs.

108 "IFR Asia India debt capital markets Roundtable 2018: Changing with the climate" <http://www.ifrasia.com/ifr-asia-india-debt-capital-markets-roundtable-2018-changing-with-the-climate/21350960.article>

109 UBS Investment Bank, "Bank debt vs. bond and the European syndicated loan market", <http://portal.idc.ac.il/en/main/research/caesareacenter/annualsummit/documents/c08-7.pdf>, Accessed on 1-4-2019

110 Proptiger, "Prime Lending rate" <https://www.proptiger.com/guide/post/prime-lending-rate>, Accessed on 1-4-2019

4.2 Depth and liquidity of the Indian corporate bond market

India's corporate bond market has grown steadily in size, with outstanding bonds totalling INR 27.4 lakh crore (USD 392 billion) at the end of March 2018 compared with INR 8.9 lakh crore (USD 127 billion) at end-March 2011.^{111,112} The following section contextualises these figures by examining market depth and secondary market liquidity—two common measures of bond market development.¹¹³

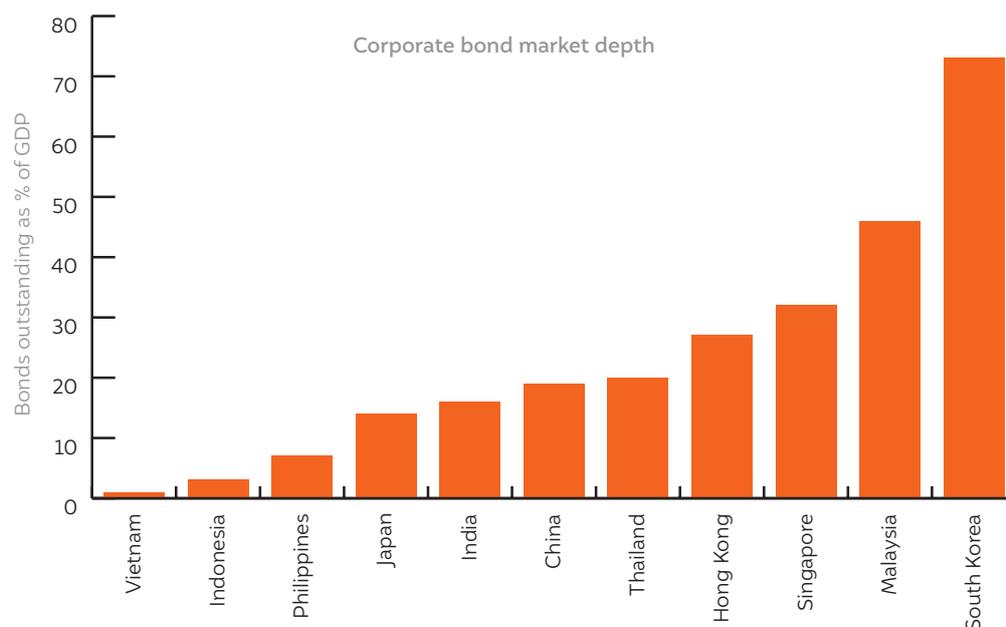


FIGURE 5:

India's corporate bond market depth does not compare favourably with Asian peers

Source: CARE Ratings, *Asian Corporate Bond Market – A comparison with India, 2018*

Note: Figures as of March 2018

Bond-market depth¹¹⁴ is the value of outstanding bonds as a percentage of GDP. Compared with other emerging and developed Asian economies (Figure 5) India's corporate bond market is at a nascent stage of development.

A bond market's liquidity refers to the strength of the secondary market in terms of ease of trading out existing holdings.¹¹⁵ Greater liquidity also facilitates the efficient discovery of market prices of securities. Globally, corporate bond markets are dominated by institutional investors who usually buy and hold securities instead of actively trading them, translating into low levels of liquidity in bond markets in general.¹¹⁶ However, market mechanisms that facilitate liquidity management (such as repos – discussed later in this chapter) translate into higher levels of liquidity in highly developed bond markets.¹¹⁷ While liquidity in the Indian corporate bond market is comparable to that in major Asian markets, it is much less than in the highly developed markets (Figure 6).

111 CARE Ratings, *Assessment of the Corporate Bond Market, 2018*

112 RBI, "Challenges in Developing the Bond Market in BRICS", https://rbi.org.in/Scripts/BS_SpeechesView.aspx?id=1025, Accessed on 28-10-2018

113 International Organization of Securities Commissions, *The Development of Corporate Bond Markets In Emerging Market Countries, 2002*

114 World Bank, "Financial Depth", <http://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-depth>, Accessed on 28-10-2018

115 CFA Institute, "Bond Market Liquidity", <https://www.cfainstitute.org/en/advocacy/issues/bond-market-liquidity>, Accessed on 3-11-2018

116 RBI, "Corporate Bond Markets in India: A Framework for Further Action", https://rbi.org.in/Scripts/BS_SpeechesView.aspx?id=980, Accessed on 3-11-2018

117 Crisil, "A repo platform boost for corporate bonds", <https://www.crisil.com/en/home/newsroom/press-releases/2018/07/a-repo-platform-boost-for-corporate-bonds.html>, Accessed on 31-3-2019

Market liquidity is further hampered by India's extensive use of private placements as the preferred mode of issuance.¹¹⁸ Private placement only engages with around 200 investors in a financial year.¹¹⁹ Investors favour private placements because of their lower transaction costs (An issue size of INR 1 billion costs 0.5 per cent of the issue size for private placement and 3-4 per cent for a public bond issuance).¹²⁰

The lack of liquidity means investors charge a premium to compensate for potential delays in trading out their holdings.¹²¹ Low levels of liquidity also translate into higher transactions costs pertaining to the clearance and settlement systems.¹²²



FIGURE 6:

India's corporate bond market liquidity is comparable to major Asian peers but short of developed liquid markets

Source: CRISIL

Note: Trading ratio is a measure of secondary market liquidity, defined as daily traded volumes as a share of total outstanding bonds. The trading ratios shown in the figure correspond to those for June 2017.

Thus, despite the growth in size of the bond market in absolute terms (bonds outstanding), the Indian corporate bond market is still at a relatively early stage of its development.

4.3 Strengthening the corporate bond market

A vibrant corporate bond market requires supportive regulatory and market frameworks which lower credit, market and liquidity risks for investors, and costs for bond issuers. Policymakers and regulators have taken, or are contemplating, steps to address current deficiencies. The successful implementation of these measures could transform the Indian corporate bond market into a viable complement to banks and NBFCs as a source of debt capital.

118 Private placements accounted for 99.2% of issuances in FY 2018 – from CARE Ratings, Assessment of the Corporate Bond Market, 2018

119 Business Standard, "Private placement route can have up to 200 investors", https://www.business-standard.com/article/companies/private-placement-route-can-have-up-to-200-investors-113092000873_1.html, Accessed on 24-12-2018

120 RBI, "Choice of Private Placement as an Instrument for raising Debt Resources: An Evidence from Indian Firms", https://rbi.org.in/scripts/bs_viewcontent.aspx?id=3280, Accessed on 24-12-2018

121 Jean Helwege, Jing-Zhi Huang, Yuan Wang, Liquidity effects in corporate bond spreads (Journal of Banking & Finance, 2013)

122 Michael G. Plummer, Reid W. Click, Bond Market Development and Integration in ASEAN (ICSEAD, 2003)

4.3.1 Improving the government bond market

A pre-existing well-developed government bond market provides a benchmark yield curve, which is essential for the pricing of corporate bonds.¹²³ Corporate bond yields are determined by adding spreads (additional yield) over the benchmark yield for a security of a given tenor, in order to account for additional risks pertaining to the corporate bond. An efficient yield curve is based on regular primary government bond issuances across maturities as well as an active secondary market for government securities.¹²⁴ The lack of a well-developed benchmark yield curve can be a hindrance--emerging markets without a well-developed benchmark yield curve are characterised by poorly-developed corporate bond markets.¹²⁵

India's central government bond market is characterised by debt securities with tenors ranging from less than one year to 40 years.^{126,127} Maturities lower than 10 years are characterised by regular issuances with considerable secondary market trading. Issuances of bonds with maturities greater than 15 years are rare, with low trading activity.¹²⁸ Greater government bond issuances corresponding to these longer tenors could facilitate the establishment of reliable benchmarks, and the pricing and issuance of corporate bonds of the corresponding maturity. The growing corpus of India's pension and insurance funds (Section 5.4) represents sources of demand for these longer dated products.¹²⁹

4.3.2 Mechanisms for creditor protection

The presence of an effective legal framework for protection of creditors' rights inspires confidence among potential investors for participation in the bond markets.^{130, 131} Such a mechanism helps minimise losses for investors in case of defaults by bond issuers. Ineffective contract enforcement makes the pricing of credit risk difficult, which deters bond market investments, particularly in lower-rated securities. A credible mechanism for investor protection essentially helps both reduce and simplify the pricing of credit risk, facilitating investments in lower-rated securities and the deepening of markets.¹³²

In order to address the deficiencies of India's legal framework for creditor protection, the Insolvency and Bankruptcy Code (IBC) was enacted in 2016. Before the introduction of the IBC, a multiplicity of laws and mechanisms dealt with corporate insolvency and bankruptcy proceedings. The pre-existing regime was characterised by poor outcomes from the perspective of creditor protection: an average of 4.3 years for the completion of insolvency proceedings with a recovery rate of 25.7 cents per US Dollar as compared to 1.7 years in high-

123 International Organization of Securities Commissions, Development of Corporate Bond Markets in the Emerging Markets, 2011

124 Michael G. Plummer, Reid W. Click, Bond Market Development and Integration in ASEAN (ICSEAD, 2003)

125 International Organization of Securities Commissions, Development of Corporate Bond Markets in the Emerging Markets, 2011

126 RBI, "List of Government of India Securities outstanding as on October 29, 2018", https://rbi.org.in/Scripts/bs_viewcontent.aspx?Id=1956, Accessed on 4-11-2018

127 RBI, "Government Securities Market A Primer", <https://www.rbi.org.in/scripts/PublicationsView.aspx?id=16413#14>, Accessed on 4-11-2018

128 Asia Securities Industry and Financial Markets Association, India's Debt Markets, The Way Forward, 2017

129 Business Standard, "40-year govt bonds set to grab the attention of insurers, pension funds", https://www.business-standard.com/article/finance/40-year-govt-bonds-set-to-grab-the-attention-of-insurers-pension-funds-115032400766_1.html, Accessed on 19-2-2019

130 John D. Burger, Francis E. Warnock, and Veronica Cacdac Warnock, Bond Market Development In Developing Asia (ADB, 2015)

131 International Organization of Securities Commissions, Development of Corporate Bond Markets in the Emerging Markets, 2011

132 Mint, "Bankruptcy code can help deepen bond markets: SEBI chief Ajay Tyagi", <https://www.livemint.com/Money/bwoY5q2vYOrpnvYQDyaOmJ/Bankruptcy-code-can-help-deepen-bond-markets-Sebi-chief-Aja.html>, Accessed on 4-11-2018

income Organisation for Economic Cooperation and Development (OECD) countries with a recovery rate of 71.9 cents per US Dollar.¹³³

The IBC aims for time-bound resolution of insolvency and to maximise recovery value for investors. The IBC has been far more effective in terms of recovery rates, with financial creditors receiving around 46 per cent of the admitted claims for insolvency cases under the new regime in an average of 0.8 years per claim.¹³⁴ Although the IBC still has a short track record, the preliminary evidence suggests that it could become a credible deterrent for debtors to default on debt.¹³⁵

The implementation of the IBC was a major contributor to the 30-spot improvement in India's Ease of Doing Business 2018 ranking, with the country climbing 33 spots on the parameter for resolving insolvency.¹³⁶ Effective implementation of the IBC through strict adherence to the 270-day timeline for resolution of insolvency proceedings would inspire confidence among investors and could facilitate investments into lower-rated bonds.¹³⁷

Besides the IBC, regulators are also considering steps to promote greater transparency in the functioning of market participants in order to bolster investor confidence. Following the unexpected default by IL&FS (section 3.4), the credibility of credit rating agencies has suffered a dent. Market regulators are planning to revise disclosure requirements and rating standards of credit ratings agencies.¹³⁸ Low disclosure requirements for unlisted companies are also a matter of concern for investors, which also need to be addressed.^{139 140}

4.3.3 Increasing liquidity in Indian bond markets

As discussed earlier, among the reasons for low levels of bond market liquidity in India are the predominance of institutional investors and private placements as the preferred mode of issuance. The predominance of institutional investors such as pension and insurance funds in bond markets globally translates into low levels of secondary market activity as these investors tend to buy and hold securities till maturity. Private placements further lower liquidity as only a limited set of investors participate in such issuances.

Liquidity can be enhanced by developing markets for financial instruments geared towards risk mitigation and liquidity management. In mature corporate bond markets, the presence of well-developed repo markets helps achieve this. A repo (repurchase) agreement is an agreement to sell securities at a given price and repurchase them at a pre-determined price at a later date. Repo agreements enable institutional investors to manage liquidity and asset-liability mismatches without needing to sell their holdings.

Tri-party repo: Following the issue of the RBI guidelines permitting stock exchanges to act as intermediaries in the repo market, the National Stock Exchange (NSE) and Bombay Stock

133 EY, Interpreting the Code Corporate Insolvency in India, 2017

134 CEEW analysis, based on Corporate Insolvency Resolution Process data released by the Insolvency and Bankruptcy Board of India as of the end of September 2018

135 Bloomberg Quint, "Insolvency Code Being Used As A Debt Recovery Tool", <https://www.bloomberquint.com/insolvency/insolvency-code-being-used-as-a-debt-recovery-tool>, Accessed on 30-11-2018

136 Business Standard, "Ease of doing business: How did India improve its ranking to 100th spot?", https://www.business-standard.com/article/economy-policy/ease-of-doing-business-how-did-india-improve-its-ranking-to-100th-spot-117110100285_1.html, Accessed on 31-10-2018

137 More than 85% of corporate bond issuance is undertaken by issuers that are rated 'A' or above as per RBI, "Challenges in Developing the Bond Market in BRICS", https://www.rbi.org.in/scripts/FS_Speeches.aspx?Id=1025&fn=6, Accessed on 5-11-2018

138 The Economic Times, "IL&FS fallout: Sebi plans major overhaul in role of rating agencies", <https://economictimes.indiatimes.com/markets/stocks/news/ilfs-fallout-sebi-plans-major-overhaul-in-role-of-rating-agencies/articleshow/66439260.cms>, Accessed on 31-10-2018

139 Based on market intelligence

140 Unlisted companies disclose financial statements on an annual basis as compared to quarterly disclosures for listed companies.

Exchange (BSE) launched their respective tri-party repo platforms (with the exchange acting as the intermediary in repo transactions) in 2018. These platforms are expected to boost corporate bond market liquidity by facilitating the participation of institutional investors.

Instruments for risk mitigation: India does not have a well-developed market for financial instruments that can be used for transferring risk. However, regulators are considering ways to stimulate activity in the largely defunct credit default swap (CDS) market in India by allowing buyers of protection (institutional investors) to also sell protection through CDS, and by easing capital adequacy and exposure norms for market participants.¹⁴¹ The development of a robust CDS market could enhance liquidity in the corporate bond market.

4.3.4 Encouraging large companies to substitute bank lending with bond issuance

Market regulators are encouraging large companies to use the bond market. They have introduced favourable tax incentives to further develop the asset-backed securities (ABS) market, are considering lowering restrictions on foreign portfolio investors (FPIs), and are planning to introduce mechanisms that reduce costs for issuers.

Banking regulations

RBI's 2016 guidelines discourage banks from lending to any single company beyond specified limits by imposing additional provisioning requirements.¹⁴² Complementing these guidelines, the Securities and Exchange Board of India (SEBI), has mandated large corporate borrowers (with outstanding borrowings of INR 1 billion or more and a credit rating of 'AA' or higher) to raise one-fourth of their incremental borrowings through corporate bonds with effect from FY 2019-20.¹⁴³

Institutional investors

Indian regulators have traditionally permitted institutional investors such as pension and insurance funds to invest only in 'AA' and above rated bonds. In order to deepen bond markets, policy makers announced there would be changes in regulation that would enable institutional investors to invest in 'A' rated bonds in early 2018.¹⁴⁴ Subsequently, the Pension Fund Regulatory and Development Authority (PFRDA) reduced the minimum allowed credit rating from "AA" to "A" in May 2018.¹⁴⁵ The initial market reaction to PFRDA's rule change from market participants has been muted at best.¹⁴⁶ Nonetheless, the pressure from the regulator for the pension fund sector to diversify away from government securities is an important step in the right direction. In conjunction with the favourable changes brought about by the IBC, such measures could facilitate investments in lower-rated bonds by institutional investors.

141 Bank for International Settlements, "Harun R Khan: Corporate bond markets in India – a framework for further action", <https://www.bis.org/review/r151230a.pdf>, Accessed on 19-2-2019

142 RBI, "Guidelines on Enhancing Credit Supply for Large Borrowers through Market Mechanism", <https://rbi.org.in/Scripts/NotificationUser.aspx?id=10574&Mode=0>, Accessed on 4-11-2018

143 Business Standard, "Sebi norms for corporate bonds could boost issuances by Rs 500 bn: CRISIL", https://www.business-standard.com/article/markets/sebi-norms-for-corporate-bonds-could-boost-issuances-by-rs-500-bn-crisil-118092000843_1.html, Accessed on 4-11-2018

144 Ministry of Finance, "Budget Speech 2018-19", <https://www.indiabudget.gov.in/ub2018-19/bs/bs.pdf>, Accessed on 4-11-2018

145 Press Information Bureau, "Important Announcements and Approvals in Board Meeting of PFRDA", <http://pib.nic.in/newsite/PrintRelease.aspx?relid=179122>, Accessed on 19-2-2019

146 Based on market intelligence

Foreign portfolio investors

The central government is contemplating measures that would augment foreign portfolio investments (FPI) in the corporate bond market. These include removal of investment limits in the bond issuance of a single corporate borrower and exemptions from withholding taxes.¹⁴⁷ If implemented, these measures could further support investments in the Indian corporate bond market.

Tax incentives have boosted the ABS market

Indian regulators have reversed the applicability of taxation provisions on returns from India's asset-backed securities (ABS) market. This has stimulated rapid growth in the ABS market.

Securitisation refers to the process of transforming a pool of illiquid financial assets into tradable financial instruments. Mortgages, auto loans and receivables of microfinance institutions constitute the bulk of the underlying securities in India's ABS market.¹⁴⁸ Securitisation enables lenders to sell their loans to institutional investors to generate new lending capacity. This allows NBFCs to overcome any funding constraints, and also enables them to access the capital markets. ABS are issued in different tranches of seniority providing different investors a range of products to match their risk-return appetites. Usually the senior tranche is of investment grade, rated at AA or above.

Securitisation constitutes a major source of raising capital for NBFCs. Commercial banks, the traditional investors in India's ABS market, often use this route to meet their priority-sector lending requirements. Investors can participate either through pass-through certificates (PTCs - an ABS instrument in India's securitisation market) or the direct assignment method, which involves the direct sale of a portfolio of loans from a financial institution to the investor.¹⁴⁹ The introduction of distribution taxes on returns from PTCs in 2013 stalled the momentum in India's securitisation markets.¹⁵⁰ PTC issuances fell from around INR 30,200 crore (USD 4.3 billion) in FY 2013 to INR 17,200 crore (USD 2.4 billion) in FY 2015, limiting the growth in overall securitisation volumes from around INR 38,000 crore (5.4 billion) in FY 2013 to INR 43,000 crore (USD 6 billion) in FY 2015.¹⁵¹ Lifting this provision later in 2016 triggered a sharp growth in market volumes of ABS.¹⁵² Overall ABS issuances have risen sharply to INR 144,000 crore (USD 20.3 billion) in the first nine months of FY 2018.¹⁵³ The favourable tax incentives have also facilitated the participation of institutional investors besides banks, such as mutual funds.¹⁵⁴

147 Bloomberg Quint, "Government, RBI Take Steps To Encourage Capital Flows, Boost Rupee", <https://www.bloombergquint.com/business/finance-minister-arun-jaitley-announces-5-measures-to-control-indias-current-account-deficit#gs.ofQyvk8>, Accessed on 5-11-2018

148 Crisil, Securitisation Market Overview 2016-17

149 Vinod Kothari Consultants, "Budget gives a tax reprieve to securitization, replaces distribution tax with tax deduction at source", http://vinodkothari.com/wp-content/uploads/2016/02/Securitisation_tax_gets-reprive_in-budget_2016.pdf, Accessed on 9-1-2019

150 ibid

151 ibid

152 ibid

153 Hindu Business Line, "Securitisation volumes at all-time high of Rs 1.44 tn in April-Dec", <https://www.thehindubusinessline.com/markets/securitisation-volumes-at-all-time-high-of-rs-144-tn-in-april-dec/article25931013.ece>, Accessed on 9-1-2019

154 Crisil, Securitisation Market Overview 2016-17

Measures to lower transaction costs of issuance

SEBI is planning to introduce the 'on tap' mode of public bond issuance to reduce costs for issuers.¹⁵⁵ This mode of issuance is used extensively in developed markets and entails lower regulatory requirements for repeat bond issues.¹⁵⁶ The potential lowering of transaction costs through this mode should make public bond issuance relatively more attractive vis-a-vis private placements at present, thereby providing a fillip to both new issuance and market liquidity.

While the Indian corporate bond market is still in the initial stages of its development, concerted effort by regulators to develop a vibrant bond market should propel it forward along the trajectory of market maturity. Given the fast-improving value proposition presented by the corporate bond market, its role in the debt financing of green market segments such as RE and EVs should be assessed.

155 The Economic Times, "Sebi plans 'on tap' bond market", <https://economictimes.indiatimes.com/markets/bonds/sebi-plans-on-tap-bond-market/articleshow/65556332.cms>, Accessed on 27-8-2018

156 *ibid*

5. Increasing domestic green investment using green bonds

▶ Key takeaways from the chapter

- India is the 12th largest green bond issuer in the world.
- India's sovereign credit rating of BAA2 means that many green bonds need credit enhancement to attract international investors. The role of multilateral development banks (MDBs) in helping improve ratings will continue to be important.
- Green bonds have been chiefly used for RE refinancing, and have offered long-tenor finance, suitable for RE assets' useful life, in some cases.
- In the future, the EV sector could also make use of green bonds. A quick win would be using existing financing mechanisms such as ABS, which are already used for auto-loans, to start financing purchase of EVs or hybrids.
- India's local long-term investors, specifically the retirement and insurance industries, are an important future source of capital. The current policy direction is positive, but an acute need for investor education persists.

Green bonds can be issued on-shore to tap the INR capital market, or off-shore to attract international investors. Both will be needed to fund India's massive RE and EV infrastructure ambitions.

5.1 The current green bond market

The Indian green bond market witnessed its first issuance in February 2015 and 27 green bonds have been issued by 18 issuers until May 2019, cumulatively amounting to USD 7.6 billion.¹⁵⁷ This figure may look small in the face of India's investment needs, but the trend is decisively positive. India stands 12th in the list of the leading global green bond issuers.

Global green bond issuance reached USD 167.3 billion in 2018, according to Climate Bonds Initiative, and surpassed the 2017 volume of USD 162.1 billion by three per cent. The market also saw a rise in the issuance of sustainability, Sustainable Development Goals (SDG) and social bonds, indicating label diversification. Taking all labelled issuances into account, the market was up 13 per cent in 2018. Amongst emerging economies, China maintained the lead with 78 per cent of the total issuance volume.

157 Climate Bonds Initiative data as of December 2018

5.1.1 Issuer profile

Both public and private sector players have tapped the green bond market in the country. According to the July 2018 Climate Bonds' report¹⁵⁸ on the state of the market, cumulative issuances by the private sector stand at 38 per cent of the total volume between 2015 and July 2018, followed by government-backed entities at 36 per cent. With the State Bank of India issuance of USD 650 million in September 2018, the share of government-backed entities has bolstered the overall trend of their dominance in driving green issuances in India. Government-backed entities club both financial (five) and non-financial government issuers (two). Private financial institutions and MDBs comprise 13 per cent market share each. In 2019 (as of May 10), ReNew Power was the only issuer of a certified green bond in March 2019 to raise USD 350 million. This was its second certified green bond, the first being in 2016 through which it had raised USD 75 million. Figure 7 depicts the issuers' profile.

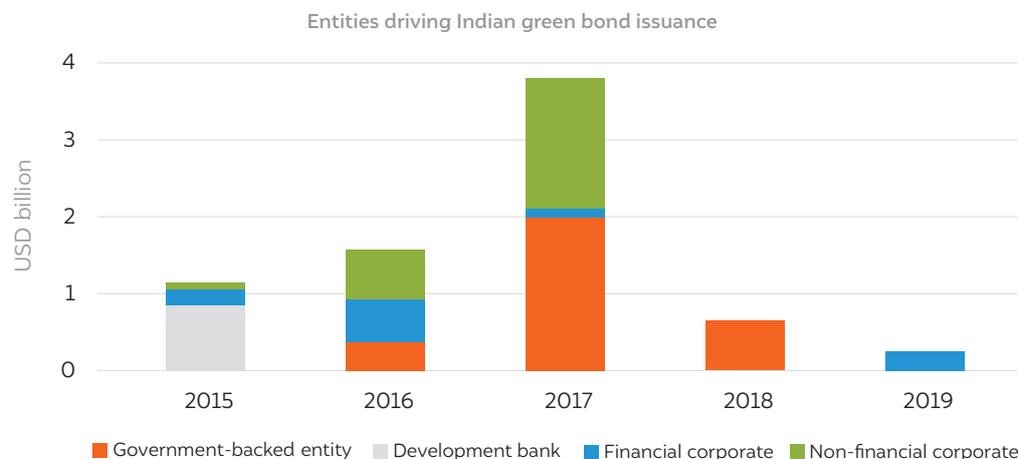


FIGURE 7:

Issuer profile of green bonds issuance in India

Source: Climate Bonds Initiative

In 2017, government-backed entities dominated the market. More than half of these were renewable energy financing institutions, and in total, 78 per cent of the issuances (in terms of volumes) came from financial institutions. Overall, only six out of the 18 issuers are pure-play RE companies.

The largest issuance till date has been USD 1.2 billion and was sold by a private RE promoter (Greenko) in 2017. Next in line is IREDA, the most frequent issuer, which has issued six green bonds till date. Outside of the RE sector, prominent issuances comprise those by the Indian Railway Finance Corporation, L&T Infrastructure Finance and PNB Housing Finance—the latter two were subscribed by MDBs, underscoring the importance of these institutions in the nascent market.

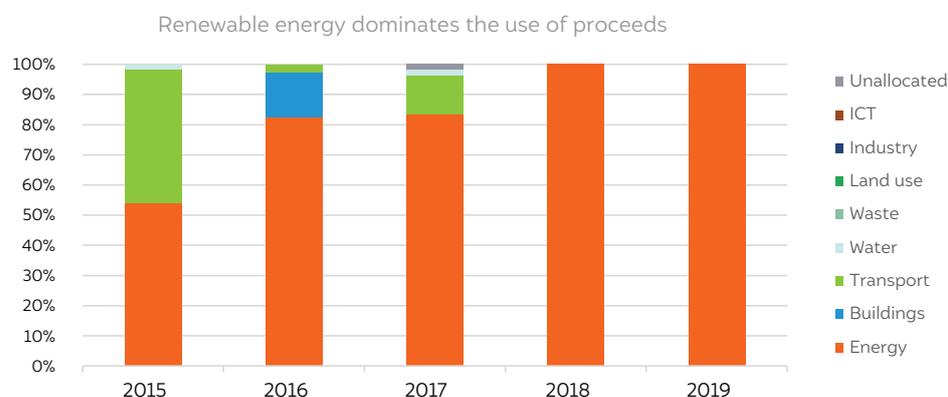


FIGURE 8:

Sectoral split of capital raised through green bonds

Source: Climate Bonds Initiative

158 Climate Bonds Initiative, "India Country Briefing - July 2018" <https://www.climatebonds.net/resources/reports/india-country-briefing-july-2018>, Accessed on 1-4-2019

The distribution of the use of these proceeds shows a clear domination by the RE sector (figure 8) followed by construction and transport sectors.

Climate Bonds Initiative has not historically tracked ratings and credit enhancement. However, credit ratings from at least one of the international rating agencies – Standard & Poor’s (S&P), Moody’s and Fitch - are available for 46 per cent of the green bonds (by count) from Indian issuers. These ratings range from B+ to BBB-. Half the Indian green bonds by volume carry an investment grade rating of BBB-, with another one-third carrying a sub-investment grade rating by at least one of these agencies.

The bonds of government-backed entities such as Indian Railway Finance Corp, State Bank of India, Rural Electrification Corp and the Export-Import Bank of India are typically rated BBB-. However, there are also government-related issuers, whose bonds are either not rated (e.g. PNB Housing Finance) or rated sub-investment grade (BB+ for IDBI). Among financial institutions, the green bonds of Axis Bank are rated BBB-, while those of Yes Bank are not rated. Non-financial companies are generally not rated or rated sub-investment grade, ranging from B+ to BB.

Examples described later in this section show that credit enhancement could mobilise India’s huge domestic savings for infrastructure projects, facilitating market access for the private sector and lengthening bond tenors. Green bond issuance so far has not benefitted households and MSMEs. Nor have there been any such issuances in the DRE or EV segments.

5.1.2 Demand for green bonds

That investor demand is strong has already been illustrated in the two-to-three times oversubscription of green bonds issued so far. These bonds have attracted a wider pool of investors than vanilla equivalents by the same issuer. Interactions with issuers suggest that issuances by government-backed entities between February 2015 and July 2018 witnessed between 14 to 24 per cent investments from dedicated green funds.

This investor diversification could also be reflected in terms of a pricing advantage, although there is no evidence yet of any statistically significant enhancement. Anecdotal estimates suggest that pricing advantage for Indian issuers has varied between 7 to 14 basis points.

5.1.3 Certification is a rising trend

The use of external reviews is a notable feature of the Indian green bond market. Between 2015 and 2018, 80 per cent of deals by volume benefitted from external review. This included certification against the Climate Bonds Standard (54 per cent of the total volume)¹⁵⁹ second party opinions (25 per cent) and assurance (5 per cent)¹⁶⁰, indicating the benefits of such reviews in the international market. Certification acts as a definitive differentiator in the market for investors looking specifically for green projects.

While China dominates green issuance volumes among the emerging economies, India leads in the total certified climate bonds representing 35 per cent of the total number of certified bonds from emerging markets. Issuers, which have not labelled their bonds green, have obtained second opinion from organisations such as Centre for International Climate and Environmental Research (CICERO) and adhered to the Green Bonds Principles (GBPs)

159 Climate Bonds Initiative

160 *ibid*

laid out by the International Capital Markets Association (ICMA).¹⁶¹ Indian issuers have tapped both domestic and foreign markets for green bond issuance. However, given the constraints on the Indian bond market, most of these issuances have been in foreign markets denominated in in US dollars.

Parameters	All sectors	
	No. of issuances	Value of issuances (USD equivalent)
Total Issuances (India & Abroad)	26 (certified 13, non-certified 14)	7.6bn
Currency		
INR	16	1.6bn
USD	10	6bn
Non-INR and non-USD	0	0

TABLE 2:

Classification of Indian green bonds by currency of issuance

Source: Climate Bonds Initiative

5.2 Financial instruments to increase issuance of green bonds

The bond market has seen some innovative structures develop to help reduce costs of debt. Innovative and socially conscious Indian businesses are also developing financial instruments to match investor demand for small-scale sustainability projects¹⁶². Securitisation structures have also involved multiple originators mainly engaged in microfinance and small business loans.

5.2.1 Blended finance to enhance the credit rating of green bonds

Credit rating of corporate bonds (green or vanilla) issued in India will be lower than India's current sovereign rating of BAA2 on Moody's, which is one notch above the minimum investment grade rating. Most corporate bonds issued by Indian companies are at best BBB- (barely investment grade)—these will not attract investments from international pension funds and will be priced disadvantageously.

The MDBs and national development banks have designed programmes to use their balance sheets to attract private investors by using various forms of credit enhancement¹⁶³. The idea is that a private sector loan is supplemented with development finance.

Development banks play two important and distinct roles: they mitigate risks, for instance, by taking the first losses, thus lowering the overall cost of capital. Second, their expertise in assessing the quality of projects offers a great deal of comfort to private investors less familiar with RE or EV. Blending of private and public finance leverages a far larger flow of capital than could be achieved by the concessional finance alone. Box 3 gives an example of credit enhancements in action.

161 ICMA is a membership organisation, headquartered in Switzerland, comprising private and public sector issuers, financial intermediaries, asset managers and other investors, capital market infrastructure providers, central banks, law firms and others worldwide. It focuses on a comprehensive range of regulatory and market practice issues which impact all aspects of international market functioning and prioritises four core areas – primary markets, secondary markets, repo and collateral markets, and the green and social bond markets.

162 For example, up to 10 ideas have been endorsed by the Climate Finance Lab run by the Climate Policy Initiative. These range from financing e-autorickshaws to piloting sustainable energy bonds. Please see details here: http://mofapp.nic.in:8080/economicsurvey/pdf/043-054_Chapter_03_ENGLISH_Vol_01_2017-18.pdf

163 Blended Finance Task Force, "Better Finance Better World", http://s3.amazonaws.com/aws-bsdc/BFT_BetterFinance_final_01192018.pdf#asset:614:url, Accessed on 15-1-2019

Box 3 Long-term credit-enhanced domestic green bond issuance of Renew Power (Partial Guarantee from IIFCL)

In September 2015, Renew Power Group issued a bond that was partially guaranteed by IIFCL, with backstop support from Asian Development Bank (ADB). ReNew Wind Energy's issuance was of INR 451 crore (USD 63.7 million) for refinancing its existing debt. The issuance had multiple maturities with the longest tenor bond of 17 years. The partial guarantee from IIFCL enhanced the bond's rating from BBB to AA+ (SO) and enabled full subscription of the issuance.

This issuance opened up infrastructure investment to bond finance. The long tenor was enabled by the partial guarantee, which increased its credit rating and made the issue attractive for risk-averse institutional investors. But it was difficult to sell and stayed on the books of the underwriter for longer than the usual 2-3 months for bond issuances. Anecdotal evidence suggests this happened due to the lack of understanding of the partial guarantee structure. In a subsequent deal in January 2018, the issuer offered a similar credit-enhanced bond. The size was INR 760 crore (USD 107 million) and a partial guarantee (first loss) worth INR 230 crore (USD 32.5 million) was jointly extended by IIFCL and IREDA. This was much easier to sell, indicating greater understanding of the credit enhancement. This is also a staggered redemption bond, with the final redemption being 17 years.

5.2.2 Pooling of different stage projects into a single green bond instrument

While bank debt is the commonest way to finance early-stage risks, green bonds have on occasion been used to fund the project construction stage, reducing the cost of finance. CLP Wind Farms (CLPWF), whose parent company has strong balance sheets, has developed an innovative financial structure that allowed low-cost capital to be deployed even during the project construction phase.¹⁶⁴

As its portfolio grew to 850 MW, CLPWF adopted a new corporate financing structure whereby the cash-flows and security of all its projects, whether operating or under construction, were pooled together and secured. Ratios, covenants and defaults were measured at the portfolio level rather than at a single project level. This structure is the first of its kind to be implemented in the Indian renewables sector. The corporate finance structure devised by CLPWF can be the ideal structure for financing wind projects.

The stability achieved by this structure secured CLPWF's bond an "AA" rating. CLPWF is one of the few wind platforms in India given such a high rating. It has resulted in some immediate benefits for the company. Due to the lowering of risks, the cost of debt for these projects declined between 100-200 basis points (bps).

CLPWF strategically issued bonds with short- to medium-term maturities, recognising the lower refinancing risk of these tenors in light of the falling interest rate scenario. Historically, CLPWF had to provide a corporate guarantee during the construction phase of new projects as lenders typically do not take new project risk. The presence of a corporate platform means that lenders to new projects have access to cash and security from the operating projects as well. No corporate guarantee is needed for financing new projects.

The pooling of assets can save cost and time incurred in individual evaluation for investors. This also provides lenders with an opportunity to refinance existing loan portfolios and recycle capital to create a fresh portfolio of green loans. As a financial tool for the aggregation of multiple small-scale loans, securitisation has the potential to be adopted as

¹⁶⁴ Interview of CFO of CLP India undertaken for the report

a vehicle for pooling low-carbon and climate-resilient assets into green investible deals. It also provides an opportunity to investors such as Overseas Private Investment Corporation (OPIC), Proparco, FMO (Dutch Development Bank), and others interested in investing large amount of capital (>USD10 million) in debt financing to energy enterprises.

5.3 Attracting international investors

The value of funds managed by large institutional investors is vast—around USD 83 trillion managed by the largest 400 institutional investors.¹⁶⁵ But only a fraction of this—around 1 per cent—is used to fund infrastructure, and most fund managers concentrate their investments within developed country markets.

But this is changing. Investors view sustainability becoming more important over time. In a recent survey of institutional investors, 74 per cent said sustainability would become increasingly important and 27 per cent said it already played a significant part in their investment decisions.¹⁶⁶ There is, therefore, a large potential market for green bonds.

International investors typically invest in ‘offshore’ (i.e. non-local currency) issuance from developing and emerging markets to avoid foreign exchange and currency risk. Only specialist international funds with higher risk profiles invest in local currency “masala” issuances. However, the cost of overseas finance depends on the credit worthiness of the issuer.

As explained already, MDBs play an important role in facilitating the issuance of green bonds by providing credit enhancement and technical assistance to improve issuers’ skills and capacity to assess green investments. Such volumes play a useful role in leveraging in the private sector at the early stage of the market development, but are not big enough to replace the private sector.

For credit-worthy issuers, international investors can provide large bonds with a low cost of finance. Export-Import Bank’s green bond for USD 500 million had a coupon of 2.75 per cent reflecting its short tenor of 5 years and its “quasi” government credit rating (Box 4).

A bond issued by ReNew Power also for a 5-year tenor had a coupon of 6 per cent. Indian issuers have to bear the expense of hedging the currency risks. As mentioned in chapter 3, this can add 3.5- 8.5 per cent to the cost of finance.¹⁶⁷ Indian companies such as EXIM Bank, SBI, IREDA, NTPC, REC & Axis Bank, PFC and IPPs such as Renew Power, Greenko and Azure Power have tapped the offshore market’s dedicated green capital successfully. Accounts of participation by dedicated green funds vary as in the case of Exim Bank about 0.8 of the 3.2-fold over-subscription came from dedicated green funds.

165 IPE (2017) Top 400 Asset Manager <https://www.ipe.com/Uploads/k/x/x/Top-400-Ranking.pdf>

166 Schroders Institutional Investor Survey 2018 - https://www.schroders.com/en/sysglobalassets/schroders_institutional_investor_study_sustainability_report_2018.pdf

167 Conversation with the issuer

Box 4 Pioneering issuance by EXIM Bank - India's first dollar-denominated green bond

In March 2015, the Exim Bank of India issued a five-year USD 500 million green bond: India's first dollar-denominated green bond. The Exim Bank will use the proceeds to fund eligible green projects in countries that include Bangladesh and Sri Lanka. The issue was rated BBB- by Standard & Poor's and Baa3 by Moody's.

The Exim Bank issue was oversubscribed 3.2 times from 140 accounts by attracting USD 1.6 billion in bids. Around 76 per cent of the participation came from institutional investors (including pension, insurance and sovereign wealth funds), and 20 per cent from banks. Geographically, 60 per cent of participation came from Asia, 30 per cent from Europe, the Middle East (West Asia) and Africa, and the remaining from offshore US investors.

To quote David Rasquinha, CMD Exim Bank, "When we went in for this issue, we were looking at investor diversification. We achieved that: we did get in a number of investors who do not normally invest in our bonds, and we're otherwise a pretty regular issuer. This came from both pure green funds and the green arms of not-so-green funds. So we did achieve investor diversification—that was not a problem. Our issue was about 3.2 times oversubscribed and perhaps about 0.8 of that was the green funds... without the green investors we would have been perhaps 2.4x. To that extent our ability to tighten the price would have been less."

5.4 Increasing domestic investment using green bonds

In developed markets, domestic investors are key to the functioning of a vibrant green bond market. If companies borrow domestically in local currencies (from outside of the banking system), it greatly enhances the size of the capital pool and also reduces currency-risk mitigation costs for the transaction. Domestic investors are also more aware of local nuances and understand risks better and can recycle domestic capital into local projects.

Domestic institutional investors in bonds often include pension funds and insurance companies. Depending on the nature and mix of current domestic investors, green bonds can provide an attractive proposition to them. The credit rating of an Indian bond issued internationally is usually limited by the Indian sovereign bonds' credit rating. Indian bond issuance is typically of much smaller size than international issuance reflecting the smaller pools of capital available.

5.4.1 The insurance sector

India's insurance industry consists of 53 insurance companies: 24 are licensed for life insurance business, and 29 for non-life insurers. The General Insurance Corporation of India (GIC Re) is the sole national re-insurer. The sector is regulated by the Insurance Regulatory and Development Authority (IRDA).

Current regulations permit life and non-life insurance companies to invest in debt securities rated AA and above. Our interaction with banks and NBFCs indicates that life and non-life insurance companies do invest in private sector bond issues and therefore, it might be easier for them to invest in RE bonds as long as their investments are in papers rated AA and above.

In terms of premium collected during April 2016 to March 2017, the life insurance industry recorded a new premium income of INR 4.18 lakh crore (USD 59.78 billion). The general insurance industry recorded new premium income for the year ending March 2017 at INR 1.28

lakh crore (USD 18.55 billion). As of 31st March 2017, the total invested corpus of the insurance industry was INR 30.77 lakh crore (USD 439.5 billion) and that of the life insurance industry INR 28.54 lakh crore (USD 407.8 billion)

At least 40 per cent of the funds of insurance companies need to be invested in Government Securities or state government related papers. Insurance companies are allowed to invest below AA, but it entails a complicated approval process. There is a cap of 15 per cent on the allocation and more often than not, this limit remains unutilised.

5.4.2 Retirement benefits industry

The industry consists of the Employees' Provident Fund (EPF), which is a mandatory retirement plan supervised and run by five portfolio managers for private employees, and the National Pension Scheme (NPS), a defined contribution pension for central government employees. The sector is regulated by the Pension Fund Regulatory and Development Authority (PFRDA). The most recent data on the EPF corpus for 2015 shows it holds INR 2.4 lakh crore (USD 34 billion)¹⁶⁸. Around 24 per cent of assets are held in bonds issued by either the corporate sector or public sector financial institutions. For the NPS, the most recent data is for October 2018¹⁶⁹ and the corpus is INR 2.7 lakh crore (USD 38 billion).

While previous regulation mandated a minimum AA rating for pensions funds, this has been lowered to an A rating (section 4.3.4). However, the actual scale of investment flows into A rated securities has been muted post the change in regulation, but it is too early to suggest that it will not pick up.

5.4.3 Mutual Funds

The Mutual Fund (MF) Industry has existed since 1963, but growth in Assets Under Management (AUM) occurred in the 1990s after private sector MFs were allowed in 1993. From AUM of INR 47,000 crore (USD 6.6 billion) in March 1993, these rose to INR 12.85 lakh crore (USD 181 billion) in March 2016. Of this, the AUM of debt funds is INR 7.88 lakh crore (USD 111 billion). Alongside this growth in AUM, there has been an expansion in the number of players and the range of products.

SEBI has introduced significant regulatory reforms over the last two decades to increase mutual fund penetration, adopt global best practices in governance and transparency, and also ensure investor protection.

Debt mutual funds constitute a significant share of industry AUM. Unlike life insurance companies and pension funds, MFs tend to invest in relatively short-dated and liquid paper in consonance with the nature of their business, which allows withdrawal of corpus at short notices.

5.4.4 Domestic funding sources

Having seen the various investors in the bond market, we can roughly analyse the volume of funds that is potentially brought into the markets. Assuming a 16 per cent compounded

168 EPFO, "Annual report" https://search.epfindia.gov.in/Annual_Reports/AR_2015-16.pdf, Accessed on 1-4-2019

169 Pension Funds Regulatory and Development Authority "Pension Bulletin Volume VII Issue X", <https://www.pfrda.org.in/myauth/admin/showimg.cshhtml?ID=1531>, Accessed on 1-4-2019

annual growth rate (CAGR) as projected by EY¹⁷⁰, the total corpus of retirement benefit funds in March 2017 was INR 18.73 lakh crore (USD 264 billion).

Investment Corpus	Banks	Insurance companies	Retirement benefits	Debt mutual fund schemes
INR trillion	108.79	30.77	18.73	7.88
USD billion	1554.14	439.57	267.57	112.57

Long-term domestic investors should play an important role in refinancing RE debt issued by banks. There are good structural reasons for wishing to see investment sourced domestically to help provide resources for future pensions as India's young population ages. But at present, long-term investors such as pension and insurance companies are not actually purchasing large volumes of longer tenor assets. Further steps, as previously discussed, will need to be undertaken in a concerted manner to extend a larger market for long-tenor bonds.

TABLE 3:

Investment corpus of various sources of funds

Sources:

For Banks - RBI,
Insurance Companies –
IRDS, Retirement Benefits
– PFRDA Debt Mutual
Funds – AMFI

5.5 Using green bonds for investment in renewables

Wind and solar PV investments typically have a useful life of 20 years or more. But most Indian bonds have relatively short tenors, the majority less than five years, because of limited investor demand for longer-dated paper. Power Finance Corporation and India Infrastructure Finance Corporation Limited have released 20- and 30-year bonds.¹⁷²

The bulk of long-tenor bonds were initially invested by the underwriters. Anecdotal evidence suggests that most were subsequently sold to the retirement benefits industry. The Employees' Provident Fund Organisation (EPFO) used to only invest in AAA rated bonds (it only decided in April 2017 to invest INR 3000 crore/ USD 540 Million in AA+ rated Bonds)¹⁷³. Consequently, the long-term bonds issued were mostly sold to private retirement trusts mentioned earlier, which control about 25 per cent of the retirement benefit corpus. The potential for such investments can still substantially increase.

The RE segment has particular significance for long-term bonds and a significant supply of capital-seeking long-term assets can be provided by the life insurance and retirement benefits industry. However, both retirement benefits and Insurance in India have had regulations that are necessarily risk-averse. Even with the amendment in regulations, the institutions would need time to build their risk assessment capacities.

A bond guarantee institution could make a decisive difference in enabling these two sectors to become long-term investors. CRISIL Infrastructure Advisory with India's Ministry of Finance and ADB has prepared the business plan for a bond guarantee fund for India.¹⁷⁴ A bond guarantee fund/ institution is likely to help a lot in establishing a long-term bond market for which operational and financial stability of the assets will be important ingredients. To achieve this, policy certainty and consistency, and sanctity of contracts will play a significant role.

170 Pensions business in India, <https://www.ey.com/Publication/vwLUAssets/EY-Pensions-business-in-India/%24FILE/EY-Pensions-business-in-India.pdf>

171 Association of Mutual Funds of India

172 Source: National Securities & Depository Limited (NSDL)

173 ET, "EPFO diverting investment from AAA to AA+ bonds", <http://economictimes.indiatimes.com/wealth/personal-finance-news/epfo-diverting-investment-from-aaa-to-aa-bonds/articleshow/60259490.cms>, Accessed on 1-4-2019

174 Yes, we need a dedicated bond guarantee fund for Indian infrastructure, <https://blogs.adb.org/blog/yes-we-need-dedicated-bond-guarantee-fund-indian-infrastructure>

Box 5 Bond guarantee fund institution for infrastructure: A pipeline creator of green bonds for non-banking institutions?

The guaranteed bond issuances of Renew Power and another similar one by Hindustan Power Projects demonstrate clearly that credit guarantees can make infrastructure projects appetising for risk-averse institutional investors, notably life Insurance companies and retirement benefit funds with an appetite for long term funds—thereby channelling India's large domestic savings for infrastructure. To bring more funds to the table, the establishment of an institution dedicated to credit-enhancing corporate bonds would be key.

There is a wide range of infrastructure financing initiatives in India. Besides the IIFCL and IREDA's credit enhancement scheme, recent years have seen infrastructure debt funds, infrastructure investment trusts, and a Reserve Bank of India (RBI) notification allowing all scheduled commercial banks to provide partial credit enhancements¹⁷⁵, which, to date, has not been used for any market issuances.

A bond guarantee fund owned by private institutions with minority state-ownership can be a significant catalyst. It would promote efficiency and reduce the cost of the bond guarantee fees currently charged by banks. As the market develops, the full guarantee could be replaced by a partial guarantee, which could be eventually eliminated as the market becomes familiar with longer-dated bonds.

Guarantees need to cover a greater proportion of the project risk to attract investors. IIFCL can guarantee a maximum 50 per cent of bond principal while specialised commercial banks can guarantee up to 20 per cent—but to achieve a rating of AA, which is needed to allow insurance and retirement benefits funds to make substantial sums available, most infrastructure projects require credit enhancement well above 20 per cent. In neither case, can they provide a full 100 per cent credit wrap necessary for a rating of AAA, a must-have for some institutional investors. It is envisaged that the entity's portfolio would be dominated by full-guarantee products in the initial years of operations to create market acceptability¹⁷⁶. Difficulty in communicating the partial guarantee has also been the complaint of merchant bankers.

5.6 Using green bonds for investment in electric mobility

Heavy investment is needed throughout the e-mobility industry if EV ambitions are to be realised. In addition to allowing the expansion and diversification of funding sources, green bonds are particularly suitable for projects with high upfront costs and long-dated income streams that characterise EV manufacturing and mobility services value chains. However, some segments of the EV ecosystem are more suited for green bond issuance in the short term than others, based on their creditworthiness and lower risks associated with their business models.

5.6.1 EV Segments suited for green bonds issuance

Auto-financing loans and OEMs looking to finance or refinance EV manufacturing loans represent two immediate segments suited for green bond issuance. Auto-financiers can free up their balance sheets through the green ABS route, by tapping the existing market for auto ABS in India. While cash flows pertaining to nascent EV manufacturing are more uncertain than those for auto loans, the general creditworthiness of large OEMs render these as suitable issuers of green bonds.

175 Partial Credit Enhancement (PCE) to Corporate Bonds, <https://www.rbi.org.in/Scripts/NotificationUser.aspx?id=10571&Mode=0>

176 Will India's proposed bond guarantee fund work? <https://www.livemint.com/Money/fmah4PN1Exp7e2MFUUQ6KN/Will-Indias-proposed-bond-guarantee-fund-work.html>

Green bonds could potentially finance EV uptake for both mobility services as well as private ownership. Under green ABS, cash flows backing the bonds can be from non-green assets¹⁷⁷. This means that auto-finance companies can leverage their existing internal combustion engine (ICE) vehicle loan portfolio to channel the flow of capital through green ABS to EVs. Further, packaging of ICE and EV vehicle loans can diversify the risks associated with the overall portfolio for the issuance of green ABS.

Globally, the largest green bonds raised towards EVs have been by captive auto-financing companies. In 2014, the automotive industry's first ABS green bond was issued by Toyota Financial Services, USA¹⁷⁸. Backed by income stream from existing leases, USD 5.3 billion has been raised till date to finance loans and conventional leasing of hybrids and electric vehicles^{179,180}. Similarly, Hyundai Capital Services, Korea that offers loans and leases for new Hyundai and Kia vehicles, issued a USD 500 million green bond in 2016 at a coupon rate of 2.87 per cent with a five-year tenor¹⁸¹. Access to low-cost finance can boost uptake of EVs by various mobility service providers who will be early and mass adopters of EV on account of lower total cost of ownership compared with ICE vehicles.

OEMs in India looking to raise capital or refinance their existing borrowings from banks or NBFCs can use green bonds for the same as demonstrated by issuances abroad. For instance, Zhejiang Geely Holding Group raised USD 400 million of green bonds at a coupon rate of 2.75 per cent for five years in May 2016. These funds were earmarked for financing or re-financing design, development, and production of zero-emission black cabs for London Taxi Company. It was oversubscribed close to six times^{182,183}. BAIC Motors issued green bonds worth USD 387.5 million in 2016, with 60 per cent of the proceeds earmarked for construction of facilities for manufacturing energy efficient cars and EVs, while the remaining 40 per cent would be directed towards working capital for R&D and manufacturing of hybrid and electric cars. It is worth noting here that BAIC Motors is a Chinese state-owned enterprise and thereby benefits from the sovereign guarantee unlike a typical OEM. In addition, Tesla and FDG Electric Vehicles are pure-play EV manufacturers who have issued bonds in the past, but these were not labelled as green bonds¹⁸⁴.

5.6.2 EV Segments potentially suitable for green bonds issuance in the future

Mobility service providers can issue green bonds towards raising capital to acquire fleets. Corporate fleet operators, aggregators, car rentals, and urban freight logistics in India have established business models and a transition to EVs can reduce operational expenses on account of lower total cost of ownership (TCO) for these assets. However, such entities are likely to be limited by smaller issue sizes and lack of creditworthy backers. Green ABS can potentially allow pooling of such assets to address credit rating and issue size. ALD SA is a French mobility service provider catering to large companies, SMEs, and individuals though

177 CBI, Bonds and Climate Change - The State of the Market 2018, 2018

178 TMCC, TMCC Green Bond Program, 2017

179 CBI, Bonds and Climate Change - The State of the Market 2018, 2018

180 Toyota Financial Services, Green Bond Program | Toyota Financial, 2017

181 CBI, Green Bond Market Report: Korea! Hyundai Inaugural \$500m for Hybrids & EVs, China! Bank of Qingdao RMB 4bn (\$615m), Sweden! Sveaskog SEK 1bn (\$116m) Forestry, US! Georgia Power \$325m, and Philippines! APRI Certified Green Bond \$500m w/ADB Guarantee, 2016

182 Ashish Gupta and Prerna Lidhoo, Green Bonds: The \$2 Trillion Opportunity, <https://www.fortuneindia.com/macro/the-2-trillion-opportunity/102150>, 2018

183 HSBC, "China - Raising the Bar in the Green Bond Market," 2016, <https://www.gbm.hsbc.com/solutions/sustainable-financing/q3-newsletter-2016/china-raising-green-bond-market>

184 CBI, Bonds and Climate Change - The State of the Market 2018.

vehicle leasing and fleet management. ALD SA issued USD 580 million for the financing and refinancing the purchase of low-carbon emission vehicles across 22 countries¹⁸⁵.

As the electric 2W space includes several start-ups, green convertible bonds are potentially most suited here as these projects are likely to be perceived as risky, and the flexibility offers additional incentive to investors. Convertible bonds are particularly suitable for start-ups with risky projects – in the event of the company's failure, the investor can recoup some principal whereas if the company is successful, they benefit from converting bonds into equity¹⁸⁶. Tesla has previously issued convertible bonds to raise USD 2 billion to build a battery factory¹⁸⁷.

Green bonds have also supported the expansion of charging infrastructure internationally—Fastned, a Dutch EV charging network provider issued a EUR 3.3 million bond in 2017 with a coupon rate of 6 per cent¹⁸⁸. TGOOD, the world's largest e-vehicle charging solution provider, issued green bonds specifically for an EV-charging station network. As business model viability for this segment is not clear at the moment and experimentation is underway, it may not be best suited to issue green bonds in the near term. The viability of business models pertaining to charging is contingent upon utilisation and therefore the actual number of EVs on road.

Green bonds, along with other instruments, can be immensely useful at the state level to drive the next stage of green transition in the RE and EV segments. States have a major role to play in delivering a green economy. Though states do not invest in generation assets by themselves, they facilitate the deployment of RE projects through investment in transmission assets, address land-related constraints and as offtakers of RE generation. In the EV sector, states can be instrumental in stimulating a market for new vehicles through their purchases of EVs for their own fleets and investments in strengthening local grids to enable the setting up of charging infrastructure.

185 CBI, ALD SA - Green Bond Fact Sheet - Climate Bonds Initiative, 2018

186 James Chen, Convertible Bond, Investopedia, 2018

187 Arash Massoudi, Tesla Raises \$2bn in Convertible Bond Sale Financial Times, Accessed on 20-12-2018

188 Business Green, "Fastned Launches Latest EV Charging Bond Issue", <http://www.businessgreen.com>, Accessed on 20-21-2108

6. Role of states in the issuance of green bonds

▶ Key takeaways from the chapter

- States can tap the green bond market, drive the next stage of green finance, help achieve scale to meet investment needs and contribute to meeting clean energy and climate targets.
- The readiness of states to issue green bonds depends broadly on three factors—a pipeline of projects constituting suitable end uses for the deployment of green bond proceeds, the viability of these end uses, and the general creditworthiness of the issuer (states themselves or state-level corporate entities).
- The capacity of states to absorb the proceeds of green bonds depends on the availability of suitable end uses in the form of planned investments in the RE and EV segments or potential investments in these segments.
- The presence and effectiveness of policy and regulatory measures in addressing key risks pertaining to the RE and EV segments is an important determinant of the viability of planned investments and of the likelihood of realising potential investments.
- States, being sub-sovereign entities, are highly creditworthy entities from the perspective of bond issuance. However, if state-level corporate entities are used as a vehicle for green bond issuance, there could be considerable variations in creditworthiness, depending on the assets or cash flows underlying the entity's operations and the availability of state guarantees for the obligations of the issuer.

Box 6 Preface to this chapter

This chapter presents an analysis of the opportunity for using green bonds for financing state governments' investments related to the RE and EV segments. These bonds may be raised as green state development loans (SDLs) at the sub-sovereign level or by state finance corporations/ state-level corporate entities. States, as sub-sovereign issuers, can potentially raise capital through green bonds at lower yields than state-level corporate entities. However, from a public debt management perspective, the issuance of green SDLs creates a distinct asset class, thereby affecting the fungibility of public debt. SDLs also cannot be issued in foreign markets.

Alternatively, state-level corporate entities as a vehicle for raising green bonds offer greater flexibility in potentially tapping international capital as these entities do not face the same

restrictions on international bond issuance. The INR 2,150 crore (USD 310 million) masala bond issuance by the Kerala Infrastructure Investment Fund Board (KIIFB) in the London and Singapore exchanges in April 2019 is an example of a bond issuance by a state-level corporate entity in international markets.¹⁸⁹ The yields realised by state-level corporate entities as issuers will be higher than those in case of issuance by state governments. In addition, many state-level corporate entities across India are known to suffer from poor governance and management practices – these would need to be addressed before bond issuance through such entities can be considered. States would need to evaluate these considerations in order to access the capital markets for green bond issuance.

The chapter presents a framework that captures the preparedness of states to issue green bonds for the RE and EV segments. The readiness of a state to issue green bonds is contingent upon the availability of a pipeline of projects and the commercial viability of these end uses (which determines the expected returns for investors). Besides the viability of the assets themselves, the general creditworthiness of the issuer is an additional factor that lowers risks for investors and increases the attractiveness of any potential issuance. The report specifies both the end uses for green bond issuance in the RE and EV segments as well as determinants of the capacity utilisation and thereby the commercial viability of these end uses. The extent to which states have been successful in mitigating risks for investors are major drivers of RE and EV investment, and thereby the capacity utilisation and viability of the supporting infrastructure set up by states. These have been specified in this chapter as determinants of 'Attractiveness of RE Ecosystem' and 'Attractiveness of EV Ecosystem'. These constitute areas which states can focus on to improve their readiness for green bond issuance.

From the perspective of the general creditworthiness of the issuer, the report does not differentiate between the creditworthiness of states as issuers (their issuances are characterised by an implicit sovereign guarantee). However, there could be considerable inter-state variations in creditworthiness of the issuer if state corporate entities are used for green bond issuance. Issuances through this route are not backed by a sovereign guarantee. The state-level corporate green bond issuer could be a new special purpose green financing corporation or dedicated green financing operations or 'green windows' set up at existing entities. Though the creditworthiness of such an entity would vary depending on its business prospects and could be enhanced by state guarantees, its initial creditworthiness is likely to be capped at the level of the state's standalone creditworthiness. Thus, inter-state disparities in the size of the economy, growth rates and debt management would be reflected in the creditworthiness of the respective state-backed corporate issuers. The report presents a minimum list of parameters (unweighted) that could determine the creditworthiness of the issuer. The state entities corresponding to states characterised by smaller economies, lower growth rates or poor debt management would be at a disadvantage in terms of creditworthiness. Appropriate mechanisms would need to be considered to enhance their creditworthiness.

As discussed in chapter 2, states play a major role in supporting RE and EV deployment by investing in supporting infrastructure. States can potentially use green bonds to finance their capital requirements for these end uses. These bonds may be raised as sub-sovereign issuances similar to state development loans (SDLs), bond instruments used for market borrowings by states.¹⁹⁰ Alternatively, these may be issued by state-level corporate entities. These state-level corporate green bond issuers could be special purpose green financing corporations or dedicated green financing operations or 'green windows' at existing entities.

The readiness of a state to issue green bonds is broadly contingent upon three factors—a pipeline of projects constituting suitable end uses for the deployment of green bond proceeds, the viability of these end uses, and the general creditworthiness of the issuer

189 Hindu Business Line, "KIIFB's masala bond issue sparks interest among other states", <https://www.thehindubusinessline.com/money-and-banking/kerala-entitys-masala-bond-issue-sparks-interest-among-other-states/article26767477.ece>, Accessed on 12-4-2019

190 RBI, "Government Securities Market in India – A Primer", <https://m.rbi.org.in/Scripts/FAQView.aspx?Id=79>, Accessed on 9-12-2018

(states themselves or state-level corporate entities as issuers). This section proposes a framework that can be used to assess the preparedness of states as potential green bond-issuers along these lines. The framework can also help states assess and improve their readiness as potential green bond issuers. It specifically assesses the readiness to issue green bonds for the RE and EV segments, which constitute the relevant end-use green segments considered in this report.

6.1 Availability of suitable end uses and their viability

This section examines the parameters to be considered for assessing the availability of a pipeline of projects and their viability, separately analysing the RE and EV segments.

6.1.1 Renewable energy

RE-related infrastructure developed by states include solar parks and dedicated green transmission infrastructure.¹⁹¹ Other eligible activities include loans to discoms to meet their Renewable Purchase Obligations (RPOs).¹⁹² States may finance these activities through green bonds either on a standalone basis, or aggregate them into a portfolio of appropriate size for bond financing. While states are also involved in financing DRE systems, these interventions have largely been in the form of state grants and have not been considered as potential end-uses for green bond proceeds in this report.

There are considerable differences between states in terms of the attractiveness of the ecosystem for project deployment as a result of differences in resource potential, discoms' creditworthiness, and regulatory frameworks and their enforcement. State attractiveness in these terms affects RE project deployment, and in turn, capacity utilisation and viability of the supporting infrastructure developed by states, to be potentially financed by green bonds. A more attractive RE ecosystem is also more conducive from the perspective of the realisation of potential end uses for green bond financing in the future.

State readiness framework for RE

A state's readiness for RE green bond issuance depends on the investment opportunity and the attractiveness of the RE ecosystem (Table 4). These parameters constitute the minimum set of parameters that must be evaluated. The framework does not assign weights to the parameters because of the qualitative nature of some inputs and subjectivity involved in assigning weights. However, the current readiness of the state to absorb green-bond proceeds (in terms of available end uses) and the attractiveness of the RE ecosystem are more important considerations than the scale of potential applications, as realisation of potential applications is far more uncertain.

191 Climate Bonds Initiative, "Climate Bonds Standard & Certification Scheme", https://www.climatebonds.net/files/files/Sector%20Criteria%20-%20Solar%20v2_1.pdf, Accessed on 30-11-2018

192 Rural Electrification Corporation, "Green Bond Framework", <https://www.recindia.nic.in/uploads/files/RECGreenBondFrameworkFinalRevafterRPO041017.pdf>, Accessed on 30-11-2018

Potential investment opportunity	Current state-readiness to deploy green-bond proceeds									
	Current investment opportunity					Attractiveness of RE ecosystem				
Untapped RE Potential (GW)	Green transmission infrastructure to be constructed (USD Mil)	Sanctioned solar park capacity under construction (MW)	Working capital loans for discoms		Resource Availability	Offtaker Risk	Transmission risk	Regulatory regime		
			Scale of RE consumption (million units)	Average payment delay (days)	RE Resource Potential (GW)	Utility grade ratings	Scheduling & forecasting regulation for RE implemented (Y/N)	Ease of doing business rank	RPO Target (%)	RPO Compliance

Sources/ Notes:

- 1 Untapped RE potential: Estimated as the difference between potential solar and wind power (at a hub height of 80m) deployment, sourced from NISE and NIWE respectively, and the present installed solar and wind capacity in a state.
- 2 Green transmission infrastructure: Data refers to the quantum of total investment needed to fund the intra-state portion of capacity in a state, sourced from Power Grid Corporation of India Limited. States will only fund a portion of this requirement as described in the following sections.
- 3 Solar park capacity under construction: As on 28-2-2018, from Lok Sabha Starred Question No 297 To Be Answered On 15-3-2018 on Solar Energy Parks
- 4 Scale of RE consumption & RPO compliance: The scale of present RE consumption refers to figures for the year 2015-16, calculated based on RPO compliance and electricity consumption figures for the years 2015-16, sourced from the MNRE's Agenda Note for National Review Meeting of State Principal Secretaries and State Nodal Agencies of Renewable Energy on 23rd and 24th January 2017.
- 5 Average payment delay: For the year 2016-17, based on CEEW analysis of annual reports of state discoms. These refer to aggregate payment delays for both RE and conventional sources of generation, as data for estimating delays specifically for RE generators was not available.
- 6 RE Resource potential: Based on estimates of installable solar and wind power by NISE and NIWE respectively.

TABLE 4:

State-readiness framework for green bond issuance for RE

Scale and scope of current end-uses for green-bond proceeds

Green transmission infrastructure

The Green Energy Corridor (GEC) project is geared towards strengthening the interstate and a portion of the intrastate transmission infrastructure. Whereas the interstate transmission infrastructure has been funded by the centre (30 per cent equity and 70 per cent soft loan), the intrastate transmission infrastructure has a substantial state component (20 per cent equity contribution from states, 40 per cent as soft loan, and 40 per cent as grant from the National Clean Energy Fund (NCEF)).¹⁹³ The same applies to the second phase of the GEC project.¹⁹⁴ The equity components of the state investments under the GEC and the investments allocated to soft loans from multilateral agencies could potentially be raised through the green bond route.

As of November 2018, the GEC remains the only project for dedicated transmission infrastructure for RE projects. Thus, the expected state-level investments in the GEC constitute the capacity of the state to absorb green-bond proceeds for the development of transmission infrastructure.

193 Press Information Bureau, "India to Receive Euro 1 billion Soft Loan for 'Green Energy Corridors' from Germany", <http://pib.nic.in/newsite/PrintRelease.aspx?relid=155455>, Accessed on 14-11-2018

194 Powergrid, "Report on Green Energy Corridor -II Part-A", <https://www.powergridindia.com/sites/default/files/footer/smartgrid/Green%20Energy%20Corridor%202-Part%20A.pdf>, Accessed on 14-11-2018

Solar parks

State nodal agencies have played a major role in solar park development, either by themselves or in joint venture with SECI or private sector entities. Sanctioned solar park capacity (rated capacity of solar park) under development (the share of development attributable to state entities) determines the capacity of the state to absorb green-bond proceeds for the development of solar parks.

Working capital loans for meeting RPO obligations

Payments by discoms to RE developers have been characterised by delays in the past, adversely impacting the viability of these projects.¹⁹⁵ State discoms have resorted to working capital loans in order to manage cash flow difficulties.¹⁹⁶ This has become essential for projects tendered out by central agencies (NTPC, SECI), since under the terms of the tripartite agreement between central governments, state governments and the RBI, central transfers to a state can be withheld in case of payment delays by the state discom signing the power sale agreement (PSA) with the tendering central agency.¹⁹⁷ Further, some PPAs corresponding to state-level RE tenders also contain penal provisions in case of payment delays by discoms.¹⁹⁸ Thus, working capital loans to discoms to meet RPO obligations could help avoid penalties under both state and central level RE projects.

The quantum of capital required for mitigating these payment delays depends on the average payment delay to RE developers and the scale of renewable electricity purchased by the discom. States with higher average payment delays and renewable power purchases would require greater quantum of credit. The scale of a state's renewable electricity purchased can be estimated by factoring in its RPO obligations (including the extent of compliance with RPOs, if available) in the total electricity purchased by the discom.

Scale of potential end uses for green-bond proceeds

Besides the readily available end uses for green-bond proceeds, states require additional capital to fund their future RE ambitions. While it is difficult to ascertain category-wise specific investment requirements, the higher the RE target (for states that have explicitly-stated RE capacity targets) or potential for a state, the greater the scale of potential investment opportunities in the form of future investments in solar parks, dedicated green transmission infrastructure and working capital requirements. In addition, there could be other commercially viable end uses for green-bond proceeds not currently factored into the framework. In order to gauge the scale of the potential future investment requirements for a state, the difference between its RE potential and current deployment (labelled as untapped RE potential in the framework) has been considered as a proxy measure. However, realisation of potential investment avenues could be limited by constraints such as availability of land and capital, and thus current end uses should be given greater emphasis in assessing a state's readiness for green bond issuance.

195 Business Standard, "Payment delays, lower tariffs hurt renewable energy sector: Mercom study", https://www.business-standard.com/article/economy-policy/payment-delays-lower-tariffs-hurt-renewable-energy-sector-mercom-study-117041100297_1.html, Accessed on 19-11-2018

196 Based on market intelligence

197 Manu Aggarwal, Arjun Dutt, State of the Indian Renewable Energy Sector (CEEW, 2018)

198 Based on an examination of model state PPAs in the public domains

Attractiveness of RE ecosystem

The attractiveness of a state for RE investment is based on expected risk-adjusted returns, which depend on resource availability and the extent to which the state has addressed investment risks for RE developers. Key among these risks are:¹⁹⁹

- Construction and regulatory risks – These refer to the risk pertaining to the acquisition of land and the relevant permits and clearances for the construction of RE projects.
- Offtaker risk – This pertains to the risk of delays, cancellation or non-compliance with the terms of PPAs (delays in payments or renegotiations of PPAs) by offtakers.
- Transmission and evacuation infrastructure risk – In the construction phase of the project, this refers to the risk of the non-availability of grid connectivity for the RE plant within a predictable time period. In the operational stage of the project, this refers to curtailment risk – the risk of the plant being unable to inject all the electricity generated into the grid as a result of instructions from transmission system operators to back down generation.
- Foreign exchange risk – This refers to the risk of the lowering of returns to foreign investors as a result of the depreciation of the Rupee.

While foreign exchange risk applies equally to investments across states, there is a considerable amount of differentiation across states in terms of the extent of mitigation of the other risks. Along with resource availability, these differentiate states in terms of their attractiveness for RE investments.

Resource availability

States characterised by superior solar and wind resource availability are more attractive propositions for investors as higher capacity utilisation factors (CUFs) of generation assets can be achieved. The potential installable solar and wind power in a state (as measured by the National Institute for Solar Energy (NISE) and the National Institute for Wind Energy (NIWE)) have been taken as proxies for the resource availability.

Construction and regulatory risks

Ease of doing business

The ease-of-doing-business ranking of a state, as captured by the Business Reform Action Plan 2017 rankings of states (developed by the Department of Industrial Policy and Promotion, Ministry of Commerce and the World Bank), includes the ease of availability of construction permits and land availability and allotment among its determinants.²⁰⁰ The ranking on this index has been taken as a proxy for measuring the ease of land acquisition and obtaining permits for RE projects.

RPO target and RPO compliance

States are characterised by considerable differences in the scale of their RPO targets. While the Ministry of Power (MoP) has recommended a long-term growth trajectory for state RPO targets up to FY 2021-22 (Table 5), few states have their existing RPO trajectories

199 For a detailed discussion of these risks, please refer to the following CEEW publication: Kanika Chawla, Money Talks? Risks and Responses in India's Solar Sector (CEEW, 2016)

200 Press Information Bureau, "Business Reform Action Plan 2017", <http://pib.nic.in/newsite/PrintRelease.aspx?relid=161017>, Accessed on 12-12-2018

in conformity with the MoP's recommendations.²⁰¹ States with higher RPO targets are characterised by a more favourable regime in context of certainty of offtake of RE power.

	2018-19	2019-20	2020-21	2021-22
Non-solar	10.25%	10.25%	10.25%	10.50%
Solar	6.75%	7.25%	8.75%	10.50%
Total	17%	17.50%	19%	21%

TABLE 5:

Long-term RPO trajectory

Source: Ministry of Power

While a state's RPO target is an important statement of intent, the extent of compliance with the target indicates how conducive its RE ecosystem is for investments. The extent of a state's compliance with its RPO targets is partly a function of the financial strength of the discom (considering that RE tariffs were considerably higher than thermal tariffs till the end of 2016). However, it also indicates the degree of regulatory enforcement in a state and presents RE developers with greater certainty of offtake.

Creditworthiness of discoms

Discom rating

Discoms across India vary widely in the strength of their finances. States whose discoms are in a superior financial position present lower offtaker risk. Given the same scale of payment delays for RE developers, states with more creditworthy discoms are also better candidates for working capital loans for meeting RPO obligations. The Ministry of Power's (MoP) Sixth Annual Integrated rating for state discoms on operational, financial and regulatory compliance parameters has been taken as a proxy for their creditworthiness.

Transmission and evacuation risk

Scheduling and forecasting regulation

The curtailment of RE generation affects the financial viability of projects and is a major deterrent for RE investors.²⁰² While the strengthening of transmission infrastructure is the long-term solution for mitigating the problem of curtailment, scheduling and forecasting of RE generation can help minimise curtailment in the short term.²⁰³ States that have implemented scheduling and forecasting regulations offer a superior environment from the perspective of minimising curtailment risk amid the rising penetration of renewables.

6.1.2 Electric vehicles

Scope of end-use activities

The state governments' involvement in the nascent EV ecosystem through investments in revenue-generating activities is limited to a few end-uses based on a review of state EV policies and announcements in media. These policy proclamations include acquisition of EVs by State Transport Undertakings (STUs) for public transport, deployment of public charging infrastructure and investments in setting up EV manufacturing clusters. Green bonds may be leveraged for these activities to augment financing. States have released tenders for both Outright Purchase Contracts and Gross Cost Contract (GCC). Under GCC, the

201 MNRE, "Agenda Note for National Review Meeting of State Principal Secretaries and State Nodal Agencies of Renewable Energy on 23rd and 24th January 2017-New Delhi", <https://solarrooftop.gov.in/notification/Notification-09012017.pdf>, Accessed on 14-12-2018

202 Anjali Viswamohanam, Manu Aggarwal, Curtailing Renewable Energy Curtailment (CEEW, 2018)

203 Manu Aggarwal, Arjun Dutt, State of the Indian Renewable Energy Sector (CEEW, 2018)

transport authority pays an operator on a per kilometre basis to provide bus services for a specified period. Under FAME II, subsidy for electric buses apply only to GCC contracts and therefore it is likely to be the preferred contracting structure for e-bus deployment. Funds raised by states through green bonds can be used for both outright purchase and GCC. In the case of the latter, the funds raised by the state can be deployed in the form of a loan to the operator to facilitate the acquisition of buses.

Attractiveness of EV ecosystem

The report presents a framework to compare the attractiveness of states to issue green bonds based on the feasibility of successfully implementing such end-use activities. The feasibility of realising these investments can be estimated through certain proxies, described below.

Technical feasibility study for electric buses

EVs, particularly buses, can have localised impacts on the grid i.e. sizing of supply capacity at a local distribution transformer will have to be planned for it to meet instantaneous loading by EVs²⁰⁴. DC fast charging in particular will require dedicated feeder lines. Grid infrastructure will have to be upgraded to accommodate the cumulative load from multiple buses charging at the same time at depots and the time of the day when charging takes place (if this coincides with peak load, it can impact the grid). Moreover, bus routes for e-buses will have to be identified to plan for the setting up of charging stations²⁰⁵. A technical feasibility study is an indicator of the measures being taken to address these issues.

EV targets and EVs on road

The utilisation and therefore the commercial viability of any public charging infrastructure set up by the states via PSUs or PPP with charging infrastructure operators will depend on the number of EVs within the state. Vehicles used for commercial purposes will be dependent on public charging unlike those used by private individuals, which cover 50-60 km a day and can be charged at residences. The current number of EVs on road and targeted penetration can be compared between states to determine which states are likely to see better utilisation of public charging infrastructure.

Private sector investments in manufacturing till date

The total investments announced by various OEMs towards setting up manufacturing infrastructure within a state can be used to gauge the viability of the EV manufacturing clusters that the state plans to invest in. It is not yet clear which activities within these manufacturing clusters the states will take over. However, state policies indicate this could range from mere provision of land to setting up flatted factories and testing facilities for OEMs. The viability of such investments will depend on the private sector interest and investment the state manages to attract from them. Such actual or announced investments till date serve as a metric for comparison.

It must be noted that most states are yet to demonstrate their ability to successfully implement adoption of e-buses, public charging infrastructure and manufacturing clusters for EVs. Thus, the framework presented here allows comparison of the 'potential' feasibility of states to absorb funds for EV activities. The framework does not assign weights to individual parameters but presents the essential list of parameters that must be evaluated.

204 Mohd. Sahil Ali and Rahul Tongia, Future and Prospects for the EV Ecosystem, (Brookings, 2018)

205 CSTEP, Implementation Plan for Electrification of Public Bus Transport in Bengaluru, 2018.

6.2 Framework for assessing issuers' general creditworthiness

States, being sub-sovereign entities, represent highly creditworthy entities from the perspective of bond issuance. The creditworthiness of a state may be considered as a composite of its standalone creditworthiness and the extent to which it is likely to receive support from the central government, in case of need. While there is no explicit sovereign guarantee on the market borrowings of states, the marginal difference in yields for bonds of the same tenor across states (with differing growth prospects and debt profiles) indicates an implicit sovereign guarantee factored in by the market on SDLs.²⁰⁶ This report assumes there is no difference among states in terms of their creditworthiness as potential green bond-issuers, since there is no evidence of variation in state-level credit risk perceptions.

If the SDL route is not the preferred option, states could consider creating special-purpose green-financing corporations for issuing green bonds. Alternatively, states could consider setting up dedicated green-financing operations or 'green windows' at existing state-level entities. Unlike states themselves as green bond issuers, there is no implicit guarantee on bond issuances of state-level corporate entities. The creditworthiness of such an entity would depend upon the assets or cash flows that underlie its operations and could be enhanced if the state were to guarantee the obligations pertaining to the issuance. In any case, the creditworthiness of such an entity at its inception would ordinarily not exceed the standalone creditworthiness of the corresponding state government.

If state entities are considered as the vehicle for the issuance of green bonds by states, there could be considerable inter-state variations in creditworthiness. Assuming the standalone creditworthiness as the cap for the creditworthiness of the state entity, metrics that measure states' standalone creditworthiness have been considered as proxies for the credit rating of corresponding state entities.

The following parameters have been considered to assess the standalone creditworthiness of states (Table 4)²⁰⁷.

6.2.1 Economic strength

State taxes constitute the major source of revenue receipts for states²⁰⁸, though they also receive a portion of central taxes and grants-in-aid. In states characterised by low per-capita Gross State Domestic Product (GSDP), central transfers could even constitute a larger share of revenue receipts than state taxes. While the quantum of central transfers is beyond the state's control, a stronger economy (coupled with greater tax compliance) translates into improved tax collections and greater ability to service debt.

The following parameters have been considered as proxies for a state's economic strength.

- GSDP per capita – This metric is an indicator of the standard of living of the state, including the ability to pay taxes.
- GSDP growth rate – A higher growth rate translates into more rapid growth in the state's tax collections (assuming unchanged compliance rates). While long-term future expected growth rate should be considered, in the absence of the availability of such

206 RBI, "State Government Yield Spreads – Do Fiscal Metrics Matter?", https://www.rbi.org.in/Scripts/MSM_Mintstreetmemos8.aspx, Accessed on 9-12-2018

207 Moody's Investor Service, Rating Methodology Regional and Local Governments, 2018

208 Aravind Gayam, Vatsal Khullar, State of State Finances (PRS, 2016)

forecasts, the average of five years' growth rate (FY 2014-15 to FY 2018-19) has been considered as a proxy.

6.2.2 Extent of indebtedness

The existing debt burden of a state has a bearing on its ability to take on additional debt. The state's debt and repayment burden can be expressed in terms of the following indicators, as also recommended by the Finance Commission for assessing state finances²⁰⁹:

- Debt as a percentage of GSDP – The overall debt expressed as a proportion of the GSDP represents the extent of burden of existing debt.
- Interest payment as a percentage of revenue receipts – This represents the burden of interest payment on state finances. The higher the ratio, the more the likelihood of the need to borrow to make interest payments. A five-year average (FY 2012-13 to FY 2016-17) has been considered in order to smooth out the effect of annual variations.
- Fiscal deficit as percentage of GSDP – Fiscal deficit refers to the difference between a government's total expenditure and revenue. The lower this figure, the lower is the need to resort to borrowings to finance state expenditure. Expressed as a fraction of GSDP, this metric indicates the extent of current discipline exhibited in state finances. A five-year average (FY 2012-13 to FY 2016-17) has been considered to smooth out the effect of annual variations.

Economic strength parameters		Debt management parameters		
		Overall debt burden		Current fiscal discipline
GSDP per capita	GSDP growth rate (per cent)	Debt (per cent of GSDP)	Interest payments (per cent of revenue receipts)	Fiscal deficit (per cent of GSDP)

TABLE 6:

State standalone creditworthiness framework

Source: GSDP per capita: Expected figure for FY 2018-19 at current prices, sourced from PRS Legislative Research.

GSDP growth rate: Average figure for FY 2014-15 to 2018-19, sourced from Ministry of Statistics & Program Implementation, Government of India

Debt management parameters: The figures for interest payments and fiscal deficit correspond to average for the period FY 2012-13 to 2016-17, whereas those for debt correspond to that for FY 2016-17, sourced from the reports of the Comptroller and Auditor General of India on state finances.

6.3 Assessing state readiness: a case study of Karnataka and Uttar Pradesh

This section exemplifies the application of the frameworks described in the preceding sections to assess the readiness of two states for issuing green bonds. In order to demonstrate how differences in the underlying parameters translate into differences in deployments in the RE and EV segments, one leading state (Karnataka) and one laggard state (Uttar Pradesh) in terms of both the RE and EV segments, have been considered.

Karnataka ranks second among states in terms of cumulative solar and wind installed capacity²¹⁰ and is one of the first movers in the EV space in terms of developing and implementing supportive policies. Uttar Pradesh ranks 10th in terms of solar capacity deployment and has limited wind installed capacity deployment.²¹¹ Karnataka is also first state in the country to announce an EV policy, leading the charge on e-mobility in India with the existing presence of EV manufacturers and service providers. In comparison, UP does not have a well-developed EV ecosystem.

1. State readiness for green bond issuance for RE

Potential investment opportunity	Current state readiness to deploy green bond proceeds									
	Current investment opportunity				Attractiveness of RE ecosystem					
Untapped RE potential (GW)	Green transmission infrastructure to be constructed (USD Mil)	Sanctioned solar park capacity under construction (MW)	Working capital loans for discoms		Resource Availability	Offtaker Risk	Transmission risk	Regulatory regime		
			Scale of RE consumption (Million units)	Average payment delay (days)	RE Resource Potential (GW)	Utility grade ratings	Scheduling & forecasting regulation for RE implemented (Y/N)	Ease of doing business rank	RPO Target for 2018-19 (per cent)	RPO Compliance (per cent)
28.7	149	1400 MW	10062	238	Solar – 24.7 GW, Wind – 13.6 GW	A, B+, B+, B, B	Y	8	13-19	126.5

Notes:

- Solar park capacity under construction refers to the unfinished portion of the Pavagada solar park, as on 28-2-2018. The solar park is being set up by a joint venture company of Karnataka Renewable Energy Development Limited (KREDL) and SECI with 50:50 equity participation.
- Karnataka has separate RPO targets for each discom, thus a range of RPO targets representing all discoms has been presented. The figures mentioned are applicable for FY 2018-19. The state has not notified the RPO trajectory till FY 2021-22.

Sources: Same as Table 4

TABLE 7:

Assessment of Karnataka's readiness for green bond issuance for RE

210 As of March 2018, sourced from Manu Aggarwal, Arjun Dutt, State of the Indian Renewable Energy Sector (CEEW, 2018)

211 Mercom, "India's Top 10 Solar States in Charts", <https://mercomindia.com/top-solar-states-charts/>, Accessed on 13-12-2018

Potential investment opportunity	Current state readiness to deploy green bond proceeds									
	Current investment opportunity				Attractiveness of RE ecosystem					
Untapped RE potential (GW)	Green transmission infrastructure to be constructed (USD Mil)	Sanctioned solar park capacity under construction (MW)	Working capital loans for discoms		Resource Availability	Offtaker Risk	Transmission risk	Regulatory regime		
			Scale of RE consumption (Million units)	Average payment delay (days)				RE Resource Potential (GW)	Utility grade ratings	Scheduling & forecasting regulation for RE implemented (Y/N)
23.5	0	445 MW	3201	217	Solar – 22.8 GW, Wind – 1.3 GW	B, C, C, C, C	N	12	6	43

Notes:

- Solar park capacity under construction refers to the unfinished portion of various solar parks, as on 28-2-2018. Solar parks in Uttar Pradesh are being set up by a joint venture company of Uttar Pradesh New & Renewable Development Agency (UPNEDA) and SECI with 50:50 equity participation.
- The RPO target figures mentioned are applicable for FY 2018-19. The state has not notified the RPO trajectory till FY 2021-22.

Sources: Same as Table 4

TABLE 8:

Assessment of Uttar Pradesh's readiness for green bond issuance for RE

The difference in RE deployment between Karnataka and Uttar Pradesh can be contextualised in terms of the relative attractiveness of their RE ecosystems (Tables 7 and 8). Karnataka is characterised by superior resource availability relative to Uttar Pradesh, particularly in terms of wind energy. Considerably lower offtaker and transmission risks as well as a more favourable regulatory regime adds to the attractiveness of Karnataka.

The superior utility-grade ratings of Karnataka's discoms translate into lower offtaker risk. The state's favourable regulatory regime, characterised by a high ease-of-doing-business rank, represents greater ease in acquiring land and construction permits for RE projects. Its latest RPO targets for are also far more ambitious than those of UP, complemented by a higher compliance rate. The notification of forecasting and scheduling regulations in the state can help lower curtailment risk for developers, which is particularly important as the penetration of RE sources in overall deployment increases. These regulations are in the draft stage in Uttar Pradesh (as of end-November 2018).

The larger scale of RE deployment in Karnataka vis-à-vis Uttar Pradesh is complemented by greater investments in supporting infrastructure – and a larger scale of potential end-uses for green bond proceeds. These include Karnataka's share of investments to strengthen the intra-state transmission infrastructure under the Green Energy Corridor – I project.²¹² It must be noted that the figure mentioned in table 7 refers to the overall investment required, with states expected to fund only a portion of this requirement. Uttar Pradesh does not have any intra-state components to fund under this project. Karnataka also has a greater capacity of sanctioned solar parks that are under construction. Lastly, Karnataka has a much larger quantum of renewable energy purchases. While both states experience similar average payment delays to generators, Karnataka requires more working capital to offset delays in payments to RE generators.

²¹² Investment that is still outstanding as of 31-12-2017 based on the report of the Standing Committee on Energy (2017-18) of the Sixteenth Lok Sabha and Powergrid Corporation's transmission plans for the Green Energy Corridor.

Apart from faring better than Uttar Pradesh on existing end uses for green bond proceeds, Karnataka is also characterized by significantly greater potential for more end-use activities eligible for financing through green bonds in the future. This is on account of Karnataka's greater untapped RE potential, and the higher likelihood of this potential being realised thanks to a superior environment for RE deployment.

The comparison between Karnataka and Uttar Pradesh indicates that Uttar Pradesh would benefit considerably as a potential green bond issuer by addressing state-specific risks for RE investments and thereby improving the attractiveness of its RE ecosystem.

2. State readiness for green bond issuance for electric transport

State	Technical Feasibility Study for Electric Buses	EV Targets (as stated in State EV Policy)	Number of EVs on Road ²¹³	Private Sector Investments in EV manufacturing value chain till date
Karnataka	In place	<ol style="list-style-type: none"> 100 per cent electrification by 2030 for the following segments - Auto Rickshaw, Cab Aggregators, Corporate Fleets, and School Buses/Vans 1000 EV buses for public transport Public sector procurement: 4W – 100, 3W – 500, e-bus – 40 	15229 ²¹⁴	INR 1000 crore by Mahindra and Mahindra Ltd. ²¹⁵
Uttar Pradesh	Not in place	<ol style="list-style-type: none"> 1000 EV buses for public transport 100 per cent electrification aimed for autos, cabs, school buses and vans in five cities 	28924 ²¹⁶	NA

TABLE 9:

Assessment of state readiness of Karnataka and Uttar Pradesh for green bond issuance for EVs

A detailed feasibility and implementation study for the deployment of e-buses in Bangalore has been carried by CSTEP, in consultation with various stakeholders including the electric utility and STU. As Bangalore Metropolitan Transport Corporation (BMTCL) is one of the STUs listed in the Karnataka State Electric Vehicle and Storage Policy, 2017, this planning indicates the state's ability to deploy e-buses once acquired. Uttar Pradesh is yet to carry out such an assessment.

While both states mention similar targets for electrification in their EV policies, Karnataka has additional plans to acquire 640 EVs, to be operated by its STU.²¹⁷ While targets may not necessarily translate to actual EVs on road, it is the only available predictor for determining adequate utilisation of any public charging infrastructure by the state. However, when it comes to current number of EVs on road, Uttar Pradesh fares better than Karnataka.

Finally, Mahindra and Mahindra Ltd has announced a total investment of INR 1000 crore (USD 141 million) to build an EV development and manufacturing facility in Karnataka. This is aligned with Karnataka's intention to attract investments to the tune of INR 31,000 crore (USD 4.4 billion) and inviting OEMs to set up manufacturing in the EV cluster being developed by the state. Uttar Pradesh is yet to see large-scale investments towards EV manufacturing while the state has similar ambitions of establishing EV manufacturing hubs.

213 The total number reported here includes both EVs and hybrid vehicles as reported on the FAME dashboard.

214 FAME Dashboard, <https://www.fame-india.gov.in/dashboard.aspx>, Accessed on 22-05-2019

215 The Economic Times, "Mahindra to invest ₹1000 crore by 2020 for electric vehicles", 2018, <https://www.livemint.com/Auto/PJHB7NmScJOr7alSHaeR9L/Mahindra-Electric-to-invest-Rs1000-crore-by-2020-for-EVs.html>, Accessed on 20-12-2018

216 FAME Dashboard, <https://www.fame-india.gov.in/dashboard.aspx>, Accessed on 22-05-2019

217 Inc42, "Electric Vehicles This Week: Karnataka Govt. To Procure 640 EVs Under FAME India", <https://inc42.com/buzz/electric-vehicles-evs-karnataka/>, Accessed on 20-12-2018

Overall, it appears that for the three state-level end-use activities of the EV value chain, Karnataka is better placed to issue green bonds than UP. This is primarily based on the favourable indicators for feasibility of Karnataka's EV ambitions translating into realistic EV end-uses. In order to improve upon its readiness for green bond issuance for EVs, Uttar Pradesh would need to address these lacunae in its EV ecosystem.

3. Creditworthiness

Economic strength parameters		Debt management parameters		
		Overall debt burden		Current fiscal discipline
GSDP per capita (INR)	GSDP growth rate (%)	Debt as % of GSDP	Interest payments as % of revenue receipts	Fiscal deficit as % of GSDP
193409	9.0	19.81	9.42	2.15

Note: Figures for GSDP growth rate, interest payments as per cent of revenue receipts and fiscal deficit as per cent of GDP represent the average for five years (2014-15 to 2018-19 for GSDP growth rate and 2012-13 to 2016-17 for interest payments and fiscal deficit) in order to smooth out the impact of annual variations.

Sources: Same as Table 6

Economic strength parameters		Debt management parameters		
		Overall debt burden		Current fiscal discipline
GSDP per capita (INR)	GSDP growth rate (%)	Debt as % of GSDP	Interest payments as % of revenue receipts	Fiscal deficit as % of GSDP
58626	6.7	32.03	10.33	3.54

Note: Figures for GSDP growth rate, interest payments as per cent of revenue receipts and fiscal deficit as per cent of GDP represent the average for five years (2014-15 to 2018-19 for GSDP growth rate and 2012-13 to 2016-17 for interest payments and fiscal deficit) in order to smooth out the impact of annual variations.

Sources: Same as Table 6

In terms of the economic strength parameters, Karnataka is in a better position vis-à-vis Uttar Pradesh, as demonstrated by its superior GSDP per capita and GSDP growth rate figures (Tables 10 and 11). Karnataka is also characterised by a lower debt burden in terms of debt and interest payment metrics and higher fiscal discipline. Therefore, Karnataka demonstrates superior standalone creditworthiness than Uttar Pradesh. Thus, a state guarantee for boosting the credit rating of the green bond issuance of a state-level corporate entity would be more impactful in the case of Karnataka than in the case of Uttar Pradesh.

After assessing the opportunity for green bonds in scaling up investments in the RE and EV sectors, it is also important to understand how this can be operationalised. The following section presents a step-by-step guide to issuers for raising capital through the green bond route.

TABLE 10:

Assessment of standalone creditworthiness of the state of Karnataka

TABLE 11:

Assessment of standalone creditworthiness of the state of Uttar Pradesh

6.4 Green bond issuance process: A toolkit for states

The issuance of a green bond is designed to be a simple add-on to the normal bond issuance process. The table below shows two columns:

Column A describes the regular bond issuance process that is generally kicked off when the issuer decides to get rated and ends with the monitoring of the bond's performance in the secondary market;

Column B shows the simple supplementary steps that the issuer should undertake in order to add the green layer to the bond.

Issuing a regular bond (A)	Issuing a green bond – additional steps (B)
Pre-issuance <ul style="list-style-type: none"> • Get rated • Get market intelligence on currency, tenor, size • Decide on underwriters • Register with local regulator • Issue prospectus • Comfort letter / due diligence • Outreach through road shows and sales 	Pre-issuance <ul style="list-style-type: none"> • Define a green bond Framework • Define how project meets green bond eligibility criteria (Use of Proceeds) • Put in place project selection process and select eligible projects (Selection of Projects and Assets) • Set up accounts and process to earmark and allocate proceeds – ring fence the proceeds (Management of Proceeds) • Establish Reporting processes • Get pre-issuance external review (External Review)
Launch the bond into the market	
Post-issuance <ul style="list-style-type: none"> • Price and allocate bond to support secondary market performance • Communication to the capital market • Monitor secondary market 	Post-issuance <ul style="list-style-type: none"> • Allocate proceeds to the projects • Monitor the projects • Publish impact report • Post-issuance audit if necessary

TABLE 12:

Comparison of conventional and green bond issuance process

Source: Climate Bonds Initiative

The table also shows how the regular bond issuance process (A) and the green bond issuance process (B) can take place concurrently. Both are described in terms of the internal procedures the issuer should set up before and after the launch of the bond in the market, which correspond to the **Pre-issuance** and to the **Post-issuance** phases respectively.

The processes of a green bond issuance do not significantly vary with either the nature of the issuer (for instance corporate, sovereign or semi-sovereign) or the bond type (use of proceeds bond, project bond or sovereign bond). These processes are now widely understood by investors and the market.

Step 1: Preparation of a green bond framework

A green bond framework is a document that discusses how the issuer's processes meet commonly-accepted green bond eligibility criteria. These comprise the processes that are implemented at Pre-Issuance (use of proceeds, selection of projects and assets, management of proceeds, external review) and those implemented in the Post-Issuance (Post-Issuance audit and reporting) stage.

An issuer's green bond framework is a public document and is considered the centrepiece of the issuance process. While there is no uniform prescribed way to write it, the framework reflects the four pillars of the green bond principles, which are also fully integrated in the Climate Bonds Standard.²¹⁸ There are typically four sections of a green bond framework.

Preparation: The issuer of a green bond should establish, document and maintain an internal decision-making process that it will use to determine the eligibility of the underlying projects and assets (*Use of Proceeds, Selection of Projects and Assets, Management of Proceeds, Reporting*). This begins with a statement regarding environmental objectives of the green bond, reflected in the "Introduction" or "Overview" section of the framework document.

This is a very important aspect of the issuance process as it provides issuers the opportunity to directly explain to investors why and how green bonds fit within their long-term vision or corporate strategy. For instance, the Government of Nigeria issued a green bond in December 2017²¹⁹ that was ultimately certified under the Climate Bonds Standard. The Government used the issuance of the bond to signal to the market its use of green bonds as a tool to fund their emissions reductions targets under the Paris Agreement.²²⁰

Use of proceeds: The main additional requirement for a green bond²²¹ compared to a vanilla bond is that the proceeds are allocated to "green" projects and assets. It is therefore crucial that the issuer clearly identifies the categories of "green" that are considered eligible for inclusion in the bond.

These categories are linked to the nature of the projects and assets that the issuer wants to finance/re-finance and are generally aligned with taxonomies like the Green Bond Principles or the Climate Bonds Taxonomy. The former describes broad categories of "Green" such as Energy Efficiency, Renewable Energy, Sewage Management Systems, and Air Pollution, whereas the latter tends to use more specific terms such as, Solar Energy, Low-Carbon Buildings (Residential/Commercial) and Off-Shore Wind and Water. A notable point of difference between taxonomies is the treatment of clean coal (included in the National Development and Reform Commission's green catalogue for China). In India, regulation by SEBI has not specified whether clean coal is included or excluded.

Selection of projects and assets: This section in the document describes the issuer's internal governance mechanism for selecting projects and assets. For instance, most issuers set up a selection committee comprising senior staff from relevant departments (such as finance, engineering and corporate social responsibility (CSR)) which will screen the underlying projects and assets according to the criteria disclosed in the Use of Proceeds section. This committee will recommend projects and assets to the Board of Directors for final approval.

A sovereign issuer would similarly describe its governance process. Relevant projects and assets could be screened by a joint committee comprising representatives of its finance and environment ministries (or equivalent) and then sent to the legislature for final approval, if required.

While each issuer might have a different way of selecting underlying projects and assets, it is critical that this selection process should be as transparent as possible in order to provide

218 See details at <https://www.climatebonds.net/standard/about>

219 Green bond issuance by Nigeria can be seen as an example here: Read more at <https://www.climatebonds.net/certification/federal-government-nigeria>

220 Read more at <https://www.climatebonds.net/certification/federal-government-nigeria>

221 A Vanilla Bond is the standard version of a bond that lacks any exotic features.

investors with comfort that the internal processes within the issuer are robust²²². Once the underlying projects and assets have been selected, they are referred to as ‘Nominated Projects and Assets.’

Management of proceeds: This step refers to the mechanisms that the issuer needs to establish in order to manage and track the use of proceeds. Generally, there are two ways to manage the proceeds:

Earmarking: The proceeds enter the balance sheet of the issuer and are set aside for future allocation to the nominated projects and assets. This is common practice among issuers of green bonds (including sovereign issuers) and is widely used to finance future capital investment or to refinance long-term projects.

Ring-fencing: This occurs when the issuer decides to separate the proceeds from its business-as-usual operations. For instance, ring-fencing could happen when a public utility company managing wind farms decides to financially separate the proceeds from green bond issuance from the parent company in order to allow investors to have a direct link to a specific asset (the wind farms) while also enjoying the full credit support of a parent company’s balance sheet.

While establishing the processes for the management of proceeds, the issuer also needs to decide how it will manage unallocated proceeds. Typically, any balance of proceeds that have not been allocated to Nominated Projects and Assets should be held in temporary cash investments, short-term deposits and other short-term liquidity instruments (for instance, short-term notes with a tenor of less than two years).

Moreover, it is a market best practice for the issuer to clarify that the proceeds would not be used to fund carbon-intensive projects while they remain unallocated. Finally, proceeds should not remain unallocated for longer than 24 months.

Reporting: The reporting process is essential for investors because it creates a direct link between their investment and the environmental performance of the Nominated Projects and Assets. For this purpose, the issuer should report to investors, at least annually, but some issuers might opt for biannual or even quarterly reporting. Reporting covers the following aspects:

On-going eligibility of projects and assets: the issuer should report any material changes²²³ that have occurred to the Nominated Projects and Assets since issuance and whether those changes have affected eligibility. In case the eligibility has been compromised, the issuer should report whether the proceeds have been re-allocated to new eligible assets.

Balance of unallocated proceeds: the issuer should report the total balance of unallocated proceeds and how they are being held in accordance with the processes set up in the Management of Proceeds. Typically, this will also include a confirmation that the unallocated proceeds are not being used to fund carbon-intensive projects.

Key Performance Indicators (KPIs): they refer to qualitative and quantitative environmental performance metrics of the Nominated Projects and Assets. For instance, these indicators could be the number of annual tonnes of abated CO₂, generated electricity

222 For example, investors have started to scrutinise backgrounds of the selection committee members to assess the robustness of the selection process. Investors typically expect that the committee includes members with science or engineering qualifications—who can apply a scientific approach to the selection process.

223 Material changes are generally referred to as substantial changes that have affected the eligibility of the Nominated Projects and Assets. For instance, if a Green Building is purchased and the new landlord decides to alter some of the characteristics of the building such as level of insulation, removal of solar panels and so on, then the building may no longer meet the green eligibility criteria established by the issuer.

in terms of kilowatt hours, kilometres of transmission lines installed or number of hectares of restored forest land. KPIs are generally determined at pre-issuance stage, and their data is monitored and presented, post-issuance.

As a minimum requirement, these reports should be made available to the bond's investors but, most issuers decide to go a step further and publish them on their websites as a way to enhance the transparency of their green bond issuance. While reports are published post-issuance, the reporting process is established at the pre-issuance stage.

Step 2: External review

This refers to independent assessment by an external auditor (reviewer) of the green credentials of a bond. Such external reviews fall under one of the following two categories:

Second-party opinion: these are independent, research-based assessments on the likely climate performance of green bond's projects and assets. The methodology is generally designed by the opinion provider. Second-Party opinions are issued at the Pre-Issuance stage and can vary quite a lot depending on the methodology used by the opinion provider.

Assurance: This is an independent third-party audit undertaken in accordance with standards set by an independent standard setter (like Climate Bonds Initiative) which the auditor uses to assess a bond's eligibility. Assurance opinions provide an assessment of both the green credentials of the bond against the standard as well as of the internal procedures established by the issuer.

External reviewers are engaged while or soon after the issuer has set up a green bond framework and their reviews are made public before the road show, to help promote the bond's green credentials during the road show. It is now common practice for the independent review to accompany a bond's prospectus when it is sent to potential investors.

Step 3: Post-issuance audit

In order to provide an extra layer of comfort to investors, issuers might decide to re-engage an external reviewer at the post-issuance stage. This kind of audit can refer to:

Post-issuance reviews: the reviewer undertakes an assessment to provide investors with extra assurance that the proceeds are being allocated correctly to the nominated projects and assets. While this is voluntary in the Second-Party Opinion model, it is mandatory under the Climate Bonds Standard and Certification Scheme.²²⁴

Report audit: the issuer might decide to engage a reviewer in order to assess their investor reports periodically (usually on an annual basis). The practice allows issuers to provide investors with the confidence that the KPI performance is robust.

224 Climate Bonds Standard 3.0 https://www.climatebonds.net/files/files/Climate%20Bonds_Standard_Version%203_0_December%202017.pdf

7. Unlocking the full potential of green bonds

▶ Key takeaways from the chapter

- A national investment strategy for transition to low-carbon and climate-resilient development will be critical and it should systematically lay down the building blocks for scaling up green finance.
- Performance standards and thresholds are required to be spelt out as part of a green taxonomy to strengthen the current SEBI guidelines on disclosure of green bonds issuances. This will help bring about the much-needed standardisation and comparability of data to boost market integrity and streamline the flow of capital.
- Awareness about financial and non-financial benefits of green bonds needs to be substantively enhanced amongst issuers, investors, and policy makers. This would require collaborative efforts among government bodies at central and state levels, industry associations and expert institutions.
- Both anecdotal and empirical evidence have started to give the first indication that green bonds hold value during fluctuating market conditions and certification may even bear positively on their pricing and accrue incremental cost savings.
- Reducing the cost of capital remains a daunting challenge. Strengthening and optimising the use of credit-enhancement structures, catalytic mechanisms such as blended financing, and securitisation will be key to broadening the scope of green bonds in India.
- Tools like green tagging will help create visibility for green projects on books of financial institutions and government budgets, build pipelines to attract green investors.
- Dedicated green funds will be a key instrument in unlocking the domestic green bonds market, but will need a combination of policy signals and market intervention to create a business case.
- A slew of recommendations have been proposed by a host of agencies, including existing and potential issuers, but remain short of active consideration by the government. These need urgent examination to make the enabling environment for green issuances more conducive.
- States could drive the next stage of clean energy and electric transport financing and accelerate the inflow and deployment of green capital. This could be informed by a robust green bond framework (elaborated in this report) that can facilitate compliance with regulatory requirements for green bond issuance as well as streamline repeat issuances.

The Indian RE sector has made extensive use of green bonds since 2015. The ambitious RE and climate targets, the highly competitive solar tariffs, the breadth of the issuer base show that there is a need for the volume of finance the bond market provides to reach the installed capacity of 175 GW by 2022 from 75 GW currently.

So far green bonds have been used to refinance large deals (greater than USD 100 million in offshore issuance and USD 50 million in onshore issuance) by issuers that have strong credit ratings. To broaden the use of green bonds for investment in small RE and EVs, they have to be used in conjunction with project finance and catalytic mechanisms like blending (combining public/philanthropic money to crowd-in private capital).

In order for green bonds to make a significantly enhanced contribution to the clean energy transition, several challenges will need to be addressed. Some of these are discussed in detail in this section.

Many interactions with stakeholders actively engaged with green finance, including existing and potential issuers themselves, point that the following bottlenecks need resolution for the market to progress to the next stage.

The lack of common definition and disclosures based on a green taxonomy prevents standardisation in the market. Similarly, inability to identify green assets on loan books of financial institutions hinder their refinancing via green bonds and other green financial instruments. The lack of awareness of financial and non-financial benefits among issuers, investors, and policy makers at the same time further complicates the situation. Market hurdles that inflate the cost of finance, such as low credit-ratings of bonds remain to be tackled in a concerted manner. There is insufficient supply and utilisation of credit enhancement and a lack of widespread use of catalytic instruments such as blended finance and securitisation that help reduce the cost of finance.

While innovative market interventions are necessary and will continue to emerge, the scale and breadth of financing required for the clean energy transition will need the central and state governments to play a larger role. This calls for a clear national investment strategy aligned with low carbon and climate resilient growth and for states to drive green bonds issuances themselves.

Tiding over these bottlenecks may even contribute positively to the bond market as a whole through greater transparency, new liquidity and possibly, by building a new class of green investors in the medium to long term. Therefore, a well-planned combination of supply and demand side measures is required.

7.1 Defining “green”

Market participants, both within India and outside, have consistently raised concerns over the lack of clarity about what constitutes green. This is a common complaint arising from the laissez-faire evolution of green bonds, often with regulators encouraging issuers to experiment. Clear definitions help in identifying, deploying, measuring, attracting and tracking capital according to standardised, comparable norms—important for issuers, investors and policy makers and regulators alike.

Security and Exchange Board of India’s “Disclosure Requirements for Issuance and Listing of Green Debt Securities” in May 2017²²⁵ sought to regularise issuances. This was a necessary

225 https://www.sebi.gov.in/legal/circulars/may-2017/disclosure-requirements-for-issuance-and-listing-of-green-debt-securities_34988.html

and progressive step, but insufficient to drive the market in the absence of other enabling measures. SEBI's guidelines provide a list of green asset categories. These are:

1. Renewable and sustainable energy including wind, solar, bioenergy, other sources of energy which use clean technology, etc.
2. Clean transportation including mass/public transportation, etc.
3. Sustainable water management including clean and/or drinking water, water recycling, etc.
4. Climate-change adaptation
5. Energy efficiency including efficient and green buildings, etc.
6. Sustainable waste management including recycling, waste-to-energy, efficient disposal of wastage, etc.
7. Sustainable land use including sustainable forestry and agriculture, afforestation, etc.
8. Biodiversity conservation

The guidelines also provide details about the process that issuers must follow to issue a green bond. The guidelines ask for specified disclosures including environmental objective, decision-making process to decide project eligibility, procedures for tracking fund allocation, and annual monitoring of spending of funds.

The guidelines are largely in line with international standards - the International Capital Markets Association's Green Bond Principles and the Climate Bonds Initiative's taxonomy. The guidelines also require issuers to disclose any international standard they follow to determine green assets. However, the SEBI's guidelines need to be strengthened with thresholds and performance standards to assess the assets underlying a bond—for e.g., how energy efficient a building would need to be to qualify, or what 'other sources of energy which use clean technology' in the green category list mean.

Growth of green bonds markets across the globe suggests that a detailed set of standards, which establishes thresholds for attainment of targets set out in the Paris Agreement, like the Climate Bonds Initiative taxonomy, serves a useful function. It assesses the greenness of the projects and assets in a comparable way, helps bridge the gap between the information expected by investors and that provided by the issuers, provide a comparable tracking of mobilisation and deployment of green finance, and helps the issuing entity locate itself and progress further on its decarbonisation pathway.

Disclosures based on such a taxonomy need to be adequately granular in terms of data on carbon emissions. This would help make markets transparent and credible and serve the important policy need for an aggregated view of the flow of climate investment directed towards emissions reduction in line with the Paris targets.

The next crucial step in India's green finance journey is to develop such a taxonomy, studying and adapting the best in use globally. This is important not only to attract international investors into India which seek adherence to internationally recognised green bonds standards/norms, but also to start crafting a science-backed benchmark for green investment at home. The National Action Plan on Climate Change lays out the approach for GHG mitigation and adaptation through its eight missions.²²⁶ The SEBI categories for green bonds issuances and the work undertaken under the eight national missions can together form the substratum for which definitions and thresholds could be set.

226 Please refer for details <http://www.moef.nic.in/downloads/home/Pg01-52.pdf>

While having an Environmental, Social and Governance strategy is not an essential requirement for the issuing entities, investors and issuers do cite this as an added positive factor. More recently, investors in Europe have started to take this up seriously as an indicator of the overall brown-to-green strategy of the issuing organisation. This is an important development and may become a required precursor to propel the brown-to-green transition of the Indian economy.

7.2 Green-tagging assets to build bankable pipelines

The lack of credible project pipelines is a clear and present bottleneck to scaling up. It thus needs no emphasis that increasing the visibility of assets that lend to green/sustainability criteria (specific parameters) will help attract investors. That is true across all sectors.

One way to increase the visibility is to develop green tagging tools for different sectors to identify assets and their climate impact. It can prove to be an effective supply-side measure to match future demand.

Green tagging refers to a systematic process where banks identify the environmental attributes of their loans and underlying asset collateral as a tool for scaling up sustainable finance. The green tagging of bank assets allows for easier access to green bond markets, better tracking of green loan performance and provides greater transparency of climate risks and portfolio resilience.²²⁷ Each loan is tagged to the underlying asset's energy performance, fuel efficiency, or existing environmental standards.

In Europe, where green tagging has been used for financing energy efficiency and green buildings with considerable success, awareness among and adoption by banks is accelerating. The key drivers of this acceleration were indicated in the findings of a 2017 survey²²⁸ of 10 banks.

First, the fact that non-green buildings in many countries in Europe will cease to be legally rentable in the future, increasing business risk for both – bank clients and bank lender, was a major driver for banks to identify the green assets on their loan books.

Second, banks are sufficiently convinced about the financial case for green tagging to adopt it even in the absence of long-term year-on-year data on green performance. Banks have been positive that improvement in availability of data on energy efficiency and green buildings over time will help them assess the quality of their lending and investment decisions.

Third, climate-related and sustainability disclosures are becoming more quantitative and in spite of the variability in green definitions, banks find that energy efficiency and reduction in GHG emissions are material parameters for risk management and revenue growth. It is noteworthy that banks that perceive green tagging is linked to increased revenues are more advanced in their internal systems for green tagging than those which perceive it to be a tool for risk management alone.

Fourth, green tagging enables financial innovation in lending and debt capital markets and in securitisation. It provides valuable information on energy efficiency loan portfolios,

227 Definition quoted from UNEP Financial Inquiry website, See <http://unepinquiry.org/inquirynews/page/2/>

228 Green Tagging: Mobilising Bank Finance for Energy Efficiency in Real Estate, Report from the Bank Working Group, https://hypo.org/app/uploads/sites/2/2018/03/Green_Tagging_Mobilising_Bank_Finance_for_Energy_Efficiency_in_Real_Estate_3222151.pdf

which can be packaged as ABS and refinanced by green bonds. Besides, it helps measure the performance of such loans as opposed to normal loans, giving a truer picture of environmental exposure on banks' balance sheets.

Green tagging tools can be developed for RE and EV segments as well. Governments at the central and state levels can also tag green allocations in their budget outlays and embed green tagging in the design of state investment plans for climate-change mitigation and adaptation.²²⁹ Market players, research institutions and government agencies will need to collaborate for data and criteria development, and for wide adoption of these tools.

7.3 Improving awareness about the benefits of green bonds

Lack of awareness about the benefits and opportunities offered by green bonds is a considerable bottleneck in mainstreaming this market. Awareness generation and the associated capacity-building within institutions is an ongoing task and cannot be effectively delivered by private or non-government institutions alone. Governments at the central and state levels need to partner in these efforts to maximise reach and impact.

Therefore, it is important to understand and clearly communicate the benefits of green bonds. These can be typically classified for issuers, investors and, at the broader systemic level, for the market and policy objectives.

7.3.1 Benefits for issuers

Green bonds diversify the investors' pool

Government-backed Indian issuers attracted between 14 to 24 per cent new investors (dedicated green funds) that invested only because the bond was green (Climate Bonds Initiative analysis). This diversification spreads the risk and unlocks the capital that vanilla issuers do not have access to. The long-term benefit in stabilising and expanding the base of investors pertains to their issuances getting fully subscribed at an attractive rate, particularly when the market conditions deteriorate or the issuers' borrowing capacity is restricted. In case the bond is certified green, it becomes more visible to investors as its publicity is enhanced on the listings. Reputational benefits also accrue as the certified green label demonstrates issuers' long-term strategic vision.

Certification and labelling benefits outweigh their costs

There are two types of costs involved with certification--internal and external. Internal costs are incurred by the issuer when they establish the required internal processes and controls to meet the requirements of certification. There may also be costs associated with tracking the performance of the projects and assets tied to the climate/green bond. A certification fee is equivalent to 1/10th of a basis point of the bond principal. For example, on a USD 500 million bond, the certification fee is USD 5,000. Certification fees contribute to funding the development of the Climate Bonds Standard and the operation of the certification scheme. This is paid only once and immediately after issuance of the bond.

229 Neha Kumar, Prashant Vaze, Sean Kidney, "Moving From Growth to Development: Financing Green Investment in India" in "Financing Green Transition" edited by Samir Saran, ORF, January 2019, <https://www.orfonline.org/research/moving-from-growth-to-development-financing-green-investment-in-india-49420/>

External costs include engagement of the verifier for pre-issuance and post-issuance assurance procedures and reports and, possibly, periodic assurance as well. The cost is based on commercial negotiations between issuers and verifiers. The cost of engaging a verifier depends on the variety of assets included in the portfolio. Costs can be as low as USD 7,000-10,000 for pure solar assets and up to USD 40,000-45,000 for portfolios of assets under several technical criteria. In India, these have been on the lower side mainly because the majority of assets have not yet involved multiple criteria.

Issuers tend to underestimate the benefits of certification owing to the costs involved. They consider them to be non-financial benefits as pricing advantages of green bonds are not explicit. For companies whose businesses are partially green (for example, a bank which has lent to solar and wind as well as coal-fired power producers) that have issued labelled and certified green bonds, differentiation and visibility in the market and diversification of their investor pool have been the main arguments for certification. For benchmark issuances, these costs are relatively easily justified and absorbed, especially when they achieve economies of scale for repeat issuers. For smaller issuers though, certification may not offer an unambiguous business case yet. Indubitably, labelling and certification open up the green route more visibly, and also enable tracking and tagging of the assets—important for developing this market further, but from an issuer's point of view, these concerns remain secondary.

A 2018 report by the National Bureau of Economic Research (NBER - US) notably suggests cost savings on certified green bonds issued by US municipalities. The sample size of five Climate Bonds Initiative certified bonds out of the 137 bonds analysed is small but the findings reveal a certain causality. The median total issue size, corresponding to the 22-bond issue by San Francisco Public Utilities in December 2016 analysed in the report, is USD 259 million. The report indicates a reduction of 10 basis points per year, implying a savings of USD 259,000 per year. It suggests that even a small causality consisting of a single basis point would still save the municipality USD 25,900 per year. This has a nontrivial present value. In the context of a larger issuer, which brings numerous bonds to market every year, CBI certification may offer a potentially meaningful cost reduction, according to the report.²³⁰

Green bonds issuance improves the communication between sustainability and finance teams, positively impacts governance

Green bonds issuance has been seen to initiate a more strategic conversation on environment and financial opportunities and options available beyond sustainability teams. As the issuance is a decision made at the top of the hierarchy of an organisation, a more comprehensive examination of environmental standards and impacts, CSR strategies, and prevalent good practices has begun to take place. Green bond issuance does not make having an environmental, social and governance (ESG) strategy for the organisation a precondition, but issuers tend to avail the opportunity for publicising such initiatives for enhanced market differentiation and investors' comfort.

It has been argued for long that good corporate governance can be taken as a proxy for better risk management of sustainability impacts by organisations. Evidence is now emerging that green bonds may actually be enabling organisations to improve their governance as they evaluate and upgrade their systems for a long-term commitment. More comprehensive risk management as part of governance structures and processes is definitely a factor for retaining investors' appetite from a credit-spread perspective. Even though research is

230 Malcom Baker et al, "Financing the Response to Climate Change: The Pricing and Ownership of US Green Bonds," NBER Working Paper No. 25194 accessed at <https://www.nber.org/papers/w25194>

constrained by the short history of green bond markets, initial analysis of European markets suggests that in the case of utilities, green bonds may indeed be resulting in better and responsible governance to manage and cover their exposure to carbon risks.²³¹

Preliminary analysis indicates green bonds achieve better pricing than vanilla equivalents.

Green Bonds are normally over-subscribed. The report for the first half of 2018 by Climate Bonds Initiative suggests that over-subscription, which is now an established feature of green bonds, was 2.3x for EUR and 3.4x for USD-denominated green bonds; and the spread compression was 8 basis points (bps) as against 7 bps for vanilla in EUR and 18bps as against 14 bps for USD-denominated green bonds. It clearly indicates that green bonds during this period fared better than their vanilla equivalents, even if by a narrow margin.²³²

Additionally, performance in the immediate secondary market has shown that 62 per cent of green bonds were traded at lower yields than comparable bonds seven days after pricing and 90 per cent had traded at lower yields than their comparable index. After 28 days, this changed to 59 per cent for comparable bonds and 66 per cent for comparable index.²³³

Pricing benefits are starting to be seen even if in a limited manner. The short history and limited sample size of green bonds constrains the analysis at present. However, the NBER's empirical analysis of 2102 municipal and corporate green bonds issued in the US empirically establishes that green municipal bonds are issued at a premium to otherwise similar ordinary bonds. It also confirms that green bonds, particularly small or essentially riskless ones, are more closely held than ordinary bonds, and that these pricing and ownership effects are strongest for bonds that are externally certified as green.²³⁴ The report finds a slightly lower yield of 6 basis points (0.06 per cent) for self-identified green bonds, and up to 20 basis points (0.2 per cent) for certified green bonds. Notably, it states, "CBI-certified green bonds have yields that are 26 basis points lower than ordinary bonds with similar characteristics and timing. In the context of low-risk municipal bonds issued in a historically low interest-rate environment, this is a sizeable difference. The calculation suggests that 26 basis points is equivalent to the reduction in yield that comes from climbing more than two ratings notches".²³⁵ This lends credence to the anecdotal reports that Climate Bonds Initiative gets from treasuries.

Green bonds issuances are sometimes smaller than vanilla equivalents and have often resulted in greater demand, which may also affect the pricing. Pricing trends in the H1 2018 report of Climate Bonds Initiative show that among the benchmark issuances (USD 500 million and above) analysed, two out of the pool of 17 green bonds priced on their curve and the rest exhibited new issue premia, a normal feature for new issuances in the bond market.²³⁶ A total of 180 green bonds have been analysed since 2016 by Climate Bonds Initiative.

These trends are encouraging. As the market grows, there will be more data to track the behaviour of green bonds, which is expected to change according to the economic backdrop, as it would for all bonds.

231 https://www.environmental-finance.com/content/news/governance-quality-could-drive-green-bond-outperformance-says-nomura.html?utm_source=211218na&utm_medium=email&utm_campaign=alert

232 Green Bond Pricing in the Primary Market, CBI, Page 8 For details and methodology, please refer to https://www.climatebonds.net/files/reports/cbi_pricing_h1_2018_011.pdf

233 Green Bond Pricing in the Primary Market, CBI, page 10

234 Malcom Baker et al, op cit

235 Ibid, p 18

236 Green Bond Pricing in the Primary Market, CBI, page 6.

7.3.2 Benefits for investors

Green bonds hold value during fluctuating market conditions

The performance of green bond indices is a good indicator of the value these bonds hold for investors, especially during volatile economic conditions, compared with their vanilla equivalents. A recent report by Nomura Asset Management indicates a positive correlation. Released in December 2018, the report compares the performance of the Bloomberg Barclays Morgan Stanley Capital International (MSCI) Global Green Bond index with the Bloomberg Barclays Global Aggregate bond index, and the Bloomberg Barclays MSCI Euro Green Bond index with the Bloomberg Barclays Euro Aggregate bond index.²³⁷ It finds that green bonds indexes have consistently outperformed non-green bonds indexes since mid-2016.

Climate Bonds Initiative has found similar results. During 2018, green bonds appear to have offered better value than vanilla equivalents. While green bonds are popular in the primary markets, analysis of the yield curves offered no evidence of a 'greenium' (higher price that an investor is ready to pay owing to high demand). However, green bonds demonstrated better secondary market performance when compared with vanilla equivalents and corresponding indices.²³⁸

Additional information captured by green bonds is an added value

Investors find the additional information on the impact of their funds and the use of proceeds is an added value in itself.²³⁹ As green bonds have the same financial characteristics as 'vanilla' bonds plus enhanced information, investors can capture this surplus information--even if not its full value--without additional transaction costs. Also, certification helps reduce transaction costs for investors, who use this measure as a pre-due diligence mechanism.

7.3.3 Systemic benefits

Green bonds enable more comprehensive risk identification, including climate considerations, in context of capital flows. Further, as the issuance process involves closer interaction between issuers and investors, green bonds potentially help strengthen awareness of and capacities for sustainability in the financial sector itself. Green bonds also enhance visibility of opportunities in the low-carbon transition market, thereby helping allocate capital effectively.

For such opportunities to materialise, however, measures that would help reduce risks and the cost of debt will be critical. This effort calls for well-defined national and subnational climate investment strategies with clear institutional ownership. In the absence of a broader economic and industrial policy rethink, bottom-up market-led approaches will only result in limited gains.

237 https://www.environmental-finance.com/content/news/governance-quality-could-drive-green-bond-outperformance-says-nomura.html?utm_source=211218na&utm_medium=email&utm_campaign=alert

238 Green Bond Pricing in the Primary Market, CBI, page 10.

239 Beyond transparency: Unlocking the full potential of Green Bonds, Climate Works, page 26

7.4 Enhancing the financial benefits of green bonds

Driving down the cost of capital and thereby enhancing the financial benefits remains a challenge to green bonds' market development. Some of the ways to do so are described below.

7.4.1 Growing green investment pools

India has no dedicated domestic pool of green capital. India's domestic savings (29 per cent of GDP)²⁴⁰ is predominantly (nearly three-fourth) locked up in physical assets. Of the household financial saving, more than half is in the form of short-term bank deposits that do not match the investment criteria for RE projects, which are typically perceived to be high-risk, have large upfront capital costs and need long-tenor debt.

One way of channeling these savings and providing cheaper capital is the creation of dedicated green funds²⁴¹, which can be adapted from successful examples abroad.²⁴² Creation of such funds has been in the works, but none has materialised yet. A green fund with a mission to expand clean energy can bundle small projects together to increase scale and reduce transaction costs, making them more attractive to private lenders. This would be an important policy and institutional intervention that would generate demand in the domestic market and channelise the vast reserves in the pension and insurance funds into RE and DRE projects as discussed earlier in the report.

7.4.2 Growing green securitisation to drive down the cost of capital

Enabling small-scale projects to access the green bond markets is a commercial opportunity, which would fit with the economy's needs and stimulate the expansion of the green bond market itself. It will help pool individual risks, mitigate the aggregate risk and further decrease the cost of capital. From the project developer perspective, it is the opportunity to access a source of low-cost capital that makes pursuing a bond issuance attractive.

One of the ways to do so is securitisation (as discussed in Box 2). "Green" securitisation implies that the cash flows backing it come from low-carbon assets. RE, DRE and EV fit this categorisation. The introduction of a tax reprieve for unlisted debt securities and new rules in favour of foreign investment into the sector have given a fillip to securitisation in India. This avenue of market borrowing in light of banks' aversion to lend to MSMEs, can make finance more accessible to such small borrowers, especially from NBFCs that would be able to shift loans off their balance sheets and unlock funds for lending to small businesses. This would effectively direct capital flows to smaller, disaggregated assets by harnessing the steadily growing (35 per cent per year) NBFC lending to the MSME sector.

240 Chapter 3, Investment and Saving Slowdown, Economic Survey 2017-2018, http://mofapp.nic.in:8080/economicsurvey/pdf/043-054_Chapter_03_ENGLISH_Vol_01_2017-18.pdf

241 A green fund is an investment vehicle that will only invest in companies that directly promote environmental responsibility. A green fund can come in the form of a focused investment vehicle for companies engaged in environmentally supportive businesses, such as alternative energy, green transport, water and waste management, and sustainable living.

242 CEEW & NRDC, Clean Energy for All Framework for Catalytic Finance for Underserved Clean Energy Markets in India, 2018

7.4.3 Strengthening credit enhancement channels such as blended finance

Credit enhancements in the form of partial or full guarantees and liquidity facilities can support standalone credit ratings and make green bonds attractive to long-term investors such as insurance companies, provident funds and pension funds. There is a clear need to systematically use such domestic credit-enhancement structures to power issuances in the RE, DRE and EV sectors.

India's green bonds pay coupon rates in the ranges of 2.75-6 per cent for a USD-denominated issuance, and 7.38 -10.75 per cent for an INR-denominated issuance, depending upon whether the issuer is a government or private sector entity.²⁴³ The INR corporate bond is at a disadvantage because of competition from government sector bonds which offer high interest rates, as well as the high costs of issuing in INR due to a volatile and depreciating currency that is expensive to hedge. The poor liquidity of the bond market due to low trading volumes worsens the landscape for corporate bond issuance.

Blended finance is an approach to combine concessional funds from public or philanthropic sources with funds on commercial terms from the private sector. Here, public finance provides a sizeable tranche subordinated²⁴⁴ to private finance, thereby reducing costs for the latter and increasing the volume of lending. Such instruments can improve credit rating of the bond, making it attractive to risk-averse investors. One such successful example in India is that of US-India Clean Energy Finance (USICEF) which deploy funds sourced from leading foundations and India's Ministry of New and Renewable Energy (MNRE), to eligible distributed solar power projects for long-term financing from the Overseas Private Investment Corporation (OPIC). USICEF's support lays the foundation for project developers in distributed solar power to catalyse access to much-needed private capital to scale up their businesses.²⁴⁵ This blending of private and public finance leverages far larger flows of capital than could be achieved by concessional finance alone. A recent report on blended finance reviews different models for using concessional finance to reduce the private sector's exposure to risks. Table 13 is a schematic representation of these models.

Instruments	Risk									
	Macro		Credit/Commercial			Technical		Finance	Infra Specific	
	Political/ country risk	Currency risk	Credit risk	Liquidity risk	Demand risk	Corruption risk	Operation risk	Access to capital	Lack of pipeline	Off- shore risk
1. Guarantees										
2. Insurance										
3. Hedging										
4. Junior/ subordinated cap										
5. Securitization										
6. Contractual mechanism										
7. Results-based incentives										
8. Grants										

TABLE 13:

Schematic representation of blended finance models

Source: Better Finance Better World: Consultation Paper of the Blended Finance Taskforce²⁴⁶

²⁴³ Bonds and Climate Change, State of the Market 2017, India Update

²⁴⁴ Debt owed to an unsecured creditor (in this case public finance) that in the event of a liquidation can only be paid after the claims of secured creditors (private commercial funds) have been met

²⁴⁵ A list of awardees of the grant support provided by the USICEF can be found here: https://www.usicef.org/wp-content/uploads/2018/10/USICEF_-Awardees.pdf

²⁴⁶ Accessed here: p 11 https://www.usicef.org/wp-content/uploads/2018/10/USICEF_-Awardees.pdf

In addition, creation of a Bond Guarantee Fund (Box 5) with private institutions as the majority owners and states as minority partners can be a significant catalyst for more issuances. This would promote efficiency and reduce the bond guarantee fees currently charged by banks. As the market develops, the full guarantee could be replaced by a partial guarantee, which could be eventually eliminated as the market becomes familiar with longer-dated bonds.

7.5 Re-examining existing recommendations and carving institutional ownership

The past five years have seen several incentives and recommendations tabled for deepening and widening the green bonds and green finance markets in India.²⁴⁷ These include:

- Establishment of a national level exchange-risk liquidity facility with a special focus on infrastructure, including green infrastructure
- Consolidation of credit-enhancement facilities offered by donors and introduction of exclusive arrangements for green bonds.
- Exploring access to funding from the UNFCCC's Green Climate Fund for developing exchange-risk guarantees for international credit enhancement
- Categorisation of bank investments in green bonds as permissible Priority-Sector assets
- Allowing hold-to-maturity classification for investment for tenors less than seven years, as well for bank investments in green bonds
- Lowering the risk-weightage for investments into green bonds to help popularise these bonds, and extension of cash reserve ratio (CRR)/ statutory liquidity ratio (SLR) benefits to investments into green bonds
- Obtaining debt through government issuances and selectively-guaranteed issuances to lower the cost of debt for renewable energy developers
- **Green as part of the fiduciary duty of investors:** Developing the foundation for institutional adoption of climate agenda and incorporating environmental risk as part of best practice, regulations and disclosure. Bringing domestic asset managers, pension schemes and insurance investment arms into the ESG fold will create scale and direction. That will give a further fillip to international investors as local scale becomes evident and price signals are embedded.
- **Exemption from withholding tax for green bonds:** The withholding tax on external commercial borrowings (ECBs) is currently set at five per cent. There has been a consistent demand to exempt green bonds to reduce their over-all cost of borrowing. A preferential withholding tax rate has previously been given to long-term infrastructure investments, setting a precedent for the use of this fiscal incentive. In addition, the removal of 40 per cent ceiling on re-financing through ECB for green bonds would support market expansion.
- **Continuation of regulatory ease for masala bonds:** Large issuers have been tapping this route for green issuance. Within a week of RBI shifting out masala bonds from the Foreign Portfolio Investment category at the end of 2017, RE issuers such as IREDA came

²⁴⁷ UNEP FI India Report, Delivering a Sustainable Financial System, 2015, IUKFP report "Building a Green Finance Market in India (2017)", consultations with members of Indian Green Bonds Council (a joint platform created by the Federation of the Indian Chambers of Commerce and Industry and Climate Bonds Initiative in 2016) to name a few.

to the market with a certified green masala bond, indicating that large, high-rated issuers have an appetite to go this route. This should continue.

- **Engaging International Solar Alliance (ISA):** ISA can provide support for commercial viability of solar projects by matching institutional demand and supply. ISA can develop projects with implementing partners and infrastructure funding institutions such as the New Development Bank and the Asian Infrastructure Investment Bank.
- **Develop and mandate ESG disclosures for the financial sector:** The National Voluntary Guidelines on Responsible Financing, developed through an extensive consultation process among public and private sectors banks and NBFCs under the aegis of the Indian Banks' Association (IBA) in 2015, can provide the basis to formulate detailed ESG disclosure criteria based on the guidelines for comprehensive risk management as well as investment. These principles are enshrined in the guidelines already.²⁴⁸

One of the main reasons why these recommendations have not seen adequate policy action is the lack of clear ownership of the climate investment agenda within the Indian government. While India has been proactive in its climate policy, the government is yet to take an economy-wide view of climate risks, assess sector-specific bottlenecks and adopt appropriate interventions and climate investment strategies.

The RBI had announced its plans to come up with a green finance strategy in 2015. It is, however, yet to publish even a draft. Market participants, including IBA, the apex association of banks, had effectively put a halt on their collective effort in anticipation of an RBI directive. The central bank has been rather slow to integrate the issue of climate risk with financial stability and climate-linked investment as a source of additional finance.

A national investment strategy aligned with low-carbon pathways for India's economic growth is needed—to recognise the preparedness levels across sectors and determine the right mix of capital instruments to be deployed. Such a strategy should be used to minimise the mounting hidden costs of growth—mispricing of climate risks and externalities; to introduce standards and definitional criteria for green finance; to coordinate regulatory action and to proactively empower the states for realigning capital raising plans in sync with climate and Sustainable Development Goals (SDG) targets.²⁴⁹ Such a strategy must also recognise, debate and elaborate upon desirable and necessary fiscal and non-fiscal incentives structures for sectors that need support. This report argues for a concerted effort in this direction and for the Indian government to take a more coordinated approach and provide an explicit policy direction for scaling up low-carbon and climate resilient investments.

7.6 States as green bond issuers

This report argues that the next frontier in scaling up of financial flows into RE and EV will necessitate action by the states themselves as green bond issuers. In order to improve their readiness for issuing green bonds, states should focus on addressing their indebtedness and risks pertaining to RE and EV investments. In addition, instituting credible measures that lower risks for RE and EV investors would enable the scaling up of investments in these sectors, translating into greater utilisation and viability of supporting infrastructure deployed by states and financed through green bonds. Finally, the setting up of a robust green bond framework would facilitate compliance with regulatory requirements for green bond issuance and would streamline repeat issuances.

²⁴⁸ National Voluntary Guidelines for Responsible Financing, Indian Banks' Association https://www.iba.org.in/reports/national-voluntary-guidelines-for-responsible-financing_290.html

²⁴⁹ Neha Kumar, Prashant Vaze, Sean Kidney, "From Growth to Development: Financing Green Investment in India" in *Financing Green Transitions*, edited by Samir Saran, January 2019

8. Annexures

8.1 Agencies in India offering corporate credit rating services

	Credit rating agency	Remarks
1	Credit Rating and Information Services of India (CRISIL)	Linked to S&P
2	ICRA Limited	Linked to Moody's Investor Services
3	India Ratings & Research	Linked to Fitch Ratings
4	CARE Ratings	
5	Acuite Ratings & Research	Earlier known as SMERA, which focused on SME Ratings
6	Brickworks Ratings	
7	Infometrics Ratings	

TABLE 14:

Agencies in India offering corporate credit rating services

Source: Authors' analysis

8.2 Credit ratings of RE Bonds issued by Indian entities

	Issuer	Credit rating	Credit rating agency	Date of issuance
1	CLP Wind Farms India	Ind AA (Stable)	India Ratings & Research	September 2015
2	Hero Solar Energy Pvt. Ltd	[ICRA]A(Stable)	ICRA Ltd	February 2016
5	GREENCO	B+	S&P, Fitch Ratings	August 2016
3	ReNew Power	A+	CARE Ratings	November 2016
4	IREDA	Baa3	Moody's Investor Services	September 2017

TABLE 15:

Credit ratings of RE bonds issued by Indian entities

Source: Authors' analysis







COUNCIL ON ENERGY, ENVIRONMENT AND WATER (CEEW)

Sanskrit Bhawan, A-10, Aruna Asaf Ali Marg
Qutab Institutional Area
New Delhi 110 067, India
T: +91 11 4073 3373

info@ceew.in | ceew.in | [@CEEWIndia](https://www.instagram.com/CEEWIndia)