INTERIM REPORT

GREENING INDIA'S FINANCIAL MARKET: HOW GREEN BONDS CAN DRIVE CLEAN ENERGY DEPLOYMENT

EXECUTIVE SUMMARY

India is at a critical juncture in scaling renewable energy to provide energy access to its growing cities and vast rural communities. Financing remains the principal barrier to the rapid expansion of India's clean energy market needed to meet the ambitious national target of 175 gigawatts (GW) of solar, wind and other renewable energy by 2022. The right policy settings and incentive structures must be adopted to enable renewable energy investment to scale up to needed levels in India. Innovative financial mechanisms and institutions such as green bonds and green banks, respectively, which have proved successful on the state level and internationally, can help propel India's solar and wind energy markets and support critical energy-saving efficiency and climate resilience projects.

A green bond is a fixed-income financial instrument for raising capital through the debt market, like traditional corporate bonds. The key difference is that green bonds raise funds for projects with environmental benefits, such as renewable energy, low carbon transport or climate adaptation.

To achieve India's clean energy and climate goals, new innovative financial instruments (such as green bonds) that tap into international resources to leverage a wider investor base (such as pension funds, sovereign wealth funds and insurance companies) need to scale up. Our analysis finds that strategies that help strengthen and expand the market for green bonds in India from this nascent stage should aim to achieve these three objectives:

1) Reduce the cost of capital further,
2) Stimulate demand from institutional and retail investors, and
3) Expand and diversify the issuers base.

Encouraging the development of a robust financing ecosystem that leverages inputs from stakeholders across sectors can help achieve these strategies. As this report lays out, the following recommended roles for government agencies, domestic financiers, industry stakeholders and clean energy experts can support green bonds scaling up in India.

IREDA, National Clean Environment Fund, and Ministry of New & Renewable Energy, in collaboration with credit rating agencies and regulators:

- Facilitate market development for currency risk hedging products, such as 10-year or longer options and contracts, at competitive prices. Availability of hedging products can help lower the cost of capital for the issuer and make Indian green bonds more attractive internationally. Alternatively, development finance institutions (DFIs) like the Export-Import Bank of India (Exim) that hold high credit ratings and need long-term funds based in U.S. dollars can be approached to enter into a currency swap that would be mutually beneficial.
- Coordinate efforts to determine whether (a) to a adopt an international certification standard for green bonds such as the Climate Bond Standard, (b) to adapt international standards for India, or (c) develop a new India-specific standard, in order to verify the transparency, quality, and "greenness" of projects.
- Lead efforts, along with the Reserve Bank of India, to develop rupee-denominated bonds (RDBs) that open access to new sets of international investors for India's clean energy projects. RDBs are a new avenue for

NRDC NATURAL RESOURCES DEFENSE COUNCIL
CEEW Council on Energy, Environment & Water
इरेडा IREDA

borrowers in India to raise low-cost capital overseas without bearing the exchange rate risk.

- Develop credit enhancement products such as loan loss reserves and credit guarantees in order to support the market in its initial stages and to diversify the issuers base.

Reserve Bank of India (RBI), Ministry of Finance, Securities Exchange Board of India (SEBI), Insurance Regulatory and Development Authority (IRDA), and Pension Fund Regulatory and Development Authority (PFRDA), in collaboration with domestic financiers:

- Establish green investment guidelines and set portfolio-level mandates, such as sub-categories within the priority sector lending targets for banks, and social and infrastructure investments by insurers.
- Allow insurance and pension funds to invest a certain percentage of their fixed-income portfolio in high-yield green bonds to open up an enormous market for clean energy investment in India.
- Repurpose subsidies and tax incentives to attract retail investors in India.

Industry experts, in collaboration with clean energy knowledge leaders and standards institutions:

- Support measures to make the green bond market in India more inclusive and diverse beyond large, creditworthy investors, including:
  1. Providing training and awareness building to attract prospective borrowers unfamiliar with green bonds; and
  2. Simplifying and standardizing the issuance and compliance process to increase transparency and reach new investors in India and abroad.
- Use collaborative platforms that represent diverse stakeholders to aggregate performance data and demand, highlight best practices, and bring markets together to develop clean energy finance markets internationally. Potential collaborative platforms such as Green Bond Market Development Committees and the International Solar Alliance could provide needed support mechanisms to grow the green bonds market in India and internationally.

I. GREEN BONDS OVERVIEW AND OPPORTUNITY

Green Bonds: Green bonds function like any other type of bond. Green bonds have an added characteristic that the proceeds must be used to support "green" projects such as renewable energy deployment, water, clean transportation, and climate adaptation efforts.

Green bonds are an effective vehicle to raise capital for renewable energy projects while meeting the environmental targets of the investors and climate targets of the Government of India.

Tenure and Issue Size: Tenures of green bonds typically range from 18 months to 30 years. Presently, about half of the green bonds are issued for 1 to 5 years tenure, 30 percent are issued for 5 to 10 years, and 21 percent are issued for more than 10 years.[1] The average size of most green bonds issued in 2014 is already about $500 million per issue.[2]

Issuers: Issuers of green bonds may be governments (including municipal, state and national governments and export-import banks), intergovernmental organizations such as the World Bank or regional development banks, financial institutions, and other corporations. The green bond market is still dominated by the public sector, primarily development banks, with 44 percent of market issuances. However, since 2014, corporate banks in the private sector have started raising finance and make up 33 percent of issuances as of June 2015. Municipal bonds, asset-backed securities (ABS) and regional and private banks make up the rest of the market (approximately 23 percent).[3]

Investors: Mainstream institutional investors, specialist Environmental, Social, Governance (ESG) investors, Responsible Investors (RI), corporate treasury, sovereign and municipal governments, and retail investors are all participating in the green bond market.[4] The availability of a variety of 'use of proceeds' of bonds is attracting corporate investors.[5] The high level of oversubscription of green bonds as compared to the non-green issuance clearly demonstrates the demand and the growth opportunity of green bonds to mobilize finance in India.

Underwriters: The green bond market scope is pulling in a wide range of underwriters for the issuance. In 2014, Credit Agricole CIB was the lead underwriter for about $3.4 billion worth of green bonds and involved in four of the top five deals. Other key underwriters include Bank of America, Merrill Lynch, Morgan Stanley, CITI, Deutsche Bank, JP Morgan, and HSBC, and Royal Bank of Canada.

Table 1: Diversity of Green Bonds Available in the Market[6]

Types of Bonds	Details
High-Yield Green Bonds	'High-Yield Green Bonds' are non-investment grade and use of proceeds bonds. They includes robust reporting. 'NRG Yield' issued the first high yield green bond in August 2014 for $500 million.
Corporate Green Bonds	Green corporate "earmarked" bonds helped create depth in the green market. Share of corporate issuance in the market is relatively small, ranging from $1 billion to $3 billion.
Municipal Green Bonds	Started in the US in 2014 under green properties for universities and sustainable water projects. This was followed by green bonds issued by European cities and municipalities, leading to an increasing trend and several new entrants.
Commercial Bank Green Bonds	Bank green bonds use proceeds to finance a mixture of renewable energy, such as solar, wind and hydropower projects, and energy efficient property.
Asset-Backed Securities (ABS)	Toyota brought the first ABS bond in the market with $1.75 billion. The innovative bond showcased how proceeds from a bond backed by car leases and loans can be earmarked for future green vehicles.
Labelled Green Covered Bond	First labelled green covered bond – a bond with dual recourse to the issuer and a cover pool of assets – was issued by real estate and mortgage bank BerlinHyp in May 2015 for €500 million ($568 million). The bond received a very positive reception and was four times oversubscribed.

Green Bonds Principles' definition of a Green Bond[7]

Green bonds are any type of bond instruments whose proceeds will be exclusively applied to finance or re-finance, in part or in full, new or existing eligible projects that will promote progress on environmentally sustainable activities.

Potential eligible projects explicitly recognized by the Green Bonds Principles (GBP) include:

- Renewable energy
- Energy efficiency (including efficient buildings)
- Sustainable waste management
- Sustainable land use (including sustainable forestry and agriculture)
- Biodiversity conservation
- Clean transportation
- Sustainable water management (including clean and/or drinking water)
- Climate change adaptation

VALUE PROPOSITION: WHY GREEN BONDS ARE A NECESSARY TOOL TO LEVERAGE AND SUPPORT BROAD CLEAN ENERGY DEPLOYMENT IN INDIA

Green bonds expand the quantum of clean energy finance and broaden investor base: To meet India's clean energy targets, a variety of mechanisms and instruments are needed to mobilize adequate finance in a timely manner. Infrastructure financing in India has traditionally been supported by institutions such as banks, non-banking financial companies (NBFCs) and financial institutions. Given the huge investment needed to scale renewable energy, existing traditional financing sources such as domestic bank loans are not sufficient to support capacity addition. Thus, new innovative financial instruments – such as green bonds – that tap into international resources to leverage a wider investor base such as pension funds, sovereign wealth funds and insurance companies are needed to achieve India's climate and clean energy goals.

Bond markets are an attractive means to provide this much required alternate source of financing. The corporate bonds market is the world's largest pool of capital.[8] In India, green bonds could support renewable energy projects by providing broader access to domestic and foreign capital as well as better financing terms, including lower interest rates with longer lending terms.

Green bonds provide access to low cost, long term capital: Green bonds are cost-competitive with other bonds and can provide capital at a lower cost than commercial bank loans. Cost of capital through green bonds can be lowered even further through strategies such as forex hedging and standards and certifications, as discussed in Section IV of this report. Banks are usually unable to invest in long-term projects, creating a maturity mismatch between traditional bank loans and the longer payback period typical for most renewable energy and sustainable development projects.[9] In India, interest rates are high, increasing the intensive upfront capital investment of most green projects. Green bonds address both these challenges. Offering a competitive risk-return profile compared to traditional bonds, green bonds can provide lower cost, stable funding for renewable energy projects regardless of an individual government's policy support for clean energy.

Additionally, green bonds have a high potential to mobilize international finance for renewable energy project developers by enabling access to scalable low-cost capital from institutional investors.[10] Diversification, increasing demand by bringing additional capital into India and scaling the green bond market will quickly drive down any minimal cost increases necessitated by the accounting and certification requirements of green bonds.

Green bonds increasing liquidity and drive green investment by enabling refinancing: Green bonds offer a strategy for refinancing lending institutions allowing proceeds to be used for further investment in renewable energy and other sustainable development projects. Following the 2015 UN climate agreement in Paris, an estimated $1 trillion per year is needed to achieve the climate commitments made by all countries. It is estimated that private sector investments make up 86 percent of global financial flows.[11] Hence, in order to meet low carbon development goals, a significant share of finance would have to flow from private sources. Innovative financing mechanisms like green bonds can tap into private sources of capital and have other advantages, making them an attractive financing instruments to deploy more broadly.

Green bonds create investment pipelines to meet climate commitments: The international investor community can use green bonds to meet growing demand to support climate-friendly investments. Investors are increasingly focused on integrating Environment, Social and Governance (ESG) factors into their investment processes. An estimated $45 trillion worth of publicly declared climate and responsible investment commitments currently exist. Green bonds can help meet these investors' ESG objectives. Additionally, India pledged to reach 175 GW of clean energy by 2022 and advance climate resilience projects domestically through the 2015 UN climate agreement. An estimated investment of $264 billion is required to reach the 175 GW renewable energy target, meaning innovative mechanisms such as green bonds could play a critical role to leverage this market.[12,13]

Green bonds provide the following benefits to investors and governments:

- Greater transparency into a bond's use of proceeds and the ability to highlight green assets and businesses;
- Lack of additional risk, so green bonds can be incorporated into pension funds' existing asset allocations;
- Ability to meet commitments, for signatories to climate agreements and other green commitments.

Common Barriers to the Expansion of Green Bonds

Some common barriers can stifle the growth of green bonds but these barriers can be overcome in a maturing market and through policy interventions, as detailed in Section IV.

- **Need for Validation of "Green" Projects:** Transparent and credible certification of the quality and "greenness" of selected projects is needed to ensure no "greenwashing" occurs. A strong standards and certification process that clearly establishes green credentials, can mitigate this risk.
- **Liquidity:** Because green bond investors tend to be buy and hold investors, the secondary market for green bonds can be thin. As the market matures and expands, this dynamic is changing. As the market diversifies and new investors enter, liquidity also increases.
- **Additional Costs to Issuers:** Green bonds may have some additional transactional costs associated because issuers must track, monitor and report on the use of proceeds. These costs are quickly declining and expected to be driven down even more as green bonds scale, diversification improves the market, and demand increases (such as the Hero Wind Energy green bond described in Section III, which was three times oversubscribed). Additionally, many green bond issuers do not pass on this cost into the pricing of green bonds because the expense is offset by benefits, including:
  - Highlighting their green assets and business;
  - Providing a positive marketing story;
  - Diversifying their investor base (as they can now attract ESG specialist investors);
  - Improving internal collaboration of teams across different departments, such as sustainability, finance and operations.

KEY TAKEAWAYS

- **Green bonds function like any other type of bond.** Green bonds have an added characteristic that the proceeds must be used to support "green" projects such as renewable energy deployment, water, clean transportation, and climate adaptation efforts.
- **Green bonds are competitive with traditional bonds based on economic merit.** Offering a similar risk-return profile compared to traditional bonds, green bonds provide lower cost, stable funding opportunities for renewable energy projects regardless of the policy support for clean energy.
- **The corporate bonds market is the world's largest pool of capital.** Given the huge investment needed to scale renewable energy, existing traditional financing sources such as domestic bank loans are not sufficient to support capacity addition.
- **India aims to install 175 GW of renewable energy by 2022, which will require an estimated $264 billion of investments.** Green bonds could support deployment of renewable energy projects by providing broader access to domestic and foreign capital as well as better financing terms, including lower interest rates with longer lending terms.

RECOMMENDATION

To achieve India's clean energy and climate goals, new innovative financial instruments – such as green bonds – that tap into international resources to leverage a wider investor base such as pension funds, sovereign wealth funds and insurance companies, need to be scaled up.

II. GREEN BONDS' HISTORICAL AND INTERNATIONAL TRENDS

"Credible international entities such as IFC, ADB and [Singapore's] Sembcorp have either taken equity stakes or debt financed renewable projects in India. I think investments are purely based on economic merits."

~ Jayen Shah, Head of DCM at IDFC Bank (Mumbai)[14]

The first green bond was issued in 2007 and was initially characterized as a niche product pioneered by a handful of development banks. The "Climate Awareness Bond" was issued by the European Investment Bank (EIB) in 2007, followed by the World Bank issuing a "Green Bond" in 2008.[15] Between 2007 and 2012, governments began to join international organizations and issue their own green bonds and the market reached $10 billion by mid-2012.

With a growing market appetite for green bonds, there is increasing diversification of issuers and investors in more currencies beyond the early investments by the United States and Europe. The largest issuer in 2015 was the EIB, with KfW, EDF, and the Agricultural Bank of China. New investors including Credit Agricole and HSBC made first time pledges, and various consortia of banks formed to issue guidance on impact reporting, aimed at bringing companies to market.[16]

Corporate sector engagement has increased substantially since 2013, indicating high demand among investors, including overall growth in the issuance of green bonds as well as the volume, diversity and size of issues.[17] In 2014, the green bond market reached $37 billion, almost triple the total level of investment in 2013.

The United Kingdom, China, Germany, Japan, the Netherlands, Norway, and the United States have shown significant growth in the green bonds market since 2014. Seven new markets released $3.2 billion worth of green bonds in 2015 – Brazil, Denmark, Estonia, Hong Kong, India, Latvia and Mexico.

$46 billion worth of green bonds were sold worldwide in 2015, according to Bloomberg New Energy Finance. Investment is anticipated to continue increasing in 2016, following the strong climate agreement at the UNFCCC climate negotiations in Paris.[18] Overall, Europe hosts the highest number of green bonds, with nearly $18.4 billion issued in 2015. About $10.5 billion came from the U.S., where the market was mainly driven by municipal green bonds.[19] Within the next five years, China's green bonds market may reap an estimated 1.5 trillion yuan ($230 billion) for renewable energy and environmental projects.[20] The launch of diverse types of green bonds and geographic expansion has indicated that the market is maturing and investor interest is outpacing supply.

Total investment in green bonds is expected to exceed $60 billion in 2016.[21] In fact, banks are projecting the value of outstanding green bonds to almost double in 2016, to as much as $158 billion due to climate change-related projects becoming mainstream.[22] This follows the upward trend of growing renewable energy investments worldwide, with investment in developing countries surpassing those in developed countries in 2015 for the first time. Following China's leading $102.9 billion investment in renewables in 2015, India increased investment by 22 percent to $10.2 billion.[23]

Green bonds currently fund renewable energy (38.3 percent), building and industry (27.5 percent), transport (10.2 percent), water (9.7 percent), waste management (6.2 percent), climate adaptation (4.3 percent), and agriculture and forestry (3.9 percent). Although this represents rapid growth of the green bonds market, it is still small compared to the overall $100 trillion bond market. As the market matures, collaborative models are being created. For example, Green Bond Market Development Committees representing various stakeholders are currently being organized in Mexico, Brazil, Turkey, India, China, Canada and California to develop green bond markets.

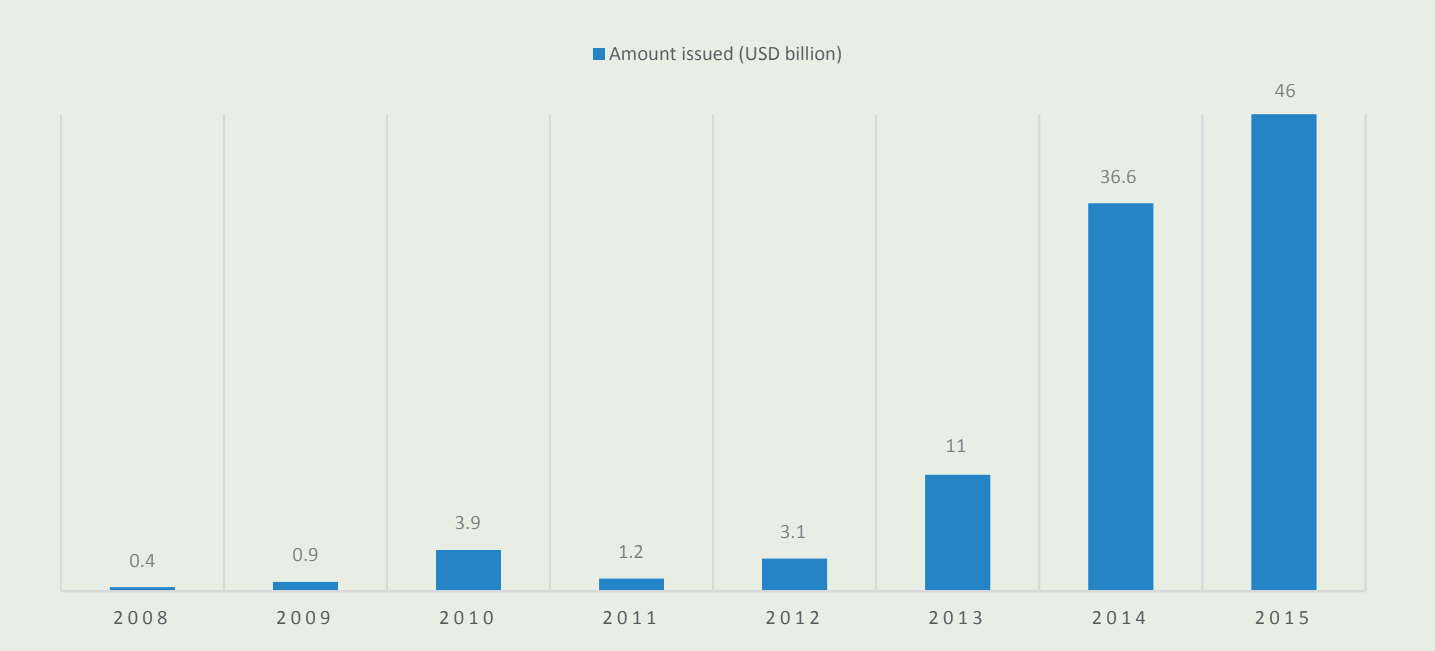
KEY TAKEAWAY

In 2015, $46 billion of green bonds were issued worldwide, and total investment is expected to exceed $60 billion in 2016. The launch of diverse types of green bonds and geographic expansion have demonstrated the market's maturation, and investor interest is outpacing supply.

RECOMMENDATION

Collaborative models representing diverse stakeholders would help support the maturing green bonds market internationally. Potential collaborative platforms such as Green Bond Market Development Committees and the International Solar Alliance could provide needed support mechanisms to grow the green bonds market in India and internationally.

Figure 1: Issuance of Green Bonds Globally



Source: NRDC with data from Climate Bonds Initiative

Table 2: Top Countries for Green Bonds in 2015

Country	Amount (USD)	Country	Amount (USD)
USA	10 billion	UK	0.7 billion
Germany	5.6 billion	Denmark	0.6 billion
Netherlands	4.1 billion	Brazil	0.6 billion
India	1.1 billion	Mexico	0.5 billion
China	1 billion	Japan	0.5 billion
Norway	0.9 billion	Hong Kong	0.3 billion

SPOTLIGHT: CHINA'S FIRST DOMESTIC GREEN BOND

The Shanghai Pudong Development Bank Co. raised 20 billion yuan ($3 billion) in China's first domestic green bond in January 2016.[24] Shanghai Pudong will pay 2.95 percent annually for the three year bond issuance, an interest rate lower than traditional commercial bonds offer in China. The issue was oversubscribed by over two times, demonstrating green bonds' attractiveness in China where demand is high for investments that curb pollution and support renewable energy.

Following the green bond's high demand, China announced a pilot of a new requirement in March 2016 for green corporate bonds on the Shanghai stock exchange. The requirement mandates the issuer to disclose details of the "green" use of project proceeds and seek independent professional verification that the projects are indeed serving "green" purposes and in line with political clean energy priorities of China.[25]

SPOTLIGHT: IDB'S ENERGY EFFICIENCY GREEN BOND IN MEXICO

The Inter-American Development Bank and Clean Technology Fund issued the first phase of a $125 million Energy Efficiency Green Bond in Mexico in March 2015.[26] The goal is to provide an alternative financing mechanism for private sector energy efficiency projects – primarily efficiency projects developed by Mexican energy service companies (ESCOs) – through the issuance of green asset-backed securities.[27] Verification and validation of environmental impacts is completed in accordance with the Green Bond Principles.

What makes this bond unique is its two-phased approach and long-term support for projects that reduce energy consumption. In the first phase, IDB financing warehouses up to $50 million aggregate a portfolio of ESCO projects. Then, in the second phase, the investments are securitized through issuance of green bonds in local debt markets. The Clean Technology Fund provides $19 million worth of guarantees for the portfolio of projects. ESCO funding sources are typically limited, expensive and have very short terms that are infeasible given the payback period for energy efficiency project savings. This approach overcomes those common financing barriers.

III. OVERVIEW OF GREEN BONDS IN INDIA

"We see a healthy pipeline of green bond issuance in India both onshore and offshore. It is clear that much more educational work is needed on the investor side in India but this is part of the natural progression. Green bonds are a nice way of attracting more foreign direct investment which is a key cornerstone for the Indian government."

~ Ulrik Ross, Global Head of Public Sector and Sustainable Financing at HSBC (London)[28]

India has set ambitious renewable energy goals to improve energy access and energy security while taking action on climate change – including target to install 100GW of solar energy and 60GW of wind energy by 2022. To scale the necessary finance to achieve these national targets, which is the centerpiece of India's climate commitments made at the 2015 UN climate negotiations, the Government of India is working with different market players to enable market creation and remove key obstacles for mobilizing finance. Likewise, investment from multilateral and national development banks can establish standard models and provide market liquidity.[29]

The Government of India is interested in green bonds and has approached at least eight domestic lenders to raise low-cost, long-tenure funds through green bond energy plans. Encouraging national players like the Rural Electrification Corporation (REC), Power Finance Corporation (PFC), Industrial Development Bank of India (IDBI), Indian Renewable Energy Development Agency (IREDA), and private sector entities like India Infrastructure Finance Corporation Limited (IIFCL), ICICI Bank, and Yes Bank to enter the market would help scale up green bonds in India. As more financial entities enter the Indian green bond market to provide capital for renewable energy projects of all sizes, the cost of financing prospects in the market will become more favorable.[30]

There is a significant market potential for green bonds in India. In 2015, the green bond market in India kick-started with smaller issuances of $100 million to $200 million with high potential to scaling-up.

Green bonds are also diversified in terms of credit ratings (AAA to BBB) with most green bonds rated AAA to A, providing stability and higher quality of bonds.[31] However, challenges for green bonds issuance exist, including high currency hedging cost, poor sovereign rating (BBB-) and lower tenure causing hurdles for the growth.[32]

Several entities have issued the green bonds in India, raising more than ₹120 billion ($1.85 billion) so far:[33]

- **Yes Bank:** Yes Bank – one of India's largest private sector banks – issued its first green infrastructure bond in February 2015. The Euro-denominated ₹10 billion ($161 million) 10-year issue received a AA+ rating and was oversubscribed by almost over two times, demonstrating a huge demand. The issue proceeds are being utilized to fund renewable energy infrastructure projects, including solar, wind, biomass and hydropower projects.

  Yes Bank then issued another 10-year ₹3.15 billion ($50 million) green bond in August 2015. The entire issue was subscribed by the International Finance Corporation (IFC), part of the World Bank Group. IFC then issued an AAA- rated "Green Masala Bond" on the London Stock Exchange for the same amount. This essentially capitalized the Yes Bank green bond and lowered the cost of lending to green projects. Proceeds from the offering will support a forthcoming infrastructure bond issuance by Axis Bank.[34] The bonds are intended to increase foreign investment in India by mobilizing international capital markets to support infrastructure development in India.[35] The projects to be funded by Yes Bank's green bonds must meet the IFC green bond eligibility criteria, which leverages the development bank's expertise in assessing green credentials and has a second opinion from Cicero, a leading financial services company.

- **Export-Import Bank of India:** Exim Bank issued India's first ever and Asia's second dollar-denominated green bond in March 2015. The sale, initially aimed at $300 million, raised $500 million for a five-year green bond to international investors.[36] The BBB- rated issue was oversubscribed by more than three times, attracting a total of $1.6 billion in bids. A majority of investors were asset managers, with banks and sovereign wealth funds with insurance companies accounting for the rest of the interested parties. The Exim Bank did not get an external green certification, but provided a series of detailed investor updates and assured audit certification of the use of proceeds. The issue proceeds are directed toward funding eligible green projects in Bangladesh and Sri Lanka. The Exim green issue followed close on the heels of a standard $500 million issue, but owing in part to the

green angle, received very strong market response with no signs of investor fatigue. The issue priced at 147.5 basis points over benchmark US Treasury Bonds, for a coupon of 2.75%.

- **CLP Wind Farms:** CLP Wind Farms, the largest wind power developer in India with 1,000 MW of wind energy assets in the pipeline across 6 states, became the first Indian corporate (non-bank) issuer of green bonds in September 2015.[37] CLP Wind Farms raised ₹6 billion ($90.3 million), receiving an AA- rating and attracting primarily Indian mutual funds as investors. The bonds have been offered at a coupon of 9.15% per annum, in three equal tranches of ₹200 crore ($30 million) and will mature every April in 2018, 2019 and 2020. The proceeds will be used both for capital expenditures and refinancing of wind assets.
- **ReNew Power Ventures:** ReNew Power Ventures, a leading Indian clean energy company, issued the second corporate green bond in the country, and the first to boast a credit-enhanced structure in September 2015.[38] The proceeds of the ₹4.51 billion ($68 million) green bond is intended to refinance bank loans for the company's 85 megawatts (MW) wind power plant in Maharashtra. Asian Development Bank (ADB) and India Infrastructure Finance Company Ltd. (IIFCL) jointly guaranteed the bond, which matures in 17.5 years (in March 2033), to increase its credit rating from BBB to AA+ to draw more institutional investors to support this renewable infrastructure project.
- **Hero Future Energies:** Hero Future Energies, the green energy arm of the Hero Group, one of India's leading industrial conglomerates, issued the country's first certified climate bond in February 2016. Hero Future Energies raised ₹3 billion ($44 million) by issuing non-convertible debentures – certified by the Climate Bonds Standard – to finance the development of wind energy projects in the states of Madhya Pradesh, Telangana, and Andhra Pradesh with cumulative capacity of 521.5 MW. KPMG was appointed to assess the readiness of Hero Future Energies and if their proposed bond conformed with the requirements of the Climate Bonds Standard.
- **IDBI Bank:** India's State-Owned IDBI Bank raised $350 million in BBB-rated 5-year green bonds for renewable energy projects in November 2015, becoming India's first public-sector bank to raise funds through green bonds. The issue, certified through the Climate Bond Standard, was oversubscribed by over three times, with prospective investors offering a total of $1.1 billion. 82 percent of the investment came from Asia and the rest from Europe (18 percent).[39]
- **IREDA:** In January 2016, IREDA issued a tax-free ₹10 billion ($150 million) green bond which was oversubscribed by over five times on the opening day.[40] The tax-free bond offered retail investors up to 7.68 percent interest rate for tenures ranging between 10 and 20 years. Factoring in tax savings, the effective interest rate for investors is substantially higher than bank fixed deposits, which attract income tax on interest income. The IREDA green bond successfully reached a broad base of investors including retail individual investors, high net-worth individuals, and institutional buyers.

SPOTLIGHT: HERO FUTURE ENERGIES CLIMATE BOND FOR WIND ENERGY PROJECTS

Hero Future Energies issued green bonds in the form of non-convertible debentures for ₹ 3 billion ($44 million) in three tranches between January and March 2016 in India to expand the company's wind energy portfolio consisting of 220 MW of wind projects operating across states in India and an estimated 1.1 GW in the pipeline.[41] The proceeds of the first certified climate bond in India are targeted for the development and construction of wind farms and associated transmission infrastructure[42]

As verifier for the bonds issue, KPMG issued a "Report on Factual Findings" in January 2016, assessing the readiness of Hero and whether the proposed bond conformed with the pre-issuance requirements of the Climate Bonds Standard.[43] KPMG also assessed that the total capital cost for setting up the said capacity will be around ₹ 32.29 billion ($480 million).[44]

KEY TAKEAWAYS

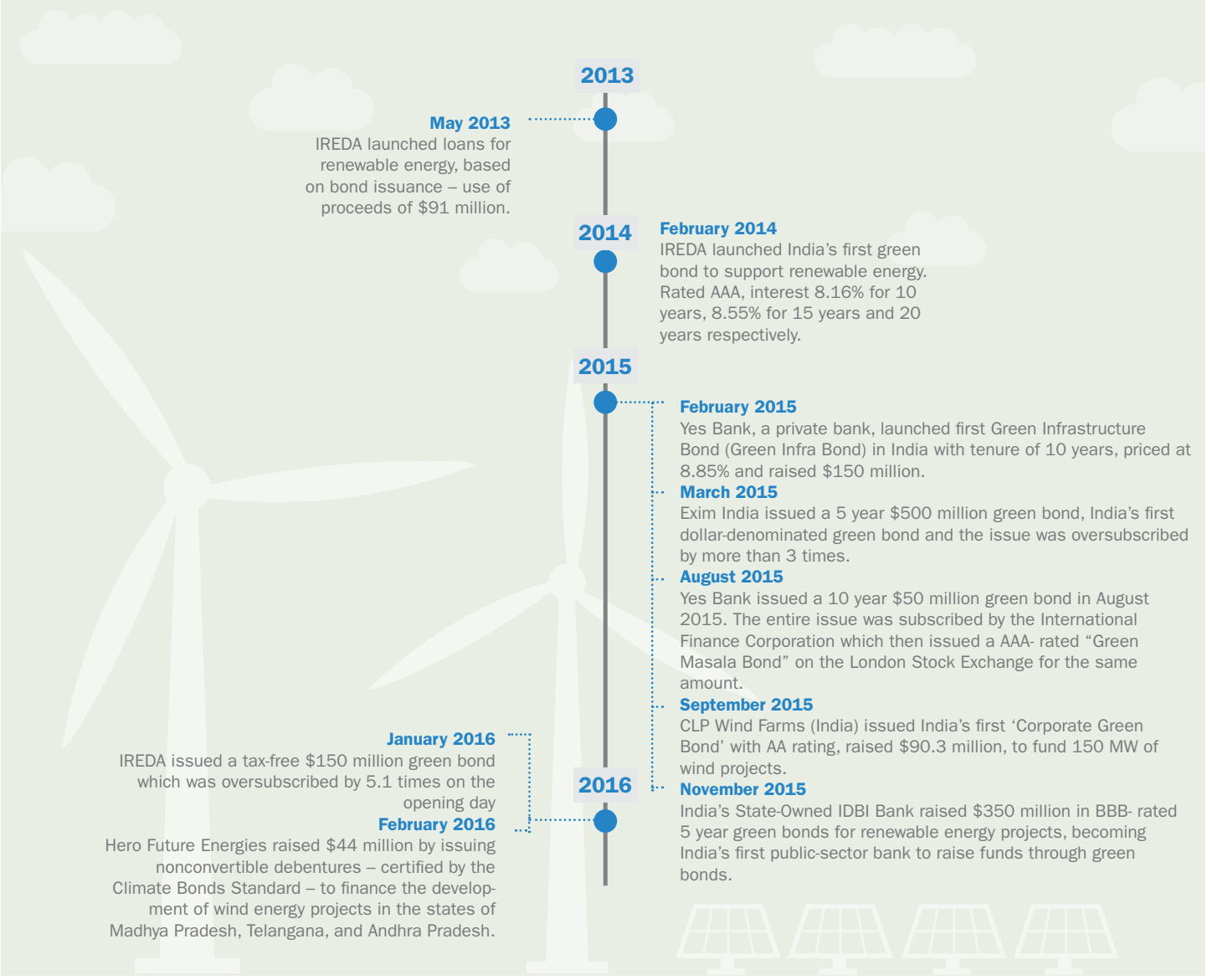
- India's green bond investments raised ₹79 billion ($1.2 billion) in 2015, showing growing momentum in its debut year. Within a year of India's first green bond issuances by public and private banks, three private corporations issued their own green bonds, demonstrating the market's quick maturation and diversification into the corporate sector.
- The high level of oversubscription of green bonds in India (up to 5 times oversubscribed) as compared to the non-green issuances shows the significant demand and the growth opportunity of green bonds to mobilize finance in India.
- Early issuances of green bonds in India have been limited to highly creditworthy financial institutions and corporations. Internationally, green bond markets are rapidly diversifying from predominantly development finance institutions to include banks, clean energy developers, corporate sector, and municipal and local governments. The green investor market can serve to diversify funding sources and thereby improve capital market access.

RECOMMENDATION

Strategies that can help strengthen and expand the market for green bonds in India from this nascent stage should aim to achieve these three objectives:

1) Further reduce the cost of capital,
2) Stimulate demand from institutional and retail investors, and
3) Expand and diversify the issuers base.

Figure 2: Timeline of Green Bonds in India[45]



IV. STRATEGIES TO STRENGTHEN INDIA'S GREEN BONDS MARKET

"The simplicity of the [green bonds] market helped it become what it is today. We need to develop guidance and encourage greater transparency, but also encourage growth in new directions."

~ Rachel Kyte, CEO & Special Representative of the UN Secretary General for Sustainable Energy for All. [47]

The green bonds market has been growing rapidly as it offers investors diverse issuances that vary in size, maturity, currency and structure. Green bonds are becoming more attractive in that they allow climate risks to be hedged separately from other financial risks. Development banks' mandated investments and the growing familiarity of institutional investors to recognize the similarity of green bonds to classic bonds are also driving growth.[47]

Portfolio managers looking for environmentally responsible investments have to consider risk-weighted returns first. This means that green bonds have to be financially competitive with other fixed income assets to meet the minimum investment criteria. While green bonds benefit from a strong demand from environmentally-focused funds and therefore garner a small basis point premium over comparable corporate bonds, the following three objectives and targeted strategies that can help strengthen and expand the market for green bonds in India:

1. Reduce the cost of capital
2. Stimulate demand from institutional and retail investors
3. Expand and diversify the issuers base

As laid out in the table and explored in detail below, there are key strategies to achieve each objective and corresponding institutions and organizations to implement those strategies.

REDUCING THE COST OF CAPITAL

Green bonds are an effective vehicle to channel low-cost financing for renewable energy while meeting the environmental targets of the investors. Green bonds can provide low cost financing in several ways:

- **Providing lower interest rates than typical domestic clean energy project financing**: Green bonds help overcome the high upfront cost of renewable energy projects, the higher interest rate and shorter tenure of typical domestic financing available by providing a funding opportunities with lower interest rates and longer tenure loans.
- **Being cost-competitive as compared to other corporate bonds:** Research conducted by Barclays suggests that green bonds on an average command a 20 basis points premium over comparable corporate bonds, especially in secondary market trading, due to a strong demand from environmentally-focused funds.[48] While this premium is not insignificant, it may not be enough by itself to meet the low-interest requirements of clean energy especially in the Indian context and overcome minimal cost increases necessitated by the accounting and certification requirements of green bonds.
- **Bringing down transactional costs** with higher volumes and green bond standards and certification efficiencies of scale.
- **For frequent issuers, the green investor market helps to widen access and reduces the probability of investor fatigue.**

Table 3: Proposed Strategies to Deepen and Expand the Green Bonds Market in India

Barrier	Strategy	Means of Implementation	Actors	Current and Potential Role
High cost of capital, limiting developers' ability to obtain affordable financing to deploy new renewable energy projects and increases investors' perceived risk of the project	Reduce cost of capital	Standards and Certification	Regulator: Securities Exchange Board of India (SEBI)	Issued green bond guidelines; could specify criteria for 'green' ; require disclosure of use of proceeds
			Rating Agencies, like CRISIL, CARE, ICRA	Develop green bond standard for India or adopt international standard
			International Standards: Climate Bonds Initiative, Moody's	Benchmark local standard against international standards
		Develop competitive credit enhancement products	International Development Finance Institutions, like Green Climate Fund	Funding for institutions providing credit enhancement
			IREDA	Develop credit enhancement products such as loan loss reserves and credit guarantees
			Indian Green Banks	
		Reduce foreign exchange hedging costs	International Development Finance Institutions like Green Climate Fund	Fund development of low cost currency hedging products/facility
			IREDA, National Clean Energy Fund	Fund development of low cost currency hedging products/facility
			Regulator : Reserve Bank of India	Facilitate external commercial borrowing such as through rupee denominated bonds
Limited set of green investors, limiting demand for green bonds to infuse new capital to scale the renewable energy market	Stimulate demand from institutional and retail investors	Mandates for public investment	Ministry of Finance	Set high level green financing targets and sub-targets under priority sector lending
		Insurance and Pension Fund Regulation	RBI, SEBI, IREDA, PFRDA	Allow investment in high yield green bonds; establish clean financing targets
		Tax incentives	Ministry of Finance, IREDA	Expand investor tax incentives for green bonds, targeting retail investors
Limited to large, creditworthy investors	Expand and diversify the issuers base	Training and Awareness	Industry, knowledge leaders such as NRDC-CEEW	Organize workshops, training content, and webinars on green bonds to increase familiarity and bring in new investors
		Credit Enhancement Products	Industry, knowledge leaders such as NRDC-CEEW	Organize workshops, training content, and webinars on green bonds to increase familiarity and bring in new investors
		Simplification and Standardization	Industry, Standards institutions	Simplify issuance and compliance process to increase transparency and reach new investors

To lower the cost of capital further, we recommend the following key measures:

- Reducing forex-hedging costs
- Working with swap counterparties that have a use for long term U.S. dollar funding;
- Credit enhancement products
- Certification and standardization

1. REDUCING FOREIGN EXCHANGE HEDGING COSTS

The cost of borrowing from international markets can be fraught with uncertainty due to the unknown and volatile nature of currency exchange rates, especially for bonds with long-term maturities (longer than 10 years). International investors have to factor in the cost of volatility of the Indian rupee vis-a-vis their home currency when making investment decisions. Typically, investors manage exchange rate risk by buying hedging products such as options and currency contracts. However, rupee hedging products are limited and costly.

A greater availability of currency risk hedging products, at competitive prices, can help lower the cost of capital for the issuer and make Indian green bonds more attractive. DFIs such as the Exim India have significant foreign currency balance sheets and can be effective counterparties in currency swap contracts.

Another policy option to cushion international investors from currency depreciation is to provide dollar-denominated contracts, funded through a national cess (tax). This could be created through the National Clean Environment Fund (NCEF) or a reserve created through international climate grants. Solar power developers in India have called for a sovereign fund to back dollar-based tariffs.[49] In the long run, developing a robust market for competitive hedging products is less expensive than directly bearing the cost of forex hedging. A green climate fund grant or other international climate funds could fund a foreign exchange liquidity facility for clean energy investment which stimulates market development.

Rupee denominated bonds (RDBs) are a new avenue for borrowers in India to raise low cost capital overseas without bearing the exchange rate risk.[50] In this case, the issuer of the bond borrows, and repays in due course, the debt in Indian rupees, thus the risk of currency fluctuation lies with the investors rather than borrowers. For overseas investors, the attractiveness of high yield Indian assets offsets the cost of currency hedging. Additionally, international investors also benefit from any appreciation of the Indian rupee.

Green RDBs open up access to a whole new set of international investors for Indian clean energy projects. To limit the impact of perceived creditworthiness issues in reaching a broad segment of investors, international development finance institutes, such as IFC and ADB, can act as a bridge linking Indian RDBs to international investors.

The IFC-Yes Bank Green Masala Bond issued in 2015 on the London Stock Exchange is a good example of this strategy.[51] IFC issued the 5-year rupee bond on London Stock Exchange and then used the proceeds of the issue to invest in a green bond by Yes Bank, which in turn will funnel the proceeds to its renewable energy and energy efficiency investments in India. Through this arrangement, international investors are lending to IFC, rather than a relatively lesser-known Indian borrower. Thus, the cost of hedging lies with the creditors rather than the borrower and IFC provides the credit enhancement for this issue without any incremental cost to the ultimate borrower.

CREDIT ENHANCEMENT

Lack of adequate credit history, or below investment-grade credit ratings, are typical barriers for new clean energy players in raising capital through green bonds. There is a demand for credit enhancement products such as partial credit guarantees and loan loss reserves at competitive prices that enable issuers to meet the credit expectations of the investors. Internationally, green banks have played a key role in providing credit enhancement products for clean energy deals, including for green bonds. The Green Climate Fund and other multilateral and bilateral climate funds can help capitalize green banks at national and sub-national level, which can in turn provide credit enhancement for green bonds.

STANDARDS AND CERTIFICATION: DEFINING WHAT IS A "GREEN" BOND

The green bonds market is growing rapidly, necessitating an effort to ensure the transparency of projects and reporting through a standard mechanism. Environmentally-conscious investors want to ensure green bonds proceeds are not used for non-green purposes (called "green-washing"). Related issuance costs, including the extra cost for tracking, monitoring, reporting the investment as meeting green criteria can create a barrier to scaling up the green bonds market.

Issuance costs can be reduced by adopting standard procedures to assess that a bond fulfills its green objectives. Therefore, a robust Certification and Standardization (C&S) scheme is an essential component of green bond-supported projects. The certification specifies sectors in which green

bond proceeds can be invested, such as renewable energy, energy efficiency, clean transportation, sustainable land use and climate adaptation projects. Standards would also enhance investor confidence and increase the long-term credibility of the Indian green bonds market by providing evidence to issuers and investors that the selected green projects are achieving environmental benefits. Additionally, labeling a bond as a "green bond" would give issuers access to a more diverse group of investors than regular bonds, growing the overall market.

International Certification Standards: To address this gap in a uniform definition of what types of projects a "green" bond should finance, international certification standards have been developed. As described below, the mandatory Climate Bond Standard and voluntary Green Bond Principles are the primary certifying standards for green bonds. The advantages of green bonds in India utilizing international standards include increased transparency and potentially lower transaction costs if an accepted universal standard is adopted and enforced by a regulatory body. Reputational risk, a concern for large institutional investors, would be addressed by an international standards. Furthermore, issuers can quantify the environmental benefits to present evidence robustly, and quantification methods such as KPMG True Value can be used.[52]

India-Specific Certification Standards: Some stakeholders are concerned that given the country's unique needs, a certification standard should be tailored to the Indian context rather than adopting an international standard. A country-specific standard is viewed by some as necessary to achieving green bonds' greatest potential impact in India. However, it can add costs for international investors to understand local standards and confirm they are consistent with their portfolio standards. Additionally, differences in which specific asset classes are considered "green" in a specific country vs. internationally may create difficulties for otherwise-interested international investors.

Credit rating agencies such as CRISIL, CARE and ICRA (formerly, Information and Credit Rating Agency of India) may be the appropriate entities to develop and tailor such a standard for India. Benchmarking an India-specific certification standard against international standards can provide overseas investors with needed transparency and confidence to invest in green bonds.

Another strategy for India may be to not develop an altogether new standard, but work with international standards bodies to develop India specific reporting guidelines.

The following examples describe three international examples of certifing green bonds on the market:

i. **International mandatory standard: Climate Bonds Standard –** London-based Climate Bonds Initiative (CBI) is considered one of the leading certification entities for climate bonds standards and developed the Climate Bond Standard (CBS).[53] The CBS provides clear, sector-specific eligibility criteria for assets and projects that can be used to certify "climate bonds."[54] In order to receive the "Climate Bond Certified" stamp of approval, a prospective issuer of a green bond or Climate Bond must appoint an approved third party verifier, who will provide a verification statement that the bond meets the CBS green credentials.[55] Hero Wind Energy's ₹3 billion ($44 million) green bond issuance in January 2016 became the first certified climate bond in India by receiving third party verification by KPMG and CBS certification.

Climate Bonds Standard's Eligible Projects for Green Bonds

The Climate Bonds Standard (CBS) sets out a two-step process to determine the eligibility of specific projects or physical assets that are considered as part of the low carbon and climate resilient economy. In CBS Version 2.0, five Sector-Specific Standards are available and provide technical criteria for eligible projects and assets in:

- Wind energy
- Solar energy
- Geothermal energy
- Low Carbon Building
- Low-carbon transport

Additional future Sector-Specific Standards may be available in bioenergy, water, agriculture, forestry, industrial energy efficiency, fisheries and marine investments, co-generation and infrastructure adaptation and resilience.

ii. **International voluntary guidelines: Green Bonds Principles –** The Green Bond Principles (GBP), developed by the International Capital Market Association, are a voluntary process with non-binding guidelines that recommend transparency and disclosure, and promote integrity in the development of this fast growing market by clarifying the approach for issuance of a green bond.[56] In developing their principles for green bonds, GBP focuses on four principles – use of proceeds, project selection and evaluation, management of proceeds, and reporting.

iii. **Country-specific standard: China's Green Bonds Regulations –** The central bank (PBOC) on 22 December 2015 issued green bond issuance regulations for issuance in China's domestic interbank sector (which makes up 93 percent of China's bond market, the world's third largest). These Guidelines are mandatory and "are meant to ensure that environmental assessments have been done for all company lending and that projects financed by loans remain in compliance with environmental laws. One component of the model provides that banks

are not allowed to provide financing to companies "in default" of environmental laws. This places the banking regulator in a position to police green bond issuance. The China Green Finance Committee has developed China green definitions, partly based on the Climate Bonds Taxonomy; these have been endorsed by PBOC as appropriate to use under its regulatory framework

2. STIMULATING DEMAND FROM INSTITUTIONAL AND RETAIL INVESTORS

While strong demand for climate-focused assets exists globally, there are many steps to be taken at the policy level to create a commensurate demand in Indian capital markets. To fulfill India's strong climate commitments, domestic financial institutions need to be engaged meaningfully. For green bonds to have a truly transformative impact on economy, climate considerations need to percolate down to the level of every major financial transaction. The following strategies can help to achieve this goal:

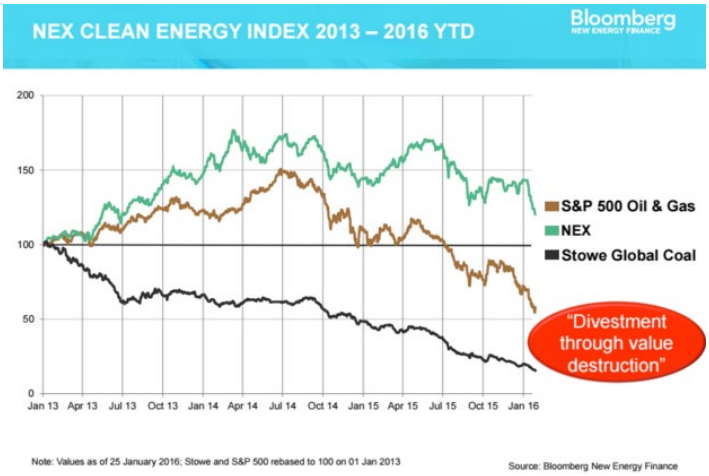
- Mandates for public investment
- Insurance and pension fund regulation for institutional investors
- Investor tax credits and incentives to drive demand

Mandates for public investment: State-owned financial institutions, such as nationalized banks, Life Insurance Corporation (LIC), other public insurers and pension funds, command a huge market share of Indian investment markets. Establishing green investment guidelines and setting portfolio-level mandates such as sub-categories within the priority sector lending targets for banks, and social and infrastructure investments by insurers can ensure a robust demand for clean energy assets.

Insurance and pension fund regulation for institutional investors: Green bonds can be a good fit for long-term investors such as insurance and pension funds. As India and the rest of the world pursue low-carbon development, fossil-fuel based investment is turning riskier and less attractive.[57] Clean energy projects, on the other hand, provide a stable long-term investment potential. As shown in the NEX Clean Energy Index chart below, clean energy investments have provided superior returns compared to fossil fuels over the past 3 years.

Insurance regulation in India does not allow investment in assets below AA credit rating.[58] As the domestic renewable energy markets grow, associated risk perception is expected to go down. Allowing insurance and pension funds to invest a certain percentage of their fixed income portfolio in green bonds will open up a huge market for clean energy investment in India. Structural support in the form of credit enhancement and guarantees can further alleviate the risk perception of institutional investors.

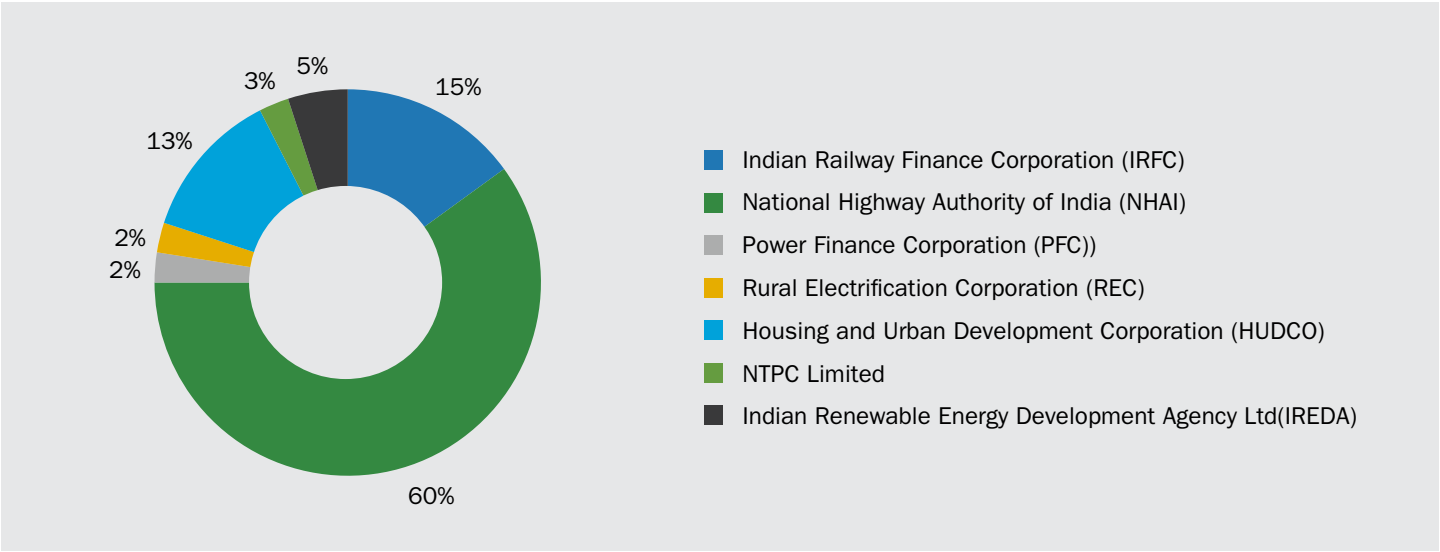
Figure 3 Superior returns from Green Investments Source: Bloomberg New Energy Finance



Investor tax credits and incentives as demand drivers: Investing in clean energy development is good for the economy and reduces the energy import bill of the country. Further, renewable energy has enormous job creation potential. Energy efficiency is a low-cost resource to meet rising energy demand that obviates the need for costly new power generation capacity. Moreover, clean energy reduces the carbon emissions and other pollutants, thus reducing the healthcare costs and improving productivity. Considering the beneficial social, economic, and environmental impacts, providing tax incentives for clean energy investments are a strong policy opportunity. Tax incentives, especially for retail investors, can go a long way in creating a demand for green bonds and enables citizens to invest in India's clean energy future. A time-bound sunset clause could make such tax incentives more attractive as a policy option.

Stakeholder discussions held by NRDC-CEEW clearly highlighted the need to expand the scale of green bonds following the successful example of the recent ₹20 billion ($313 million) tax-free bond issued by IREDA. In the financial year 2016, the Indian government allocated ₹400 billion ($ 6 billion) among eight state-owned entities including the National Thermal Power Corporation (NTPC) and IREDA. All tax-free bonds have been oversubscribed signaling a clear investor interest in these products. While the Union Budget for financial year 2016-17 does not have a provision for green tax-free bonds, we recommend that future allocations of tax-free bonds should have a larger share for clean energy to diversify and deepen the debt markets in India.

Figure 4. India Tax-free bonds allocation FY2016 Source: Union Budget 2015[59]



Expand and Diversify the Issuers Base. Early issuances of green bonds in India have been limited to highly creditworthy financial institutions and corporations. Internationally, green bond markets are rapidly diversifying from predominantly development finance institutions to include banks, clean energy developers, corporate sector, and municipal and local governments. Several measures can facilitate making the green bond market more inclusive and diverse in India, including:

- Financial skills training and awareness
- Credit enhancement
- Simplification and standardization

Financial skills training and awareness: Green bonds are a relatively new financial tool for raising capital and still many prospective borrowers, including local and municipal governments, are not familiar with the mechanism and the opportunity. To nurture nascent clean energy markets, basic awareness and training content can be developed and disseminated to target audiences. Even within the financial community, there is a need to raise awareness about green bonds as a powerful tool to attract new investors.

Credit Enhancement: As described above, green banks have played a key role in providing credit enhancement products for clean energy deals, including green bonds. Credit enhancement can help bring new issuers on board.

Simplification and standardization: Green bonds require establishing the environmental integrity of the use of proceeds. In some "pure play" cases such as financing a solar power developer, this could be straightforward. However, to diversify the markets to include varied players, access to simple-to-understand green bond standards could yield positive results. For example, with the focus on smart city development in India, many local governments have the opportunity to raise capital through issuing bonds. Certifying these bonds through an accepted green standard will increase the reach of the issuing government to institutional and even international investors.

KEY TAKEAWAYS

- Green bonds have a high potential to mobilize international finance for renewable energy project developers by enabling access to scalable, long-term and low cost debt capital from institutional investors. Green bonds can provide low cost financing by providing lower interest rates than typical domestic clean energy project financing and by being cost-competitive as compared to other corporate bonds.
- A greater availability of currency risk hedging products, such as 10 years plus options and contracts, at competitive prices can help lower the cost of capital for the issuer and make Indian green bonds more attractive. Another policy option to insulate international investors from currency depreciation is to provide dollar-denominated contracts, funded through a national cess (tax).
- Rupee denominated bonds (RDBs) are a new avenue for borrowers in India to raise low cost capital overseas without bearing the exchange rate risk. The IFC-Yes Bank Green Masala Bond issued in 2015 on the London Stock Exchange is a good example of this strategy.
- To increase investment and investor confidence, a robust Certification and Standardization (C&S) scheme is an essential component of green bond-supported projects that can verify the transparency, quality and "greenness" of projects and enable reporting through a standard mechanism. Standards increase the long-term credibility of the Indian green bonds market by providing evidence to issuers and investors that the selected green projects are achieving environmental benefits and no "greenwashing" has occurred.
- The following strategies can help create a demand for green bonds and enable citizens to invest in India's clean energy future:
  - Mandates for public investment through green lending targets;
  - Insurance and pension fund regulation for institutional investors; and
  - Investor tax credits and incentives, especially for retail investors.

RECOMMENDATIONS

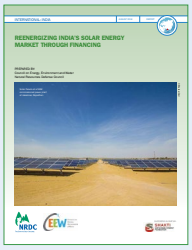
- Prioritizing diversification, increasing demand by bringing additional capital into India and scaling the green bond market will quickly drive down any minimal cost increases necessitated by the accounting and certification requirements of green bonds.
- Transactional costs associated with green bonds can be brought down even further through deployment of the following strategies:
  1. Reducing forex-hedging costs;
  2. Credit enhancement products
  3. Certification and standardization
- Ministry of Finance and the RBI can lead efforts to develop rupee denominated green bonds that open access to new sets of international investors for India's clean energy projects. To limit the impact of perceived creditworthiness issues in reaching a broad segment of investors, international development finance institutes, such as International Finance Corporation (IFC) and Asian Development Bank (ADB), can act as a bridge linking Indian RDBs to international investors and providing credit enhancement.
- IREDA, NCEF and MNRE may coordinate efforts with SEBI and credit rating agencies such as CRISIL, CARE and ICRA to determine whether to adopt an international standard such as the Climate Bond Standard or tailor an India-specific certification standard. Benchmarking an India-specific certification standard against international standards may provide overseas investors with needed transparency and confidence to invest in green bonds.
- Establishing green investment guidelines and setting portfolio-level mandates – such as sub-categories within the priority sector lending targets for banks and social and infrastructure investments by insurers – can ensure a robust demand for clean energy assets.
- RBI can allow insurance and pension funds to invest a certain percentage of their fixed income portfolio in green bonds to open up an enormous market for clean energy investment in India.
- The Ministry of Finance play an active role in attracting both issuers and investors to green bonds by providing credit enhancement and guarantees to alleviate the perceived risk and draw more corporate players. The Ministry should also consider providing future allocations of tax-free bonds with a larger share for clean energy to help diversify and deepen the debt markets in India.
- Industry experts in collaboration with clean energy knowledge leaders and standards institutions can support several measures to facilitate making the green bond market more inclusive and diverse in India beyond large, creditworthy investors, including:
  1. Financial skills training and awareness is needed to attract prospective borrowers unfamiliar with green bonds;
  2. Credit enhancement products by green banks and industry leaders can bring new issuers on board; and
  3. Simplification and standardization the issuance and compliance process to increase the transparency and reach to new investors in India and internationally.

REFERENCES

1 Green Bond Discussion, BoA, Merrill Lynch, May 21, 2015, http://www.vgfoa.org/2015%20Spring%20Conference/Presentations/Steve%20Schemmel.pdf (Accessed October 15, 2015)
2 Labeled Green Bonds Date, https://www.climatebonds.net/cbi/pub/data/bonds?items_per_page=All&order=field_bond_issue_date&sort=desc (Accessed October 16, 2015)
3 The first Green Muni Bond was issued by Massachusetts in June 2013. Gothenburg in October 2013 issued the first Green City bond, https://www.climatebonds.net/market/history (Accessed October 15, 2015)
4 Investor Appetite, Climate Bond Initiative, https://www.climatebonds.net/market/investor-appetite (Accessed October 15, 2015)
5 History – Explosive Growth in Green Bonds Market, Climate Bonds Initiative, https://www.climatebonds.net/market/history (Accessed October 15, 2015)
6 Green bonds are also differentiated on the basis of debt-recourse as defined by the Climate Bonds Initiative, https://www.climatebonds.net/market/explaining-green-bonds Climate Bonds Initiative (Accessed October 15, 2015)
7 *Source: International Capital Market Association, "Green Bonds Principles 2015," (March 27, 2015), http://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/green-bonds/green-bond-principles/.*
8 Black Rock Viewpoint, "Corporate Bond Market Structure: the Time for Reform is Now," September 2014, https://www.blackrock.com/corporate/en-mx/literature/whitepaper/viewpoint-corporate-bond-market-structure-september-2014.pdf
9 WRI, "With New Guidelines, China's Green Bond Market Poised to Take Off in the Year of the Monkey," January 8, 2016, http://www.wri.org/blog/2016/01/new-guidelines-china%E2%80%99s-green-bond-market-poised-take-year-monkey
10 Issue Paper: Green Bonds in India, http://www.pace-d.com/wp-content/uploads/2015/02/Issue-paper-Green-Bonds-Report-Reprinted-Feb-2015.pdf (accessed October 15, 2015)
11 UNFCCC Factsheet, http://unfccc.int/press/fact_sheets/items/4982.php (accessed October 15, 2015)
12 CEEW Analysis
13 Ashish Nigam, "How green bonds can help achieve 2022 RE targets," DaijiWorld, March 24, 2016, http://www.daijiworld.com/news/news_disp.asp?n_id=386620
14 Narae Kim, "India's Green Issuers Set to Make a Dash for Cash," Global Capital: Emerging Markets, March 23, 2016, http://www.globalcapital.com/article/x1jfh4plghkx/indias-green-issuers-set-to-make-a-dash-for-cash
15 Getting to Know the Green Bond Market, Pension Fund Service Local Government, http://treasury.worldbank.org/cmd/pdf/GettingtoKnowtheGreenBondMarket_PensionFundService.pdf (Accessed October 15, 2015)
16 Green bond market ends 2015 on a high as it breaks records, Environmental Finance, Jan. 6, 2016, https://www.environmental-finance.com/content/news/green-bond-market-ends-2015-on-a-high-as-it-breaks-records.html
17 IFC $1 Billion Green Bond Marks Largest Climate-Friendly Issuance, http://ifcext.ifc.org/ifcext/pressroom/IFCPressRoom.nsf/0/F9E346765F24CB3085257B1200776829 (Accessed October 14, 2015)
18 Sustainable Insight: Gearing up the Green Bonds, KPMG International https://www.kpmg.com/Global/en/IssuesandInsights/ArticlesPublications/sustainable-insight/Documents/gearing-up-for-green-bonds-v2.pdf (Accessed October 15, 2015)
19 SeeNews Renewables, http://renewables.seenews.com/news/overview-usd-41-8bn-green-bonds-issued-in-2015-that-s-the-biggest-ever-508646 (Jan. 12, 2016)
20 Bloomberg Business, "China's $230 Billion Green Bond Thirst to Supercharge Market," February 3, 2016 http://www.bloomberg.com/news/articles/2016-02-04/china-s-230-billion-green-bond-thirst-to-supercharge-market
21 Business Standard, "Hero Future Energies issues ₹ 300 crore certified climate bond "http://www.business-standard.com/article/companies/hero-future-energies-issues-rs-300-crore-certified-climate-bond-116020400807_1.html (Accessed February 15, 2015)
22 Bloomberg Business, http://www.bloomberg.com/news/articles/2016-01-26/green-bond-market-will-grow-to-158-billion-in-2016-hsbc-says
23 Times of India, "Renewable energy growth in developing countries is led by China and India," March 25, 2016, http://timesofindia.indiatimes.com/home/environment/the-good-earth/Renewable-energy-growth-in-developing-countries-is-led-by-China-and-India/articleshow/51553687.cms
24 Bloomberg Business, "China's $230 Billion Green Bond Thirst to Supercharge Market," February 3, 2016 http://www.bloomberg.com/news/articles/2016-02-04/china-s-230-billion-green-bond-thirst-to-supercharge-market
25 Bloomberg Business, "China Aims for Green Bond Expansion With Shanghai Bourse Trial," March 16, 2016 http://www.bloomberg.com/news/articles/2016-03-17/china-aims-for-green-bond-expansion-with-shanghai-bourse-trial
26 IDB, "IDB to support energy efficiency financing through the issuance of Green Bonds in Mexico," May 19, 2015, http://www.iadb.org/en/news/news-releases/2015-05-19/energy-efficiency-in-mexico,11161.html
27 Green Climate Fund, Consideration of funding proposals – Addendum 15 October 2015, http://www.gcfund.org/fileadmin/00_customer/documents/MOB201511-11th/04_Add.06_-_FP006_and_NOL_20151015_fin.pdf
28 Narae Kim, "India's Green Issuers Set to Make a Dash for Cash," Global Capital: Emerging Markets, March 23, 2016 http://www.globalcapital.com/article/x1jfh4plghkx/indias-green-issuers-set-to-make-a-dash-for-cash
29 ref
30 ref
31 Green Bond – A Primer, https://www.schroders.com/en/SysGlobalAssets/digital/insights/pdfs/green-bonds-a-primer.pdf (Accessed October 14, 2015)
32 ref
33 Narae Kim, "India's Green Issuers Set to Make a Dash for Cash," Global Capital: Emerging Markets, March 23, 2016 http://www.globalcapital.com/article/x1jfh4plghkx/indias-green-issuers-set-to-make-a-dash-for-cash
34 IFC, IFC Issued First Masala Bonds in London to Attract International Investment for Infrastructure in India, http://www.ifc.org/wps/wcm/connect/region__ext_content/regions/western+europe/news/ifc+issued+first+masala+bonds+in+london+to+attract+international+investment+for+infrastructure+in+india
35 IFC, IFC Issued First Masala Bonds in London to Attract International Investment for Infrastructure in India, http://www.ifc.org/wps/wcm/connect/region__ext_content/regions/western+europe/news/ifc+issued+first+masala+bonds+in+london+to+attract+international+investment+for+infrastructure+in+india
36 The Economic Times, "Exim Bank raises $500 million via green bond sale," March 25, 2015, http://articles.economictimes.indiatimes.com/2015-03-25/news/60475236_1_green-bond-cent-reg-s
37 Sean Kidney, Climate Bonds Initiative, "India's 1st Green Corporate Bond from CLP (INR6bn)," September 18, 2015, https://www.climatebonds.net/2015/09/india%E2%80%99s-1st-green-corporate-bond-clp-inr6bn-gossip-nordic-investm-bank-eur500m-new-york-env
38 Asian Development Bank Blog, "First bond issue under guarantee facility can be a boon for Indian infrastructure," September 23, 2015 http://blogs.adb.org/blog/first-bond-issue-under-guarantee-facility-can-be-boon-indian-infrastructure
39 CleanTechnica, "India's IDBI Bank Raises $350 Million Through Green Bonds," November 27, 2015, http://cleantechnica.com/2015/11/27/indias-idbi-bank-raises-350-million-green-bonds/
40 The Economic Times, "IREDA bonds got subscribed 5 times: What's drawing investors," January 9, 2016 http://articles.economictimes.indiatimes.com/2016-01-09/news/69634818_1_tax-free-bonds-ireda-cent-tax-bracket
41 CleanTechnica, https://cleantechnica.com/2016/02/29/indias-hero-future-energies-issues-44-million-certified-climate-bond/
42 KPMG Report of Factual Findings, Hero Wind Energy Private Limited, January 2016, http://www.climatebonds.net/files/files/HWEPL%20Green%20Bond%20-%20Final%20Report%20-%20Public.pdf
43 Ibid.
44 Ibid.
45 Table Sources: HDFC Securities, "IREDA's Tax Free Bond Issue," February 14, 2014, http://www.hdfcsec.com/Share-Market-Research/Research-Details/DebtReports/3001303; The Hindu, "Yes Bank to raise ₹ 500 crore through Green Infrastructure Bonds," February 16, 2015, http://www.thehindu.com/business/Industry/yes-bank-to-raise-rs-500-crore-through-green-infrastructure-bonds/article6902084.ece; The Hindu, "YES Bank raises ₹ 315 cr via green infra bonds," August 5, 2015, http://www.thehindubusinessline.com/markets/yes-bank-raises-rs-315-cr-via-green-infra-bonds/article7503106.ece; The Economic Times, "Exim Bank raises $500 million via green bond sale," March 25, 2015, http://articles.economictimes.indiatimes.com/2015-03-25/news/60475236_1_green-bond-cent-reg-s; Reuters, "CLP Wind Farms Print India's first Corporate Green Bond," September 15, 2015, http://in.reuters.com/article/2015/09/15/clp-holdings-debt-bonds-idINL4N11L2B820150915; The Economic Times, "HSBC India plans to launch 'green bonds' this year," August 3, 2015, http://economictimes.indiatimes.com/articleshow/48329095.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst; International Finance Corporation, "IFC Issues First Green Masala Bond on London Stock Exchange," August 2015, http://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/ifc+issues+first+green+masala+bond+on+london+stock+exchange. Asian Development Bank Blog, "First bond issue under guarantee facility can be a boon for Indian infrastructure," September 23, 2015 http://blogs.adb.org/blog/first-bond-issue-under-guarantee-facility-can-be-boon-indian-infrastructure
46 The World Bank, http://www.worldbank.org/en/news/speech/2015/03/27/green-bonds-and-climate-policy-foundation-for-scalable-investment
47 Green Bonds – Risk, Rewards and Opportunity, http://www.asyousow.org/wp-content/uploads/2014/reports/green-bonds-in-brief.pdf (Accessed October 21, 2015)
48 The Cost of Being Green: Barclays 2015 https://www.environmental-finance.com/assets/files/US_Credit_Focus_The_Cost_of_Being_Green.pdf (accessed January 21, 2016)
49 Solar industry seeks VAT exemption on equipment, incentives for projects http://goo.gl/83pqZj
50 As described in the Reserve Bank of India (RBI) circular in 2015: External Commercial Borrowings (ECB) Policy - Issuance of Rupee denominated bonds overseas: Reserve Bank of India, Sept 2015 https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=10049&Mode=0
51 IFC issues first Green Masala Bond: http://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/ifc+issues+first+green+masala+bond+on+london+stock+exchange
52 Sustainable Insight: Gearing up the Green Bonds, KPMG International https://www.kpmg.com/Global/en/IssuesandInsights/ArticlesPublications/sustainable-insight/Documents/gearing-up-for-green-bonds-v2.pdf (Accessed October 15, 2015)
53 Climate Bonds Initiative: http://www.climatebonds.net/climate-bonds-initiative
54 "Green bonds" and "climate bonds" are categorized according to their investment rating as well as their label. In practice, "climate bonds" proceeds are used for the same projects as "green bonds" proceeds, though green bonds could technically support projects with greater breadth and scope.
55 Climate Bonds Initiative, "Climate Bonds Standard V2.0," http://www.climatebonds.net/standards/standards-V2.0
56 International Capital Market Association, http://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/green-bonds/
57 Fossil Fuels Are A Terrible Investment, and They're Only Going To Get Worse https://www.ceres.org/press/press-clips/fossil-fuels-are-a-terrible-investment-and-theyre-only-going-to-get-worse
58 The Insurance Regulatory and Development Authority (Investment) (Amendment) Regulations, 2001 https://www.irda.gov.in/ADMINCMS/cms/frmGeneral_Layout.aspx?page=PageNo51&flag=1
59 Bajaj Capital, Tax Free Bonds 2016, http://www.bajajcapital.com/bonds/tax-free-bonds.aspx

INDIA CLEAN ENERGY FINANCE SERIES

For more information and to download these reports, please visit:
https://www.nrdc.org/resources/renewable-energy-india-employment-potential-and-financing-solutions-solar-and-wind-energy



1. Reenergizing India's Solar Energy Market Through Financing
www.nrdc.org/international/india/files/renewable-energy-solar-financing-report.pdf

2. A Second Wind for India's Energy Market: Financing Mechanisms to Support India's National Wind Mission
www.nrdc.org/international/india/files/renewable-energy-wind-financing-lp.pdf

3. Surging Ahead: Scaling India's Clean Energy Market Through Jobs and Financing
www.nrdc.org/international/india/files/india-renewable-energy-jobs-ib.pdf

4. Greening India's Financial Market: How Green Bonds Can Drive Clean Energy Deployment
https://www.nrdc.org/resources/greening-indias-financial-market-how-green-bonds-can-drive-clean-energy-deployment

5. Greening India's Financial Market: Investigating Opportunities for a Green Bank in India
https://www.nrdc.org/resources/greening-indias-financial-market-investigating-opportunities-green-bank-india

AUTHORS and INVESTIGATORS:

Council on Energy, Environment and Water: *Arunabha Ghosh, Kanika Chawla*

Natural Resources Defense Council: *Anjali Jaiswal, Sameer Kwatra, Meredith Connolly, Nehmat Kaur, Bhaskar Deol, Anna Mance*

Center for Market Innovation: *Douglass Sims, Sarah Dougherty*

Coalition for Green Capital: *Jeff Schub, Rob Youngs*

Natural Resources Defense Council
40 West 20th Street
New York, NY 10011
212 727-2700
Fax 212 727-1773
www.nrdc.org

Council on Energy, Environment and Water
Thapar House
124 Janpath
New Delhi 110001
+91 11 40733300
Fax: +91 11 40733399
www.ceew.in