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Solving India's Renewable Energy Financing Challenge: Instruments to Provide Low-cost, Long-term Debt

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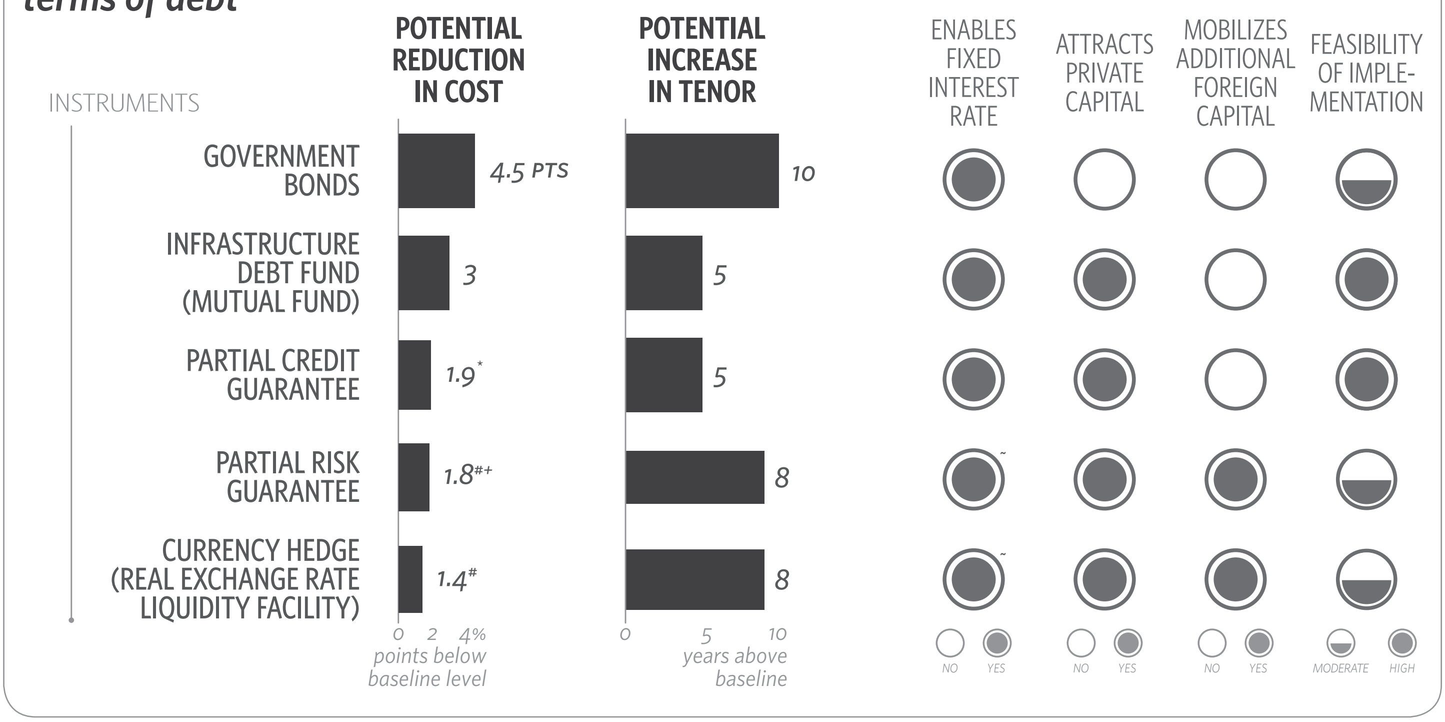
Executive Summary

The government of India plans to more than double the renewable energy capacity installed in the country from 25 GW in 2012 to 55 GW by 2017. However, renewable energy is still approximately 52-129% more expensive than conventional power (CPI, 2014b). In our previous work (CPI, 2012), we found that the biggest barrier to renewable energy in India is the inferior terms of debt – i.e., high cost, short tenor, and variable rate – which raises the cost of renewable energy in India by 24-32% compared with similar projects in the US.

While a number of financing instruments that have been used elsewhere could contribute to solving the main problems in financing renewables in India, none are currently available. In this paper, we explore financing instruments, used in other regions as well as those that were recently introduced in India in other contexts that have the potential to provide and/or facilitate low-cost, long-term debt for renewable energy in India.

We explored three categories of instruments used to finance renewable energy around the world: (a) instruments that provide access to previously untapped low-cost, long-term funds from domestic capital markets; (b) instruments that provide access to foreign debt; and (c) guarantee instruments that mitigate the risk associated with projects. We then further analyzed five instruments for: (1) their cost reduction potential, (2) their potential to increase tenor of funds, and (3) whether they provide fixed interest rates. For each instrument, we also considered (4) potential to mobilize private capital, (5) potential to attract foreign investments; and (6) feasibility of implementation. The figure below presents our results.

Potential impact of financing instruments on the terms of debt



Source: CPI Analysis

* The baseline cost is 12.8%, which is the average annual return of an "A" rated bond.

\+ Actual cost reduction depends on the structure of the guarantee

\~ We assume the developer avails an interest rate swap for foreign debt

\# Based on baseline foreign debt cost of 13%

Since each of these instruments represents a different kind of debt, we estimated the reduction in cost of debt for each instrument based on the typical baseline cost applicable for that particular instrument. The potential benefits from each of the instruments are as follows:

- **Government bonds:** A direct government borrowing and lending program, compared with a typical domestic loan that is available at 12.3% for 10 years, would reduce the cost of debt by up to 4.5 percentage points and increase tenor by up to 10 years, ultimately decreasing the delivered cost of renewable energy by approximately 25%. However, a direct government borrowing and lending program may crowd out private financing if not designed carefully.
- **Infrastructure debt funds (mutual funds):** An infrastructure debt fund, compared with a typical domestic loan, would reduce the cost of debt by up to 3 percentage points and increase tenor by up to 5 years, which would reduce the delivered cost of renewable energy by approximately 14.5%.
- **Partial credit guarantees:** Partial credit guarantees reduce the cost of debt by enhancing the credit rating of a project. By using a partial credit guarantee, an A-rated bond at 12.8% can be enhanced to AA, reducing the cost of debt by up to 1.9 percentage points, which when combined with a tenor increase of 5 years compared to domestic debt would reduce the delivered cost of renewable energy by approximately 10.5%.
- **Partial risk guarantee:** Partial risk guarantees attract foreign funds by mitigating political risks. A partial risk guarantee, for a typical foreign loan at 13% for 10 years, could reduce the cost debt by up to 1.8 percentage points and extend the tenor by up to 10 years, ultimately decreasing the delivered cost of renewable energy by approximately 12.7%.
- **Exchange rate liquidity facility:** An exchange rate liquidity facility offers a standby lower-cost credit line to mitigate currency depreciation risk for project developers who access foreign loans. A liquidity facility, compared to a typical foreign loan at 13% for 10 years, would reduce the cost of debt by up to 1.4 percentage points and increase the tenor by up to 8 years, which would decrease the delivered cost of renewable energy by approximately 11.2%.

These instruments can potentially help mobilize domestic capital and foreign investment, while improving risk management. Ultimately, the selection of the most appropriate instrument(s) for solving India's renewable energy financing challenge depends on policy priorities and implementation feasibility. The actual benefit derived from these instruments depends on their design and implementation. The government of India should coordinate with financial institutions and research organizations on the selection, development, and implementation of these financial instruments.

Depending on which instrument mixes seem most relevant to India, we recommend further analysis to examine the instruments in greater detail: for the direct government lending program, on the design of the program to identify checks and balances to limit crowding out private investment; for infrastructure debt funds, on how to increase effectiveness and suitability for renewable energy projects; for credit guarantee on project selection and cost of implementation; for risk guarantee, assessment of guarantee programs already implemented elsewhere in the world; and for exchange rate liquidity facilities, on feasible models for Indian conditions.

Table of Contents

1. Introduction

Financing problems continue to restrict the growth of renewables

In an earlier paper (CPI, 2012), we identified that the terms of debt in India – high cost of debt, short tenors, and variable rate of interest – add as much as 24-32% to the cost of electricity generated from wind and solar PV. The main causes of high interest rates for renewable energy are general Indian financial market conditions: economic growth, high inflation, competing investment needs, and country risks (CPI, 2012). An under-developed bond market and regulatory restrictions on foreign capital flows add to the problem, while high cost of currency hedging tools negate the advantages that could come from access to lower cost foreign debt.

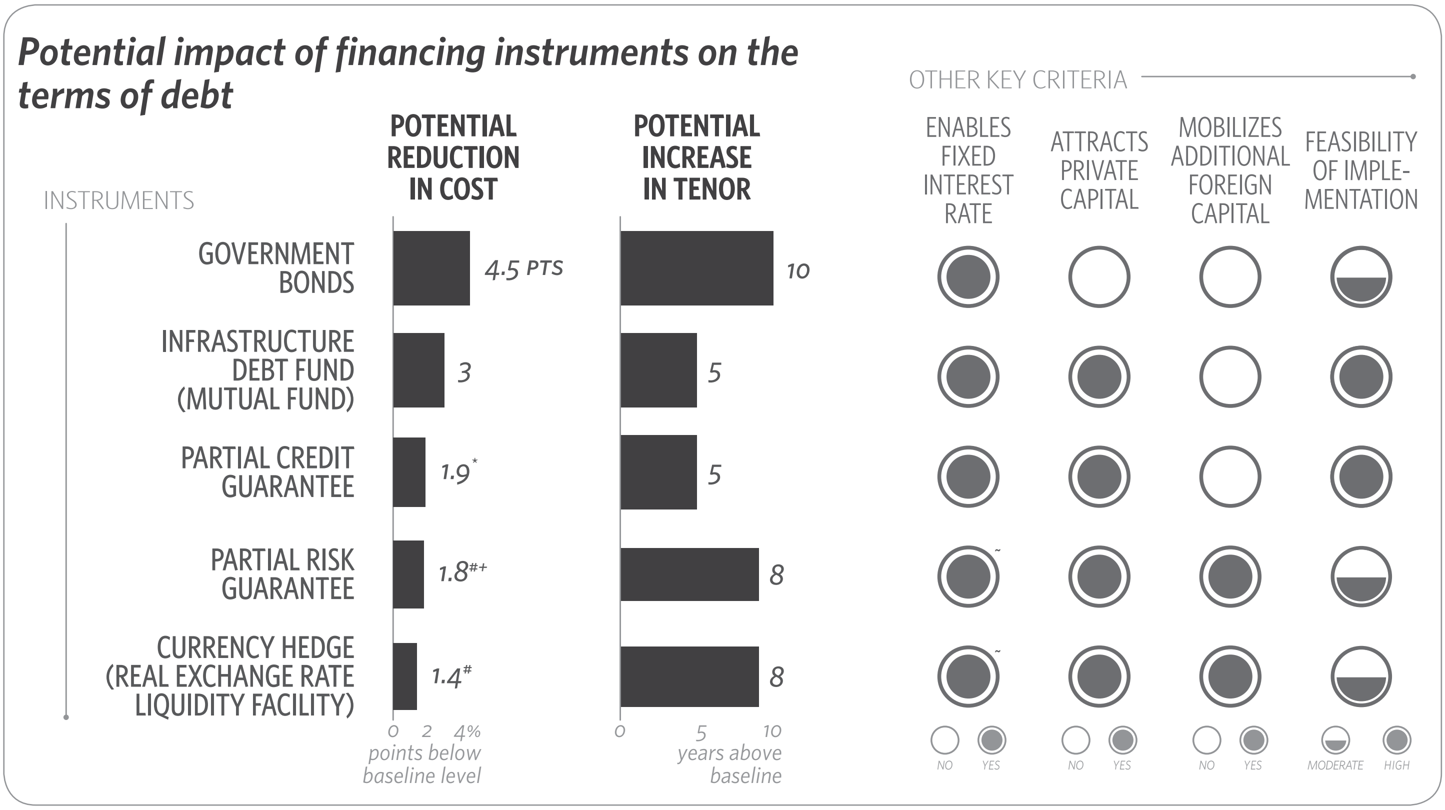
Lack of availability of debt funds for renewable power projects, whether high cost or not, may also become an impediment in achieving the goals set by the government during the 12th Plan (2012-17) and beyond. Based on the Planning Commission's estimates of shortfall of around INR 14.75 trillion for the overall infrastructure financing during the 12th Plan (Planning Commission, 2011), we expect a shortage of approximately 45% of the required funds for solar and wind, amounting to ~INR 101 billion and ~INR 414 billion respectively.

The Indian government is expecting scarcity of funds for financing infrastructure in general, and renewable energy specifically, due to a variety of factors, including asset-liability mismatch and prudential exposure caps for banks, and regulatory constraints for insurance and pension funds (Planning Commission, 2011). The Indian government has attempted to bridge this gap in infrastructure investment through a number of initiatives, such as Infrastructure Debt Funds (The Hindu, 2013) and the National Clean Energy Fund (CleanTechnica, 2010). However, given the ambitious renewable energy targets and limited resource availability, there is a need to explore alternative modes of financing for renewable power projects, by leveraging existing resources effectively.

Innovative financial instruments may solve the problems related to debt financing

Globally, governments and multi-lateral lending agencies have tried various financial instruments to solve the problems related with financing infrastructure projects, including renewables. Some of these financial instruments were designed to address a specific problem

Figure A: Potential impact of instruments on renewable energy financing



Source: CPI Analysis. *The baseline cost is 12.8%, which is the average annual return of an "A" rated bond. +Actual cost reduction depends on the structure of the guarantee. ~We assume the developer avails an interest rate swap for foreign debt. #Based on baseline foreign debt cost of 13%.

Figure 1: Typical cost break-down of domestic and foreign loans*

Source: Discussions with financial institutions, CPI Analysis
*Note: The costs of domestic and foreign loans given in this Figure are for indicative purpose but not for comparison. The domestic debt cost is for a variable rate loan, while the foreign debt cost is for a fixed rate loan.

associated with financing such as short debt tenor or high cost of debt or high volatility in foreign exchange. Nevertheless, some of these instruments are also capable of solving more than one problem; for example, credit guarantees encourage borrowers to issue bonds at a higher rating allowing access to cheaper and longer term funds.

Problems associated with financing renewables in India are the usual problems involved with financing infrastructure projects in developing countries and a number of instruments that have been used elsewhere have the potential to solve the main problems in financing renewables in India. We have examined these (Table 2), with a particular focus on: (1) instruments that would provide additional funding from domestic capital markets; (2) instruments that would help in accessing foreign funds; and (3) instruments that provide indirect support to projects by mitigating associated risks.

In the next section (Section 2), we examine the financial instruments that we recommend for providing low-cost, long-term debt for renewable energy projects. We examine potential impacts on key debt-related parameters, namely – cost, tenor, and whether or not the instruments can provide fixed rate debt. We also examine the implementation feasibility for each of the instruments recommended. In Section 3, we examine a few other promising instruments, which cannot be used to fund renewable energy projects currently due to a design mismatch or because of a structural problem. In Section 4, we highlight the key takeaways and recommend next steps for the policymakers.

2. Recommended instruments

We identified instruments that not only address the key problems associated with debt financing but also are feasible to implement

We selected financial instruments based on their potential to (a) reduce cost of funds, (b) lengthen the tenor of debt available, and (c) whether funds through these instruments can be provided at a fixed interest rate.[1] Since each of the instruments deals with a different kind of debt, we estimated the reduction in cost of debt for each instrument based on the typical baseline cost applicable for that particular instrument. Figure 1 shows the baseline costs for typical (variable-rate) domestic and (fixed-rate) foreign debt. An instrument would likely reduce the total cost of debt by reducing either one or more cost components.

Further, we considered the potential of each instrument to attract private capital (by enhancing credit, mitigating risk, or channeling private funds to projects) as well as to mobilize foreign investments in order to attract low-cost, long-term funds into the country. Finally, we examined the implementation feasibility of such instruments in the Indian context, based on a novel selection criteria (see Annex A for more details), where we rated each instrument on the parameters – the existence of a precedent, the presence of facilitating institutions,

1 Although we have examined more instruments than those highlighted here, we have included only those instruments in this table which meet our criteria with their current design elements. We included a brief discussion (Section 3) of other promising instruments.

conformity with existing financial regulations, dependence on developed financial markets, and the extent of involvement of multiple stakeholders.

The potential impact of these instruments on the financing terms for renewable power projects is highlighted in Figure A. Additionally, the government can also add an explicit subsidy to further incentivize the borrowers on top of the benefits that these instruments naturally offer. In CPI (2014b), we show that such explicit debt-related subsidies are more cost-effective than the existing policy support mechanisms, and can reduce the overall cost of renewable energy subsidies as much as 28-78% compared with the maximum possible with the existing federal policies.

Table 2: List of financial instruments explored, by-category

CATEGORY	DESCRIPTION	INSTRUMENTS EXAMINED
Local currency lending	Debt instruments that provide access to previously untapped long-term, low-cost funds from domestic capital markets.	• Government bonds • Infrastructure debt funds • Mezzanine financing • Asset-backed securities[1]
Foreign currency lending	Instruments to provide access to foreign currency lending, which are available at a lower cost and for longer tenors compared to domestic funds.	• Fixed nominal exchange rate • Fixed exchange-indexed tariff • Mezzanine financing
Risk mitigation	Guarantee instruments that reduce the risk associated with a project to facilitate access to both domestic and foreign funds at a reduced cost and increased tenor.	• Partial Credit Guarantee • Partial Risk Guarantee • Comprehensive Guarantee • Feed-in Tariff Insurance • Exchange rate liquidity facility

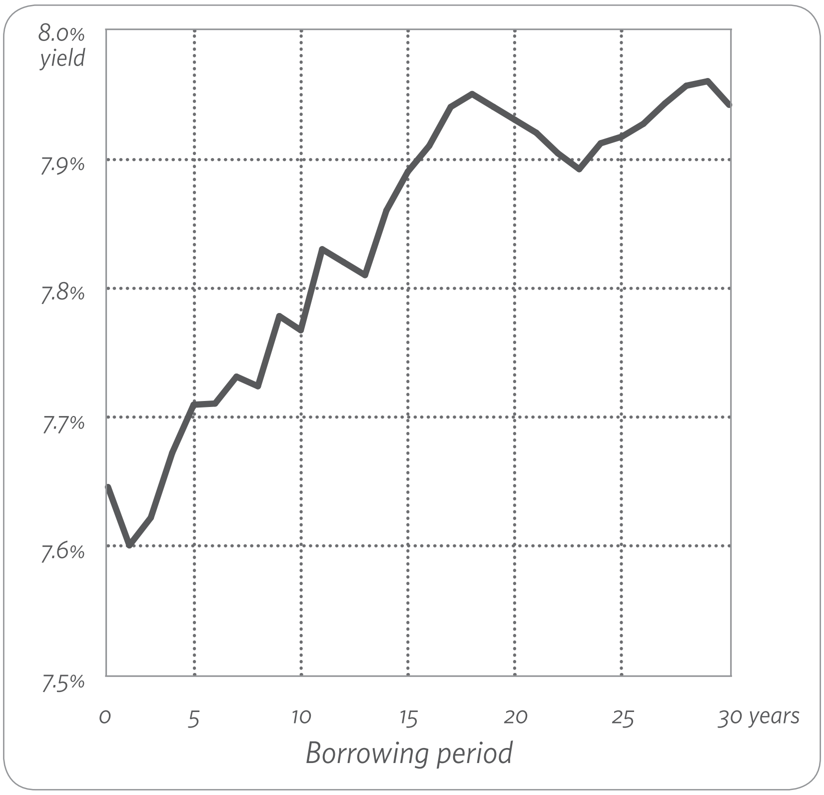
Source: Matsukawa et al (2003), The World Bank; CPI Analysis
[1] As securitization markets in India are thin and foreign lenders are subject to stringent regulations, asset backed securities may not be used to tap foreign funds.

2.1 Government bonds

The central government can have maximum direct impact by lending to renewable project developers as it can borrow and lend at cheaper rates than commercial banks

One of the ways that the government can provide concessional finance to renewable power projects is to raise money through a domestic issue of bonds and directly on-lend the proceeds to project developers. Since the government holds the highest credit rating in the domestic market, it can raise money at the lowest possible rate of interest.

Figure 2: Average yield to maturity for government dated securities

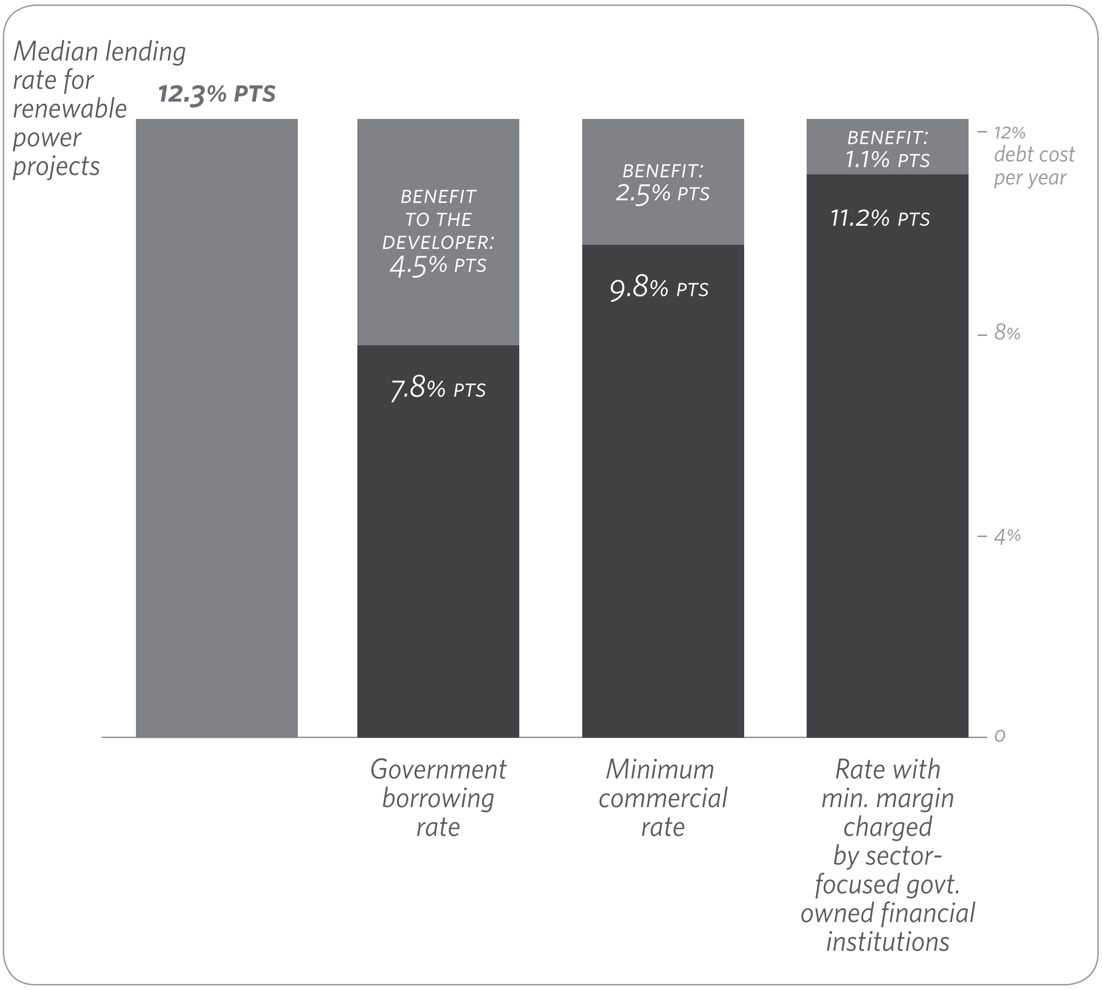


Source: Reserve Bank of India, 2013

The yield curve in Figure 2 illustrates the relationship between the tenor and yield for government bonds with maturities ranging from 1-30 years.[2] Based on maturity period, the yield on government securities varies from 7.6% to 8%, with the rate of borrowing for a 10-year bond at 7.8%. The government can pass on the benefit of its ability to borrow at the lowest rate possible to the borrowers by lending at the same rate or at a minimum required margin. In addition, through this mechanism, the government can provide a fixed interest rate loan to renewable project developers as the government itself raises money at a fixed rate.

2 6-month average (January - June 2013) of the yield on government dated securities; Reserve Bank of India

Figure 3: Potential savings from government borrowing and direct on-lending program



Source: RBI, SBI, and CPI Analysis

A direct government borrowing and lending program has the potential to reduce the cost of debt by up to 4.5 percentage points and increase the tenor by up to 10 years

The government of India can design the lending program in various ways. Though several possibilities exist, we explore three representative cases (Figure 3):

1. Lend at the borrowing rate of 7.8% or lower;
2. Lend at the lowest possible commercial margin (i.e., 2 percentage points);
3. Lend at the lowest possible sector-focused, government-owned financial institution margin (i.e., 3.4 percentage points).

Reduction in cost of debt of developers would be the highest (up to 4.5 percentage points compared with the baseline of a typical domestic loan) when the government lends at its borrowing rate of 7.8% without adding any margin to cover its expenses and account for a project risk premium. Our cash flow models (CPI, 2014b) indicate that a reduction in the cost of debt by 4.5 percentage points and increase in tenor of debt by 10 years would decrease the delivered (or levelized) cost of renewable energy by approximately 25% compared with the case in which the projects do not receive any federal support and rely on commercial loans.[3]

If the government charges for administrative/transaction costs as well as project risk premium, but is able to keep these costs below 2%, it can still lend at the best commercial rate – i.e., State Bank of India's base rate of 9.8%.[4] The benefit to the borrower is now up to 2.5 percentage points compared with the baseline of 12.3%.

If the government does not keep costs below 2%, it should aim to match the lowest margin (i.e., 3.4% by Power Finance Corporation (PFC)) charged by a sector-focused, government-owned financial institution (Table 4 in Annex B). This would result in reduction of cost of debt of the developers by up to 1.1 percentage points compared with the baseline. The government should aim for the lowest margin charged by these institutions as typically, compared with commercial banks, these institutions charge higher margins due to the risk involved in their business model related to lack of diversification.

3 The cost of onshore wind would decrease by 26% from INR 5.31/kWh to INR 3.93/kWh and the cost of solar photovoltaic would decrease by 25% from INR 8.12/kWh to INR 6.10/kWh.

4 SBI's base rate indicates the floor rate below which no commercial bank can lend money as all other lenders peg their lending and deposit rates marginally higher than SBI's rates. SBI is the largest public sector bank in the country accounting for over 20% of India's banking activity.

Implementation feasibility of government raising money and directly on-lending to project developers is moderate

The central government periodically raises money from the domestic markets through the issue of bonds of various tenors. The money raised is usually used to meet the government's expenditure commitments. While there is no precedent for the government of India to use the money raised in this manner to subsidize financing of any particular industry, this is a practice common in other developing countries, such as Brazil through the Brazilian National Development Bank, for a number of industries perceived as high priority for the country's development. BNDES is widely credited with promoting the economic success of Brazil through policies of concessionary finance (Pinheiro A.C., 2012).

If the government of India chooses to implement this scheme through one of the government-owned financial intermediaries such as the Rural Electrification Corporation (REC) or PFC, it needs to make sure that their margins are lowered for renewable energy lending. The government can in return subsidize the financial intermediary to allow reduction in the lending margin.

Regardless of the potential benefits of such a scheme, it is worth noting that a government direct lending program would likely crowd out private investment in the sector (Pinheiro A.C., 2012). Ideally the government should design such a program with checks and balances; for example, using the program to support a specific renewable energy technology for a limited period or for a pre-determined capacity installation.

This question could be a subject of future analysis. Specifically, if a government direct lending program is of interest, we recommend further examining the duration of a direct government lending program for renewable energy financing to achieve a pre-determined target, such as capacity installation, without crowding out private finance in the long-run.

2.2 Infrastructure Debt Fund (Mutual Fund model)

While the central government created Infrastructure Debt Funds to finance infrastructure projects, at present, only the Mutual Fund model is suitable for power projects, including renewables

In 2011-12, the government of India set up the Infrastructure Debt Fund (IDF) framework to provide low-cost, long-term funds for infrastructure development. An IDF can be set up under two models – a Mutual Fund (MF) or a Non-Banking Financial Company (NBFC). In this section, we focus on the MF model only, given that the current design of the NBFC model is not compatible with India's power project development. Given the potential of the NBFC model, we discuss it further in Section 3.1, to explore how it could be modified to work for renewable energy projects.

An IDF-MF functions like a typical mutual fund, which issues units to raise money and invests the proceeds in debt securities / bonds issued by companies and projects, with an exclusive focus on the infrastructure sector. The investment objective of an IDF-MF is the capital appreciation of its units, which are tradable on the stock exchange. IDF-MFs are also intended to provide much-needed liquidity to the corporate bond market in India.

Investing in the units issued by an IDF-MF is similar to investing in securitized debt instruments, with the underlying assets being the bonds issued by infrastructure companies and projects. An IDF-MF diversifies the risk of investing in infrastructure since the units derive their value from a basket of bonds rather than an individual bond. The value of the units issued is also influenced by the strength of the IDF sponsor company, the reputation of the fund manager, and the quality of the portfolio. Investors may also find more liquidity in these units as they are traded on the stock exchange, providing the investors an easier exit option.

The cost of debt may decrease by up to 3 percentage points and loan tenor could increase by up to 5 years if developers raise money via bonds rather than through bank loans

If the IDF-MF mechanism is successful in developing the corporate bond market in India, the cost of debt for the borrower could reduce by up to 3 percentage points from the current median interest rate of 12.3% on a 10-year domestic loan to renewable projects. A large and liquid corporate bond market could enable project developers to raise money directly through the issue of bonds, saving the cost of financial intermediation.

As there are no present examples of renewable project developers issuing bonds in India, the possible cost savings could be estimated from a recent bond issuance by a power generation company. For example, National Thermal Power Corporation (NTPC) — a largely government-owned enterprise with an AAA rating and therefore, bringing the lowest possible cost of funds — issued a 10-year corporate bond in 2012 with a coupon rate of 9.26% (NSE, 2013). Hence, depending on the rating, a renewable project developer could issue bonds at 9.3-12.3%, with a possible saving of up to 3 percentage points (=12.3-9.3%).

A well-developed bond market would also allow project developers to increase their debt tenor to 15 years from the current domestic loan tenor of 10 years. Typically, companies in India issue bonds with tenors ranging from 5-15 years, but as liquidity in the bond market increases, companies would likely be able to issue bonds for longer tenors since it would be easier for investors to exit the investment before maturity.

Using our cash flow models (CPI, 2014b), we find that that lowering the cost of debt by 3 percentage points and increasing the tenor by 5 years would reduce the delivered cost of renewable energy by approximately 14.5%, compared with the case in which the projects do not receive any federal support and rely on commercial loans.[5]

Implementation feasibility for IDFs is high

The framework for IDFs has been established by the government and the first IDFs under the MF and NBFC models are already approved by the respective regulatory bodies. The first IDF- MF was set up by India Infrastructure Finance Company Limited (IIFCL), a wholly-owned government of India Company, along with Canara Bank, Oriental Bank of Commerce, Corporation Bank, and Housing and Urban Development Corp. (HUDCO) as co-sponsors.

The amount of additional money that an IDF-MF can mobilize depends on the design and the eventual success of the scheme. With the present design, the fund would mostly attract additional domestic capital from insurance and pension funds, but may not attract further foreign investment as the units of the fund would be issued in INR.[6] The Planning Commission estimates a total of at least INR 1.5 trillion to be available for infrastructure investments during the 12th Plan (2013-17) from insurance companies, accounting for the mandate of 15% of total investable funds to be invested in infrastructure and housing sectors.[7,8]

The government expects the units issued by the IDFs to be rated higher than some of the individual debt securities issued by project developers due to the portfolio diversification benefits and sponsor company strength. However, to increase the certainty of success of IDF-MFs the government should address the structural issues that are hindering the development of the corporate bond market in India. For example, the government should relax regulatory restrictions on institutional investors for investments in corporate bonds and streamline bond issuance processes to reduce the costs and time taken for issuing corporate bonds.

If IDF-MFs could manage to get better ratings than the individual infrastructure developers, they would be able to attract investments from insurance and pension funds. Funds available with insurance companies may also grow over time with increasing insurance penetration in India. Additionally, any project developer with a credit rating below the investment grade could opt for credit enhancement using partial credit guarantees (Section 2.3) to improve the rating of the project bond.

2.3 Partial Credit Guarantee

Partial credit guarantees enhance the credit rating of a bond to reduce the cost of debt and provide access to long-term funds

Partial credit guarantees reduce the cost of debt by enhancing the credit rating of a project. The guarantor agency (usually a multilateral agency or a private financial institution) leverages its higher credit rating to reduce the risk associated with the project by guaranteeing a specific proportion of the borrowing. It enables the leverage of resources by attracting domestic or foreign private investment with relatively low capital outlay (IFC, 2010; Infrastructure Today, 2013). Since it assumes that funds are raised through a bond issue, the cost of funds remains fixed.

For bonds with a lower credit rating, the cost of debt is higher since the expected risk premium is higher. The

5 The cost of onshore wind would decrease by 14.9% from INR 5.31/kWh to INR 4.52/kWh and the cost of solar photovoltaic would decrease by 14.1% from INR 8.12/kWh to INR 6.97/kWh.

6 Foreign investors are allowed to invest in these units but have to bear the currency risk as with their usual investments in the Indian stock markets.

7 Planning Commission estimated 6.14% of the total investment sum available for infrastructure and housing sector to be directed toward infrastructure sector.

8 However, life insurance companies were not able to invest up to their mandate of 15% in infrastructure sector during 2007-2012 due to lack of good quality projects with rating of above AA. For example, life insurers' share of infrastructure investments among their total investments accounted only for 10% in 2011-12 (Deloitte, 2013).

cost of borrowing for an AA rated bond is up to 3.48% lower than a BBB rated bond (Figure 4).[9]

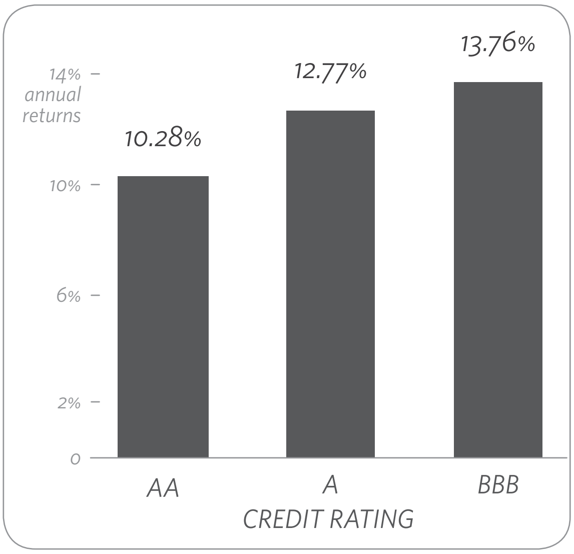
Depending on the structure of the guarantee, the potential reduction in the cost of debt is up to 1.9 percentage points and the estimated increase in tenor is by up to 5 years

We consider two partial credit guarantees in this section – the Asian Development Bank's (ADB) first loss default guarantee under its pilot credit enhancement scheme with India Infrastructure Finance Company Limited (IIFCL) and the International Finance Corporation's (IFC) partial credit guarantee for developing nations, which covers 100% of each debt service payment subject to a cumulative maximum of the guarantee amount (World Bank, 2013; Business Line, 2012).[10,11] The guarantee fee depends on the source rating of the bond (ADB, 2012). The maximum guarantee amount is 60% of the total borrowing for ADB and assumed to be the same for IFC (ADB, 2011).

We assume that the average guarantee fee for each of the possible credit enhancement schemes represented in Column C of Table 4, below, is the average of the cost range provided by the ADB and IFC. Cost reduction in Column B is based on the difference in annual returns by rating category depicted in Figure 4.

In Table 3, we see that the net reduction in the cost of debt through a partial credit guarantee is estimated to lie in the range of 1.4-1.9 percentage points. The benefit is highest (i.e., 1.9%) in the case of credit enhancement from A to AA,[12] which is possible if banks assume construction risk and project bonds are issued after the construction period, when the requisite level of credit

Figure 4: Annual returns from corporate bonds, by rating category



Source: New Bond Spread and Total Return (2011), Standard & Poor's

enhancement is lower on account of reduced risk.[13] A bond issue would also allow the borrower to access funds at a fixed cost.

Pension and insurance funds have longer investment cycles of 10-15 years, compared to 7-10 year loans offered by commercial banks (Business Line, 2013a). However, Indian regulations permit long-term investors such as pension and insurance funds to invest in corporate bonds only if they have a minimum credit rating of AA from at least two rating agencies (DIPP, GoI, 2012). By enhancing the credit rating of project bonds to AA, partial credit guarantees make it possible to tap additional funds from insurance and pension funds. Also, raising debt from the corporate bond market allows extending the tenor by 5 years (Section 2.2) compared with the typical loan tenors available through commercial banks.

Using our cash flow models (CPI, 2014b), we find that that reducing the cost of debt by 1.9 percentage points and increasing the tenor by 5 years would reduce the delivered cost of renewable energy by approximately 10.5%, compared with the case in which the projects raise funds at a cost equivalent to a typical A rated bond.[14]

9 Calculated by matching S&P's return-rating data for USD denominated bonds with the corresponding rating for the Indian market using CRISIL's guidelines for translating global scale ratings to CRISIL's scale: global ratings are usually 4-5 points lower than Indian ratings. Data for American bonds has been used since the database is larger compared to Indian markets, where corporate bond data, especially for lower ratings, is thin.

10 ADB provides a counter guarantee to IIFCL up to 50% of the exposure under the guarantee. Using its AAA rating, IIFCL raises the credit rating of the project bonds from BBB or A to AA. The amount of guarantee provided and the guarantee fee vary depending on the source rating of the bond and the amount of credit enhancement required to raise the rating to AA, subject to a maximum of 60% of the total borrowing.

11 IFC's guarantee fee is 2-5% of the guarantee amount. The precise guarantee amount is not specified, and IFC does not currently offer this guarantee in India. We have therefore assumed the coverage to be the same as the ADB guarantee.

12 Compared with the baseline cost of (variable-rate) domestic debt of 12.3%, this would be a cost saving of 1.4 percentage points.

14 The cost of onshore wind would decrease by 10.8% from INR 5.36/kWh to INR 4.78/kWh and the cost of solar photovoltaic would decrease by 10.1% from INR 8.20/kWh to INR 7.37/kWh.

Table 3 : Net reduction in cost of debt through a Partial Credit Guarantee

CREDIT ENHANCEMENT	COST OF FUNDS WITH ORIGINAL RATING* (A)	COST REDUCTION FROM CREDIT ENHANCEMENT (B)	GUARANTEE FEE (C)	COST OF FUNDS WITH PCG (D=A-B+C)	NET COST REDUCTION (A-D)
ADB (A to AA)[a]	12.8%	2.5% pts.	0.60%	10.9%	1.9% pts.
ADB (BBB to AA)	13.8%	3.5% pts.	1.7%[+]	12.0%	1.8% pts.
IFC (BBB to AA)	13.8%	3.5% pts.	2.1%[#]	12.4%	1.4% pts.
Average	13.4%	3.2% pts.	1.5%	11.8%	1.7% pts.

*Cost of funds based on returns by rating category presented in Figure 4
+ For a BBB-rated bond, ADB's guarantee fee is between 1.3% and 2.1% of the outstanding bond value. For our calculations, we assume an average of 1.7%.
[#] For a BBB-rated bond, IFC's guarantee fee is estimated to lie between 1.2% and 3% of the outstanding debt. The average guarantee has been assumed to be 2.1%.
[a] We also consider a case where the banks provide debt for the initial years and ADB provides credit enhancement after the construction is completed in order to attract long-term investors for take-out financing. In the absence of construction risk, we assume that the credit rating of the project is A. In this case, the guarantee fee is between 0.2% and 1%. For the purpose of calculation, we assume an average fee of 0.6%.
Source: Asian Development Bank, International Finance Corporation, CPI Analysis

The implementation feasibility of partial credit guarantees in India is high

Partial credit guarantees have been successful in attracting private investment in other developing nations. In India, the institutional framework for offering such guarantees is already available in the form of IIFCL under ADB's pilot project, which lowers the implementation cost (Business Line, 2013b). However, partial credit guarantees require coordination among the lender, the multilateral agency (which offers counter-guarantees), the project developer and the guarantor, which can be complex to manage.

Although partial credit guarantees are effective in mobilizing debt even in the absence of large corporate debt markets, the impact is likely to be higher when bond markets are well-developed, which is not the case in India. We recommend further analysis on the design aspects of partial credit guarantees, such as the nature of coverage and risk sharing among stakeholders. Implementation issues such as project identification and sourcing of funds may also be explored.

2.4 Partial Risk Guarantee

Partial risk guarantees protect foreign lenders from specific risk, such as political risk

Partial risk guarantees attract foreign funds by mitigating political risks such as breach of contract by the state, expropriation and currency inconvertibility, thereby reducing the cost of financing (ADB, 2013). A partial risk guarantee typically covers the entire debt amount as well as interest payments.

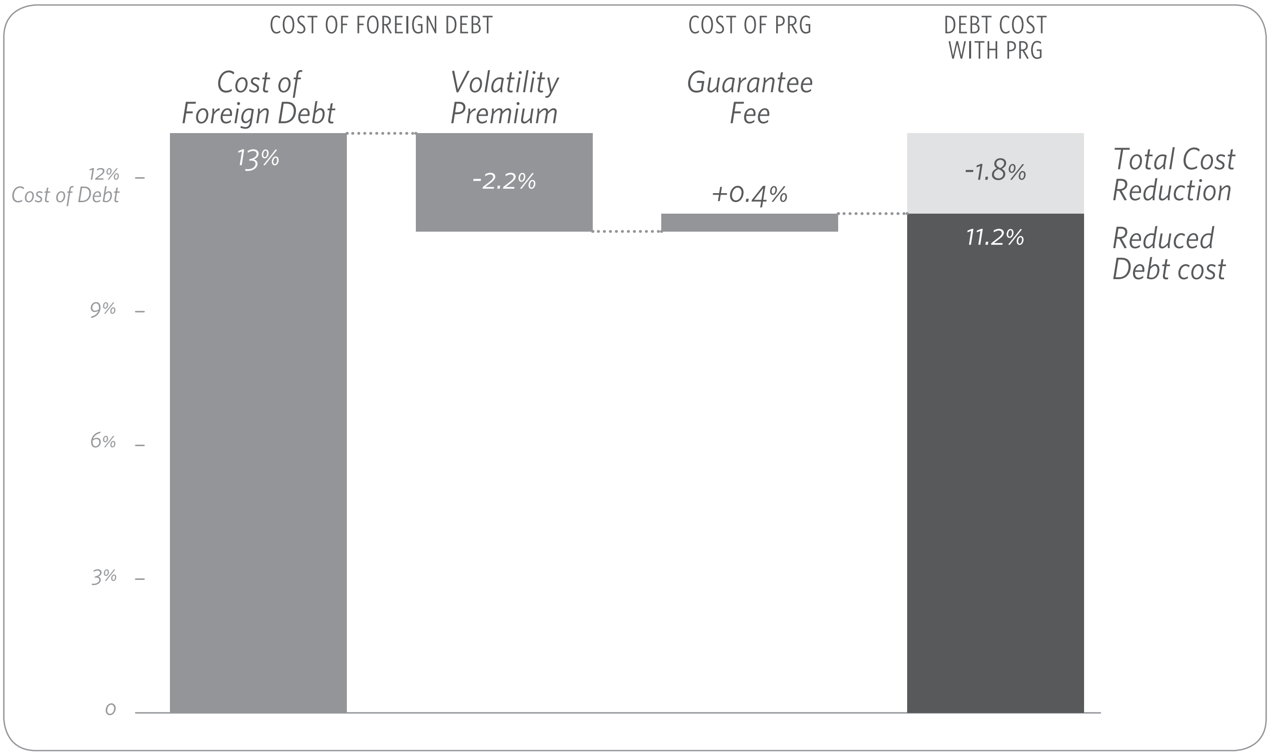
While partial credit guarantees cover defaults arising from all risks subject to a pre-determined maximum amount, partial risk guarantees cover all defaults arising from a specific risk. Furthermore, partial risk guarantees may be structured to protect either the bondholders or project developers, while partial credit guarantees protect bondholders.

Depending on the structure of the guarantee, partial risk guarantees may reduce the cost of debt by up to 1.8 percentage points and increase the tenor by up to 8 years

Based on the World Bank's fee structure for a partial risk guarantee, with a 10-year tenor, the cost of the guarantee as a proportion of total financing cost is estimated to be 0.4%.[15] The net reduction in the cost

15 The World Bank's partial risk guarantee involves a one-time initiation fee of 0.15% of the amount of the guarantee or a minimum of USD 100,000, a one-time front-end fee of 0.25% and a one-time processing fee up to 0.5% of the amount of the guarantee for out-of-pocket expenses. Thereafter, a guarantee fee of 0.3% per annum is to be paid on any amount disbursed.

Figure 5: Reduction in Cost of Debt through Partial Risk Guarantee



Source: Discussion with banks and project developers, World Bank, and CPI Analysis

of debt depends on the structure of the guarantee and the extent of risk coverage. For example, as discussed in Section 2.5, the cost of foreign debt for renewable energy in India is approximately 13%, which includes a premium of 2.2% for liquidity, volatility and political risk. For the purpose of illustration, let us optimistically assume that this entire risk is covered by a partial risk guarantee. Accounting for a guarantee fee of 0.4%, an upper bound on the cost reduction would be up to 1.8 percentage points, as illustrated in Figure 5.[16]

By facilitating the mobilization of private foreign capital, partial risk guarantees provide access to longer tenor financing (Ferrey S., et al., 2006). The instrument would most likely extend the tenor up to 18 years from the usual 10 years as it reduces the risk involved for foreign lenders. The developer has also the option of fixing the cost of debt through an interest rate swap.

Using our cash flow models (CPI, 2014b), we find that reducing the cost of debt by 1.8 percentage points and increasing the tenor by 8 years would decrease the delivered cost of renewable energy by approximately 12.7%, compared with the case in which the projects do not receive any federal support and rely on commercial loans.[17]

The implementation feasibility of partial risk guarantees in India is moderate

India has the necessary infrastructure and conducive regulatory framework for offering such a risk guarantee mechanism (Panchabuta, 2012). Furthermore, the effectiveness of the guarantee is not heavily dependent on the corporate bond market and the upfront investment is low compared to direct lending by the government. One of the drawbacks of a partial risk guarantee is the sovereign counter-guarantee requirement: multilateral agencies such as the World Bank provide partial risk guarantees only if the national government agrees to provide a counter-guarantee for any draw down on the guarantee amount. This has led to low up-take across the world due to complex stakeholder interactions under such an arrangement (CPI, 2013). In addition, the efficacy of existing partial risk guarantee programs in mobilizing finance for renewable energy in countries where they exist, such as Bangladesh and Nigeria, is unclear since a detailed assessment of outcomes is not available.

With a 10-year tenor, the cost of the guarantee as a proportion of total financing cost is 0.39% (assuming that draw downs are repaid within one year).

16 Compared with the baseline cost of (variable-rate) domestic debt of 12.3%, opting for a (fixed-rate) foreign loan with partial risk guarantee would amount to a cost reduction of up to 1.1 percentage points.

17 The cost of onshore wind would decrease by 13.1% from INR 5.39/kWh to INR 4.68/kWh and the cost of solar photovoltaic would decrease by 12.2% from INR 8.23/kWh to INR 7.23/kWh.

For implementing partial risk guarantees in India, the government should examine the design for this instrument in greater detail. The success of existing partial risk guarantee programs and the types of risk that should be covered under such a guarantee are areas for further analysis.

2.5 Exchange rate risk management

The high costs of hedging in India almost entirely negate the benefit that foreign borrowings have over domestic borrowings

Foreign capital, specifically foreign debt, due to lower interest rates in developed markets, provide a cheaper financing option for infrastructure projects, including renewables. While foreign funds are available to Indian project developers at lower rates than domestic debt, the high costs of hedging associated with lack of liquidity and depth of derivative markets often neutralize the benefit of low-cost foreign funds. While a typical foreign loan is available to an Indian project developer at a rate of LIBOR + 300 basis points (bps) which amounts to approximately 3.4 percentage points, a 100% hedge on the loan adds approximately 7 percentage points to the debt cost (Capital Mind, 2013).[18] At present, the all-in-cost of a foreign loan is around 13% (Figure 1), which is almost equivalent to the domestic loans that are available in the range of 12-13% (Morgan Stanley, 2012).

Hedging costs also depend on the creditworthiness of the borrower, the currency being hedged, the type of instrument used, and the period of the hedge. In theory, the cost of currency swaps should equal the differences in inflationary expectations between countries plus a premium for liquidity, transaction costs, and volatility risk (CPI, 2014a; Morgan Stanley, 2012; Sivakumar A., e t al., 2008). In 2013, the International Monetary Fund (IMF) estimated a long-term (10-year) inflation differential of 4.8 percentage points between India and the U.S. (Figure 6), meaning that liquidity premium and transaction costs account for anywhere between 0.2 to 2.2 percentage points (hedge costs of 5-7 percentage points minus inflation differential of 4.8 percentage points) to the debt cost (Figure 7).

There are various ways that the central government can explore lowering the cost of currency hedging in India. A government managed currency hedge may lower the hedging costs for infrastructure project developers as the credit profile of the government would be higher than, for example, a stand-alone renewable project. In addition, the government should also be able to lower liquidity and transaction costs due to the large scale operation at the government level. While there are many ways that the government can intervene to lower the hedging costs, we discuss a few possible instruments through which the government can achieve this goal in the following sections.

A fixed exchange rate mechanism can shield developers from foreign exchange risk, but may be a crude way of managing the risk as there is no cap on the downside for the government

The central government can help renewable power project developers mitigate the currency risk by entering into a nominal exchange rate hedging contract. Such a contract would fix the exchange rate at (say) INR 55 per 1 USD, where fluctuations in the exchange rate above and below the fixed rate would be borne by the government through a dedicated fund (Morgan Stanley, 2012). The government would pay from the dedicated fund if the INR depreciates and can replenish the fund when it gains from INR appreciation. In this mechanism, the project developers and eventually the power consumers would benefit from lower costs as the entire risk (including inflation differential plus liquidity and volatility premiums) in foreign exchange would be absorbed by the government/ tax payers. While the expenditure to the government would be positive or negative depending on the currency movements in any particular year, the amount of risk taken by the government may turn unmanageable if the rupee depreciates sharply. We provide an example of how this facility would work, and the corresponding exposure to the government, in Annex C.

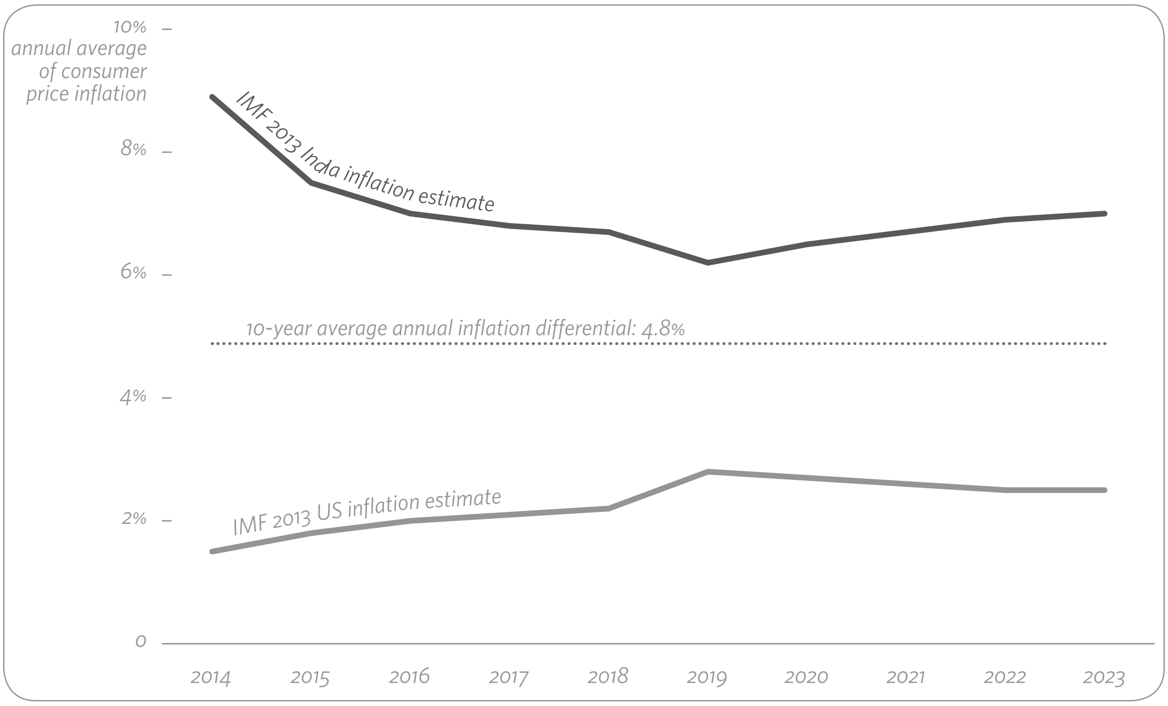
Foreign exchange-indexed tariff would protect developers from currency risk, but its success depends on political will to adjust tariffs when required

The government could help renewable project developers manage foreign exchange risk by linking a portion of the power purchase price to foreign exchange movements.[19] The amount of the tariff that would need to be linked to USD or Euros would depend upon the

18 To avoid such high hedging costs, companies may opt for a partial hedge in the range of 60-70% which costs around 2-3 percentage points for a period of 5-6 years (discussion with Reliance Power).

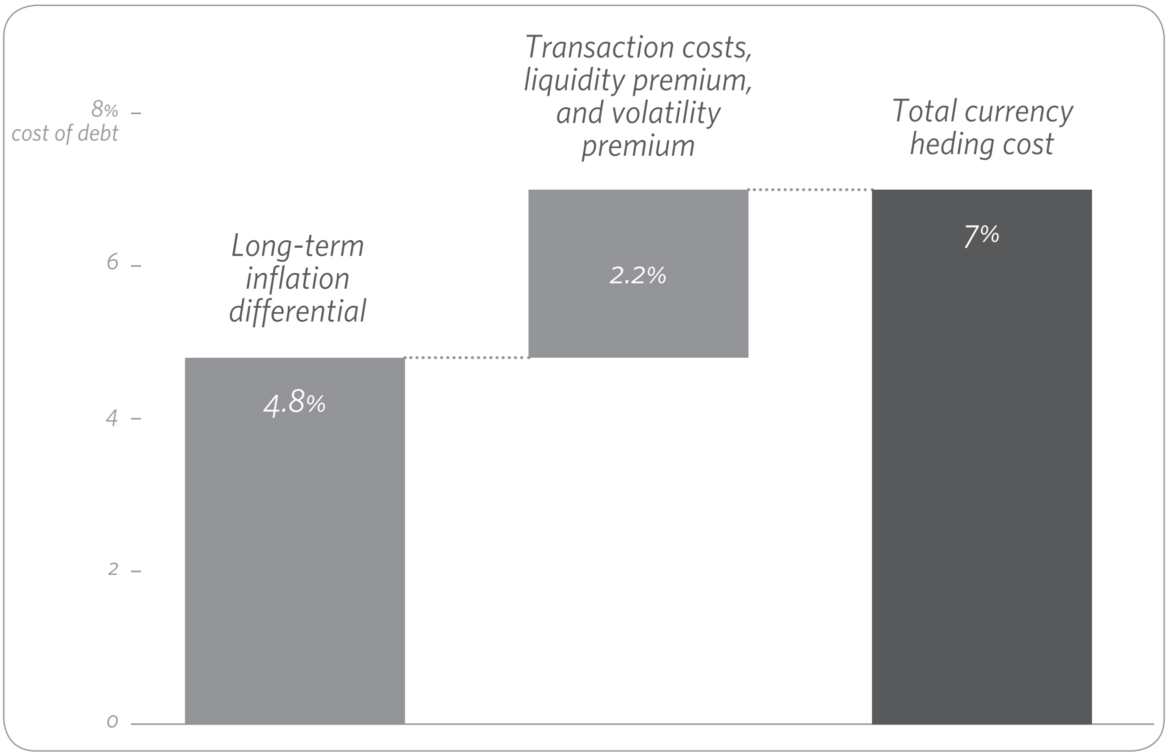
19 Typically, conventional power project developers who are dependent on both fuel imports and foreign funding have the highest exposure to currency movements. In the case of renewable power projects, the foreign currency exposure risk is comparatively lower due to no dependence on imported fuels; however, those who used international loans face significant foreign exchange risk in servicing their debt.

Figure 6: India-US inflation differential estimates, 2013



Source: IMF

Figure 7: Break-up of currency hedging cost in India, 2013



Source: Discussions with banks and power producers, IMF proportion of a project that is supported by the foreign-currency-denominated debt (CPI, 2014a). Such a tariff mechanism would shift the risk of currency depreciation caused by inflation from project developers to power purchasers. However, project developers would continue to bear the risk of currency depreciation from factors other than inflation such as volatility in global financial flows and liquidity concerns.

In the past, foreign exchange-indexed tariffs were used in developing countries, such as China, Mexico, and Indonesia, for the development of power and water projects. In fact, India also experimented with such a tariff mechanism a combined cycle gas plant in 1997.[20] However, such mechanisms didn't work well in extreme stress situations as experienced in Indonesia and Argentina as these governments refused to increase tariffs to match currency depreciation against the USD (Matsukawa T., et al., 2003).

The World Bank identifies the major risk with the foreign exchange-indexed tariff mechanism to be the need to increase tariffs beyond the rate of inflation due to sharp depreciation in local currency against the USD at some point in a long-term agreement. Government authorities may refuse to increase the tariffs more than the inflation rate due to political reasons, while offtakers or consumers may also refuse such increases by defaulting on the agreement and forcing for renegotiation of the contract.

2.5.1 Exchange rate liquidity facility

The exchange rate liquidity facility provides a cheaper currency hedging option to developers by diversifying the currency risk to different stakeholders

The government could introduce an exchange rate liquidity facility that can act as a standby credit line to mitigate currency depreciation risk for renewable energy developers who accessed foreign loans. This would help a project developer draw down funds from the facility when the domestic currency depreciates and the project's cash flows available for debt service (converted into USD) go below a predetermined floor value. The facility can be structured on similar lines as the Overseas Private Investment Corporation's (OPIC) and Sovereign Risk Insurance's Real Exchange Rate Liquidity Facility (Matsukawa T., et al., 2003), which relies on the observation that real exchange rates are much less volatile than nominal ones.

Similar to OPIC's facility, electricity tariffs should be adjusted for inflation periodically, thus reducing the nominal exchange rate risk problem to managing a real exchange rate risk one. In the interim, if there are adverse movements in real exchange rates, the developers would be allowed to draw from the liquidity facility to service the debt. The amount withdrawn from the facility would be indicated as a subordinated loan[21] to the project's senior lenders in the books of the borrower and would be repaid whenever the project generates surplus cash; resembling a revolver credit facility (Figure 8).

The liquidity facility can lower the cost of debt by up to 1.4 percentage points depending upon withdrawals and extend tenor by up to 8 years

The exchange rate liquidity facility would likely encourage project developers to opt for foreign loans as it provides a cheaper currency hedge option compared to the existing market instruments, which presently account for approximately 7% of the debt cost. Project developers using the liquidity facility would bear the minimum risk in the movement of exchange rates, which would be in line with the long-term inflation differential estimates (Figure 6).

The cost of the liquidity facility would likely include a commitment fee of - e.g., 0.85% per year – plus an interest on the amount withdrawn from the facility.[22,23] However, it is difficult to estimate the cost that the interest rate would add to the total cost of debt in general as the interest rate charged would depend on the size and duration of withdrawal. In general, the cost of withdrawals can be estimated by multiplying the probability of draws with the duration of draws and interest rate charged by the facility provider.

In total, the cost savings for a project developer would be equivalent to the cost of currency hedge (7%) minus the cost of the liquidity facility to the developer plus the inflation differential (Figure 9). At an assumed commitment fee of 0.85%, compared to the baseline foreign debt cost of 13%, the liquidity facility can reduce the cost

20 GVK Industries' 217 MW (Phase 1) in Jegurupadu, Andhra Pradesh

21 In the liquidity facility offered by OPIC to AES Tiete, the amounts drawn from the facility were subordinated only from a cash flow repayment standpoint, but are equivalent to a project's senior debt in case of liquidation.

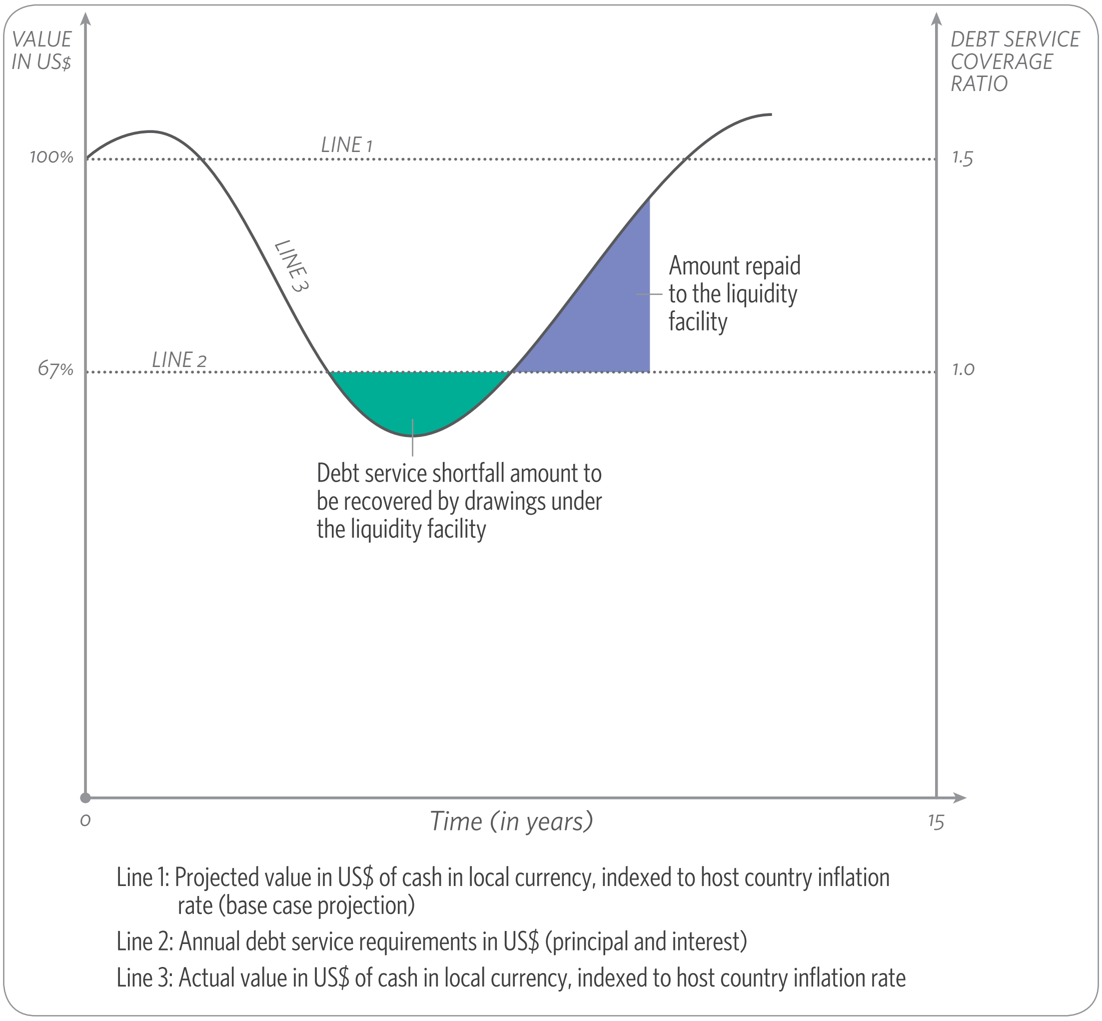
22 Discussion with Robert Sheppard, the architect of the original Exchange Rate Liquidity Facility.

23 The interest charged by the provider of the liquidity facility would be priced lower than the interest rate the developer pays for the project's senior lenders, reflecting the lesser risk taken by the liquidity facility provider (Cheikhrouhou H., et al., 2007).

of debt by up to 1.4 percentage points, assuming that there were no withdrawals from the facility. Any withdrawals would attract additional interest rate cost, which would lower the overall benefit.[24]

The exchange rate liquidity facility would lower the foreign exchange risk for the borrower and, in turn, for foreign investors. Although foreign loans could be extended up to 18 years, the lack of currency hedging instruments for such long durations limits the tenors to 10 years. The exchange rate liquidity facility would help to extend the tenor of foreign loans to up to 18 years.

Figure 8: Structure of foreign exchange rate liquidity facility



Source: Proposal of Foreign Exchange Liquidity Facilities, Robert Sheppard, Independent Consultant

Using our cash flow models (CPI, 2014b), we find that that reducing the cost of debt by 1.4 percentage points and increasing the tenor by 8 years would decrease the delivered cost of renewable energy by approximately 11.2%.[25]

Feasibility of introducing this facility in India is moderate

The government of India or any multi-lateral agency that provides an exchange rate liquidity facility in India could determine the size of liquidity facility based on the historical volatility of real exchange rates of INR/USD and the prospective debt service coverage ratios of the projects to be covered under this facility. OPIC managed to cover a USD 300 million foreign bond issue by AES Tiete (a Brazilian hydropower company) under this facility for the first time ever in 2001 with a standby credit facility of USD 30 million (Institute of International Economics, 2003). The government of India may similarly size the liquidity facility at 1/10th the size of the foreign bond issues that it wants to support.

If the Indian government plans to introduce this facility for renewable power projects in India, it needs to address some of the existing hurdles that restricted the use of this facility. The government must educate project developers on the benefits of using this facility as historically there has been very little effort in this direction (Sheppard R., 2003). The terms of the liquidity facility extended by OPIC remain confidential and hence there could be lack of understanding about this facility among the developer community. The government must also remove political interference in tariff adjustments and ensure the tariffs are indexed to inflation. Electricity tariffs in India are set by the State Electricity Boards and are usually subject to political interference of the state governments. Indexing electricity tariffs to inflation,

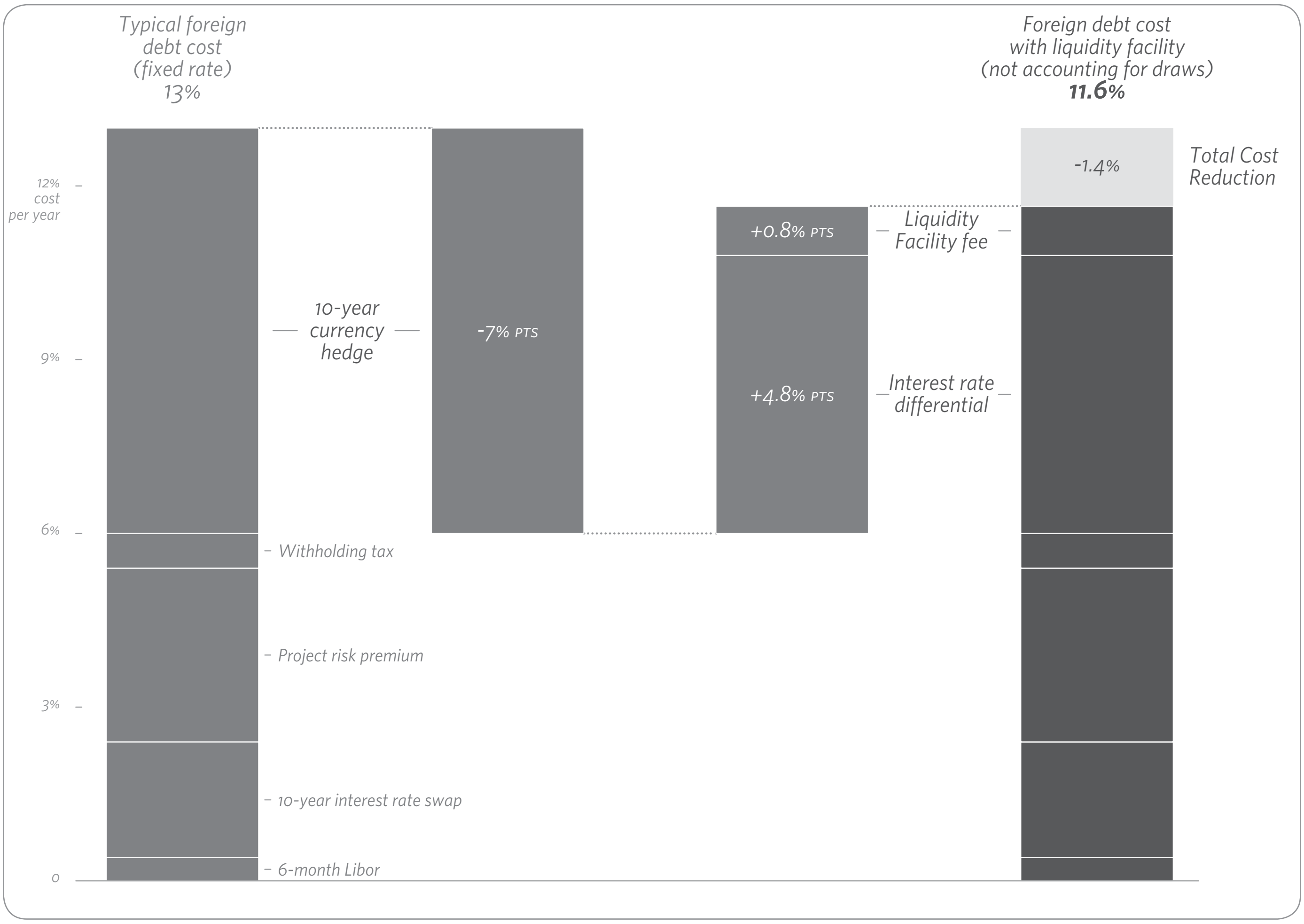
24 The cost savings compared with domestic loan at 12.3%, a variable rate loan, would be 0.6 percentage points.

25 The cost of onshore wind would decrease by 11.6% from INR 5.39/kWh to INR 4.76/kWh and the cost of solar photovoltaic would decrease by 10.8% from INR 8.23/kWh to INR 7.35/kWh.

which is currently at high levels, would likely be politically unpopular.

We recommend further work to examine the foreign exchange liquidity facility in more detail to identify a design that is suitable for Indian conditions. We also recommend analysis on specific issues such as the size of the liquidity facility and design of tariff.

Figure 9 : Savings in cost of foreign debt with forex liquidity facility



Source: Discussions with developers, financial institutions, Robert Sheppard, Independent Consultant.

3. Other promising instruments

3.1 Infrastructure Debt Fund (Non-Banking Finance Company model)

IDF-NBFCs were established to provide long-term finance to infrastructure projects, but have not been expanded to renewable energy

Infrastructure Debt Funds (IDFs) can be set up either as a Mutual Fund (MF) or as a Non-Banking Finance Company (NBFC).[26] IDFs formed as NBFCs are pre-dominantly established to re-finance infrastructure projects developed under a Public Private Partnership (PPP) model and have successfully completed one year of commercial operations (MoF, 2011). The IDF-NBFCs would likely tap resources from wide variety of investors compared to IDF-MFs as they can raise money through issue of either INR or USD denominated bonds.

In addition, IDF-NBFCs are less risky for investors compared to IDF-MFs due to the in-built credit enhancement mechanism, which stems from the tripartite agreement between the Concessionaire (project developer), Concessionary Authority (Government of India (GoI) or GoI's agency such as the National Highways Authority of India), and the IDF (CRISIL Ratings, 2013). This agreement would allow the IDF to be compensated by the Concessionary Authority in case of a default by the Concessionaire. The first IDF under the NBFC structure – India Infradebt Ltd. – was rated AAA by CRISIL, primarily due to this feature.[27] A rating equivalent to AA or above would allow the fund to raise money at lower rates and from long-term sources such as insurance and pension funds.

IDF-NBFCs may not be able to fund power/ renewable projects as the current design requires them to re-finance only projects developed under PPP model

While the IDF-NBFC model has the characteristics needed for renewable energy financing, the model's lending is limited to PPP projects alone. The model is designed to focus on late-stage assets and ultimately on government owned assets (KPMG, 2013). Following the Electricity Act 2003 and the liberalization of the electricity sector, the private sector has taken a lead role in building generation projects and presently, no new electricity generation projects are being built under the PPP model. An alternate way that IDF-NBFCs can aid renewable energy development is by re-financing some of the transmission projects that are currently being developed under PPP model. We recommend further analysis to explore design issues for making IDF-NBFCs suitable for renewable energy financing.

3.2 Mezzanine Capital

Mezzanine finance could be used to reduce the overall cost of capital by bridging the gap between debt and equity

Mezzanine finance is a hybrid instrument that bridges the gap between debt and equity. It provides patient capital in the form of subordinated debt or preferred equity, thereby making more finances available where debt markets are thin or unable to meet industry needs. It also permits an investor to raise funds at a lower cost compared to equity without diluting ownership. From the investors' perspective, mezzanine structures provide greater predictability of returns and more security relative to equity, along with the possibility of equity-like returns contingent upon financial performance of the project.

The institutional feasibility of mezzanine finance in India is uncertain

Indian renewable energy firms such as Mytrah Energy and Azure Power have raised financing through mezzanine capital from domestic and international investors (MNRE, USAID India, 2013). However, mezzanine finance requires large and liquid markets to provide exit options for investors. The lack of a large and diversified pool of projects and underdeveloped financial markets may have led to limited use of mezzanine finance in Indian renewable energy projects.

The possibility of using mezzanine finance requires further analysis

International Finance Corporation's (IFC) renewable energy mezzanine facility has been implemented on a pilot basis in a number of developing countries with underdeveloped financial markets. Under this facility, the credit risk for the projects is assumed by IFC (IFC Projects Database, 2013). Mezzanine capital has also

26 NBFCs lend and make investments like banks, but there are a few differences between the two: i) NBFC cannot accept demand deposits; ii) NBFCs do not form part of the payment and settlement system and cannot issue cheques drawn on themselves; iii) Deposit insurance facility of Deposit Insurance and Credit Guarantee Corporation is not available to depositors of NBFCs, unlike in case of banks. [Source: RBI]

27 At present, this model of tripartite agreement was approved only for road projects (with NHAI as the Concessionary Authority) by the Cabinet Committee on Infrastructure. India Infradebt will likely choose a similarly strong Concessionary Authority for funding projects in other sectors of infrastructure.

been used by the World Bank to finance renewable energy projects in Central America (World Bank, 2012). This suggests that it is possible to use mezzanine in relatively illiquid markets through efficient risk allocation. We recommend further analysis to examine the capacity of different financial intermediaries in India to assume such risk, the limitations posed by the regulatory environment, and the appropriate structural composition of such financing for Indian renewable energy.

3.3 Asset-Backed Securities

Asset-backed securities make it possible to match the tenor of financing with the useful life of an asset

Renewable energy projects usually have a useful life of 20-25 years. Hence, the tenor of funds raised on the basis of these assets should be longer. Asset-backed securities are long-term bonds backed by the cash flows associated with project assets.

The Indian government proposed setting up Infrastructure Trust Funds in September 2013, modeled along the lines of Real Estate Investment Trusts (REITs) in Singapore (Economic Times, 2013).[28] The underlying revenues of infrastructure projects would be transferred to a trust, which would issue bonds secured by these cash flows. The funds mobilized through the bond issue would be on-lent to project developers. Furthermore, by setting up an expert-managed fund, the government seeks to address the lack of experience with sectors such as renewable energy, which limits bank lending to such projects. International pension funds have shown interest in investing in such funds (Livemint, 2013b).

However, the success of such a fund in India is uncertain due to shallow bond markets and project delays

Asset-backed securities have been successful in economies with large, liquid corporate bond markets which can attract a large number of investors. REITs are seen as a method to lend liquidity to otherwise illiquid assets. In the Indian context, weak capital markets, high stamp duty and the lack of effective foreclosure laws have led to a shallow securitization market (MoF, 2006). This may also affect the feasibility of implementing an Infrastructure Trust Fund since attracting investors would be difficult.

28 Singapore REITs are required to distribute at least 90% of their taxable income. Furthermore, tax is only payable at the investor level and not at the REIT level. For India, a favorable tax structure for the proposed Infrastructure Trust Fund would help attract institutional investments.

Further, Indian infrastructure projects are facing major time and cost overruns. Only a quarter of all infrastructure projects are commissioned on their scheduled date (EY, 2012). This is also true of renewable energy projects, which have moved at a sluggish pace on account of policy uncertainty and rupee depreciation (Bloomberg, 2013). Given this scenario, an infrastructure trust fund may struggle to diversify risks and provide adequate returns on investment.

Risk management and the implementation framework need to be studied in greater detail

The level of dependence on bond markets would become clearer when the government releases guidelines on the structure of Infrastructure Trust Funds. Mechanisms for risk management and managing project delays require further analysis.

3.4 Bonds

3.4.1 Sovereign bonds

The central government could raise money through the issue of sovereign bonds to provide concessional finance for renewable power projects

The government of India can raise low-cost, long-term funds from international markets at better terms than an individual project developer due to the inherent sovereign guarantee. International funds can be raised through the issue of foreign bonds (otherwise known as sovereign bonds) by the central government. Funds raised in such a manner can be used to provide concessional financing for renewable power projects.

Lack of a precedent in government issuing sovereign bonds may act as a hurdle

India has never issued sovereign bonds before and (it appears) that the government is still not comfortable issuing bonds in the international markets. This may be largely due to fears that such a step could attract greater international scrutiny on the government's finances (Arjun Parthasarathy, 2013). Also, a sovereign bond issue by the government of India would set the benchmark rate for all foreign borrowings (Indian Express, 2013a). Eventually, all corporate borrowings would need to be priced above the government's cost of borrowing. This may, in fact, raise the cost of borrowing from foreign sources for some of the reputed companies in India. Currently, Indian companies issue bonds in the U.S. market priced at U.S. treasury rates (for equivalent tenor) plus 300-350 basis point spread (Business Standard, 2013; Indian Express, 2013b).

3.4.2 Green/climate bonds

Green bonds are fixed income instruments that could provide an avenue for mainstream investors to participate in socially responsible investing

The government may also issue bonds in the form of green bonds or climate bonds. Green bonds raise funds for environmental projects, while climate bonds focus specifically on projects that involve climate change mitigation or adaptation (UNEP, 2009). Both are fixed income financial instruments that offer returns similar to those on non-green bonds. The objective is to provide mainstream investors the opportunity to invest in climate-related projects. For example, the World Bank's Green Bond is a fixed income product that invests in projects that fulfill specific criteria such as tackling climate change issues, reducing poverty, and improving local economies (World Bank, 2009).

Green/climate bonds would enable the government to combine financial leverage with its regulatory leverage and provide targeted support for renewable energy in the form of tax breaks (Climate Bonds Initiative, 2012). However, there would be a cost associated with performing due diligence to ensure that the projects meet the specified criteria, which may lower the returns from such bonds. Furthermore, a stable project pipeline for creating investment grade offerings may be difficult in the initial years and risk diversification may prove to be a challenge.

4. Conclusions

Meeting India's ambitious renewable energy targets requires solving the financing challenge. Our analysis suggests that reducing the cost of debt is a more cost-effective solution for solving this challenge compared with existing solutions (CPI, 2014b). There are financial instruments, tried and tested in other emerging economies, which can effectively reduce the cost of debt, and thus help solve the renewable energy financing challenge in India.

In this study, we assess a set of instruments on their potential for most cost-effectively reducing the cost of debt within the Indian context. We find that several instruments offer the most promise and highlight the following policy implications for the government of India to consider.

1. The government of India would need to take a lead role in introducing financing instruments

Some instruments, such as the infrastructure debt funds and partial credit guarantees, have been recently introduced in India, while some others haven't been used in the country yet. The purview of a few other instruments needs to be expanded to cover renewable energy projects. Further, a single instrument alone cannot solve the problems in debt financing for renewable projects. In addition, private players would find it difficult to introduce concessional financing instruments due to various structural issues. The government should therefore prepare the groundwork to introduce a set of instruments that can, together, effectively reduce the cost of debt in a way that also encourages private investment.

2. Government bonds have the highest potential to reduce costs (up to 4.5 percentage points) and increase tenor (up to 10 years), but should incorporate proper checks and balances to keep administrative costs down and avoid crowding out private investment

The government could raise money from the market at a low cost on account of its high credit rating and on-lend the funds to renewable project developers at a fixed rate of interest. However, the actual cost reduction depends on the government's administrative/ transaction costs as well as project risk premiums. Government borrowing and lending for a specific sector is unprecedented in India. Government bonds also pose the risk of crowding out private investment in the sector.

Therefore, such a program should include proper checks and balances to avoid crowding out private investment. For example, the program can be used to support the growth of a specific new renewable energy technology for a limited period and for a pre-determined capacity addition. In our future work, we will examine the design elements of such an instrument in terms of sourcing of funds and duration for which the facility should be offered.

3. Infrastructure Debt Funds - Mutual Funds could reduce the cost of debt by up to 3 percentage points and increase tenor by up to 5 years, but the accrual of these benefits depends on its success in developing the Indian corporate bond market

Infrastructure Debt Funds - Mutual Fund (IDF-MF) model was created by the Government of India to mobilize institutional investments for infrastructure by developing a large and liquid corporate bond market. An IDF-MF issues units to raise money and invests the proceeds in debt securities issued by renewable energy projects/ companies. Although this enables risk diversification, its success depends on the depth of the bond market.

In order to ensure the success of infrastructure debt funds, the government should address many structural problems that are hindering the development of the corporate bond market in India. For example, the government should relax regulatory restrictions on institutional investors for investments in bonds and streamline bond issuance processes to reduce the costs and time taken for issuing bonds. We recommend further analysis on how the promising IDF-Non-Banking Financial Company (NBFC) model can be used for financing power projects as these are not currently being developed under Public Private Partnership (PPP) model.

4. Partial credit guarantees can mobilize additional private capital from pension and insurance funds and can also reduce cost of debt by up to 1.9 percentage points and increase tenor by up to 5 years for the developers

Partial credit guarantees present an innovative mechanism to lower the cost of debt and attract long-term finance for renewable energy projects. Partial credit guarantees have been successful in attracting private capital for projects in other countries, but the need for coordination among multiple stakeholders would affect the implementation feasibility.

The lack of liquidity in bond markets could adversely affect the uptake of the mechanism. We recommend further analysis on the design aspects of partial credit guarantees, such as the nature of coverage and risk sharing among stakeholders. Implementation issues such as project identification and sourcing of funds may also be explored.

5. Partial risk guarantees could attract foreign funds by guaranteeing all defaults arising from political risks, but requires further study to ascertain suitability for Indian conditions

Partial risk guarantees are offered by multilateral agencies and offer to cover all defaults arising from political risks. The cost reduction depends on the cost of foreign funds, the type and extent of risk coverage and the structure of the guarantee, while the tenor of funds can be raised by up to 8 years.

The need for a sovereign counter-guarantee has led to limited uptake of partial risk guarantees in other countries. We recommend the design of this instrument to be studied in greater detail before introducing it in India. In our future work, we will analyze the success of existing partial risk guarantees to draw lessons for India.

6. Foreign exchange liquidity facility can make it possible for developers to use the benefits of low-cost, long-term foreign funds by mitigating the cost of currency hedging

The cost of exchange risk management often offsets the benefit of low-cost foreign investment. An exchange rate liquidity facility is a standby credit line that can be used by energy developers for servicing foreign loans in the event of drastic INR depreciation. This mechanism can reduce the cost of debt by up to 1.4 percentage points.

However, if the Indian government plans to introduce this facility, it must educate borrowers on the benefits of the facility, and ensure that the power tariffs are indexed to domestic inflation, which is a design requirement of the liquidity facility. The government could support a set of pilot projects using this facility in order to study its benefits as it has been used only once in the world in the past.

We recommend further analysis on the foreign exchange liquidity facility to identify, in more detail, a design that is suitable for Indian conditions. We also recommend analysis on specific issues such as the size of the liquidity facility and the design of the tariff.

7. Finally, the government can reduce the cost of debt further through an explicit subsidy

The government could reduce the cost of debt further (beyond what the instruments inherently do) by extending an explicit subsidy through these instruments. For example, in a direct lending program by the government, it can lend to renewable power projects with no margin or below its cost of borrowing, such as the one we briefly explored in Section 2.1.

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Annex A

Implementation feasibility assessment

We determined the feasibility of implementation of the financial instruments discussed in this paper through qualitative analysis. Five criteria reflecting implementation feasibility were identified and each instrument was rated on a 3-point scale (1 indicating low, 2 indicating moderate, and 3 indicating high) on each of these parameters. We discuss the parameters chosen below:

1. **Precedent:** An instrument was rated high along this parameter if it has been successfully used for raising low-cost funds in the past under comparable conditions. If there is a precedent that has seen partial success, the instrument is rated moderate. If there is no precedent or the instrument has failed to fulfill the desired objectives in the past, the rating is low. For example, India has never issued sovereign bonds in the past (as discussed in Section 3.4.1), and so sovereign bonds were rated low on this parameter.
2. **Institutional framework:** Instruments that can be offered and implemented using existing institutional structure were considered more feasible and were rated high on this parameter, whereas instruments that require the creation of new institutions were considered less institutionally feasible. For example, partial credit guarantees were considered more feasible since a body like Indian Infrastructure Finance Company Limited, which has a high credit rating and offers credit enhancement for similar projects, already exists.
3. **Conformity with existing financial regulations:** Instruments that are fully compatible with existing regulations were assigned a higher feasibility rating. However, instruments that can only be implemented with the modification of any existing rules or regulations are considered less compatible in the Indian context. For example, since infrastructure debt funds have been created in consonance with the existing regulatory framework, they were rated high.
4. **Dependence on mature financial markets:** Indian financial markets are not as sophisticated as the financial markets of developed countries. For example, Indian bond markets are shallow and lack liquidity. However, many debt instruments require a large and liquid debt market in order to be effective. Instruments that are highly dependent on the domestic financial markets were assigned a low feasibility rating, while instruments that are capable of attracting credit irrespective of the level of development of the financial markets are rated high. For example, the exchange rate liquidity facility is rated high on implementation feasibility as the facility is not dependent on the maturity of the financial markets.
5. **Involvement of stakeholders:** If the instrument design necessitates the involvement of multiple stakeholders, it was assigned a low feasibility rating because the complexity of implementation is higher. For example, partial risk guarantees require a counter-guarantee from the government, which has led to low uptake of the instrument.

A simple average of the scores obtained along these five criteria is calculated and rounded to the nearest integer to obtain an assessment of the implementation feasibility of an instrument. Explanations for the ratings are provided with the discussion of the instrument.

Annex B

Lending margins of sector-focused, government-owned financial institutions for renewable projects

Table 5: Renewable lending margins of govt.-owned financial institutions, 2013

INSTITUTION	COST OF FUNDS (%)	LENDING RATES FOR RENEWABLE POWER PROJECTS (%)	MARGIN (%)	AVERAGE RENEWABLES LENDING MARGINS (%)
Indian Renewable Energy Development Agency	7.66	11.90-13.50	4.24-5.84	5.04
Rural Electrification Corporation	8.14	12.75-13.50	4.61-5.36	4.99
Power Finance Corporation	8.86	12.25-13.50	3.39-4.64	4.02
Average (%)	8.22	12.9	-	4.68

Source: IREDA, REC, PFC, Mint Newspaper

Annex C

An example of fixed exchange rate mechanism

Consider a scenario where the central government enters into a nominal exchange rate agreement with the renewable project developers to attract additional foreign funds to the tune of the expected shortfall in funding for renewables for the 12th Plan, which is approximately INR 500 billion (~101 billion for Solar and ~414 billion for Wind). If we assume 70% of these funds will come in the form of foreign debt, around INR 350 billion debt funds would enter India in a staggered manner during the 12th Plan (2012-17). Let's say INR 70 billion is the amount of debt raised each year during the 5-year period. The annual debt service payments (principal plus interest) would amount to USD 2.9 billion for the five years combined, for loans of tenor of 18 years and at an interest rate of 13%. If these loans were raised at an average exchange rate of INR 53.38/USD (average exchange rate in 2012), then the total outflow in INR terms would be INR 153.5 billion during the five years.

To estimate the potential costs to the government due to INR depreciation, suppose we assume that the INR depreciates by 6.6% per year, which is the expected inflation differential between the INR and the USD during 2012-17[29]. The total outflow would be INR 163.6 billion if the INR depreciates by 6.6% from INR 53.38/USD to INR 56.9/USD. The difference in outflow – INR 10.1 billion (163.6 minus 153.5 billion) – would be the expenditure of the government if the INR depreciates equivalent to the expected inflation differential during the 12th Plan period. If we assume the worst case of INR depreciating by 9.5% per year, the difference in the outflow would be INR 14.5 billion.

The expenditure in average case would be a small portion (0.031%) of the total budgetary support of INR 32.5 trillion (Planning Commission, 2011) that the Planning Commission expects from the central and state governments for infrastructure development in the 12th Plan. However, in reality, the rupee might depreciate much more than the expected inflation differentials (driven by several global factors) exposing the government to a much higher risk.

29 Theoretically, the depreciation in the value of INR against the USD should over time be equal to the difference in inflation rates between India and the US.

Annex D

Risk mitigation using credit pooling mechanism – the TNUDF model

An amendment in the investment mandate of IDF-NBFCs to permit investments in non-PPP projects could make it possible to raise fresh capital for renewable energy projects through this route. Since IDF-NBFCs focus on less risky investments, the risk associated with renewable energy projects can be mitigated through credit enhancement, similar to the model adopted for the Tamil Nadu Urban Development Fund (TNUDF) under its credit pooling mechanism (Matsukawa T., et al., 2007). In this case, there are three levels of credit enhancement. First, the borrowers are required to fund escrow accounts prior to the bond issue with an amount equivalent to one year's loan obligation. Second, the government sets up a Debt Service Reserve Fund with an amount equal to 1.5 times the annual debt service. Third, USAID provides a counter-guarantee to replenish drawdowns on the reserve fund up to 50% of the principal (Kehew R., et al., 2005). Due to the guarantees provided to the investors, the bonds issued by TNUDF received a credit rating of AA+ from ICRA, making it possible to tap funds from insurance and pension funds.

Glossary

Government bonds: The government of India issues bonds periodically to raise funds to finance its activities. These bonds carry the highest credit rating in the country due to the implicit sovereign guarantee; and as such, have the lowest cost of borrowing. We evaluate the option of government raising money through the issue of bonds and directly on-lending the proceeds to the renewable project developers resulting in reduction in the cost of funds for project developers.

Infrastructure Debt Fund (Mutual Fund): The government of India established the Infrastructure Debt Fund (IDF) concept to augment the supply of long-term capital to infrastructure projects and provide additional liquidity to the corporate bond market. While the government has set up the framework for two different models for IDFs – namely, the Mutual Fund (MF) and Non-Banking Finance Company (NBFC); at present, we evaluated the IDF (MF) model alone as the NBFC model can invest only in projects developed under Public Private Partnership (PPP) mode, which is not popular for power project development in India. IDF-MFs are investment trusts designed to mobilize funds from institutional investors (especially pension and insurance) for investment in debt securities issued by infrastructure companies.

Partial Credit Guarantee: At present, Indian regulations do not permit pension and insurance funds to invest in bonds with ratings lower than AA. Since most renewable power projects are set up as special purpose vehicles, they often receive a relatively low credit rating, limiting their ability to attract low-cost, long-term funds. Under a partial credit guarantee (also known as credit enhancement facility or direct debt subsidy), a third party with a higher credit rating, guarantees debt service for a specific portion of the loan to raise the creditworthiness of the borrower; thereby, making low cost, long-term debt available for such projects.

Partial Risk Guarantee: Debt costs are high for renewable energy developers due to high perceived risks associated with government policies, construction, off-take, and technology. By mitigating the risk that governments or multilateral agencies are better equipped to handle, it is possible to raise the availability of debt and reduce the cost of financing. A partial risk guarantee (also known as political risk guarantee, political risk insurance or expanded co-financing guarantee) covers a part of the debt servicing in the event of losses arising from exposure to a specific type of risk.

Currency risk management: Low cost, long-term debt is readily available in international markets. However, Indian renewable energy developers are unable to tap into these funds due to the high cost of exchange risk management. We examine a few instruments such as the exchange rate liquidity facility, foreign exchange indexed tariffs, and fixed nominal exchange rate; which can lower the cost of currency hedging for developers.