

Foreign Exchange Risk Mitigation for Power and Water Projects in Developing Countries

Tomoko Matsukawa, Robert Sheppard and Joseph Wright



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FOREWORD

The importance of the infrastructure sectors in achieving growth, poverty reduction and the Millennium Development Goals is well established. Meanwhile, private financing of infrastructure projects in developing countries has decreased and private participation in the power sector has not reached the levels originally anticipated. Foreign exchange risk has been identified by private financiers as a major factor in their reluctance to invest in developing country infrastructure projects, especially in the wake of the East Asia financial crisis and the Argentine and Brazilian currency crisis. Foreign exchange risk is as much a concern for the financial sustainability of public infrastructure projects as for private projects.

This paper explains how foreign exchange risk affects power and water infrastructure projects. It analyzes the effectiveness of various mechanisms that have been used to mitigate the risk of local currency depreciation and examines how these may be improved, with a view to suggesting a variety of potential roles for donor agencies in facilitating foreign exchange risk mitigation. There is a range of approaches to mitigating and allocating foreign exchange risk and the best approach for each project will be determined by the specific project structure and the sector and country circumstances. We expect that paper will provide some insights for policy makers, stakeholders, private financiers and donors in meeting the challenge of mobilizing private financing for developing country power and water projects.

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ACRONYMS AND ABBREVIATIONS

IFC	International Finance Corporation
IPP	Independent Power Project
IRP	Interest rate parity
MIGA	Multilateral Investment Guarantee Agency
MLA	Multilateral agencies
OPIC	Overseas Private Investment Corporation
PCG	Partial Credit Guarantee
PPP	Purchasing power parity
PRG	Partial Risk Guarantee

INTRODUCTION

The objective of this paper is to explain how foreign exchange risk affects power and water infrastructure projects, to analyze the effectiveness of mechanisms that have been used to mitigate foreign exchange risk and examine how they may be improved, and to suggest roles for donor agencies in facilitating foreign exchange risk mitigation. A key theme of the paper is that the most appropriate mechanism for mitigating foreign exchange risk will be determined by the specific circumstances of the project and country in question. The paper is designed to serve as an introduction to foreign exchange risk for stakeholders in the development and financing of infrastructure projects—government officials, consumers, sponsors, investors, and donor agencies—and as an aid for designing foreign exchange risk mitigation mechanisms for specific projects and countries.

The occurrence of currency crises has coincided with sharp reductions in private investment in infrastructure in developing countries. Currency crises tend to have a negative effect on all the key stakeholders in an infrastructure project. In addition to financial loss, the experience of investors is that contractual arrangements for infrastructure projects have been broken or re-negotiated. Even when projects are financed on a non-recourse basis, a currency crisis in foreign markets can negatively affect an investor's credit rating as the value of foreign assets and their expected revenues decline and investors face the choice of financing losses or writing-off their investment. Currency crises also negatively affect consumers, for example, when the consequence is that service is interrupted, quality of supply is impaired, or investment programs are suspended or postponed.

Foreign exchange risk is as much a concern for public projects as private ones. Private financiers, however, usually require infrastructure projects to be structured to mitigate foreign exchange risk, whereas this is not always the case for publicly financed projects. While the focus of this paper is how to mitigate foreign exchange risk sufficiently to attract private investment, many of the examples and findings are equally relevant to public projects and utilities.

It is important to note that in many cases the magnitude of other project risks will be too great for the infrastructure project to obtain private financing regardless of how foreign exchange risk is treated. This paper concentrates on foreign exchange risk because private infrastructure financiers have identified it as a major factor in their reluctance to invest in developing country power and water projects, especially in the wake of the East Asian financial crisis (1997) and the Argentine and Brazilian currency crises (2001–2002).¹ The paper does, however, explore the relationship between foreign exchange risk and other related risks, regulatory and political risks in particular.

1. WHAT IS FOREIGN EXCHANGE RISK?

Foreign exchange risk has the following components:

- *Exchange Rate Risk:* Exchange rate risk exists where a project's revenues and costs are denominated in different currencies. Exchange rate risk naturally has an upside as well as a downside, but the experience of most developing countries has been a local currency depreciation against more stable industrial country currencies.

Power and water projects typically generate revenues in local currency, while their financing costs and fuel costs for thermal power projects are denominated in U.S. dollars or other hard currencies.² Depreciation in the exchange rate can therefore result in revenues that are insufficient to cover costs.

- *Convertibility Risk:* Convertibility risk is the possibility that a firm will be prevented from exchanging local currency for foreign currency by a policy action of the government to restrict access to foreign exchange, i.e., administrative allocation of foreign exchange (rationing).
- *Transfer Risk:* Transfer risk is the possibility that a firm will be prevented from transferring foreign exchange out of the country. It is conceptually distinct from convertibility risk but in practice rather similar, as governments that have restricted convertibility have also tended to limit transfer.

¹ Private firms canvassed by the World Panel on Financing Global Water Infrastructure raised foreign exchange risk as a particular concern.

² For brevity, this paper uses "dollars," except where noted, as the U.S. dollar is the most widely used foreign currency in infrastructure project financings.

There are several well-tested guarantee instruments available to protect investors and lenders from government actions to restrict conversion and transfer; they are described in Appendix 1. This paper focuses principally on exchange rate risk.

Interest Rate Parity Theory

Interest rates and exchange rates determine the relative returns on assets denominated in local and foreign currencies. Interest rate parity (IRP) theory states that a change in the interest rate differential between two countries will be off-set by an appreciation (depreciation) of one currency against another currency, making the returns on local and foreign currency investments equivalent (thereby eliminating opportunities for arbitrage). If interest rate parity theory holds, interest rate and exchange rate risks should be equivalent. There is, however, little empirical proof of IRP theory for the period after the 1980s. Contrary to the theory, currencies with higher interest rates characteristically appreciated rather than depreciated (possibly on the reward of future containment of inflation and a higher yielding currency).

In reality, investors do not consider assets denominated in different currencies to be perfect substitutes. Assets denominated in developing-country currencies tend to carry a risk premium that reflects, among other things, the risks of government interventions to restrict convertibility and transfer and the difficulty in hedging against exchange rate risk for currencies with undeveloped financial and currency derivatives markets. Empirical evidence supports the existence of a large risk premium and indicates that the value of the premium can be volatile. An important conclusion to be drawn from this is that foreign investors that accept foreign exchange risks will factor this risk premium into their expected rate of return on investment.

Purchasing Power Parity Theory

Purchasing power parity (PPP) theory states that exchange rates between currencies are in equilibrium when their purchasing power is the same in each of the two countries. Absolute PPP states that the exchange

rate between two countries equals the ratio of the price level of a fixed basket of goods and services in each country. Relative PPP is concerned with the rate of change in price levels (inflation) and states that the rate of depreciation of a currency is equal to the difference in inflation rates between the home country and a foreign country. Therefore, when a country's rate of inflation increases relative to others, its currency may be expected to depreciate in order to return to PPP. Empirical evidence tends to support this theory over a medium-term (3- to 5-year) horizon. If PPP holds, it implies that if a project's revenues are indexed to local inflation, over the medium- to long-term the effects of foreign exchange risk should be neutral.³

Forecasting Exchange Rates

In addition to the IRP and PPP theories, there are others that also offer useful insights. Although theories help us understand exchange rate movements, their predictive power is limited.⁴ While investors manage foreign exchange risk at a portfolio level and in doing so have to form expectations about future exchange rates, when appraising investment in an infrastructure project investors normally assume that future exchange rates will maintain the existing real exchange rate (i.e., that future exchange rates will reflect PPP, with the current period as the base for measuring PPP). They will, however, seek to structure a project that is sustainable and achieves a minimum internal rate of return, even in the event of a "worst case" currency depreciation.

2. FOREIGN EXCHANGE RISK ALLOCATION

Extensive literature on risk allocation is premised on the idea that a risk should be allocated to the party that controls it or is best able to manage it at the least cost. The problem with foreign exchange risk, and the reason it is of perennial concern to investors, is that it is not directly in control of any of the parties, nor is it clear which party can best manage it. The remainder of this section discusses the principles of risk allocation among project stakeholders as a basis for the later analysis of the sustainability of various risk mitigation mechanisms.

³ Whether a project can be sustained during the time it takes for exchange rates to adjust to their PPP level is another question, discussed in section 4.

⁴ For example, monetarist theories stress the importance of expectations in determining exchange rates and the value of reducing informational asymmetries, for example, with regard to government policy intentions. Sticky price theories suggest exchange rates will continually over- and undershoot their equilibrium levels, further suggesting that whenever a project is financed, the local currency is likely to be under- or overvalued.

There are three principal groups of stakeholders in an infrastructure project: investors, consumers, and government. A risk allocated to a government may be thought of as a risk borne by taxpayers (or future taxpayers). In many developing countries where large proportions of the population do not have access to electricity or water supply, consumers and taxpayers may well be different sets of stakeholders (depending on the distribution of the tax burden).

Government policies influence foreign exchange rates through monetary and fiscal policy and foreign currency market interventions. A government’s policy orientation and its track record of macroeconomic management are therefore of key concern to investors. However, even a country with good policy and sound macroeconomic management is exposed to the risk of currency depreciation caused by an external shock.⁵ This risk is especially acute in least developed countries, which often (a) derive foreign exchange earnings from exporting a limited set of basic commodities and (b) are oil importers. There is also the risk that “contagion”—a generalized failure of confidence in emerging market currencies—may affect the value of a currency for reasons beyond government control. Therefore, because foreign exchange risk is not directly controlled by any single entity, the question turns to which party—government, investor, or consumers—is best able to bear the risk.

Investors

It is sometimes argued that investors should be willing to bear foreign exchange risk because they are able to hedge the risk in financial markets. However, derivatives markets do not exist for many currencies. A second argument is that investors should bear foreign exchange risk because they are able to diversify this risk by owning a basket of assets denominated in different currencies. However, there are few if any multinationals active in power and water and large enough, or indeed with a broad enough range of investment opportunities, for this to be an effective strategy.⁶ There are, however, a number of ways in which exchange risk may be mitigated at the project level

(described below), and if such opportunities exist, it may be reasonable to expect that equity investors share in foreign exchange risk in order to give them incentives to be innovative in its mitigation.

Section 1. notes that investors will expect a higher rate of return on their investment as compensation for bearing foreign exchange risk. Typically, an investor will endeavor to achieve this higher rate of return by paying less for privatized assets or by requiring higher tariffs. Consumers or the government (taxpayers) may therefore question whether they are getting “good value” when the exchange risk is allocated to investors, if they can bear the risk at a lower cost.

Consumers

There are two basic arguments for allocating exchange rate risk to consumers. The first is that they are numerous and diversified and the risk would therefore be spread thinly over many individuals with none suffering significantly (a similar argument is made with regard to taxpayers). The second is that consumers should pay the full cost of supply, including foreign exchange costs, as this price signal encourages efficient demand-side responses, e.g., reducing consumption or substituting a cheaper source of supply. The problem with the former argument is that for poor households expenditures on energy and water supply form a large part of household income (often in the region of 20 percent). The problem with the latter argument is poor consumers have limited potential to reduce consumption below a minimum that provides for basic needs. Also, alternative types of supply are not perfect substitutes (e.g., piped versus unprotected water supply), and there are often barriers to substitution (e.g., the high capital cost of switching from electric power to gas).

Government

Investors often argue that government is better able to bear foreign exchange risk because it has an informational advantage (due to knowledge of its own future policy intentions and its ability to use policy instruments to influence the exchange rate). In this case a simple policy prescription is for the government to disclose as much of

⁵ As important as the prevailing economic policy is a government’s policy response to an external macroeconomic shock.
⁶ The argument may be extended by saying that even if foreign exchange risk cannot be mitigated at the corporate level, the company’s ultimate shareholders are able to diversify the risk exposure at the portfolio level. However, while the shareholders will seek to diversify their risk in this way, it does not follow that boards and management of companies will be indifferent about their own foreign exchange risk exposure.

this information as possible.⁷ However, while this approach will engender greater confidence among investors, it is not a complete solution because there is uncertainty about (a) the policy a government will adopt in response to an external shock and (b) policies that may be adopted by future governments. Therefore, one reason for the government to share in foreign exchange risk is better to signal its policy objectives and to demonstrate that it has an incentive to observe prudent policy.

A second argument is that the government should bear foreign exchange risk because taxpayers⁸ are numerous and diversified, so the risk is spread thinly over many individuals with none suffering significantly. The difficulty with this is that governments typically carry a lot of foreign exchange risk (e.g., foreign debt) and in a currency crisis foreign currency obligations to infrastructure projects may fall due at a time when the government is least able to manage them. Hence, lenders are quite often skeptical about whether government foreign exchange guarantees will be honored (see *Mechanisms That Allocate Exchange Rate Risk to Government* below).

A third argument is that the government must bear foreign exchange risk simply because the other stakeholders to a project are not willing to. If investors consider the foreign exchange risk to be too great, they can choose not to invest. It may also be that the social costs of requiring consumers to bear the full cost of exchange rate changes is too great, so the government must bear the risk as the last resort.

Risk Allocation Among Investors in Infrastructure Projects

Sponsors that wish to acquire existing infrastructure assets or build new infrastructure projects in developing countries have a choice of recourse or non-recourse debt. Recourse debt can be incurred at the project level and guaranteed by the sponsor or can be incurred by the sponsor at the corporate level (usually in the financial markets of the sponsor's home country) and down-streamed to the project company (with the sponsor's investment in the developing-country asset appearing as an all-

equity investment from the standpoint of the developing country).

It is easier for sponsors to use corporate funds or guaranteed project-level debt to finance infrastructure assets, but few do so (even in industrial countries). The reasons for this preference are the capital-intensive nature of these assets and a desire to share project risks with lenders and fixed-income investors. In the typical case, where the project sponsor finances a developing-country infrastructure project with non-recourse debt, lenders or fixed-income investors will require a transaction structure that would mitigate foreign exchange risk. Lenders and fixed-income investors will not generally assume exchange rate risk (although they have of course found themselves in transactions where the structure failed to mitigate such risk). A key issue is the extent to which equity may be expected to bear exchange rate risk. While equity sponsors are expected to take more risk (and earn higher returns) than lenders, their preference is to bear risks they can control, such as construction or commercial risks, rather than exchange risks that they cannot mitigate. Certainly the appetite of equity sponsors for exchange rate risk is lower today than it was in the mid-1990s. This appetite may return if there is a period of greater stability in emerging market currencies and more positive investment experience. Meanwhile, it is reasonable to expect that equity sponsors will require at least partial protection from exchange rate risk.

In summary there is no conclusive argument that any single group of stakeholders to a project should bear foreign exchange risk in its entirety. Moreover, there are several reasons for sharing foreign exchange risk among a project's stakeholders: (a) it gives government an incentive to signal its policy objectives and live up to them, (b) it gives equity investors an incentive to mitigate a project's foreign exchange risk exposure, and (c) it gives consumers price signals that encourage demand-side responses. However, ultimately financiers and rating agencies will independently assess the allocation of foreign exchange risk, and their views will determine the availability of financing. Whereas governments and consumers consider power and water supply a

⁷ See Mas 1997

⁸ This includes present and future taxpayers. To the extent that all citizens enjoy public services and public finances are affected by government exposure to foreign exchange risk, a risk to government is a risk borne by all citizens.

necessity, financiers can always choose to invest in other projects and sectors. It is reasonable to expect that (a) foreign currency lenders will always require foreign exchange risk protection and (b) sponsors (equity investors) will in most cases expect at least partial protection from foreign exchange risk.

3. ALL INDUSTRIES FACE FOREIGN EXCHANGE RISK: WHAT'S SPECIAL ABOUT INFRASTRUCTURE?

Most foreign investors face exchange rate risks; however, for the reasons described below, exchange rate risk is of special concern to investors in power and water projects. None of the factors described below are exclusive to power and water projects, but taken together they tend to increase exposure to exchange rate risk:⁹

- *Financing Needs Exceed Local Markets' Capacity:* In many developing countries the financing requirements of power and water investments are large relative to the size of local capital markets. Undeveloped capital markets typically do not provide credit with tenors long enough to match the lives of power and water assets. Infrastructure investors are therefore more likely to have to turn to international markets to raise capital.
- *Long Pay-Back Periods:* Power and water assets are often depreciated over 20–30 years, meaning that investments tend to be recovered over a longer period and increasing the risk that a currency crisis will occur at some point during the project's life.
- *Dollar-Denominated Inputs and Expansion Costs:* Thermal power generation projects have the major component of their operating costs (fuel) denominated in hard currencies (this is less of a concern for water production, sewerage treatment, and renewable energy generation projects, which have lower operating costs). In developing countries expansion of service is a major objective of privatized water and power distribution networks. The plant and equipment required for network extension are often manufactured outside the host country and priced in hard currencies, which means that staged investment commitments of private operators during the concession period also involve foreign exchange risk.
- *Assets Difficult to Re-Deploy:* Power and water projects are capital intensive, and most assets may not be re-deployed once they have been installed. In addition, regulations often restrict the sale of power and water assets. It is therefore more difficult for investors to exit from their investment in order to minimize foreign exchange losses. An important consequence of this is the weak bargaining position investors have in the event of a contract renegotiation following a financial crisis. An off-taker usually has an incentive to ensure the project has sufficient revenue to cover its operating costs in order to ensure continued supply; however, because the assets may not be redeployed, the off-taker is less concerned that the project is able to meet its fixed costs (debt service and equity returns).
- *Non-Tradable Outputs:* With the exception of some export-based power generation schemes, the output of power and water production projects and the services provided by distribution businesses are not tradable on international markets. This may be compared to investments that produce tradable goods or services that have some protection from foreign exchange risk because local currency depreciation makes the goods or services cheaper on international markets, leading to an increase in sales and revenues.
- *Regulated Prices:* Because water and power distribution networks are characterized by economies of scale, the market can only support one distribution network in a given geographical area. Prices for network services are therefore regulated to protect consumers from the abuse of monopoly power. Moreover, water and electricity supply is considered valuable to the welfare of households, so the pricing of these services has a political dimension. In times of financial crisis when households are exposed to the effects of higher interest rates, unemployment, and inflation, the risk that the government will fail to apply earlier pricing agreements is significant.

⁹ Other infrastructure sectors share many of these features, and where fewer of them apply, exchange rate risk exposure appears to be of less concern. For example, these features apply for telecommunications except that (a) the pay-back period is generally shorter and (b) prices are often unregulated. These features apply for buildings except that (a) the size of investment is likely to be better matched to the depth of local markets, (b) assets are easily re-deployable, and (c) prices are also typically not regulated.

4. MECHANISMS FOR THE ALLOCATION AND MITIGATION OF EXCHANGE RATE RISK

This section describes several ways of mitigating foreign exchange risk, which may be categorized as follows: (a) reducing the problem by matching the currency in which expenses—especially the project’s financing costs—are incurred to the currency of the project’s revenues (“local currency financing”), (b) governmental macroeconomic policy and, specifically, undertakings regarding exchange rate policies, (c) standardized financial instruments that are publicly traded or can be purchased with enhanced terms on a one-off basis in a private transaction (“hedges”), (d) contractual or regulatory provisions (“tariff indexes”), and (e) liquidity facilities or other contingent financial commitments (“liquidity facilities”). Each of these approaches results in a different allocation of risk among the stakeholders (government, consumers, sponsors, and lenders) in an infrastructure project.

Local Currency Financing

Local currency financing is attractive because it eliminates the potential currency mismatch between a project’s revenues and its debt service.¹⁰ Some developing countries (e.g., Chile, Malaysia, and Mexico) have domestic markets that can provide long-term, fixed-rate

local currency financing for infrastructure. Others (e.g., possibly India, Peru, and Brazil) have emerging long-term debt markets, where interventions can be made to extend the tenors available or to enable infrastructure projects to access long-term debt (or currency swap) markets from which they may otherwise have been excluded. This section discusses a number of approaches to facilitate local currency infrastructure financing. It is important to note that local and foreign currency financing are not mutually exclusive, and even a small tranche of local currency debt may improve the sustainability of a project in a currency crisis.

Local Capital and Bank Market Development

Market capacity can be a significant issue for the financing of water and power projects, given their large capital requirements. Moreover, in many capital markets the available tenors for debt are too short to match with the project pay-back periods. The development of a bank market offering long-term loans in local currency typically requires that banks be able to finance themselves on a long-term basis in local currency; if this is not feasible, banks offer short-term local currency financing.¹¹ A similar problem arises with interest rate risk; unless there are markets in long-term, fixed-rate instruments (e.g., government bonds) then longer-term debt will have a floating rate.

Efforts to promote local currency financing must respond to the specific constraints to local capital market development and infrastructure finance in the country in question. Possible constraints may include:

- Lack of experience of infrastructure or project finance lending
- The absence of long-term government bonds to provide a basis for pricing long-term debt
- Government borrowing that crowds the private sector out of capital markets
- Government lending that inhibits local finance for infrastructure, e.g., lending to infrastructure at below-market rates or to projects that would not be considered creditworthy by local investors, thereby

BOX 1. The Gujarat Torrent Power Plant

This was the first large private power project in India to achieve financial closure without a sovereign guarantee (though there was a state guarantee of the off-taker’s obligations). The Rs 24.55 billion project achieved financial closure in 1995 and was financed with a debt-equity ratio of 70:30. Indian financial institutions and banks provided Rupee term loans of Rs 3.01 billion (12 percent of project costs) and foreign currency loans of Rs 5.72 billion (23 percent), plus commercial guarantee cover for the remaining debt, which was provided in foreign currency by international lenders.

To facilitate mobilization of funds from the banking sector, the Reserve Bank of India relaxed the exposure limit for the banking sector and funds for power project investments.

¹⁰ This will not eliminate exchange rate risk where other project inputs (e.g., fuel) are denominated in foreign currency. However, given the magnitude of the capital costs in infrastructure projects, local currency financing will be a major part of the solution to exchange rate risk.

¹¹ Local banks could obtain long-term financing in dollars, but this approach merely transfers the risk from the borrower to the lender.

reducing incentives for sponsors to present bankable projects in the future

- Legal constraints and prudential regulations with respect to diversification and asset classes, perhaps owned by institutional investors, such as pension funds and insurance companies.

The development of local capital markets is a long and gradual process, and it is beyond the scope of this paper to fully explain this issue. The remainder of this section discusses interventions that governments and/ or donor agencies may take to assist infrastructure projects in mobilizing local currency debt in situations where there is a market in local currency debt, but (a) the debt is not sufficiently mature to be useful for financing infrastructure projects or (b) long-term local currency financing would be available if investors could be protected from other risks.

Local Currency Fund Schemes

Fund schemes may facilitate local currency debt financing by (a) providing additional security to lenders, (b) diversifying project risks, and/ or (c) reducing transaction costs. Typically, a fund scheme would use its initial capitalization—which could be provided by private investors, donor agencies, or the government¹²—as a reserve fund. It would then issue bonds, using the proceeds to lend to infrastructure projects, with the reserve fund securing bond debt service payments. The fund therefore acts as an intermediary, facilitating supply of domestic capital market funds to infrastructure. By enhancing credit quality (by providing additional security and diversifying project risks), such funds can enable infrastructure projects to access long-term local currency debt markets from which they otherwise may have been excluded. By aggregating several infrastructure projects, they may also permit smaller projects to access local capital markets where transaction costs otherwise would have excluded them. Such a fund can mobilize domestic finance by providing expertise in the appraisal of infrastructure that may not have previously been present in the capital markets. The Infrastructure Finance Corporation of South Africa is one example of a fund scheme that has been a successful intermediary between

long-term bond markets and water investments (though these have been municipal projects, which carry implicit or explicit government guarantees). The Infrastructure Development Finance Company of India, which has a similar structure, has also participated in the financing of power sector projects.

Local Currency Credit Enhancement

Partial Credit Guarantees

Partial credit guarantees (PCGs) can be structured to mitigate specific credit risks for local banks and bond investors and may be applied to facilitate financing in situations where the borrower can access the local credit market but cannot realize sufficiently long tenors. A PCG may be structured as follows:

- To cover later maturity payments; this may be appropriate where long-term debt instruments exist but lenders are uncomfortable with the duration of infrastructure investments.
- To cover a certain amount of debt service payments over the life of the credit; this guarantee could be provided on a rolling basis which, if not called, will be moved to subsequent debt service payments; this may be appropriate where there are long-term debt markets but financiers are deterred by concern about temporary interruptions to the project's ability to service debt.
- As a put option or call of take-out financing, in particular where banks and institutional investors are unwilling to commit to long-term assets due to the lack of matching funds. With a put option the lender makes a long-term loan but has the option to sell the loan to the guarantor at an earlier date. Brazil's development bank, BNDES, provided put instruments for two power transactions (see Box 2). With take-out financing¹³ the guarantor commits to extend credit to (a) the borrower in lieu of the initial creditor upon take-out or (b) the lender to enable it to extend long-term credit by protecting it from re-financing risk.

¹² Sponsors could provide additional security to lenders by providing contingent reserve funds or subordinated loans.

¹³ Take-out financing is different from a guarantee in that it could be structured as a loan, while under a guarantee the guarantor would have a right to be subrogated to claim repayment from the defaulting party on demand. Take-out financing could be structured to trigger a take-out upon events other than debt service defaults; while financial guarantees are called upon defaults.

BOX 2. BNDES Put Structures

Brazil's development bank, *Banco Nacional de Desenvolvimento Econômico e Social (BNDES)*, has provided puts for two power transactions and two transport sector projects. The power transactions were Ita Energetica (R\$84 million) and Machadinho Energetica (R\$320 million), both announced in December 2000. (Machadinho also featured a guarantee of the project's debt provided by the project's sponsors, which are prominent Brazilian corporations.) The put in each of these transactions is exercisable on a date certain, but only if the project's debt is not in default. Local investors are, therefore, required to take all project risks until the date on which the put is exercisable.

Following the completion of these transactions, BNDES became concerned that the puts would be exercised by investors, not for project-specific risks, but rather as a result of issues affecting an entire sector. BNDES worried that if all outstanding puts were to be exercised, it could experience a liquidity crisis. Purchase of the securities pursuant to the puts could require BNDES, with little notice, to access financial markets at a time when market conditions might be unfavorable. BNDES has no current plans to offer this structure for new transactions.

Such credit guarantees can be extended by a state-owned financial institution, if its credit is perceived as adequate by the market. Donors may play a guarantor role when commercial institutions require greater credit strength than that of the state-owned guarantor. Donors may also provide up-front funding or a funding commitment for government-sponsored credit guarantee schemes to enhance the credit of the local guarantor.

Partial credit guarantees could be extended to both public and private infrastructure projects or municipalities to help them access local currency commercial debt. The guarantee coverage should be set to balance the needs to mobilize term debt financing and encourage local creditors to increase risk taking. The selection criteria, pricing, and security mechanism should be developed to avoid moral hazard on the part of the borrower. The PCG could be limited in its

BOX 3. Mexico: Talnepanitla Municipal Water Project (2003)

A Mexican trust ("the trust") was set up to issue up to \$8.8 million in local currency bonds (*Certificados Bursátiles*) in the domestic capital market to make a loan to the Municipality of Tlalnepanitla de Vaz and its municipal water utility to finance water conservation projects. The municipality pledged property taxes, and the municipal water utility pledged its water fees to secure the loan from the trust. IFC provided a partial credit guarantee to the trust (for the benefit of bond holders) up to \$3 million, alongside Dexia Credit Local Agency N.Y., which issued a letter of credit for up to \$5.3 million. The transaction is IFC's first direct municipal finance deal and facilitates the municipality's access to local capital markets by alleviating credit risk for institutional investors.

application by having its call made conditional upon certain external events (such as local currency devaluation) or borrower performance of certain commercial obligations.

The International Finance Corporation (IFC), for example, has started offering a local currency PCG which may be employed to mobilize longer-term local currency debt and recently provided its first PCG to a water project in Mexico¹⁴ (see Box 3).

Partial Risk Guarantees (PRGs)

Local financiers may be expected to have a greater appetite than foreign financiers for political and regulatory risks in their home countries because they have a better understanding of local conditions; however, they still may consider these risks to be too great to invest long term. In such instances partial risk guarantees or political risk insurance could be used to mobilize longer-term local currency finance where local currency commercial creditors are willing to take commercial project risks but are deterred by uncertainty in the political and/ or regulatory environment.¹⁵ To this end, PRGs can be extended by a state-owned financial institution and may be backstopped by multilateral agencies (MLAs), many of which offer this type of instrument.

¹⁴ IFC local currency PCGs have also been used to finance non-infrastructure projects in Thailand and India.

¹⁵ PRGs can also be used to guarantee the performance of regulatory agreements, which provide protection to foreign creditors against foreign exchange risk.

BOX 4. GuarantCo: A Local Currency Guarantee Facility

Several donors (including the governments of Britain, the Netherlands, Switzerland, and Sweden, the IFC, and the World Bank) are supporting the establishment of a local currency guarantee facility (GuarantCo) to facilitate access to local financial markets for sub-national borrowers—they may be sub-national governments, utilities, or private firms engaged in infrastructure projects. The donors intend initially to contribute some \$130 million towards a target capitalization of \$200 million. GuarantCo will be a global facility providing partial guarantees to eligible borrowers without requirement of sovereign government counter-guarantees. Details of the facility design and administrative arrangement are being prepared.

BOX 5. Chile–Santiago-Valparaiso-Vina del Mar Toll Road Concession Project (2002)

The project is a concession for construction/ rehabilitation and operation of toll roads with foreign sponsors. The Inter-American Development Bank/Private Sector Department (IDB/PSD) provided a full-wrap guarantee for the equivalent of \$300 million of three-tranche Chilean UF-denominated, limited-recourse project bonds. IDB/PSD has taken on \$75 million equivalent of debt service on its book (up to its institutional limit) and serves as the guarantor of record for FSA, a monoline insurer, to provide a guarantee umbrella for the private co-guarantor. The guaranteed bonds were issued with a 23-year maturity, the longest achieved for Chilean infrastructure bonds, and a fixed rate of 5.8 percent, the lowest coupon rate achieved by local currency Chilean infrastructure bonds. The full guarantee enabled the private concession project to attract local institutional investor capital in a sizable amount.

Also, an international guarantee fund is being developed to provide partial credit/ risk guarantees for infrastructure projects (see Box 4).

Comprehensive Guarantees

One approach to lengthening tenors in local currency financing is to improve the credit profile of the borrower by eliminating all project risk and decoupling fund providers and risk takers (see Box 5). With this approach, a long-term loan in local currency is made to an infrastructure project by a local financial institution, but the loan is guaranteed by an international/ regional bank that has experience with project financings. If the international bank is concerned about political risk in the host country with respect to issues such as stability of the regulatory framework for the sector, this risk can be mitigated by undertakings of the host country government, backstopped by a partial risk guarantee from an MLA.

MLA Local Currency Instruments

Some MLAs have started lending in local currency and are seeking opportunities to make local currency loans to infrastructure projects. Due to risk control requirements of MLAs, local currency loans are most likely to be available

(a) in currencies where cross-currency swaps can be made to hedge the MLA's exposure or (b) when the donor can raise funds in the same currency in order to match its exposure. IFC, for example, is lending in local currency to projects in developing countries where it can fully hedge its foreign exchange exposure back to dollars in the currency swap market.¹⁶

Some MLAs such as IFC also intermediate currency swaps to convert foreign currency loans to local currency. As with local currency loans, such instruments are usually available only where currency swap counterparties are available in the market for the MLA to hedge its position. Swap intermediation by an MLA can be valuable (a) where the borrower is not sufficiently creditworthy to become a counter-party in the swap market (typically swap market participants are highly credit sensitive) or (b) where the borrower's transaction costs would be high because it lacks experience in the derivative markets.

¹⁶ IBRD cannot offer a loan in the local currency of the borrower, but once funds are disbursed out of the loan, the borrower can choose to convert the disbursed and outstanding amount used to finance local expenditures into the local currency to the extent that a cross-currency market exists.

Currency Hedges

In theory, infrastructure projects could eliminate foreign exchange risk by entering into a series of forward exchange rate agreements. Such an agreement would enable the project to purchase for future delivery the amount of dollars needed to make each scheduled debt service payment in return for delivery of local currency in amounts determined by the forward exchange rates in effect at the closing of the project's financing. However, long-dated forward exchange rates exist for only a handful of non-OECD countries and are almost exclusively limited to countries with investment-grade ratings. Forward rates of five years or longer are readily available for Chile, Malaysia, and Mexico, among upper-middle-income countries (and for certain investment-grade countries in Eastern Europe); for China, the Philippines, South Africa, and Thailand, among lower-middle-income countries; and for India and Indonesia, among low-income countries. In these lower-middle and low-income countries, it is unlikely that forward foreign exchange transactions could be arranged at an affordable cost with sufficient tenor to serve as the basis for financing an infrastructure project. As a practical matter, forward foreign exchange transactions have not been used to finance infrastructure projects in developing or industrial countries.

Mechanisms That Allocate Exchange Rate Risk to Government

Fixed Exchange Rates

In theory, a fixed exchange rate removes foreign exchange risk from an infrastructure project's owners, lenders, and customers and places it on the government (taxpayers) of the host country. Although fixed exchange rates have been maintained for reasonably long periods when measured by the needs of trade finance, these periods of stability are much shorter if viewed against the needs of infrastructure projects financed with 10- to 15-year debt. Fixed exchange-rate regimes are capable of driving nominal exchange rates to levels that are dramatically different from market-determined rates. For countries that are forced to abandon a fixed exchange rate, the volatility of the real exchange rate immediately following devaluation is typically far greater than the volatility associated with floating or managed-float systems.

Argentina provides the most recent example of the consequences of a country's being forced to abandon a fixed exchange-rate regime. Equity investors in Argentina's privatized infrastructure assets (and the lenders and fixed-income investors that financed these entities without recourse to their foreign owners) regarded the peso's peg to the dollar as sufficient assurance of the dollar value of projected cash flows. When Argentina abandoned the peg, the resulting sharp devaluation so reduced the dollar value of local currency cash flows that many firms defaulted on their dollar-denominated debt. The effect of the devaluation was exacerbated by the

BOX 6. Argentina's Devaluation and Its Impact on Utilities

Until January 2002 the Argentine peso was pegged to the dollar, and utility tariffs were effectively indexed to the foreign exchange rate, thus protecting investors with foreign currency debt from the risk of currency depreciation. Between January 2002 and January 2003, the peso lost 70 percent of its value following the removal of the peg. The government initially banned implementation of tariff indexation mechanisms for utilities, freezing tariffs at their January 2002 peso levels (with the intention of reducing inflationary pressures and protecting consumers amid a sharp economic downturn). The examples of Aguas Argentinas (the Buenos Aires water and sewerage provider, 35 percent owned by Suez Lyonnaise des Eaux S.A.) and Edenor (northern Buenos Aires electricity distributor, 90 percent owned by Electricité de France [EdF]) illustrate the impact on utilities, as follows: (a) suspension of investment programs, (b) debt defaults, (c) credit downgrades, (d) provision for losses at parent company level, and (e) inability to fund operation and maintenance expenses leading to a deterioration in service quality.

Under pressure from the utilities and MLAs, the government made several attempts to increase utility rates in November 2002 and January 2003 both of which were blocked by Argentine courts. The proposed increase in average electricity tariffs of 9 percent was considerably less than the minimum 30 percent requested by utilities. The rate increase was also designed to protect low-income residential consumers, with 40 percent being exempt. Industrial consumers on the other hand were expected to face a 25 percent increase.

government's decision to freeze tariffs, denying any increases that could have provided even a partial offset for the decline in currency values. For project sponsors and lenders to infrastructure projects, Argentina has provided a particularly instructive lesson in the interplay of currency risk and regulatory risk (see Box 6).

Whatever benefits fixed exchange rates may have, because they have not proven sustainable, they represent the worst choice of exchange rate regime for the successful financing of infrastructure projects.¹⁷ The consequences of the collapse of fixed exchange-rate regimes are likely to be severe because of the magnitude of ensuing depreciation.

Public Sector Lending in Local Currency

One common solution to the absence of local long-term debt markets or difficulties in allocating exchange rate risk to consumers and foreign investors has been local currency lending by the government. Loans may be made either directly or indirectly through state-owned financial institutions. In countries with a broad range of sectoral risks (in addition to foreign exchange risk) that serve to prohibit private financing of power and water infrastructure, public financing may well be the only alternative. However, in this case governments should be careful not to use public financing as a substitute for reforms that would facilitate private financing. In particular, governments should be wary of providing capital that crowds out private investment or that, by assuming greater levels of risk, inhibits the development of a pipeline of projects that could be financed by the private sector. Public financing may, however, be used to leverage private investment, for example, when the loan from the government is subordinated and under some output-based aid schemes. When a government provides long-term, fixed-interest rate local currency debt, it is accepting the foreign exchange risk in its entirety (along with other project risks). In instances where a government is able to borrow from donors on concessional terms to finance water and power projects, if it on-lends the funds to projects at a higher interest rate, then it may use the spread between the foreign currency fixed-interest rate loan and the local currency loan on-lending rate to provide partial cover against devaluation risks. However, if the government cannot properly price its foreign

exchange risk exposure, there is a risk that the spread may not be sufficient to cover the losses caused by a severe currency depreciation (this is similar to the limitations of exchange rate guarantees, discussed below). As a general principle, if it is specifically foreign exchange risk that is being targeted, then government resources are likely to leverage more private finance through a more carefully focused guarantee or liquidity facility arrangements (see Section Liquidity Facilities Dedicated for Exchange Rate Risk Mitigation below).

Exchange Rate Guarantees

An alternative approach is for the government to guarantee the exchange rate for a specific project. Theoretically, such a scheme fully protects lenders and sponsors from exchange rate risk. The scheme also protects the off-taker and/or consumers from cost increases caused by exchange rate changes. However, in practice an exchange rate guarantee is not likely to be sustainable. As with government local currency on-lending of foreign currency loans, an exchange rate guarantee is usually provided because long-term local debt is not available and markets do not exist to hedge the risk. If this is the case, then the government will also not be able effectively to price or hedge its exposure. In the event of a devaluation, the guarantee will be one of multiple calls on the government's foreign exchange reserves. Given that governments often do not properly disclose and account for contingent liabilities such as guarantees, they can also serve to amplify financial crisis by draining foreign exchange reserves and limiting government policy options. A further problem is that a fixed exchange-rate guarantee sets a bad precedent for future projects (in the power sector and others). There is a risk that similar guarantees would be provided to other projects, thus increasing the government's overall risk exposure and making all guarantees (and the government) less creditworthy. Exchange rate guarantees can crowd out local financing in countries where a market for term debt is emerging. Lastly, the presence of an exchange rate guarantee also inhibits the development of projects with alternative foreign exchange risk mitigation mechanisms. Despite these drawbacks, an exchange rate guarantee for a specific project (a "pioneer" project, for example) would be preferable to government financing of the project,

¹⁷ This statement should be qualified in its application to small countries that have tied their exchange rate to that of a dominant trading partner. In such cases, the smaller country's currency is less likely to become overvalued relative to the dollar or other major currencies.

because the exchange rate guarantee exposes the government to a single risk rather than the full range of project risks.

During the 1990s, the government of Pakistan guaranteed foreign exchange-indexed tariff agreements for a group of electric power generating projects (see Box 7 for a description of this scheme as applied to the HUBCO project). Most governments, even prior to the Asian crisis of the late 1990s, were reluctant to issue such guarantees, and those that did so viewed them as a means of jumpstarting the sector, rather than as permanent policies.

BOX 7. Pakistan Foreign Exchange Risk Insurance Scheme

Pakistan employed the foreign exchange risk insurance scheme (ERIS, formerly called FERL) for the country's first IPP, Hub Power Project, in 1994 to mitigate foreign exchange risk associated with the foreign currency debt service of the project company, HUBCO. The exchange rate was fixed for each loan currency at project completion in 1997 at the weighted average of actual exchange rates at the time of loan disbursements. HUBCO pays semi-annual fees (e.g., 6.7 percent per annum for dollars to 9.1 percent per annum for Japanese yen) to the central bank, SBP, which serves as the insurer. If the actual local currency debt service amount at the spot rate exceeds the insured amount, SBP pays the difference to a remittance bank; and if the actual amount required is below the insured amount, the bank pays the difference to SBP. The HUBCO power purchase agreement permitted it to pass on the foreign exchange insurance fees to the off-taker, Water and Power Development Authority. The Rupee's depreciation turned out to be greater than that expected by SBP with the result that the fixed fee was not adequate compensation for its risk exposure. As a result ERIS was discontinued. Contract terms for all IPP's were re-negotiated after the 1997 currency crisis. This example illustrates the limitations to a government's ability to accept foreign exchange risks where it is not able to hedge such risk.

While government exchange rate guarantees for infrastructure projects have often not been sustainable, there may be situations where they are unavoidable. In particular where local capital markets are undeveloped, foreign investors would rather invest elsewhere than bear the risk, and the social cost of allocating the risks to consumers is unacceptable (or politically unsustainable). Nonetheless, the assumption of foreign exchange risk is a liability (in the case of a foreign currency loan) or a contingent liability (in the case of a guaranteed exchange rate) that affects the government's creditworthiness. Therefore, if guarantees are to be credible, it is important that the government fully understands and manages its own risk exposure, in particular by properly valuing and disclosing its contingent liabilities. Programs can also be designed to mitigate this risk by, for example, promoting the development of markets that enable the government to price its risk exposure better, charging a premium for guarantees that reflects this price, reducing the magnitude of guarantees over time, and applying guarantees in a way that leverages uncovered investment.

Tariff Indexes

Long-term contracts for the sale of output from power plants or water treatment facilities and regulatory agreements that determine power or water distribution prices generally provide a mechanism for adjusting tariffs on a periodic basis. In some instances the tariff may be adjusted by a single index (e.g., the foreign exchange rate or local inflation). However, more commonly the tariff adjustment formula categorizes the project's expenses and applies an appropriate adjustment index to each ("complex tariffs"). For example, fuel expenses may be adjusted by an international fuel price index,¹⁸ locally incurred operation and maintenance expenses by the local inflation rate, and the component representing foreign currency debt service and equity returns by the foreign exchange rate.

As a general principle investors are better protected by frequent tariff adjustments to reflect cost changes. With less frequent adjustments an investor faces greater risk of losses during the lag between currency depreciation and tariff adjustment. Brazilian power distributors, which can only increase tariffs annually, were faced with this problem until 2001 when an arrangement was made to track the

¹⁸ The fossil fuels used in thermal generating plants are normally priced in dollars, and these prices tend to reflect world market prices, with appropriate adjustments for fuel quality and transportation costs. Financial instruments to hedge fossil fuel prices are widely available for long tenors, but these instruments provide a hedge against fluctuations in the dollar price of the fuel. They do not offer a means of hedging the price in local currency.

BOX 8. *The Manila Water Concessions*

Tariff regulation for the two Manila water and sewerage concessions, which were let in August 1997, includes several of the features discussed in section 4. It allows for an extraordinary price adjustment (EPA) in response to changes in exchange rates which affect debt service payments made by the concessionaire relating to debt that pre-dated the privatization and new loans taken out by the concessionaire. The tariff adjustment was to allow the concessionaires to recoup foreign exchange losses over the remaining life of the 25-year concessions. In order to obtain an EPA, the concessionaire must submit to the regulator a statement of debt service expenses for the year stating (a) the currency of the loans (b) the exchange rate for each currency at the tariff calculation reference date, December 1996, and (c) the exchange rate for each loan for the date on which debt service payments were made. If the difference between the exchange rate at the start of the concession and the rate at the time of the debt service payment is greater than 2 percent then an adjustment is permissible. EPA requests were made following the East Asian financial crisis; however, it was four years before a price adjustment was approved, during which time there was a lengthy period of arbitration. Both concessionaires requested real-time, automatic and quarterly adjustment of tariffs to reflect foreign exchange movements. Maynilad, one of the concessionaires covering the west part of the city, inherited 90 percent of the MSWW's \$800 million debt at the time of the concession in 1997, which it agreed to pay through the monthly payment of the concession fees. In early 2003 Maynilad filed to terminate its concession claiming that, among a number of disputes, the EPA mechanism was not implemented according to the concession agreement and that the adjustment was not sufficient to cover the costs of currency depreciation. The other concession, Manila Water Co with much lower inherited foreign currency payments, also requested and received rate hikes beyond the EPA and seems to have fared better.

differences (positive and negative) between actual and allowed power purchase costs and enable them to be recovered at the annual tariff adjustment. The risk with such a "tracking account" approach, however, is that the annual tariff increase may be larger as a consequence, increasing the risk of popular opposition and political intervention. The distributor also faces the additional cost of financing the increased costs in the lag before the retail tariff adjustment. Nicaragua has responded to this problem by allowing a tariff adjustment when the value of the tracking account exceeds a defined threshold.¹⁹

The way in which the index is calculated also affects the allocation of exchange rate risk. For example, an index based on a daily spot price is likely to produce a more volatile tariff than one based on a moving average calculated over several months. Reduced price volatility is generally in the interests of consumers (or off-takers) as they will face more predictable energy and water prices and will be better able to budget for them. However, from the perspective of project sponsors an index based on an average will require them to arrange additional financing (or accept reduced equity returns) for the period during which the average index is lower than the prevailing spot rate. A sustainable tariff index is likely to be one that protects consumers from excessive price volatility without placing onerous requirements on the project for additional financing.

Another feature of some tariff indexes is a dead-band, which can serve to share risks between a project and its off-takers. In this case the tariff would be adjusted only by the amount that the index change exceeds a defined threshold during a given period. This has the effect of allocating to the project the risk of index escalation up to the threshold. Any change in the index in excess of the threshold would be passed on to consumers. If, for example, the threshold were ± 5 percent and the index increased by 9 percent, the tariff would be adjusted by 4 percent and the project would bear the first 5 percent of the cost increases. Such an arrangement where the project takes the "first cut" of the index change risk could give the sponsors an incentive to reduce their exposure to the risk by, for example, reducing foreign currency costs as a proportion of total costs.²⁰

¹⁹ This section draws on B. Tenenbaum et al., "Regulation by Contract", (2003) World Bank Energy and Mining Sector Board Discussion Paper No. 7, World Bank.

²⁰ An alternative way of structuring a dead-band is for the tariff to be adjusted by the full value of the index change once it exceeds the dead-band. For example, if the index dead-band were ± 5 percent and the index increased by 4 percent, there would be no tariff adjustment. However, if the index increased by 6 percent, there would be a corresponding 6 percent tariff increase. This approach is less likely to be sustainable because it has the effect of amplifying tariff volatility: it passes on to consumers only the large cost increases, when smaller, incremental increases would likely be affordable.

BOX 9. Examples of Projects with Tariff Indexes

COUNTRY/ PROJECT	FX RISK PROTECTION PROVIDED BY TARIFF INDEX
China, Tangshan IPP	Tariff is indexed to dollars and adjusted for exchange rate changes over 5 percent/ year.
Honduras, ELCOSA IPP	Fixed financial and operation and maintenance components of tariff are indexed to the dollar.
Mexico, Samalayuca IPP	Payments are denominated and paid in dollars.
Pakistan, Uch IPP	Portion of tariff relating to foreign currency costs is indexed to exchange rate.
Philippines, Sual IPP	Tariff is denominated and paid in dollars.
Turkey, Birecik IPP	Payments are denominated and paid in deutsche marks.
India, Jegurupadu IPP	Portion of tariff relating to foreign currency costs is indexed to exchange rate.
Indonesia, East Jakarta Water Lease	Portion of tariff related to the dollar debt service costs is indexed to exchange rate.
Argentina, West Buenos Aires, Water and Sewerage Concession	Tariff denominated in dollars and indexed to US CPI.
Gabon Electricity and Water Concession	Foreign currency costs are indexed to CFA exchange rate; quarterly adjustment; exceptional adjustment allowed if escalation exceeds 50 percent.

Foreign Exchange Index

Most commonly, developing-country infrastructure projects financed with foreign currency debt feature a license or contract that adjusts tariffs by a foreign exchange index. This applies especially for power generation projects that were financed in both the bank market and the capital markets during the 1990s. Such agreements contractually shift the risk of devaluation from the project to its customers. During periods when the local currency is strengthening in real terms, a foreign exchange-indexed tariff provides off-takers with a declining real cost (measured in local currency) for the service provided by the project.²¹ Conversely, during periods when the host country's currency is weakening in real terms, a foreign exchange-indexed tariff forces off-takers to pay an increasing real cost (measured in local currency).

In practice foreign exchange-indexed tariffs have not held up well under stress. Following major devaluations in Indonesia and Argentina,²² political authorities refused to permit tariff increases sufficient to compensate for the decline in the dollar value of project revenues resulting from the devaluation. The fundamental difficulty with foreign exchange-indexed tariffs is the risk that when the time comes to increase prices to consumers by much more than the rate of inflation (which will certainly occur at some point during a multi-year agreement), political authorities may intervene to hold down consumer prices or, in the case of electric generators or bulk water suppliers, the off-taker may default on the agreement and seek to renegotiate. Even if consumers have had the benefit of declining real prices during a period when the local currency strengthened, these prices will tend to be regarded as "normal" and subsequent price increases above the rate of inflation will naturally be unpopular and cause hardship.

²¹ Financing for infrastructure projects is typically based on contractual structures which at the closing of the project's financing produce adequate projected debt service coverage ratios, assuming that the real exchange rate for the host country remains constant throughout the tenor of the project's financing. The performance of a foreign exchange-indexed tariff will depend upon whether the host country's currency is overvalued or undervalued when the base price of the foreign exchange-indexed tariff is established, although little, if any, effort by sponsors or lenders is directed at determining whether the currency of the host country is overvalued, undervalued, or fairly valued at the start of the transaction.

²² By pegging its currency to the dollar, Argentina converted its utility tariffs to the equivalent of foreign exchange-indexed tariffs.

Water production or power generation projects (“suppliers”) usually sell their output under long-term contracts²³ that pass on the foreign exchange risk exposure to the off-taker by pricing the output in dollars or by indexing the local currency price to foreign exchange rates. However, this is not a complete solution to the foreign exchange risk problem because the supplier’s credit rating will be a function of, and capped by, the credit rating of the off-taker. Even if a particular supply project has low foreign exchange risk exposure, it will still be at risk if the off-taker’s foreign exchange risk exposure is large (for example, if it has large dollar-denominated debts or contracts with other suppliers²⁴).

If rising power purchase costs under long-term contracts are placing the off-taker under financial stress (e.g., if it is not able to pass on these increased costs), the risk of governmental intervention to modify the terms of the contracts may increase. If the single off-taker is state owned (as in Indonesia, Pakistan), investors are likely to perceive even greater risk of government intervention to alter the terms of the contract (as compared to contracts between two private entities).

Inflation Index

A second major alternative for tariff indexation is the inflation rate of the project’s host country. This form of indexation can be applied to the component of the tariff that covers debt service and equity return as well as all operating expenses except fuel.²⁵ With this approach, foreign exchange risk associated with non-fuel costs remains with the project, and consumers in the host country are insulated from the effects of exchange rate changes (though the rate of inflation may also be high, especially following a severe depreciation). One benefit of an inflation-indexed tariff is that, relative to an exchange rate-indexed tariff, it reduces the risk of default or renegotiation of the regulatory agreement, because consumers face a constant real cost of service. This is not, however, to say that consumers will not object to

BOX 10. Light: an Example of an Inflation Index Tariff

When Light, a Brazilian distribution company, was privatized in 1996 with a tariff adjusted annually based on local inflation, AES and Houston Industries (now Reliant) financed their purchase of equity interests in Light in the bank market. However, it should be noted that Light, like other distribution businesses, had a lower debt-to-equity ratio than most generation projects. The additional equity provided by the sponsors gave lenders comfort that the sponsors would not abandon the company if it were to experience a temporary liquidity problem as a result of currency depreciation.

adjustments in line with inflation, especially when rates of inflation are high and incomes are not increasing at the same rate. With an inflation-indexed tariff, it is necessary to have an estimation of the real value of the host country’s currency when the base price of the tariff is established if the project sponsor is to have an accurate estimate of the dollar value of equity returns from the project. An overvalued currency will lead to disappointing returns for the project sponsor unless the base price is increased to compensate; conversely, an undervalued currency will lead to superior returns.

Some distribution companies have raised financing on the basis of inflation-indexed tariffs (see Box 10). However - such tariffs have not normally provided a basis for financing generation projects, which typically require longer-term financing than distribution businesses. Unlike foreign exchange-indexed tariffs, which are intended to be a standalone solution to foreign exchange risk, inflation-indexed tariffs are in most circumstances unworkable without an additional mechanism to enable the project to mitigate the risk of devaluation. The only mechanism that has thus far been devised for this purpose is the foreign exchange liquidity facility, discussed in *Liquidity Facilities Dedicated for Exchange Rate Risk Mitigation* on next page.

²³ There are very few examples of privately financed merchant power projects in emerging markets. Two examples are Chivor, a hydroelectric project (which will be dispatched prior to thermal plants) and TermoCandelaria, a thermal project with a large amount of subordinated debt, both located in Colombia. The foreign exchange risk exposure of a merchant generator will be determined by its foreign currency cost structure relative to that of the generators, which set the marginal price. Generators in a competitive market may also derive some comfort from the belief that a government is less likely to interfere with a market mechanism than it might be to seek to renegotiate or breach a long-term contract.

²⁴ Rating agencies will view foreign currency-denominated purchase obligations as analytically equivalent to dollar-denominated debt. A distribution company’s foreign currency rating is therefore a more appropriate indicator of its ability to make these payments than is its local currency rating.

²⁵ Fuel inputs are nearly always priced in dollars, and for a thermal plant to remain in operation it must at least have an energy tariff that reflects changes in the local currency cost of fuel caused by exchange rate changes.

BOX 11. Regulation and the Allocation of Foreign Exchange Risk in Brazil's Power Sector

Brazilian electric power generation can be divided into three segments: older generators, which are state owned or have been privatized since 1996 (mostly hydroelectric); new generators (mostly thermal); and Itaipu, Brazil's large hydroelectric joint venture with Paraguay. Brazilian distribution companies are, with certain qualifications, able to pass through the cost of purchased power from each of these sources.

Older generators which had been or were to be privatized were assigned PPAs ("initial contracts"), which index the price of power to Brazil's inflation rate. New generators are permitted to sell power on an unregulated basis, but distribution companies are only able to pass through to their customers the *full* cost of power which is purchased at a price between 95 percent and 105 percent of the *Valor Normativo* (or VN). *Agência Nacional de Energia Elétrica* (ANEEL) the electric sector regulatory body, periodically re-sets VN at a level intended to enable generators to construct, operate, and earn a reasonable rate of return from new projects. Separate VNs are established for hydroelectric and thermal plants. Although a portion of VN may be indexed to foreign exchange rates, a minimum of 25 percent of the price of power must be indexed to Brazilian inflation, and price increases may occur no more frequently than annually (as is also true for increases under the initial contracts).

Although VN is intended to protect Brazilian consumers from the full force of FX indexation, it can do so only after the construction of an individual plant. As Brazil's currency depreciates, VN must be increased to enable prospective generators to purchase capital equipment from foreign suppliers, to obtain fuel, to pay the cost of dollar-denominated debt service, and to earn an adequate return. Foreign exchange risk is transmitted even more directly to Brazilian consumers by the power supplied by Itaipu, which is fully FX indexed with its costs shared among all distribution companies. Itaipu's power poses a continuing problem for distribution companies because the government frequently delays the pass-through of its cost increases.

For expenses other than purchased power, privatized distribution companies were to retain all savings resulting from improvements in operational efficiency for the first several years of privatized operation, with this portion of their tariff increasing at approximately the rate of inflation. However, each utility will eventually undergo a regulatory review, which will determine the portion of savings (termed "the X factor") to be passed through to the public in the form of lower rates. Brazilian regulators had hoped that rate reductions from application of the X factor would help to offset anticipated increases in the cost of purchased power. However, power shortages and rationing during 2001–2002 and the resulting reduction in total electric demand have forced all participants in the power sector to re-evaluate their strategies.

Regulatory Risk Mitigation

A regulatory agreement²⁶ that gives an investor protection against foreign exchange risks is not sufficient in itself: utilities must also be confident that the agreement will be honored. Distribution companies in particular are exposed to regulatory risk because they usually²⁷ have a direct relationship with the consumer and are therefore most likely to be the subject of opposition to price increases and political interference in tariff setting.²⁸ The

problem of regulatory risk is compounded by the fact that regulatory frameworks in developing countries are often relatively new and lack a track record of good performance. Also, there is a risk that new governments may not respect agreements made by their predecessors. Enhancing confidence in regulatory arrangements is therefore an important element in mitigating foreign exchange risk²⁹ and attracting investment in infrastructure. The following sub-sections discuss a number of approaches to enhancing the credibility of regulation:

²⁶ A regulatory agreement may take a number of forms, for example, a license issued by an independent regulatory agency, a concession granted by the government, or secondary legislation. It is beyond the scope of this paper to discuss the merits of each. The discussion here concerns ways to improve the prospects that such a regulatory agreement will be honored.

²⁷ Except where retail is separated from distribution.

²⁸ As discussed in Foreign Exchange Index above, a mechanism that protects distributors from regulatory risk also benefits their suppliers whose credit quality is determined in part by the rating of their off-taker.

²⁹ Enhancing the credibility of regulatory frameworks is, of course, an important factor in mitigating a much broader range of risks, but this section is concerned primarily with foreign exchange risk.

Understanding affordability and poverty impacts: As discussed above, a regulatory agreement that protects investors while placing costs that are politically or socially unacceptable on consumers, is likely not to be honored in times of currency crisis. Conversely, regulatory agreements that are sensitive to issues of affordability are more likely to be respected. There are several mechanisms to mitigate the impacts of price increases on consumers, including:

- Tariff methodologies that reduce price volatility: for example, (a) moving average tariff indexes and (b) implementing adjustments to compensate for exchange rate changes over a longer period.
- Tariff structures that provide special protection to the poor: for example, a cap on increases to the first step of the block tariffs that utilities frequently employ to provide low-cost service to meet the basic energy and water needs of poor households.
- Contingent subsidy schemes whereby in the event of a sharp tariff increase the government makes funds available for use in mitigating the impact of the tariff increase on poor households. Such arrangements are usually implemented by default rather than by design, for example, where governments allow utilities not to service debt owed to government rather than increase tariffs to cost-recovery levels. Transparent schemes would make more efficient use of subsidies and better target them to the most vulnerable.

Government and Multilateral Guarantees of Regulatory Agreements

Where regulatory frameworks are new or untested, a government could provide a guarantee to mitigate concerns about regulatory risk. The guarantee would provide extra security to the investor and additional disincentives for the government to default. For such an arrangement to be effective, the agreement should be well defined and include clear procedures (such as international arbitration) for determining whether the

agreement has been breached. However, in many developing countries a government guarantee will be of little value to investors because the government itself does not have a good credit rating. In such circumstances, a multilateral agency could provide a guarantee to backstop that provided by the government³⁰. A key issue in designing guarantees against regulatory risk is the extent to which equity should be covered in addition to debt.³¹

Co-Financing

As an alternative to tailored guarantee instruments, bank market transactions often feature a *pari passu* tranche of financing provided by a bilateral or multilateral agency or by an export credit agency in addition to commercial tranches with political risk cover. In the event of political intervention or an attempt to renegotiate the project’s off-take agreement(s) or concession agreement, these agency lenders and guarantors are expected to bring substantially greater clout to the bargaining table than commercial bank lenders alone possess.

Credible Regulatory and Appellate Institutions

Regulatory agencies that act in the interests of consumers and utilities, independently of political interference, will engender greater confidence among investors that regulatory agreements will be respected in the event of a currency depreciation. Key factors in establishing a credible regulatory agency are its legal separation from government, the appointment of its directors and staff, its source of funds, the competency of its personnel, and transparency in its operations.

Liquidity Facilities

A liquidity facility is a form of project support that is funded in a separate escrow account, or available on a contingent basis from a third party, and that may be utilized only under defined circumstances. Liquidity facilities are intended to assist the project in coping with

³⁰ The extent of the guarantee coverage may vary by project and country; however, the following considerations apply: (a) it should be of a value adequate to deter the government from violating the regulatory agreement rather than increase consumer prices and (b) rating agencies have generally required credit support in an amount equal to 40–50 percent of the amount of debt covered by the credit support to increase a transaction’s rating to investment grade if, without the credit support, the transaction’s rating would be significantly below investment grade. The World Bank can provide partial risk guarantees for government obligations in relation to regulatory risk; Multilateral Investment Guarantee Agency (MIGA) Breach of Contract and Creeping Expropriation coverage can also provide protection against regulatory risk. A PRG requires a government counter-guarantee whereas MIGA cover does not.

³¹ World Bank PRG cover, for example, is not provided for equity. MIGA does provide cover for equity.

problems that are believed to be temporary. The amount of a liquidity facility is usually much less than the amount of the project's senior debt and is used to enable the project to pay debt service until the problem is resolved. Unlike contingent equity contributions, liquidity facilities are expected to be repaid, either by refilling the escrow account or by repayment of advances made by a third party, and they can differ widely in the terms governing repayment.

Escrow Accounts

Escrow accounts are funded from a portion of the proceeds of the project's senior debt and constitute a self-insurance. The amount placed in a debt service reserve account is typically equal to six months' debt service (normally, the largest amount of interest and principal to be paid in any semi-annual period). Debt service reserve accounts are drawn upon to cover debt service shortfalls and therefore are exposed to all project risks, including the risk of adverse exchange rate movements. An escrow account is typically costly because it is funded with a portion of the proceeds of the project's senior debt.

Alternatively, a debt service reserve account could be established by the sponsor³² and/ or filled with the project's free cash flow from operations (i.e., after debt service but before equity distributions) to cover foreign exchange risk for the benefit of lenders. This type of debt service reserve enhances the project's debt service capacity at the expense of equity return. The sponsor's obligation to replenish the reserve could be triggered by a defined exchange rate depreciation, and increases in free cash flow caused by a local currency appreciation could be deposited in the reserve.³³

Liquidity Facilities Dedicated for Exchange Rate Risk Mitigation

A liquidity facility could provide standby financing to enable a project to continue to meet its current debt service obligations (and possibly provide minimum equity returns) while spreading the tariff impact of exchange rate changes over longer periods, thus reducing the

impact of price increases on consumers (or off-takers). A liquidity facility should not obviate commitment to sound tariff policy and a willingness to implement adjustments in accordance with regulatory agreements. Use of a liquidity facility should therefore be conditional upon the existence of a credible regulatory framework. While a liquidity facility can smooth the impact of devaluation on project cash flows, the retail tariff should ultimately reflect the full cost of infrastructure service provision, including foreign currency financing costs. The facility could be provided on a project-specific basis or for a series of projects in a given country or sector. The liquidity facility could operate as follows:

- The standby credit facility would ideally be provided by a local financial institution. If the facility provider is not sufficiently creditworthy, its contingent funding commitment could be backstopped by an MLA guarantee instrument.
- Funding from the liquidity facility would be made available to the project when a devaluation (in excess of a defined magnitude) is not immediately compensated by the agreed tariff adjustment formula and this negatively affects the project's ability to service debt (and reduces returns on equity).
- The facility would be structured to ensure that project operational risks, which could also result in reduction in revenues and therefore erode debt service capacity, are separated from the devaluation risk. Such operational risks should not be covered by the facility.
- The liquidity facility will be repaid over a number of years through (a) phased tariff adjustments to return tariffs to a cost-recovery level or (b) a special levy on consumers. In this latter case the project could serve as the collection agent of the levy for the account of the municipality, state, or government, as the case may be.
- Responsibility for repayment of the facility could rest with the project sponsor (e.g., in circumstances where the facility was covering debt only) or with the municipality, state, or government. The state would likely be preferred by investors to the extent that action by regulators or

³² A sponsor may use a letter of credit backed by its balance sheet to save the cost of extra reserve.

³³ In the AES Tiete transaction (see Box 12), for example, special escrow accounts were set up to be drawn for debt service prior to the liquidity infusion by Overseas Private Investment Corporation (OPIC). A facility reserve account was required to be maintained for the transaction's first three years, funded with \$5 million from the project sponsor. Deposits to an Intra-Period Inflation Reserve Account in amounts up to \$40 million are required if, during any six-month period, the annualized inflation rate exceeds 30 percent per annum.

BOX 12. The AES Tietê OPIC Exchange Rate Liquidity Facility

The first (and, to date, only) use of a standby credit facility to mitigate devaluation risk was the AES Tietê transaction, which closed in May 2001. AES Tietê is a ten-dam hydroelectric generation project located in the state of São Paulo, Brazil. A controlling interest in the project was purchased by AES in a privatization auction held in 1999. AES Tietê sells power pursuant to power purchase agreements (PPAs) which index the price of power to Brazil's inflation rate for a tenor equal to that of its capital markets financing.

Through the Tietê Certificates Grantor Trust, the AES subsidiaries that control AES Tietê issued \$300 million of 11.5 percent certificates ("the certificates"), due in 2015. The issue benefited from coverage provided by OPIC to protect investors against the inconvertibility or devaluation of Brazil's currency. The devaluation coverage, structured in the form of a standby credit facility ("the Real Exchange Rate Liquidity Facility") in the amount of \$30 million, together with transfer and convertibility coverage of \$85 million, enabled the certificates to achieve investment-grade ratings from Moody's (Baa3) and Fitch (BBB-), piercing Brazil's then-current sovereign credit ratings (B1/BB-). The OPIC coverage is described in more detail in Appendix 2.

Despite the fact that AES Tietê closed following Brazil's major devaluation in 1999, Brazil's currency has subsequently undergone a further steep drop in value. AES Tietê has not yet received a draw from the Real Exchange Rate Liquidity Facility, but it may do so later this year (2003). On the other hand, the transaction has been downgraded by Moody's and Fitch to its current ratings of Caa1/BB- (versus Brazil's current foreign currency sovereign ratings of B2/B). These rating actions were primarily a consequence of the downgrade of Eletropaulo, its major power purchaser.

Although Eletropaulo's local currency rating at the closing of the AES Tietê transaction was Baa2/BBB-, its credit deteriorated as a result of the reduced revenues and regulatory uncertainty created by Brazil's rationing program in 2001–2002, together with its high level of short-term debt (a significant portion of which is in US dollars). A further reason for the downgrade of AES Tietê is the failure of Brazilian authorities to implement a functioning spot market for the sale of electricity. Although AES Tietê anticipated receiving only a minor portion of its revenues from spot market sales, the existence of the spot market would have provided an alternative to reliance on sales to Eletropaulo. The transaction illustrates the importance of regulatory risk and its effect on the credit strength of distribution companies as an essential element in project structures.

governments to increase the tariff is required to generate sufficient revenues to repay the facility.

- If project cash surpluses are generated by tariff levels (e.g., strengthening of the real exchange rate without an offsetting decrease in tariffs), the project could fund a reserve to be the first line of recourse in event of a devaluation, or it could transfer excess cash flows to the liquidity provider to re-pay the facility or pre-pay it if it has not yet been drawn.
- The size of the facility would be determined by a number of factors, including (a) the relative share of foreign currency financing in the project's capital structure, (b) the project's debt service coverage ratio, (c) historical evidence and expectations concerning exchange rate volatility, and (d) the tariff regime and proportion of equity returns to be covered, if any.

Suspension of Investment Programs

Another common method of coping with currency depreciation is for the investor to suspend an on-going investment program. This type of response to a currency depreciation is feasible for a distribution utility, as these typically have on-going programs of investment in rehabilitation and expansion, but not for green-field power generation and water production facilities, which are commonly *single asset* projects.³⁴ Suspending investment is a common outcome of severe currency depreciation because (a) a utility's ability to contract new debt is constrained by debt service coverage ratio covenants with lenders, (b) there is insufficient cash flow after operating costs and debt service to fund new investment, and (c) sponsors will prefer to pay dividends rather than retain profits for re-investment in an uncertain economic environment.

Suspending investments as a response to currency depreciation is more often done by default rather than by design. However, regulatory or concession agreements could be designed to make this a permissible course of action, for example, by lowering quality of service or network expansion targets in the event of a defined level of currency depreciation. Suspension of investment as a response to currency crisis can negatively impact the quality of service to consumers (see Box 13), underlining the importance of sustainable arrangements for the sharing and mitigation of foreign exchange risk.

5. SUMMARY OF FINDINGS

A key theme of this paper is that the most appropriate mechanism for mitigating exchange rate risks for power and water projects will largely be determined by country circumstances. Nonetheless, at the most general level a government is best served by maintaining an environment supportive of foreign exchange risk mitigation by others, for example by ensuring the

BOX 13. Suspension of Investment Programs: Jakarta Water

Municipal water utility PAM Jaya entered into 25-year cooperation agreements with two foreign consortia in 1997 for the operation, expansion, and improvement of water supply services for the east and west parts of Jakarta, respectively. The private operators' contractual charge is based on an indexation formula, and tariffs were to be set by the provincial government. Subsequently, a drastic devaluation and an inflation rate of over 150 percent substantially increased financing and operating costs for water services. In 2001 water charges were raised by 35 percent, and the utility and operators are requesting a further tariff increase to upgrade services. Despite substantial increases of customer connection since the introduction of private operation, cash shortfalls led to delays in the investment program, creating the perception of inadequate services and water quality by the public and political difficulty for further tariff adjustment.

convertibility and transferability of foreign currency, exercising prudent macroeconomic management, and sharing information about its policy intentions.

Where long-term, fixed-rate local currency debt is available to finance power and water projects, it should be the preferred option for mitigating foreign exchange risk.

In countries with undeveloped local capital markets, a trade-off usually exists among local currency interest rate risk, re-financing risk, and exchange rate risk (if one resorts to foreign currency debt). In such environments local currency fund schemes and guarantee instruments can sometimes be employed to facilitate fixed-rate, long-term financing for infrastructure. Where there are undeveloped local capital markets for infrastructure, finance governments should also be careful not to inhibit the development of local currency financing for infrastructure.

Given the magnitude of investment required to meet Millennium Development Goal (MDG) water goals and projected demand for electricity, coupled with low savings rates in many emerging markets and the fact that local capital market development is a gradual process, foreign private capital will have a major role in financing power and water projects in the foreseeable future. Foreign investors should be encouraged to accept foreign exchange risk; however, this is likely to attract investment only where the investor is able to mitigate the risk or the perceived magnitude of the risk is small. Where neither is the case, it is likely to be necessary to protect at least the debt, and possibly some portion of the equity, from exchange rate risks. In this regard, it is suggested that:

- Tariff regimes that are designed with sensitivity to issues of affordability (or the credit quality of the off-taker as the case may be) are more likely to be sustainable. The type of index used and the frequency with which it is implemented can also enhance sustainability to the extent that it reduces tariff volatility.
- Credible regulatory and appellate frameworks with a record of good performance will engender greater confidence that tariff regimes will continue to be

³⁴ Single asset projects do not usually generate revenues until they are completed, as financing needs to be arranged up-front to start construction and interest costs are capitalized until commercial operation.

respected in the event of a currency crisis. Where regulatory frameworks are new, government and donor guarantee instruments can be employed to bolster confidence.

- Projects can be structured to cope better with severe devaluation, for example by employing liquidity facility arrangements or permitting suspension of investment programs in the event of a severe currency depreciation.

If projects are not able to attract private finance at all because of exchange rate risk, governments can borrow and on-lend in local currency, and charge a fee to off-set their own currency exposure. However, this should not substitute for reforms that would enable projects to attract private finance.

Sharing foreign exchange risk among a project's stakeholders has better prospects of sustainability and additional benefits: (a) it gives the government an incentive to signal its policy objectives and live up to them, (b) it gives equity investors an incentive to mitigate a project's foreign exchange risk exposure, and (c) it gives consumers price signals that encourage demand-side responses.

There are several ways in which donor agencies can help developing countries promote private investment in power and water by assisting in the mitigation of exchange rate risk. Assisting governments to develop domestic capital markets and establish credible regulatory frameworks will be the key to mitigating exchange rate risks in the long run. The near-term options will depend on the circumstances of each country:

- Where there are emerging markets in long-term debt, donors can assist in lengthening the available tenor and enabling infrastructure projects to access these markets using guarantee, swap, and lending instruments and by providing support to local currency fund schemes.
- Where these emerging capital markets do not exist but there is potential for private financing of infrastructure, the near-term options are to (a) support guarantee schemes that backstop the performance of tariff regimes that provide protection against exchange rate risks, (b) support regulators in designing tariff structures that are more sensitive to the impacts of exchange rate changes on tariffs and consumer welfare, and (c) support specialized liquidity facilities.
- Where there is no, or very limited, prospect of private financing, donors may support governments by providing capital that can be used to leverage private investments or be on-lent to utilities in local currency with governments charging a premium to off-set foreign exchange risk exposure. Providing this type of government support should not substitute for reforms that would facilitate local and foreign private capital investment in power and water.

APPENDIX 1: CURRENCY CONVERTIBILITY GUARANTEES

Currency convertibility guarantees may be provided by the host country government, bilateral and multilateral agencies, or private insurers. A currency convertibility and transferability guarantee for an infrastructure project from the host country government provides for explicit priority access to the government's supply of foreign exchange. As in the case of preferred credit,³⁵ government currency convertibility guarantees, to be effective, are dependent upon the host country's not having too great a share of its debt covered by guaranteed (or preferred creditor) transactions. The convertibility guarantee cannot prevent a country from running out of foreign exchange or assist an infrastructure project located in a country that has been forced to suspend convertibility.

Currency convertibility and transferability guarantees provided by bilateral and multilateral agencies protect infrastructure projects from the risk of restrictions on transfer and convertibility imposed by the host country government. Coverage may be purchased for both debt and equity investments and may not require a project-specific currency convertibility guarantee from the host country government.³⁶ Payment of claims is based on the financial strength of the insurer and not on priority access to the host government's supply of foreign exchange, although the amount of coverage is subject to an upper limit which each agency imposes for each transaction and country, reflecting its views of government capability in maintaining convertibility. The form of coverage offered by private insurers is similar to that provided by bilateral and multilateral agencies; however, its availability is not as extensive as that provided by multilateral agencies.

Bank lenders typically require coverage equal to the full principal amount of a project's senior debt. In the case of capital markets transactions, rating agencies analyze the host country's record of imposing exchange controls to determine the necessary coverage amount. Based on

this form of analysis, coverage in an amount equal to 18 to 24 months' debt service is frequently sufficient to obtain a rating in excess of the sovereign ceiling.

Currency convertibility guarantees are not designed to address the risk of devaluation. A government whose currency is under stress can preserve its reserves of foreign exchange by ending its fight to defend the value of the currency and accepting devaluation. In such a situation, while the convertibility guarantee is honored, a project may still face a significant problem in meeting dollar-denominated debt service obligations.

³⁵ For example, in an A Loan/ B Loan structure, a multilateral agency serves as "lender of record" for the loan (i.e., the A Loan, together with the B Loan). The agency retains the A Loan, funding it with its own resources, and sells the B Loan to a group of commercial lenders. This structure depends on the "preferred creditor" status of the agency which is the lender of record serving as an implicit currency convertibility guarantee.

³⁶ Some donor agencies do not require a counter-guarantee of the host government to such agency institutionally but, depending on perceived currency risks, may require an explicit government convertibility guarantee for a project to enable the agency to provide a convertibility guarantee for financiers.

APPENDIX 2: DESCRIPTION OF OPIC'S REAL EXCHANGE RATE LIQUIDITY FACILITY

OPIC's Real Exchange Rate Liquidity Facility requires that the project sell its output pursuant to a long-term contract for payment in local currency, with price changes indexed to the host country's rate of inflation. The devaluation coverage is based on a "floor value" for the dollar value of a project's cash available for debt service. Throughout the tenor of the project's financing, the dollar value of the project's cash available for debt service is determined by two factors: (a) the local inflation rate and (b) the then-current exchange rate used to convert the project's local currency cash flow into dollars to pay debt service.

OPIC's devaluation coverage is based on evidence that the economic concept of purchasing power parity is reasonably accurate if taken on an average basis over the medium-to-long run. Real exchange rates (i.e., where inflation and the nominal exchange rate are both taken into account in determining relative values) exhibit substantially less volatility than nominal exchange rates. This volatility can be managed by an appropriately sized liquidity facility, which can be drawn upon to cover temporary cash flow shortfalls resulting from exchange rate movements. The necessary size of the liquidity facility is a function of the volatility of the real exchange rate of the host country and of the project's debt service coverage ratio. A higher debt service coverage ratio reduces the chance that currency depreciation or devaluation will be severe enough to prevent the project from servicing its debt.

The OPIC coverage is structured to isolate currency risk from conventional project-operating risks. A pro-forma calculation is performed to measure whether the real exchange rate has declined to a level below the floor values established at the time of closing the project's financing. OPIC permits draws under the Real Exchange Rate Liquidity Facility only if (a) the real exchange rate at the time of a scheduled debt service payment has fallen below the corresponding floor value and (b) (only if) the project is otherwise unable to meet its scheduled debt service payment. The floor values are set at dollar values which provide the equivalent of a debt service coverage ratio that would support a contractually based project financing (e.g., an average debt service coverage ratio of 1.4 to 1.0).

Repayment of advances under the Real Exchange Rate Liquidity Facility is made only when the project has a positive cash flow after paying its senior debt service. The liquidity facility thus functions as a revolving credit facility, with payments of interest and principal to the liquidity facility being subordinated to the project's senior debt service (except in liquidation, where the outstanding balance of the liquidity facility ranks *pari passu* with the project's senior debt). Appreciation of the real exchange rate therefore benefits OPIC by providing the cash flow with which to repay previous draws under the liquidity facility.

Although OPIC's pricing for the liquidity facility used in the AES Tietê transaction reflected a number of features that were specific to the project and its devaluation coverage, the cost of the devaluation coverage was modest compared to the spread required by the fixed-income investors that purchased the project's securities. The pricing on a contingent liquidity facility reflects the fact that it is exposed to a narrowly defined foreign exchange risk, rather than to all project risks, which are captured in the spread for the project's senior debt.

Following the completion of the AES Tietê transaction that employed OPIC's coverage, Sovereign Risk Insurance Ltd., a Bermuda-based provider of political risk insurance, announced that it would offer a similar structure under the name "REX" or "Real Exchange Rate Liquidity" product.

APPENDIX 3: AN INTRODUCTION TO HOW RATINGS AGENCIES EVALUATE FOREIGN EXCHANGE RISK

Rating agencies use a foreign currency debt rating to evaluate issuers of capital markets debt in a currency other than that of the issuer's host country. This rating captures the risk that the issuer will be unable to meet its foreign currency debt obligations as a result of restrictions on the convertibility of local currency into foreign currency and/ or on the transfer of foreign currency from the host country to other jurisdictions. An issuer's foreign currency debt rating may be contrasted with its local currency debt rating, which evaluates the issuer's ability to meet obligations denominated in local currency. Typically, an issuer's local currency rating will be at least equal to—and frequently, greater than—its foreign currency rating, but this need not be the case.

A government may impose exchange controls as a means of obtaining access to all foreign exchange generated by its nationals and may make its own determination concerning how to apportion the available foreign exchange to meet its debt service obligations and those of its nationals to which it chooses to grant access to its limited supply of foreign exchange. The government's credit rating typically sets the "sovereign ceiling" or "country ceiling," i.e., a limit on the ratings of issuers located within the government's jurisdiction. The sovereign ceiling is analytically distinguishable from the foreign currency credit rating of the government, but in practice they are usually the same.

Rating agencies have recognized three mechanisms for mitigating transfer and convertibility risk: (a) political risk insurance (PRI) or partial risk guarantee, which will provide payment in dollars in the event of government-imposed restrictions on transfer and convertibility, (b) A Loan/ B Loan structures, where the A Loan provider is the lender of record and is a preferred creditor, and (c) partial credit guarantees provided by preferred creditors. If structured appropriately, each of these approaches is capable of enabling a transaction to "breach the sovereign ceiling," i.e., obtain a rating higher than the sovereign ceiling, because the limiting factor of transfer and convertibility risk has been removed as a rating constraint. If transfer and convertibility risk has been satisfactorily mitigated, the transaction's foreign currency rating will equal its local currency rating.

Rating agencies apply a different form of analysis to each structure for piercing the sovereign ceiling. The amount of PRI coverage necessary is determined on a country-by-country basis, depending on factors that include the host country's previous implementation of exchange controls and the period(s) during which controls remained in effect. In most countries where this coverage has been used, 18 to 24 months of debt service coverage has been considered adequate by rating agencies.

A Loan/ B Loan structures depend upon the preferred creditor status of the agency that is the lender of record. Although preferred creditors typically have agreements with the host country, the benefits of preferred creditor participation in a project are regarded as stemming from the reluctance of governments to allow the preferred creditor's loans to go into default and the corresponding willingness of the Paris Club to exempt such loans from the comparability-of-treatment principle in restructurings.

The agencies generally regarded as possessing preferred creditor status are:

- World Bank
- Inter-American Development Bank
- Asian Development Bank
- African Development Bank
- International Finance Corporation
- Multilateral Investment Guarantee Agency
- European Bank for Reconstruction and Development
- Corporacion Andina de Fomento

Preferred creditor structures, to be effective, are dependent on the host country's not having too great a share of its debt covered by such transactions. Rating agencies will factor this ratio into their analysis of a transaction utilizing an A Loan/ B Loan structure.

One form of partial credit guarantee is the provision of a "reinstatable rolling" guarantee of one or more debt service payments by the multilateral agency. As in the case of A loan/ B loan structures, the presumption is that the issuer is capable of generating sufficient local currency to service its dollar-denominated debt, but would be unable to do so as a result of restrictions on transfer and convertibility if it were not to benefit from the preferred creditor status of the agency providing the partial credit guarantee. The rating agencies' analysis is

based on an assumption that the government will normally allocate whatever foreign exchange is available so as to ensure that a default does not occur. The value of this structure was substantially reduced when the World Bank elected in 2002 not to require immediate repayment by Argentina under indemnity upon guarantee call, and other transactions utilizing reinstatable rolling partial credit guarantees were downgraded as a result.

Foreign exchange risk also affects the local currency debt rating of infrastructure transactions because contractual mechanisms are frequently used in an attempt to shift foreign exchange risk to a project's off-takers and/ or to the public. Where water supply or electric power generation projects have entered into supply contracts with distribution companies, the debt rating(s) of these output purchasers typically cap the debt rating of their suppliers. If output prices in supply contracts are indexed to the foreign exchange rate, the resulting obligations will be analytically equivalent to dollar-denominated debt, and the purchasers' foreign currency debt ratings will be a more appropriate measure of their ability to honor these obligations. Unless the host country has an investment-grade foreign currency debt rating, the foreign currency debt ratings of these purchasers normally will be below investment grade.

With the exception of the San Pedro De Macoris electric power project in the Dominican Republic, which featured a multilateral political risk guarantee, no electric power sector transactions in a below investment-grade country had achieved an investment-grade foreign currency rating prior to the AES Tietê transaction in 2001. All previous electric power transactions had been capped at the sovereign ceiling and, unless affected by project-specific risks, their ratings were downgraded (in the case of several countries) or upgraded (in the case of Mexican transactions) as the sovereign rating of the host country changed.

A foreign exchange liquidity facility, such as that used in the AES Tietê transaction, if used in conjunction with PRI/PRG coverage or another method of mitigating transfer and convertibility risk, can enable a project with local currency revenues and dollar-denominated debt to achieve a rating higher than the sovereign ceiling of the host country. If the issuer is a distribution company, the liquidity facility can prevent the mismatch between the currency of the issuer's revenues and its debt service

from lowering its rating. If the issuer is a supplier to a distribution company, the liquidity facility will require the issuer to sell its output pursuant to an inflation-indexed supply contract; the distribution company's ability to fulfill its obligations under this agreement will be measured by its local currency debt rating, rather than by its foreign currency debt rating, as in the case of foreign exchange indexed supply agreements.

Although foreign exchange liquidity facilities and structures to breach the sovereign ceiling can improve the foreign currency rating of an infrastructure project, the actual rating will be determined by the transaction's local currency rating, which, in turn, may be capped by the local currency rating(s) of its off-takers. Sectors such as water and electric power that are crucial for public welfare are likely to be subject to political intervention to benefit consumers at the expense of projects and their bondholders. Although rating agencies differ in their views as to how closely the water and electric sectors are linked to the government, all view the prospect of adverse government intervention to hold down consumer tariffs as highly likely in the event of devaluation or a currency crisis tied to capital flight and declining central bank reserves. The prospect of this type of intervention creates substantial uncertainty about the revenues earned by suppliers and distributors in the water and power sectors, which in turn makes it difficult for firms in these sectors to obtain investment-grade ratings on a local currency basis. Although regulatory risk may appear to be a separate issue from foreign exchange risk, in practice they are closely related because government intervention may prevent the operation of contractual provisions related to foreign exchange risk, and even in cases where such provisions are absent, government intervention is most likely to reduce an issuer's local currency revenues immediately following a devaluation or foreign exchange crisis.

