The Lab
The Global Innovation Lab for Climate Finance

Long Term Cross-Currency Swap

Phase 2 Analysis Summary

Donovan Escalante, Arsalan Farooquee, and David Wang
13 October 2014

GOAL
Catalyze renewable energy investment in developing countries by mitigating exchange rate risk and supporting the development of commercial currency swap markets.

CURRENT STAGE
Design/Pilot

SECTOR
Renewable energy

PRIVATE FINANCE TARGET
Renewable energy investors including developers, utilities, and banks. Institutional investors could be reached in combination with other instruments such as a securitization platform.

GEOGRAPHY
Latin America, Asia, Middle East, and Africa

The Lab is a global initiative that supports the identification and piloting of cutting edge climate finance instruments.

It aims to drive billions of dollars of private investment in developing countries.

Acknowledgements

Information included in this report is based on high-level preliminary analysis, subject to changes based on the more in-depth analysis that would be performed during Phase 3 of The Lab assessment, provided Lab Advisors select this instrument.

While all errors and omissions are the sole responsibility of the authors, we would like to acknowledge the enormously valuable input from the following experts: Harald Hirschhofer, Joost Zuidberg and Per van Swaay (TCX), Keshav Gaur (IFC), Philipp Hauser & Eduardo Takamori Guiyotoku (GDF Suez Energy Latin America), Akhilesh Magal (Bridge to India), Saurabh Rao (Guarantco), Janis Hoberg (BNEF), Giulia Christianson (WRI), Brian Cox (MFX).

This project also benefited greatly from the guidance and support of the Working Group composed of:

- Giulia Christianson (WRI) - Instrument proponent
- Kelle Bevine & Maya Hennerkes (IADB), Michael Cummings (OPIC), Keshav Gaur & Helen Li (IFC), Janis Hoberg (BNEF), Takashi Hongo (Mitsui Global Strategic Studies Institute), Abyd Karmali (BAML), Michael Schneider (Deutsche Bank) , Stacy Swann (US Treasury), Gabriel Thoumi (Calvert) , Sudo Tomonori & Tokuda Masato (JICA), Joost Zuidberg & Harald Hirschhofer (TCX)

The authors would also like to thank Barbara Buchner, Gireesh Shrimali, Jane Wilkinson, and Elysha Rom-Povolo for their continuous advice, support, comments and internal review.

Analytical and secretariat work of The Lab is funded by the UK Department of Energy & Climate Change (DECC), the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), and the U.S. Department of State.

Department of Energy & Climate Change

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

Sector	Renewable energy
Region	Global emerging markets
Keywords	Renewable energy, Currency risk
Contact	Donovan Escalante donovan.escalante@cpisf.org

SUMMARY

In many developing countries, the inability to address exchange rate risk impedes investment in renewable energy projects. Cross-currency swaps insure against exchange rate risk, but their use is limited due to significant barriers for commercial swap providers in managing market risk and counterparty credit risk. This proposal would establish two structures to increase the availability of cross-currency swaps in different contexts:

1. **A cross-currency swap facility** to directly issue cross-currency swaps for renewable energy projects in underserved markets at tenors of up to 10 years[1]; and
2. **A swap guarantee facility** to insure the counterparty credit risk in swap agreements and lessen collateral requirements for renewable energy projects.

The two-part structure would ensure additionality by facilitating use of commercial swap markets in countries where swaps are available but impossible to access without credit enhancement. In such cases the instrument would address counterparty credit risk by guaranteeing only the credit risk for swap transactions. In low-income countries where market risk may be too high for commercial swap providers or there are liquidity constraints, the facility would directly issue currency swaps and carry both market and counterparty credit risk.

The target size for a pilot facility is USD 1-2 billion in notional swap capacity. Rough estimates suggest a public capital injection of USD 200-500 million most of which is repayable with a modest return is needed get the facility running. At this size, the pilot could directly mobilize up to USD 3.5 billion in renewable energy investment within five years and mitigate as much as 10.5 MtCO2e per year. Imitation effects may also crowd-in additional private capital and accelerate market growth, and new financing techniques could eventually be applied to other climate-relevant sectors such clean transport and housing. To be implemented the following support is needed:

- Donor contributions to cover the first loss tranche of the currency swap facility and counterparty risk guarantee facility
- Equity contributions to capitalize the currency swap facility;
- Partnerships with local finance institutions and/or development banks; and
- Grant funding to support the development of long-term scenario building and pricing models (covering a horizon of five to 12 years) to support market analysis or as a substitute for benchmark rates for low-income countries.

1 Longer tenors can be achieved if necessary however with potentially less leverage.

INSTRUMENT DESCRIPTION

This proposal aims to overcome the barrier of exchange rate risk by increasing the availability, decreasing costs, and lengthening the tenors of cross-currency swaps for renewable energy projects[2] in developing countries.

The limited availability of financing sources in developing countries means that investors often need to seek offshore sources of capital or settle for local financing arrangements denominated in hard currencies like the dollar or euro. However, when the revenues of a project are denominated in one currency and the repayment obligations in another, projects are exposed to exchange rate risk which can substantially increase the revenue risks, raise the cost of capital and prevent projects from being built.

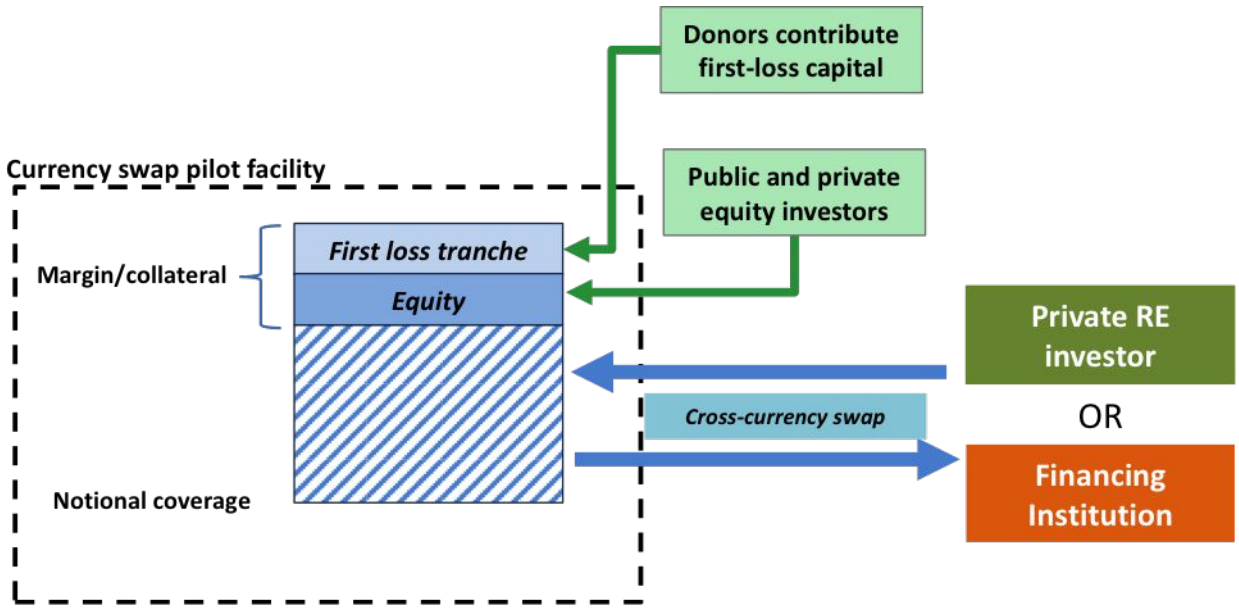
Exchange rate risk is an important barrier to renewable energy investments in developing countries. In one investor survey, 58% of respondents rated currency risk as having very high or “significant importance” for renewable energy investments (UNEP FI 2012). Cross-currency swaps insure against exchange rate risk by allowing two parties to agree to exchange a stream of payments in different currencies, at a pre-determined rate, regardless of market exchange rates over the agreement period. While cross-currency swaps are used extensively by global investors, many developing country currencies have limited presence in the market. Two types of risk hinder greater deployment of swaps in developing countries:

- **Market risk** is the risk that the underlying currency will change in value. Market risk is determined by the macroeconomic environment, inflation rates, and the liquidity of foreign exchange (FX) markets. Some developing country currencies typically middle-income countries[3] have manageable market risks and are already covered by commercial swap providers. Lower income countries, however, typically have too much market risk to be covered by commercial swap providers.
- **Counterparty credit risk** is the risk that a party to the swap agreement will default on its obligations. Cross-currency swaps have a high exposure to counterparty credit risk as they involve the exchange of notional amounts over an extended period of time (Duffie & Huang 1996). This risk increases with the length of the contract and can become a major barrier for long-term currency swaps. Swap providers assess the credit quality of the counterparty in determining whether or not to enter into a swap agreement. In markets

2 Other types of green infrastructure could be considered at a later date.

3 Brazil, South Africa, India, China, Russia, Mexico, Colombia, Argentina, Chile, Nigeria, Romania, Turkey, Kazakhstan, Philippines, Indonesia, Thailand and several more countries have well established swap markets.

Figure 1: Cross-Currency Swap Facility



where credit risk is well-assessed and priced, this is not an issue. However, investors and institutions in developing countries might not have established credit ratings and might be faced with higher prices[4] or high collateral requirements if they do not have established or internationally-recognized credit ratings. It is regularly reported that banks require an upfront down payment of collateral in excess of 20% of the notional, to be placed on a non-interest bearing USD account offshore. This magnitude of collateral can kill the fundamentals of a project. As such, even when swaps are available in the market, they might not be available to the majority of investors.

The instrument proposed here is structured to have the flexibility to operate in various country contexts, allowing it to address barriers without crowding out commercial swap markets. For example, in countries where suitable commercial swaps are available but the barrier is counterparty credit risk, the instrument would guarantee only the credit risk for swap transactions.[5] On the other hand in low-income countries where market risk may be too high for commercial swap providers, the instrument would directly issue currency swaps and carry both market and counterparty credit risk. To achieve this, the instrument would establish two facilities that have separate implementation entities. This will reflect differing operational requirements and introduce a firewall to avoid moral hazard and ensure that market and credit risk are independently assessed. More detailed descriptions of each of the two structures follow.

CROSS-CURRENCY SWAP FACILITY

Instrument overview: The cross-currency swap facility would directly provide cross-currency swaps for renewable energy projects in underserved markets at tenors up to 10 years.[6] Figure 1 shows how swaps would be collateralized and issued. The pilot facility would aim to provide swaps worth USD 1-2 billion in notional value. Notional values reflect the total leveraged position of the facility. A smaller amount referred to as "margin" needs to be kept in cash or marketable securities. The capital injections to the facility will be used as margin.[7]

STAKEHOLDERS

- **The customers of the swap facility** would include project developers, utilities, commercial banks, Development Finance Institutions (DFIs) and multilateral banks who need to manage FX risk for renewable energy projects or associated loans. The customer would enter into a swap transaction with the facility at a fixed exchange rate. The facility would pay the customer if the underlying currency loses value, and if the currency gains value, the customer would pay the swap facility the difference.
- **The proposed implementing entity** is The Currency Exchange Fund (TCX), an Amsterdam-based fund with a mandate to develop hedging instruments in emerging and

4 Under international standards, the value of derivatives should reflect the credit quality of the counterparty. This is captured through the Credit Valuation Adjustment (CVA). Under Basel III this has had the impact of increasing the cost of cross-currency swaps. The typical basis point cost for a 10 year USD/GBP cross-currency swap increased from 10bp in 2008 to 65bp in 2012 mainly due to the CVA. This impact has been much higher in developing country currencies.

5 The instrument should be deployed on a strict additionality principle, ensuring it does not crowd-out private investors and commercial offerings in target markets.

6 The facility will have better leverage within these ranges. Depending on the target countries, ambitions and risk capital provided, longer terms could be explored in subsequent phases of implementation.

7 The amount of margin needed is a function of the risk exposure being taken, including market risk and counterparty credit risk. Margin requirements for FX derivatives are dictated by the Bank of International Settlements (BIS). Additional guidance can be found in (BIS 2013).

Figure 2: Working with other counterparties to guarantee swap transactions

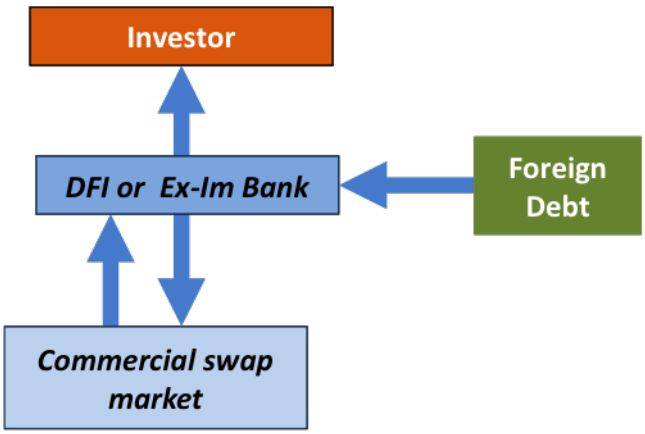
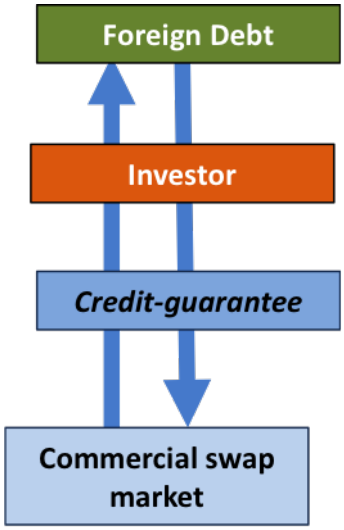


Figure 3: Direct credit guarantee for currency swaps



developing economies. TCX would manage the facility and assume all market risk.

- **Donors** would contribute funds for the first-loss tranche. These funds would be repayable except for losses after the facility is closed. Rough estimates suggest that in order to mobilize USD 2 billion in swap capacity, USD200 million would be needed for a first loss tranche.[8]
- **Private and public equity investors** would provide additional equity protected by the first loss tranche, earning a return but also sharing risks. Private investors could include social impact investors and foundations. Public investors could include DFIs, Sovereign Wealth Funds and Export-Import Banks. An additional investment of USD500 million would be needed to back a USD 2 billion facility.[8] The first loss tranche plus the additional equity make up the margin requirements of the facility.
- **Additional partners** such as commercial finance institutions, DFIs and Exim Banks with established channels in target countries can help raise awareness of the instrument and help build a project pipeline.

SWAP GUARANTEE FACILITY

Instrument overview: A swap guarantee facility would insure the counterparty credit risk in swap agreements and lessen collateral requirements for investors lacking established credit ratings, who would receive credit enhancement, allowing them to post less collateral and access better rates by transferring prudent credit risk to the facility. This swap guarantee model has already been successfully employed by other institutions focusing on emerging markets. For example, as part of the "East Asia Swap Guarantee Facility" the International Finance Corporation (IFC) in partnership with Deutsche Bank provided credit enhancement to local banks and corporate customers for swap transactions, covering up to 40% of credit losses (IFC 2002). Another example is MFX Solutions (MFX)[9] which created a counterparty risk management platform accessible to parties otherwise not able to access swap markets. MFX has worked closely with The Currency Exchange Fund (TCX) to guarantee swap transactions that otherwise would not have been possible because of counterparty risk. The platform receives credit risk guarantees provided by the Overseas Private Investment Corporation (OPIC) and the Netherlands Development Finance Company (FMO) which are pledged to commercial counterparties, covering the risk and removing the need to post collateral.

There are many approaches to assess and mitigate credit risk. The figures above show two options for how the facility could approach this role. These will be further explored in the Lab's Phase 3 analysis, with the objective of identifying the option that provides credit enhancement to the greatest number of counterparties at the least cost. The two options are to:

- **Work through existing finance providers** such as development finance institutions (DFIs) and Export Import Banks that carry out due diligence and credit assessment of counterparties for their lending operations and already have established lending relationships (Figure 2). Without incurring additional transaction costs, organisations such as the International Finance Corporation (IFC) could guarantee cross-currency swaps for their borrowers.
- **Establish a credit guarantee facility** – A stand-alone credit guarantee would cover counterparties without established lending relationships. This facility would need some concessional funding to cover transaction costs as well as risk capital for a first-loss tranche. (See Figure 3).

STAKEHOLDERS

- **The customers of the swap guarantee facility** would be renewable energy investors who wish to enter into swap transactions but do not have established credit ratings. The swap guarantee facility would serve as a guarantor

8 These proportions are only indicative. The actual amounts will depend greatly on the currency mix, tenor, and type of swap – fixed or consumer price index (CPI) linked.

9 http://mfxsolutions.com/

between the customer and commercial swap providers or the currency swap facility.

- **The proposed implementing entity for the swap guarantee** facility is the International Finance Corporation (IFC). IFC has established capacity to conduct credit due diligence, experience as a provider of currency swaps and experience as a counterparty to commercial swap providers through its local currency lending operations. IFC would manage the facility within its established risk management frameworks. IFC would be willing to share risks on equal footing with their own capital.
- **Development finance institutions (DFIs) and Export Import Banks** are crucial partners to the facility as they already carry out due diligence and credit assessment of counterparties for their lending operations and have established lending relationships.
- **Concessional finance providers** would also be sought to enable coverage of counterparties without established lending relationships.

THE ROLE OF THE LAB

If this proposal moves to Phase 3, the next steps will be to identify target countries and conduct detailed modelling assessments to estimate costs, risks, and swap premiums in these markets. Potential funders will be identified and partnerships with private banks and Development Finance Institutions (DFIs) will be sought to help disseminate knowledge of the instrument and build a pipeline of projects for swap transactions. The Lab's network could also be essential in identifying donors, investors and other partners, to provide the following types of support:

1. A donor would be sought to contribute USD 100-200 million in risk capital for the first loss tranche of the currency swap facility. The counterparty risk guarantee facility would seek 50-100 million to guarantee collaterals.[10]
2. Separate contributions of equity to capitalize the currency swap facility. This can come from a private or public investor. Equity contributions would receive a small return to compensate for risks.
3. Partnerships between the facility and local finance institutions and/or development banks able to inform investors and raise product awareness.
4. Grant funding to allow for development of long-term scenario building and pricing models (covering a horizon of 5-12 years) to support market analysis or as a substitute for benchmark rates for low-income countries.[11]

10 This rough estimate is based on the margin requirements from MFX who can cover on average ~10X the size of their swap guarantee facility in notional value so this contribution could cover between USD500m- USD1bln. It is expected that not all swaps facilitated under this instrument will need counterparty credit guarantees.

11 In the absence of an underlying market benchmark, no standard valuation method exists, creating a major obstacle. Long-term economic forecasting and pricing models can be substituted however there are significant investment costs to build these capacities.

CONTEXT

A cross-currency swap can help catalyze private sector investments in countries with ambitious renewable energy policies and limited political and regulatory risk.

Even with strong institutional support and financial backing, the success or failure of this instrument in mobilizing renewable energy investments will ultimately be determined by the policy, institutional, economic, and financial market settings that determine the overall investment climate. This section lays out the main aspects that should be considered in choosing target countries.

Policy settings. The main drivers of renewable energy investments are reliable and long-term policy commitments that offer appropriate incentives. According to private finance practitioners, national targets are the most powerful incentive mechanism for renewable energy deployment (UNEP FI 2012). These should be paired with predictable support instruments such as feed-in-tariffs, portfolio standards, or carbon pricing among others.

Institutional settings. Institutional settings play a major role, including well-defined property rights and legal frameworks that protect investors.

Economic environment. There is a strong correlation between interest rates, inflation, and exchange rates. A stable macroeconomic environment will be highly desirable for this instrument and can greatly affect the cost of currency swaps and the leverage of the swap facility.

Financial market settings. If local financial markets are lacking, there will be a greater demand for foreign capital and for currency swaps. In addition, the depth and liquidity of local FX markets will impact cost and availability of commercial swaps.

Stage of technology development. The instrument will most likely be used in the deployment stage of renewable energy projects.

COUNTRY CONTEXT AND ROLE OF INSTRUMENT

The role of the instrument will depend on the level of development of commercial swap markets. Because the pilot facility would use subsidized funds, care should be taken to avoid undermining market development by competing with private sector players on a subsidized basis. Supporting private sector development is paramount to the long-run success of this instrument and actions that could crowd out genuine risk-taking by the private sector or create perverse incentives should be avoided. Detailed guiding principles should be established that spell out when and how the instrument would be used. Sometimes a country may fall in a grey area. In these cases, an independent body should

assess the suitability of the facility's involvement.

As the maturity of currency swap markets differs greatly, the list below offers general guidance as what the role of the instrument could be:

- **Upper middle income countries & BRICs:** FX Markets in these countries are typically liquid and commercial swap providers are available. The swap guarantee facility would mitigate only counterparty credit risk and ease collateral requirements where appropriate.
- **Lower middle income countries:** In circumstances where commercial currency swaps are not available, the facility would directly issue swaps. If commercial swaps are available, the facility will only guarantee counterparty credit risk.
- **Low income countries:** Both market and counterparty risks need to be addressed by the facility. Foreign exchange markets are too illiquid and financial markets not sufficiently developed for commercial swap providers.

INNOVATION AND BARRIER REMOVAL

The instrument can directly address exchange rate risk and through that, mobilize cheaper and longer-term foreign investment capital in developing countries.

INSRUMENT INNOVATION

While currency swaps have been used for over 30 years, their usage in developing countries is very limited. Through an innovative structure that addresses market risk and counterparty credit risk, this instrument can work in a variety of country contexts while limiting any intervention to be additional to commercial currency swap offerings. This ensures commercial players are not crowded out and supports the development of commercial offerings in the long-run. Moreover, it allows project developers to access cheaper capital, thus mobilizing private finance into climate mitigation through a completely new avenue.

BARRIERS ADDRESSED

BARRIERS DIRECTLY ADDRESSED

The direct barrier addressed is exchange rate risk – specifically the risk that one currency will lose value against another. This is an important risk for investors when there is a currency mismatch and the revenues of a project are in a different currency than repayment obligations.

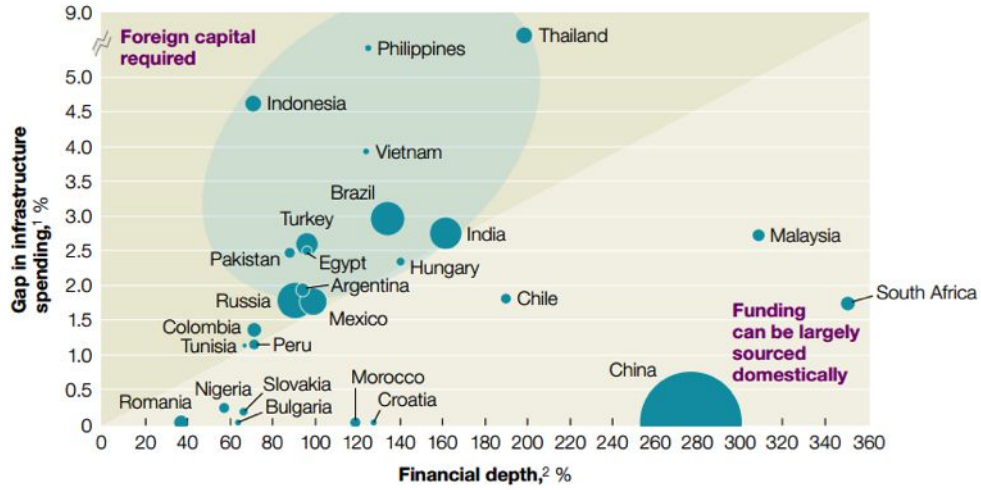
The proposed structure also provides a solution to mitigate market risk and counterparty credit risk, which act as the main barriers to greater issuance of swaps in developing countries. Market risk is mitigated within the facility by pooling risk and diversifying overall foreign exchange exposure across a wide range of emerging market currencies and through the use of long-term economic models in countries with little financial depth and a lack of financial barometers such as yield curves. Counterparty credit risk is addressed by working through counterparties with established lending relationships such as DFIs and Exim banks that have a good understanding of credit quality of borrowers. In cases where this is not possible, the instrument uses credit guarantees that will cover a certain percentage of defaults.

BARRIERS INDIRECTLY ADDRESSED

The underlying barrier is the cost and availability of long-term local currency financing in developing countries where less developed capital markets, competing investment needs, lower savings rates and more uncertain policy and macroeconomic environments greatly limit the availability of investment capital.

Figure 4 shows how projected infrastructure spending and the lack of financial depth in some developing countries create

Figure 4 In many developing countries investment demand outstrips financing
Source: (McKinsey 2011)



[1]Gap in needed vs actual infrastructure spend as % of GDP, 2009.
[2]Value of bank deposits, bonds, and equity as % of GDP, 2009.

large demands for foreign capital. By creating the conditions that facilitate greater flows of foreign capital, the instrument can:

- **Lower costs of capital** - Most renewable energy projects use debt to pay for investments; therefore, the availability of low-cost debt is an important driver of renewable energy costs. The instrument would address this barrier by facilitating the movement of cheaper debt from offshore.
- **Increase long-term financing** - Debt available in developing countries is often short-term and does not match the operational profile of renewable energy project. A long-term swap would allow developers to source offshore debt with longer tenor

A recent study in India found that lowering the cost of debt by three percentage points and increasing tenor from 10 to 15 years would reduce the delivered cost of renewable energy by 14.5% (Shrimali et al. 2014). Overall investment levels in renewable energy are affected substantially by costs of capital. Empirical studies suggest an elasticity in green investments of around 10% for every 100 basis point change in the cost of capital (Eyraud et al. 2011).

BARRIERS NOT ADDRESSED

The following barriers that are important for successful deployment of renewable energy projects in developing countries would not be addressed.

- **Policy and regulatory uncertainty** – especially renewable energy policy and incentive regimes.
- **Technical capacities of local players** – a swap can be a complex instrument depending on its structure and terms. This can be a barrier to developers without previous experience as well as for regulators, legal, and financial professionals with limited derivatives experience.
- **Technology specific risks** – such as grid connectivity issues, technical skills shortage, and competencies.
- **Performance risk** – If a project fails to perform as planned, the developer will have problems repaying debt.

IMPLEMENTATION AND RELATED CHALLENGES

This instrument has drawn interest from two solid institutions with the right experience and capacities to act as the implementation parties. This would allow capital to be deployed more rapidly, with less transaction costs, and considerably less risk, start-up time and cost. The proposal aims to establish a functional instrument within one year and facilitate USD 1-2 billion in swap transactions within five years.

The **implementing entity for the currency swap facility** is proposed as The Currency Exchange Fund (TCX), an Amsterdam-based fund with a mandate to develop hedging instruments in emerging and developing economies. The shareholders of TCX are mostly development finance institutions who have contributed a capital base of USD ~660 million. TCX currently hedges about USD 1.3 billion of local currency loans in 48 currencies. TCX holds an A- (stable) rating from S&P. It has a large capital base, diversified exposure, established capacities for financial and valuation modeling as well as risk management processes already in place. These elements would allow TCX to deploy capital more rapidly with less transaction costs and with considerably less risk, start-up time, and cost than other potential providers.

The **implementing entity for the swap guarantee facility** is proposed as the International Finance Corporation (IFC). With a portfolio worth close to USD50 billion, top credit ratings and reach in more than 100 countries, IFC is well suited to act as the guarantor for swap contracts. IFC also has established capacity to conduct credit due diligence, experience as a provider of currency swaps and as a counterparty to commercial swap providers through its local currency lending operations. IFC could establish a dedicated facility and potentially contribute capital to back credit guarantees for swap transactions.

TIME TO IMPLEMENTATION

The instrument could be operational in approximately one year if capital commitments fall quickly into place. However, it will take time to build up the project pipeline and scale the facility to the target USD 1-2 billion in notional swap capacity. The full capacity could take as much as five years to be reached. This timeframe depends on the following factors:

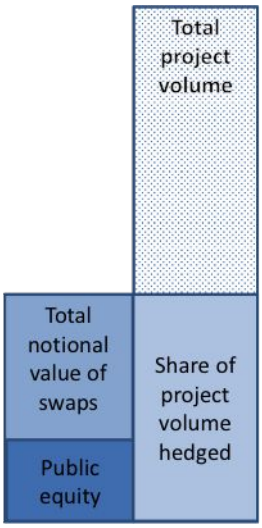
- Ability to raise capital for the first loss tranche and the equity share of the cross-currency swap facility.
- The currencies that would be offered, especially if these have not been offered by the implementing entity previously. The facility would need to develop additional valuation models and stress testing.
- The absorption capacity of TCX. Currently the firm has handled a volume of approximately USD1.2 billion in its five years of operation. It would need to build up additional operational capacity to implement this instrument. Due to the size of IFC, absorption capacity is not expected to be a major issue for the implementation of the counterparty risk guarantee.
- To minimize time to deploy capital, immediate support is needed to raise awareness of the products offered. Partner institutions could help raise awareness amongst investors in each target country and support the development of a project pipeline. The Lab could have an important role making inroads with local institutions and investors.

IMPLEMENTATION CHALLENGES

There are also key challenges that fall outside the control of implementing parties. These include:

- Short term versus long term investor expectations. Current interest rates for the dollar and euro remain very low. Hard currency financing may still be more

Figure 5: Leverage of Public Contributions



attractive if seen purely on an interest rate basis and long-term devaluation trends and foreign exchange volatility are not taken into consideration.

- Global macro risk especially changes in volatility of emerging markets and changes in interest rates in the U.S and Europe
- Hard currency financing has been the norm in many low-income countries. Using hedges can represent a major change in values and business practices.

PRIVATE FINANCE MOBILISATION POTENTIAL AND OTHER POSSIBLE IMPACTS

Between USD 1.5-3.5 billion of private investment could be directly mobilized through the pilot facility by 2020. Depending on the scale reached, the instrument would have knockoff effects that advance the development of commercial swap markets and of local currency financing in developing countries, expanding its potential. In addition, by removing an important barrier to building renewable energy in many regions, the instrument mobilizes exponentially more private finance in renewable energy, at the same time unlocking the associated GHG mitigation benefits.

PRIVATE FINANCE MOBILIZED

By 2020, the pilot facility could directly mobilize between USD 1.5-3.5 billion of private investment with a public capital injection of USD 200-500 million. Public contributions are leveraged through the facility because 1) they serve as margin for underwriting larger notional values; and 2) Not all of a project's cash flows need to be hedged (See Figure 5).

Leverage of the facilities is highly dependent on the currencies and type of projects supported. The following factors play a role:

- **Collateral requirements for different currencies.** The amount of collateral needed is inversely related to the market and credit risks being taken. More leverage will be achieved in higher income countries because swaps can be sourced from commercial markets so the facility would only cover counterparty credit risk. Less leverage will be achieved in low-income countries, particularly in highly volatile and illiquid FX markets. The facility would operate within certain parameters to ensure proper allocation and risk-taking across country income groups.
- **Ratio of debt to equity of renewable energy projects and share hedged.** A project with mostly local backers will need a lesser share hedged than a 100% foreign owned and financed project.
- **Credit quality of counterparties.** Although one of the principal aims of the facility is to reduce collateral requirements, the facility will still need to use collateral to manage its credit risk. More collateral means less leverage. Collaborating with partner institutions with established lending relationships with counterparties can help reduce collateral requirements.

To define our range of USD 1.5-3.5 billion, we drew worst- and best-case scenarios with the assumption that actual amounts will fall somewhere in between. These are rough, informative estimates.[12] For the worst-case scenario, it was estimated that 90% of a project's volume would need to be hedged (virtually all foreign debt and equity). In the best case scenario we assumed a project with a 70:30 debt to equity ratio where debt is all locally sourced and the equity share comes from foreign investors. The ranges above represent a likely mean.

In addition to the private investment directly associated with the currency swap markets, it is important to note that, by virtue of introducing currency swaps to new markets, an important barrier to building renewable energy is removed in these regions; this would indirectly mobilize additional private capital in renewable energy, increasing the scale of private finance mobilization exponentially.

MARKET POTENTIAL IN 2030

The exact market potential cannot be estimated. The uptake of this instrument depends on many factors including hard-to-predict inputs such as global macro environment, economic growth, stability in individual countries and changes in user practices that promote local currency financing. The total value of the renewable energy sector in global emerging markets except for China and Brazil is estimated at USD 450 billion by 2030.[13] The combination of high emissions growth and emissions factors, significant renewables capacity and estimated market potential for possible target countries reinforces the prospects for demand for this instrument

MITIGATION IMPACT

We estimate that the pilot facility with USD 1-2 billion in notional currency swaps could cover exchange rate risk for 1.5 to 4.7 GW of renewable energy projects and unlock emissions reductions

12 A detailed market study would follow in Phase 3 which would help narrow this range significantly.

13 Brazil and China are excluded due to the overwhelming role that their respective national development banks play in financing renewable energy, which makes it unlikely that there will be demand for this instrument in these countries.

3.4 MtCO2 and 10.5 MtCO2 per year.[14] These estimates assume that projects would not have taken place without the exchange rate protection facilitated through the instrument. The ranges reflect uncertainty regarding the final allocation per currency, types of counterparties, technology costs and types of renewable energy project structures which will greatly affect the leverage and mitigation potential of the facility.

CONCLUSIONS AND NEXT STEPS

This instrument provides a practical, market-oriented solution to the problem of exchange rate risk in contexts unserved by available currency swap instruments. Through the two facilities, the instrument can provide solutions in developing countries across a broad spectrum of income levels. Employing this instrument is expected to facilitate greater flows of foreign capital to developing countries, lower the cost of capital and improve tenors. In doing so, the instrument will lower the cost of renewable energy and increase investment levels.

A pilot facility is proposed to back the issuance of USD1-2 billion in notional value of currency swaps either by issuing swaps directly or by facilitating participation in commercial swap markets through a counterparty credit guarantee. It is estimated that the pilot facility could support between 1.5 and 4.7 GW of wind and solar PV projects. This could directly reduce between 3.4 MtCO2 and 10.5 MtCO2. The market for this instrument is very large. Overall renewable energy investment levels in emerging markets excluding Brazil and China are expected to reach close to half a trillion dollars by 2030.

There are two experienced and suitable institutions interested in implementing this instrument within a year if capital falls into place. This is a very positive factor for the instrument and considerably lessens implementation risks. Should the instrument move to Phase 3, the next steps will be to work with these institutions to identify target countries and conduct detailed modelling to refine cost estimates and risk assessments. In addition, we will work to identify and facilitate cooperation with potential funders and seek partnerships with private banks and DFIs that can support implementation. The objective of Phase 3 will be to put the pieces together for pilot implementation.

14 These estimates consider projected average costs for hydro, geothermal, biomass, solar and wind projects in 2020. They assume an emissions factor of 633gCO2/kWh and capacity factors of 45% for onshore wind and 18% for solar PV.

INDICATOR ASSESSMENT SUMMARY

CRITERIA	INDICATOR	ASSESSMENT	COMMENTS/RATIONALE
Innovative	Addresses: Exchange rate risk	High	This instrument can fully address exchange rate risk for investors
	Addresses: Specific barriers to the issuance of currency swaps in developing countries.	High	The flexible framework of the instrument provides an approach to tackle market risk and counterparty credit risk. In this manner, it provides a direct solution to barriers in currency swap markets and supports the development of commercial swap markets over the long term.
	Addresses: Access to lower cost capital	Medium	Lower-cost foreign capital could be mobilized using this instrument.
	Addresses: Increases access to long tenors	Medium	Longer-tenor foreign capital could be mobilized using this instrument.
	Instrument Innovation	Moderate	While the concept of currency swaps is not new, the use of this instrument to deploy climate finance is highly innovative.
Actionable	Time to implementation	12 months	The facility could start operating in this timeframe, however, it will take more time (5+ years) for all capital to be deployed.
	Strength of implementation plan	High	The implementation plan for the currency swap facility is based on TCX's business model which has been employed since 2008 and IFC's current activities. It is based on proven experience and this greatly strengthens the implementation plan and lowers risks.
	Strength of implementing organization	High	TCX holds an A- (stable) rating from S&P and IFC is an AAA rated institution. TCX has a large capital base, diversified exposure, established capacities for financial and valuation modeling as well as risk management processes already in place that allow it to deploy capital more rapidly with less transaction costs.
	Fit to national policy environment	Moderate	This instrument would only be deployed in countries with a supportive national policy environment. It cannot influence this directly.
Catalytic	Private finance mobilized	USD1.5-3.5 billion for USD200-500 million in public capital contributions. This share of contributions is repayable and can receive returns.	More leverage will be achieved in higher income countries. Estimates range between USD 1.5 billion – 3.5 billion for every USD200-500 million in public capital contributions. This is dependent on project structure and currencies supported. Public contributions are repayable after the operational lifetime of facility if there are no losses.
	Public finance needed	USD200-500 million for a pilot facility	Public capital will be used for first loss tranches for the facilities and additional equity to back the issuance of currency swaps.

CRITERIA	INDICATOR	ASSESSMENT	COMMENTS/RATIONALE
Transformative	Market potential in 2030	USD450 billion renewable energy potential in emerging economies.	The total market potential for the sector is USD450 billion. This takes into account projected investments in emerging economies excluding Brazil and China. The potential for this instrument is a small fraction of this value.
	Mitigation impact (potential)	Between 3.4 and 10.5 MtCO2 per year by 2020 for the pilot facility.	The ranges reflect uncertainty regarding the final allocation per currency, types of counterparties, technology costs and types of renewable energy project structures which will greatly affect the leverage and mitigation potential of the facility. USD
	Local development impact	Decreased vulnerability of local populations, decreased reliance on fuel imports.	In many low-income countries, PPAs denominated in hard currencies are offered to attract foreign investors. This instrument provides an alternative to this structure, transferring exchange rate risk from the PPA off taker to either the facility or commercial markets. This is highly beneficial because in the case of devaluation, the off taker, for example, a public utility, would need to increase electricity tariffs to compensate for the loss in local currency value. This affects local populations, especially the most vulnerable whose share of energy costs is already high. Similar FX exposure is present when utilities must purchase imported fuels for conventional power plants. Renewable energy paid for in local currency is not subject to these risks.
	Unsubsidized financial performance	-	This indicator cannot be measured for this instrument. It is unlikely that a pilot could function without a subsidized investor.

REFERENCES

Duffie, D. & Huang, M., 1996. Swap Rates and Credit Quality. The Journal of Finance, LI(3).

Eyraud, L. et al., 2011. Who's Going Green and Why? Trends and Determinants of Green Investment.

IFC, 2002. Summary of Project Information: East Asia Swap Guarantee Facility, Available at: http://ifcext.ifc.org/ifcext/spiwebsite1.nsf/DocsByUNIDForPrint/A88147755E54AB0C852576C10080CB6C?opendocument.

McKinsey, 2011. Asia's USD1 trillion infrastructure opportunity. McKinsey Quarterly, (March), pp.1–7.

Shrimali, G., Konda, C. & Srinivasan, S., 2014. Solving India's Renewable Energy Financing Challenge : Instruments to Provide Low-cost , Long-term Debt A CPI-ISB Series.

UNEP FI, 2012. Financing renewable energy in developing countries: Drivers and barriers for private finance in sub-Saharan Africa,