The Lab

Global Innovation Lab for Climate Finance

Small-scale Renewables Financing Facility

LAB INSTRUMENT ANALYSIS

JUNE 27, 2016

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 into climate change mitigation and adaptation in developing countries.

AUTHORS AND ACKNOWLEDGEMENTS

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The authors would like to acknowledge the following professionals for their cooperation and valued contributions including the proponents Reinhard Reichel (IFC), the working group members: Steven Baillie (IFC), Anna Balm and Constance Berthier (DECC); Torsten Becker, Silvia Kreibiehl and Tobias Panofen (Frankfurt School/UNEP); David Bowers (Africa Finance Corp), Dan Cleff (EKF), Asger Garnak (Danish Energy Agency); Harald Hirschhofer (TCX); Abyd Karmali (Bank of America Merrill Lynch); Susanne Kern (Deutsche Bank); Stephen Morel (OPIC); Monojeet Pal (African Development Bank); Jan Weiss (IDB); and other experts that were consulted: Sebastian Woerle (IFC), Lachlan Cameron (ECN), Lara Esser, Murefu Barasa (EED), Raymond Bona (ICED), Peter Wolff (DIE), Monica Fernandez Alvarez de Lugo, Ignacio Jesus Fernandez Stearns, and Matthew Reed McClymont (IDB), Santosh Kumar Sing, Ingo Puhl and Paul Butarbutar (South Pole Group).

The authors would also like to thank Barbara Buchner, Ben Broche, Elysha Rom-Povolo, and Jane Wilkinson for their continuous advice, support, comments, and internal review, and Amira Hankin for graphic design.

Analytical and secretariat work of The Lab has been funded by the UK Department of Energy & Climate Change (DECC), the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the U.S. Department of State, the Netherlands Ministry for Foreign Affairs, Bloomberg Philanthropies, and The Rockefeller Foundation. Climate Policy Initiative serves as Lab Secretariat and analytical provider.

Department of Energy & Climate Change

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

Ministry of Foreign Affairs of the Netherlands

Bloomberg Philanthropies

The ROCKEFELLER FOUNDATION

CLIMATE POLICY INITIATIVE

CONTEXT

Small-scale renewable energy projects[1] (SREPs) can play a key role in increasing deployment of renewables in developing countries. Small projects are well suited to conditions in emerging markets as they allow developers and banks to gain experience at a smaller scale and a more limited risk profile. However, financing options in these markets are often not well-aligned with the needs of small-scale projects. Given the high costs of project finance transactions, small projects are typically financed with corporate loans, which are not designed to finance renewable energy investments. Barriers include high interest rates, short tenors not matched to the long-term nature of renewable energy, and high collateral and equity requirements. These prevent otherwise viable projects from being pursued and hinder the long-term development of the renewables sector.

1 Small-scale is defined here as projects between 1-20MW

INSTRUMENT MECHANICS

The Small-scale Renewables Financing Facility (SRFF) aims to systemically improve financing conditions for SREPs, helping make more projects bankable and contributing to the transformational development of local institutions to enable a wider scale-up. The instrument has the following objectives:

- To pilot new financing approaches that effectively meet the needs of small projects;
- To increase the understanding of the risks small projects face and find ways to allocate these risks more effectively; and
- To simplify financing by developing hybrid instruments that combine selected project finance features with corporate lending approaches, resulting in streamlined application and due diligence processes.

FINANCING APPROACHES

The SRFF incorporates two innovative and complementary financing approaches:

- **Discounting Facility** – This facility would refinance projects post-construction through a tailored approach that "discounts" future cash-flows from power purchase agreements (PPAs) to serve as collateral. This would allow projects to obtain lower priced, long-term debt and higher leverage. Post-construction refinancing is normally not available to SREPs and is cheaper than pre-construction financing because of (i) lower due diligence costs and (ii) significantly less risk (as there is no construction risk). Once SREPs are refinanced, sponsors will be able to take equity out of projects and, as a precondition of accessing the Facility, invest it in new projects.
- **Mezzanine Facility** – This facility would provide construction financing in the form of a subordinated loan backed by donors and DFIs, in conjunction with a senior loan provided by a local bank. This would substantially decrease equity requirements and improve financing conditions for new projects. The Mezzanine Facility is particularly well-suited for markets with significant SREP potential but few existing projects. Such a facility would benefit significantly from, and ideally complement a technical assistance facility. It would be available to all projects, not only those from sponsors that have used the Discounting Facility.

The instrument would be deployed in two stages. During the first stage, a pilot would focus on the

Discounting Facility to refinance existing projects. To support market scale up and the development of new projects, the Mezzanine Facility would be launched in a subsequent stage.

This brief focuses on the Discounting Facility as the first step to deployment of this instrument while laying out an implementation pathway to incorporate the Mezzanine Facility in the future.

DISCOUNTING FACILITY

The Discounting Facility is based on the premise that a renewable energy project that is built and has a long-term power purchase agreement (PPA) carries limited risk. For solar, wind, and hydro there is no fuel price risk, limited technological and operational risks and if a PPA is present, reasonable revenue certainty. Financing terms should reflect these realities. Large-scale projects already have access to financing vehicles that allocate risks reasonably well. They are typically financed using bridge loans for construction and are then refinanced at better terms post-completion once construction risks are eliminated. However, these arrangements are not normally available to SREPs.

The Discounting Facility will offer a financing package tailored for SREPs that recognizes the reduced levels of risk post-construction. The Facility will use a corporate finance approach to simplify financing and due diligence. However, the financing decision will be based on the cash flows of the project, rather than the balance sheet of its sponsors.

The Discounting Facility provides a comprehensive solution for long-term financing of small renewable energy projects.

STRUCTURE

The Discounting Facility operational structure is illustrated in Figure 1. It would be structured as a blended finance facility with a donor-funded first loss tranche and senior funding from DFIs and commercial investors. It would be managed by a fund manager or a DFI with some regional presence.

Loan origination would be carried out by one or more local banks in each target country that would act as agents and be responsible for interfacing with borrowers, reviewing documentation, establishing eligibility and disbursing funds. This cooperation between the Discounting Facility and local bank would be similar to the relationship between an Export Credit Agency and a local bank. The structure allows local banks to participate, helping to build technical capacities, while overcoming a key barrier in countries where short-term deposit bases mean that banks lack long-term capital for loans. The local bank(s) would receive an origination fee and would also guarantee a portion (10-20%) of the Facility's loan to a SREP to align interests and avoid moral hazard.

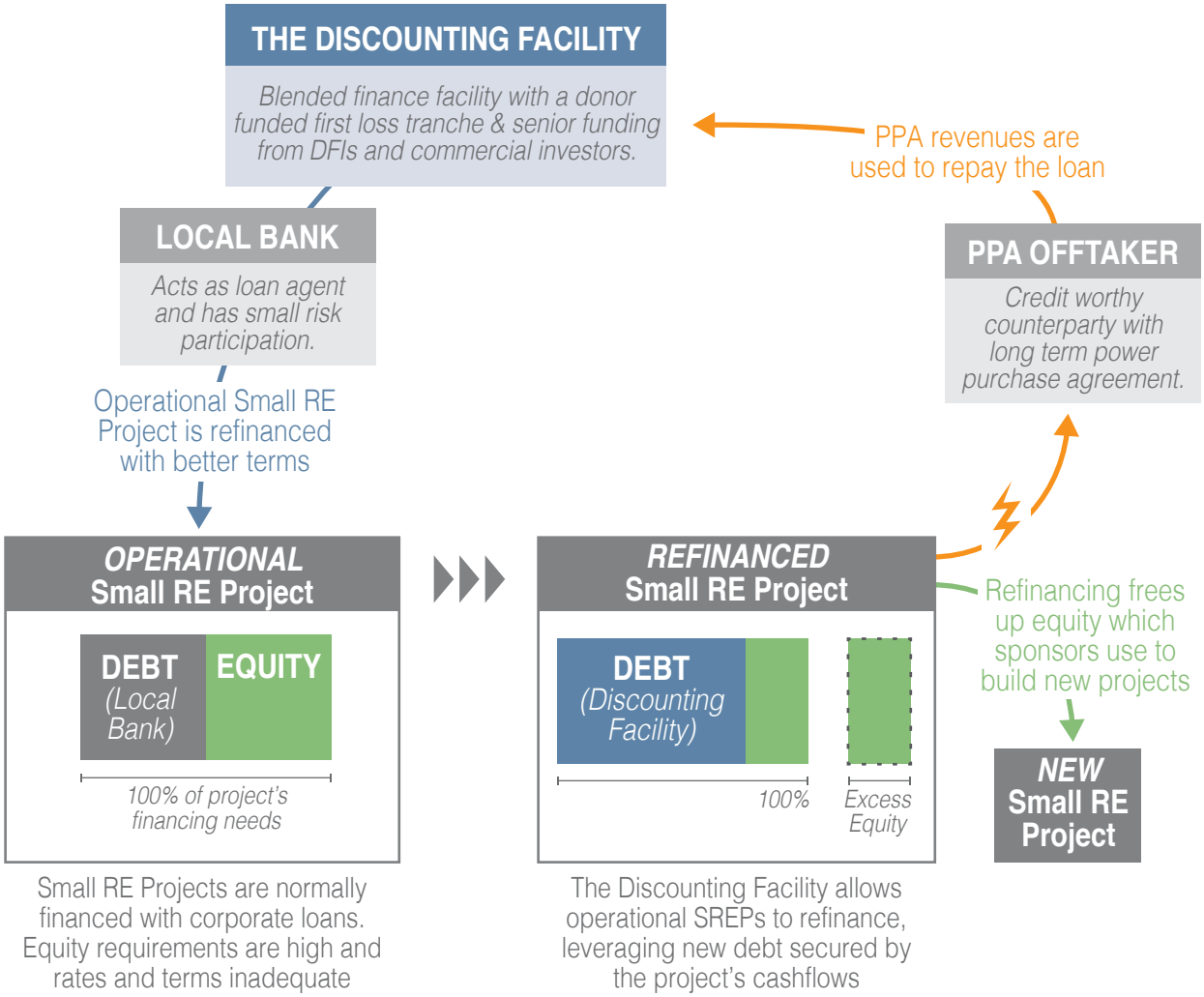
Operational SREPs that meet key criteria would be eligible for refinancing by the Facility. The projects would receive loans based on the projected future cash flows. Once a project is refinanced, the owner would be able to take out previously inaccessible equity tied up in the SREP. As a condition for refinancing, the owner/sponsor must undertake to use this freed up equity to develop a new SREP.

PROJECT ELIGIBILITY

Small renewable energy projects that generate electricity from hydro, wind, or solar PV would be eligible for refinancing through the Facility provided they meet the following conditions:

- Operating for at least one year.

Figure 1: Operational Structure of the Discounting Facility



- Nameplate capacity between 1-20 Megawatts.
- Has a Power Purchase Agreement (PPA) or a feed-in tariff (FiT) with a creditworthy entity for at least [ten] years after the refinancing.
- Positive technical appraisal from a contracted engineer.
- Project loan amount is less than 10% of fund assets but not more USD 25 million, to maintain portfolio diversification.
- Project is in compliance with local environmental laws and regulations, and the ESG standards of the Facility.
- Plant equipment is sourced from a manufacturer with an acceptable track record and the manufacturer and/or Engineering Procurement and Construction (EPC) contractor has provided a performance guarantee.

In addition, the company that owns the project:

- Commits to reinvest the freed up equity in a new SREP after refinancing in accordance with an agreed investment plan. If the company does not provide proof that the refinancing proceeds were invested in line with the investment plan, then, the refinanced but not utilized amount, has to be repaid immediately and a penalty interest rate will be applied.
- Project must be owned by individuals or privately held companies.

POTENTIAL TARGET MARKETS FOR PILOT

The Facility would be best suited to markets that have a sufficiently large number of existing SREPs suitable for refinancing, a strong pipeline for continued renewable energy project development, and a financing landscape that has scope for improvement in terms of loan rates, tenors, and equity/collateral requirements.

A market analysis was undertaken that considered all developing country markets, either as individual countries (e.g. Brazil) or regional groupings (e.g. East Africa). At a high-level, of the 25 markets examined, 16 satisfied the requirements above, illustrating that there is high potential to scale this instrument. The sections below provide an overview of the shortlisted regions for a pilot and describe the pipeline potential, and the baseline lending conditions for SREPs. While these shortlisted markets show promise, additional work needs to be undertaken to better understand the state of the overall investment and policy environments in these countries which will be the main drivers of new investment.

Nepal and Indian Himalayan States (Himachal Pradesh, Uttarakhand)

In terms of the refinancing potential, a lower bound estimate of the existing number of SREPs in this region is 148 (Nepal 32, India 116), primarily made up of small hydro.[2] The market is dynamic, with a solid pipeline of projects that aim to tap abundant hydro resources in the Himalayan region. The market is underpinned by strong policy support in both countries. The Government of Nepal aims to reduce power blackouts that affect the country,[3] and hydro is the cheapest option to increase capacity. In India, the government is also strongly supporting SREPs, and is considering introducing mandatory hydropower purchase obligations.

In terms of the financing conditions, in Nepal, commercial banks are primarily funded on short-term deposits, and therefore are more inclined to provide shorter-term facilities with one to three year durations. As local commercial banks cannot offer long-term fixed rate debt, longer-dated term loans are subject to periodic interest rate resetting, the risks of which are borne by project sponsors through variable rate loans (11.5% average rate, 3/2016), undermining the ability to determine a minimum return on their investment. Small-scale hydro power tariffs in Nepal are usually fully-denominated in local currency with no pass-through of foreign exchange fluctuations. For India, loans average approximately 12-13% based on 2014-2015 rates.5

Indonesia

In Indonesia, there are 60 existing SREPs, mainly hydro, with a good pipeline of projects under development, in particular for solar PV where 13 SREPs are forthcoming. There are around 50 to 100 active players in the small-scale RE development sector. Typical lending terms for renewable energy infrastructure projects in Indonesia today are 7-8 year tenors with negotiated grace periods during construction of up to two years at interest rates at JIBOR (Jakarta interbank bank offered rate – 6.75% on 03/16) plus 2.5% - 3% (9.25 – 9.75%), denominated in local currency. All debt financing provided by Indonesian banks is based on corporate loans, where banks only consider the credit quality of the project sponsor and collateral provided (the average collateral requirement is 120% - 140% of total facility, which is difficult for smaller scale

2 Source: Platts RE database (2013). Given the rapid pace of global RE deployment in recent years, these figures are expected to be significantly higher today.

3 The devastating April 2015 earthquake severely damaged electricity generation facilities. At the same time, electricity demand has been growing rapidly which has left the country unable to meet demand. Blackouts are common and average 12 hours per day.

companies to meet). Debt to equity is in the range of 60:40 to 70:30[4].

Andes (Peru & Colombia)

The Peruvian & Colombian small-scale RE sector is also well established, with more than 45 suitable projects currently in place, mainly hydro. There is a strong development pipeline, with over 58 projects in the development cycle. While the focus of both countries is currently on hydro power, abundant wind and solar resources mean that in the medium term these technologies also have a great potential for expansion. Colombia and Peru have similarly structured markets, although Peru's has greater depth in terms of volume. In terms of financing conditions, according to the World Bank, in 2014 rates for loans that meet the short- and medium-term financing needs of the private sector were 15.74% and 10.87% for Peru and Colombia, respectively.

4 Data obtained through expert interviews

INNOVATION AND RISK MITIGATION

The Discounting Facility emphasizes proper assessment and allocation of risks rather than their subsidization.

A NEW APPROACH TO SMALL RENEWABLE ENERGY FINANCING

The Discounting Facility borrows from mainstream practices like refinancing, warehousing, invoice discounting, and hedging. However an examination of comparable instruments did not identify other examples of instruments that combine these concepts and apply them in a similar fashion to overcome the barriers and risks that are unique to small-scale renewable energy projects in developing countries.

Comparable instruments reviewed include those focused on standardization and aggregation of small projects to decrease transaction costs,[5] and numerous instruments focused on overcoming high collateral requirements, both of which can be major impediments for small-scale renewable projects. These instruments often utilize concessional credit lines,[6] mezzanine debt,[7] or other subordinated debt. Compared to instruments reviewed, the Discounting Facility provides unique value in a number of ways:

- While existing instruments are mostly focused on supporting *pre-completion* projects, the Discounting Facility would focus on *post-completion* with the aim of increasing access to viable long-term financing.
- The Facility aims to transform bank lending practices by showcasing a business model that reassesses risks once SREPs are operational.
- The Facility would provide debt in local currency at fixed rates, allowing SREPs to reduce their risk exposure.
- Existing instruments often subsidize interest rates for loans extended prior and during construction. While this has a positive impact for the supported projects, the values are limited and which projects benefit is somewhat ad hoc. Systematically improving the financing conditions for all eligible SREPs

5 E.g. the Clean Energy Finance Corporation (CEFC) which aims to catalyze small project development by aggregating a large amount of small projects.

6 E.g. KfW's German Armenian Fund Renewable Energy (GAF-RE)

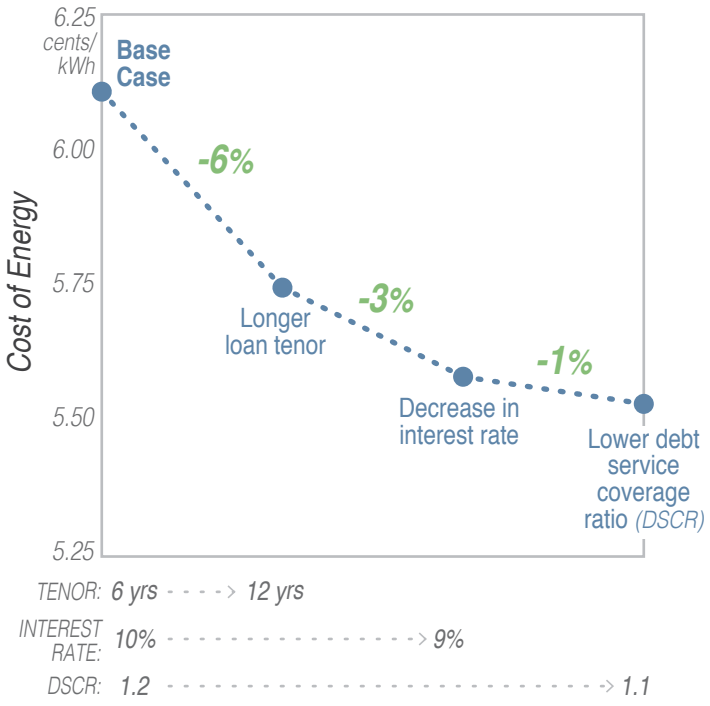
7 E.g. IDB's Central American Renewable Energy and Cleaner Production (CAREC) Facility

should incentivize commercial players to increase their focus on SREPs.

KEY BARRIERS TO MAKING SMALL RENEWABLE ENERGY BANKABLE

Financing costs are a major component of the cost of renewable energy and a bad financing package can make many good projects, unviable. Figure 2 shows indicative impacts of financing terms on the cost of renewable energy. Because renewable energy projects have high investment needs, they are more sensitive to financing costs than conventional generation.

Figure 2: Sensitivity of renewable energy to financing conditions



Our analysis shows that in many countries the key barrier to small renewable energy deployment is a financial sector that has not yet innovated to meet the needs of the sector. Specific barriers include:

- **High equity/collateral requirements** – small-scale projects financed using a corporate finance approach often require 40-50% equity – and occasionally even more.
- **Risks mispriced** – Renewable energy projects that are constructed and have long-term offtake agreements carry significantly less risk than their financing package (rates and tenors) often suggests.
- **High transaction costs** – Pre-completion, due diligence costs of SREPs, in particular small hydro, are unavoidably high. In addition, bank processes are not optimized for the needs of SREPs and more importantly the risk they represent. This adds significant costs to the project.
- **Inappropriate financing terms and conditions not suited for SREPs** – Local banking sectors may not consider SREPs to be an attractive or prominent market segment, and therefore do not provide loan products tailored to these projects. Traditional loan products (e.g. those tailored to the needs of manufacturing companies), have very different financial characteristics and are not effective vehicles for financing SREPs.

DISCOUNTING FACILITY REALLOCATES RISKS TO THE ENTITES THAT ARE BEST-PLACED TO MANAGE THEM

The Facility would use the mechanisms below to allocate risks effectively and to reduce the overall costs of financing for SREPs:

- **FX/Interest rate risks** – the Facility would work with hedging providers to hedge interest rate and FX risks. This would provide access to fixed rate, local currency financing which eliminates an important risk in countries with underdeveloped financial sectors.
- **Catastrophe and cash-flow variability risk** would be managed through a requirement for borrowers to have catastrophe insurance. Cash-flow variability is an important consideration for small hydro as the lack of water storage can significantly increase variability in outputs. Borrowers will be allowed to sculpt their payments to take into

account seasonal variability and, to the extent feasible, insurance will be made available for changes that go beyond that.

- **Sponsor credit risk** would be managed by ensuring projects meet technical criteria, and have long-term PPAs with a creditworthy off-taker. The Facility will pledge payments under the PPAs to reduce the sponsor risk.
- **Operational risk** would be reduced by requiring an engineering assessment for projects to be refinanced and standards for EPC and Operations and Maintenance (O&M) contractors, and equipment suppliers.

The Facility would not be exposed to any pre-construction risks as it will only work with projects that have been operational for at least one year. Its risk evaluation framework, due diligence process and terms of financing will reflect this accordingly.

IMPACT

The pilot is expected to mobilize USD 261 million of investment in new SREPs, which, over their lifetime will generate 17.5 TWh of clean electricity and reduce 10.5 million tons of CO_2.

FINANCIAL IMPACTS OF PILOT

Table 1 shows indicative financial metrics for the Discounting Facility compared to the baseline in target markets. The Facility would have the following impacts:

Reduced equity requirements - Loans would be secured based on cash-flows, enabling projects to refinance post-completion with a financing package that matches the expected risks of operational projects and offers more leverage to the developer. Re-leveraging operating projects will free up equity tied up in these projects for the construction of new SREPs.

Lower interest rates - Sponsors will achieve lower interest rates, improving profitability and making SREP investments attractive.

Increase in loan tenors - The instrument would be able to provide longer term funding that better matches renewable energy project lifecycles.

Table 1: Potential Financing improvements

	Discounting	Baseline Nepal
Loan Rate	9-10% (Fixed)	10-11% (Variable)
Term (yr)	12	5
DSCR*	1.1	1.2
Equity Required	Not applicable	40-50%

*Debt service coverage ratio

Access to local currency fixed rate financing - FX rate risk is an important barrier for projects where the local banking sector is underdeveloped. Projects will be exposed to this risk when they carry debt in a hard currency like USD and receive revenues in a local currency. To avoid this, the portfolio of loans will be hedged, allowing projects to borrow in local currency at fixed rates.

Reduced transaction costs - The Facility will only collaborate with post-completion projects which have significantly lower due diligence costs than pre-completion which have construction risks. Origination is based on corporate lending practices with additional due diligence: 1) Simple

and standardized technical due diligence by local engineering company(s). 2) Standardized eligibility criteria for streamlined processing 3) Standardized legal agreements. To maximize impacts, the Facility will work with project preparation facilities or similar entities to "prequalify" projects and reduce pipeline development costs.

Simplified terms and conditions for loans - The Facility will avoid a project finance approach, structuring the SREP financing based on commercial lending principles. Unlike in project finance, in commercial lending, not every risk is analyzed, as this would be prohibitively expensive.

PRIVATE FINANCE MOBILIZATION AND REPLICATION POTENTIAL

Table 2 shows the expected impacts of the pilot. It is expected that a USD 100 million facility would require approximately USD 10 million in donor funds and USD 90 million from DFIs and/or commercial investors at standard terms and USD 18m from local banks. This amount of refinancing could free up around USD 87 million in equity locked up in existing projects, which would then be used by sponsors to invest in new projects, mobilizing up to USD 261 million in total investment for new SREPs. The Facility would recycle its capital, which has not been taken into account in these estimates so the true figure is higher. A detailed table with additional figures and assumptions is available in the Annex.

Table 2: Potential Impact of Pilot on SREP Investment

Donor contribution	$10m
DFI/Investor contribution	$90m
Local Banks	$18m
Equity freed up for new projects	$87m
Total investment in new projects	$261m
New capacity deployed	172MW

In addition to the modelled *direct* impacts of Discounting, there are several noteworthy indirect impacts of the Discounting instrument:

- SREP sponsors considering new projects who ultimately decide to build due to the increased likelihood of improved refinancing conditions as a result of Discounting.
- Sponsors who are able to increase their profit margins and free up cash flow as a result of Discounting, and significantly expand their operations and scale their businesses – increasing RE project deal flow.
- Changes to local banking practices where lenders right-size the risks of pre-construction versus operational SREPs, improving both the terms and availability of commercial financing for SREPs and catalyzing greater RE deployment.

Replication potential

The discounting facility has the potential to be replicated in 16 of the 25 markets analyzed globally. These include the Balkans, Caucasus, Caribbean & Central America, East Africa, Southern Africa, South-East Asia, Mercosur, Central Asia, Brazil, Turkey, and Sri Lanka. These markets are of various sizes and are in different stages of development, however all exhibit the basic characteristics needed for the SRFF.

ENVIRONMENTAL AND SOCIAL IMPACT OF PILOT

For a USD 100 million pilot facility with USD 10 million in donor funds, the Pilot is expected to enable 172 MW of additional investment in new SREPs – primarily composed of small hydro and solar PV. Over their lifetime, these SREPs would generate 17.5 TWh of clean electricity and reduce 10.5 million tons of CO_2.

To derive these figures, an estimate was made of the potential equity freed up from refinancing and the total renewables investment that this equity

could enable. The target markets considered for this assessment are Nepal and India. Because a significant amount of investment is expected in regions with a large share of hydro in the generation mix, emissions reductions are comparatively less than in regions with more carbon-intensive grids. However, through the course of research, it became clear that calculations based on average grid factors may not capture the full impact. For example, Kathmandu is prone to 14-18 hours of blackouts daily in the winter. During these hours, small diesel generators power up to meet demand. This has a substantial impact – air pollution increases by 40% with significant impacts on human health and also on black carbon emissions (produced by diesel combustion) which drifts into the mountains, accumulating on ice and increasing the melting rate of glaciers. These impacts are expected to worsen in Nepal. Small diesel generation has doubled in the last five years and now consumes 30-40% of the total diesel import of the country.

While we could not estimate the total impacts of this instrument on air pollution, human health, black carbon, electrification and energy security in the markets we considered, we believe these will also be important benefits of deploying this instrument.

IMPLEMENTATION PATHWAY

The first stage of the SRFF deployment will focus on piloting a USD 100 million dollar Discounting Facility, aiming to complete the first transactions by the second quarter of 2018. Once demonstrated, the approach would be scaled into a global facility.

The SRFF instrument will be deployed in two stages. During the first stage, the focus will be on piloting the Discounting Facility in the target market(s). If successful, the Facility would be up-scaled. The Mezzanine Facility would then be launched in a subsequent stage. The Mezzanine Facility would be used in particular to catalyze investments in markets where the number and capacity of already existing SREPs is too low for the Discounting Facility to achieve scale (e.g. large parts of Africa).

MILESTONES TO OPERATIONALISATION

The Discounting Facility is in a late conceptual phase, with a high-level operational and financial structure already defined. The following milestones are anticipated to make the pilot Discounting Facility fully operational by 2017.

	2016	2017	2018	2019	Comments
Prepare funding proposal for setup phase	Q3				• Finalize operational & financial structure • Identify implementing partners • Detailed analysis and final decision on target market(s) • Prepare proposal for initial setup expenses and Facility administration.
Raise capital and setup fund		Q1			• Prepare sample legal documents for each country • Identify pipeline of viable SREPs developed in target region(s) • Formalization of involvement of operational entities including local banks • Development of term sheets for donors and DFIs.
Fund close		Q3			• Donor and DFI facility contributions secured for a $100m facility ($10m donors, $90m DFIs/commercial banks)
Discounting Facility is fully operational		Q4			• After financial agreements are finalized and target projects in pilot regions have been established, the Discounting facility becomes fully operational
First transactions completed			Q2		• First transactions in target countries to be completed by Q2 2018. • Hedging arrangements put in place to mitigate FX risks
Final transactions				Q3	• Facility expected to fully disburse funds by 2019
Scaling-up			Q4		• Once proven, scaling-up will be possible

*Not shown in the table above is the Mezzanine Facility. It is expected that operational design for it would begin in late 2017 and it would become operational in late 2018.

IMPLEMENTATION CHALLENGES

The following challenges are likely to be faced in the operationalization of the Discounting Facility:

- **Incentivizing local banks to participate and aligning interests to avoid moral hazard**: Getting local banks on board will be essential to success of this instrument. Balancing the incentives with the real and perceived costs and risks will require dialogue with banks in the target markets. However, there is a good precedent in the operational arrangements of Export Credit Agencies with partner banks that could serve as a model.
- **Pipeline of projects for refinancing**: The Facility requires a suitable portfolio of SREPs (approximately 10-20 for a 100 million-dollar facility). The discounting facility is only suitable for certain SREPs (privately owned, operated for at least [1] year, financing conditions have scope for improvement). Although efforts have been made during this initial scoping phase to understand the potential pipeline, a project-by-project assessment, based on engagement of SREP owners, will need to be undertaken.
- **Managing currency exchange risks in affordable way**: As most feed in tariffs are in local currency, the Facility should provide local currency loans. The donor tranche will absorb some of the FX risks; however, there will likely be a need to hedge (via e.g. TCX) or the need to take some small FX positions. Hedging in an affordable way will be critical so that the Facility can offer more attractive loans to SREP owners than those they

currently hold. At a later stage, the Facility might also be able to issue (small) local currency bonds.

- **Documentation risks**: Conditions associated with PPAs and the corresponding loan agreements in different countries vary substantially, and can have a material impact on the potential for such an instrument to be successful (e.g. minimum collateral requirements, etc.). During the set-up phase, these details will need to be examined closely, and the Facility adapted accordingly.

KEY TAKEAWAYS

Small renewable energy projects (SREPs) are ideally suited to market conditions in developing countries and provide an entry point for project sponsors and local financial institutions to develop technical capacity with less risk. However, financing is often not well matched to the needs of small projects. The instrument aims to catalyze investment in small-scale renewable energy by systemically improving financing conditions through a Discounting Facility and later, a Mezzanine Facility. The instrument has the following characteristics:

Innovative: The instrument will enable SREPs to refinance post-construction and receive debt at better terms, longer tenors and with lower equity requirements. This will allow projects to free up equity that would then be used to invest in new projects. A comparative assessment showed that this approach is an innovative model for financing SREPs.

Catalytic: The instrument can change the dynamics of financing and investment of SREPs in target markets at a cost that is comparatively low for donors and has significant scale up potential. A pilot of the Discounting Facility would require USD 10 million in donor funds, and USD 90 million in DFI/commercial investor contributions at standards terms. A USD 100 million facility has the potential to free up USD 87 million of equity and drive around USD 261 million of investment in new projects, generating up to 17.5 TWh of clean electricity, reducing approximately 10.5 million tons of CO2.

Transformative: The analysis concluded that the instrument could potentially be scaled up to 16 out of 25 markets examined. The Facility could scale in size and also by demonstrating the concept to local financial institutions, which could replicate the business model and its approach to evaluating and pricing risks for other small-scale projects.

- **Actionable:** The Discounting Facility is based on well-proven concepts used in other fields. The instrument could be launched in 12-month time frame if funds are raised in a timely manner. Promising fund managers and implementation partners have been identified, but it remains uncertain whether a central implementing entity is available to take the concept forward.

ANNEX: MODELLING ASSUMPTIONS AND RESULTS

Financial assumptions

Contributions to Facility (USD MM)	100
DFIs/Investors	90
Local banks	17.5
Donors	10
Fund lifetime (yr)	15
Loan tenor (yr)	12
Interest rate	10.5%
Margin of Discounting loans	5.00%
Local bank service fee	0.50%

Other assumptions

Emissions Factor (tCO_2 /MWh)	
Nepal	0.255
India	0.899
Construction costs ($/kW)	
Small hydro	$1,500
PV	$1,280
Wind	$1,900
Capacity Factor	
Small hydro	69%
PV	20%
Wind	37%
Asset lifetimes (yr)	25

Financial model results

Total loans refinanced (USD MM)	117.5
Equity for new projects (USD MM)	86.9
Interest income (USD MM)	66.2
Loan losses (USD MM)	7.4
Final donor assets (USD MM)	13
Final investor assets	134.9
Donor IRR	2%
Investor IRR	3.06%

Impact model results

Total finance mobilized (USD MM)	260.5
Nepal	101.4
India	159.1
Total GHG Reduced (MtCO2)	10.5
Nepal	2.1
India	8.5
Total RE Capacity Deployed	171.7
Small hydro	80.4
PV	54.6
Wind	36.7
Other impacts not quantified: The Facility contributes to job creation, electrification, energy security and important black carbon reductions in the Himalaya region.	

ANNEX: INDICATIVE DEAL PIPELINE AND FINANCING LANDSCAPE – SPOTLIGHT ON NEPAL AND INDONESIA

During the third phase of instrument development, additional research was conducted to gauge the potential pipeline for the Discounting Facility and the instrument's improvements over the baseline scenario in two of the target countries – Nepal and Indonesia.

The following table provides an overview of projects potentially suitable for refinancing through the instrument. These are small scale, between 1 MW and 20 MW (small hydro, onshore wind, solar PV), owned by private companies and have an operational lifetime for a 10+ year refinanced loan.

	Small hydro		Wind		Solar PV	
	Num.	MW	Num.	MW	Num.	MW
Nepal	51	298	-	-	-	-
Indonesia	59	237	1	10	-	-
Total	**110**	**535**	**1**	**10**	**1**	**2**

Source Platts 2013

The conditions in target countries are described in the sections below. In summary, both countries are suitable for the application of the instrument which would bring a significant improvement over the status quo. However, these markets also have significant barriers that are not addressed by it.

NEPAL

Financing conditions

- Commercial banks in Nepal are primarily funded on short-term deposits, and therefore more inclined – for risk management and commercial reasons – to provide shorter-term facilities with one to three year durations. Renewable projects require longer debt terms to amortize investments, and this presents an important gap, which is currently unmet by the banking sector.[8] The Facility, which would offer loan durations of up to 12 years, would effectively bridge this financing gap.
- As local commercial banks cannot offer long-term fixed rate debt, longer-dated term loans are subject to periodic interest rate resetting, making return analysis and debt sizing very risky for project investors. The Facility would offer fixed rate debt, which would address this barrier.
- In 2013/2014, only USD 213m in credit was extended to the *entire energy sector* in Nepal. In comparison, it is estimated that USD 1.68bn per year will be required over the next twenty years to fully develop the country's hydroelectric potential, according to the country's Hydropower Development Plan[9]. The Facility would serve to free up investment capital to contribute to these investment needs.
- Energy output from small-scale projects is sold to the state-owned utility under contracts fully-denominated in local currency with no pass-through of FX fluctuations. In Nepal, only PPAs for large hydro projects (>25 MW) can be negotiated in USD.9 The Facility would offer local currency debt, addressing this barrier.
- The amount of capacity owned by Independent Power Producers has jumped very significantly in the last five years. Most of this capacity is small hydro, coming online between 2013-2018, which indicates a strong future refinancing pipeline for the Facility.
- Investors are wary about the counterparty risk of PPAs as the state-owned utility has significant financial difficulties. This is an important barrier to future electricity investment that is not addressed by the Facility.

INDONESIA

- Local Commercial Banks in Indonesia typically offer financing in rupiah-denominated debt. Typical terms for renewable energy infrastructure projects in Indonesia today are five to seven year tenors with interest rates of roughly 10.0 – 11.5%. The Facility would offer loan terms of up to 12 years and decrease rates by 100-200bp.
- Local banks rarely offer limited/no-recourse project financing, even for large & viable projects, for small scale RE it is even rarer. This means loans are fully recourse to the project's parent company and therefore, terms are not based on project specific risks, but rather the health of the parent company. The
Facility would focus on project specific risks, allowing new companies or companies without substantial collateral to access finance.

8 Climate Investment Funds. (n.d.). Nepal SREP Small Hydropower Finance Program Approval Request. Retrieved from http://tinyurl.com/jejfngp

9 Sharma, R. H., & Awal, R. (2013). Hydropower development in Nepal. Renewable and Sustainable Energy Reviews, 21(July), 684–693. doi:10.1016/j.rser.2013.01.013

- As domestic banks perceive RE projects as risky, they request collateral of up to 110-120% of the loan sum. These collateral requirements are difficult to fulfill, especially for SMEs. This is exacerbated by the fact that receivables, like the revenues based on PPAs, are not accepted as collateral by domestic banks. This issue would be significantly improved by the instrument as it would only require collateral from the PPA cashflows.
- There are many other significant barriers to renewables development in Indonesia besides access to long-term debt and equity. These can be summarized in three areas: 1) Banks' lack of or negative experience lending to renewable energy projects 2) Higher perceived risks for renewables lending due to previous negative experience in the sector and also because fossil fuels are highly subsidized and yield higher profit with less risk. 3) Financing conditions offered and the availability of financial instruments does not properly correspond to the needs of renewable energy projects[10]. Only the latter would be fully addressed by the instrument.

10 Wolff et. al (2016). Financing Renewable Energy Investments in Indonesia. *DIE*