



Global Innovation Lab
for Climate Finance

Renewable Energy Scale-Up Facility (RESF)

Instrument Analysis
September 2017



The Global Innovation Lab for Climate Finance 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

The authors of this brief are Bella Tonkonogy, Dario Abramskiehn, and Valerio Micale.

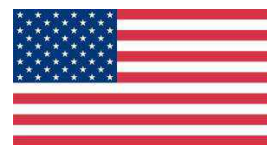
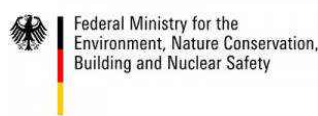
The authors would like to thank the proponents of RESF, Luis Costa of Get2C and Paul Curnow of Baker & McKenzie, for their valued contributions and continuous support.

The authors would also like to acknowledge the valued contributions of the following experts, in alphabetical order: Kome Ajegbo (AFC); Fernando Alvarado (SECA); Fenella Aouane (GGGI); Angelina Avgeropoulou (BEIS); Steve Baillie (IFC); Olivia Coldrey (REEEP); Alexander Dempsey (IFC); Hans Jakob Eriksen (Danish Energy Agency); Gianleo Frisari (IDB); Asger Garnak (Danish Energy Agency); Carlos Graffigna (Gruman Resources); Alfred Heim (BEIS); Simon Jackson (Access Power); Abyd Karmali (BAML); Sumalee Khosla (GGGI); Sandra Locoh (African Guarantee Fund); Pedro Mallmann (Renobrax); Daniela Milonova (Blackrock); Serina Ng (DFID); Ricardo Nogueira (Climate Finance Consultant); Brian O’Hanlon (OPIC); Eluma Obibuaku (AFC); Pelle Pedersen (PKA); Paola Pedroza (IDB); Brendan Pierpont (CPI Energy Finance); Nasi Rwigema (Sol Africa); Dongyub Shin (UNDP); Geoff Sinclair (Camco Clean Energy); Jens-Christian Stougaard (Pension Denmark); Natalia Svejgaard (Danish Climate Fund); Alan Synnott (Blackrock); Uday Varadarajan (CPI Energy Finance); Oliver Wassbein (UNDP); Stephen West (UK GIB); and Dharshan Wignarajah (DFID).

The authors would also like to thank Barbara Buchner, Ben Broche, Elysha Davila, Ricardo Narvaez, and Pdraig Oliver for their continuous advice, support, comments, and internal review, Amira Hankin for graphic design, and a former CPI colleague David Wang for his valued inputs and contributions.

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.

www.climatefinancelab.org



Renewable Energy Scale-Up Facility

DESCRIPTION —

The Renewable Energy Scale-Up Facility (RESF) is a fund that employs an innovative options mechanism to drive private institutional equity into earlier stages of renewable energy projects in emerging markets. In so doing, RESF helps to grow renewable project pipelines by addressing the lack of early-stage equity financing.

GOAL —

To drive private institutional equity into earlier stages of renewable energy projects in emerging markets.

SECTOR —

Renewable Energy

PRIVATE FINANCE TARGET —

Renewable energy project developers, institutional investors

GEOGRAPHY —

Initial target countries: Brazil, Colombia, Indonesia, Jordan, Morocco, Peru, Tunisia, Vietnam
In the future: additional countries in Africa, Latin America, and Southeast Asia

1. CONTEXT

While recent years have seen historic levels of renewable energy investment, with developing countries for the first time leading the way, total renewable energy investment in developing countries still falls far short of needs to meet the ambitions of the Paris Agreement and Sustainable Development Goals (FS-UNEP Centre and BNEF 2016; World Economic Forum 2017).¹

In particular, renewable energy project developers in many emerging markets do not have the capital needed to develop projects at the earliest stages (UNEP 2011; IRENA 2016). Early-stage financing is critical to project preparation activities, and to ultimately attracting additional investment, achieving financial close, and getting projects built. Although capital needs at this stage are comparatively low – up to approximately 5% of total investment costs – attracting early-stage investments can be difficult. This is due both to relatively high risks – not all projects started reach financial close and start construction – and a lack of investment vehicles that can meet private investors’ needs and help to manage these risks effectively (UNEP 2011; OECD 2016; WEF 2017). These barriers prevent many projects from being built in developing countries that would be both technically and financially viable otherwise, threatening the realization of national climate and renewable energy finance targets as well as investment mandates.^{2,3}

CONCEPT

2. INSTRUMENT MECHANICS

RESF’s innovative approach to reducing investment risk is to buy options in multiple projects, which may be exercised if and when projects meet pre-determined milestones.

The Renewable Energy Scale-Up Facility (RESF, and referred to henceforth as “the Facility”) is a solution to drive private institutional equity into earlier stages of renewable energy projects in emerging markets. By aggregating and de-risking medium-scale solar (10-50 MW) and wind (20-50 MW) projects, the Facility intends to address institutional investment requirements while channeling finance to build robust project pipelines.

2.1 MAIN COMPONENTS

The Facility will own two types of assets: 1) **Options** in renewable energy projects that are purchased at the early- to mid- stage of project development; and 2) Upon exercise of options at financial close, **shares in successful projects** (see Figure 1).

2.1.1 Options Mechanism

The Facility will seek to pay a portion of the development costs of renewable energy projects in the target pilot countries, in return for an option in that project. The Facility’s options will provide the right to purchase equity in a renewable energy project if and when it reaches financial close. The price of the option, expressed as the aggregate internal rate of return (IRR) that the Fund

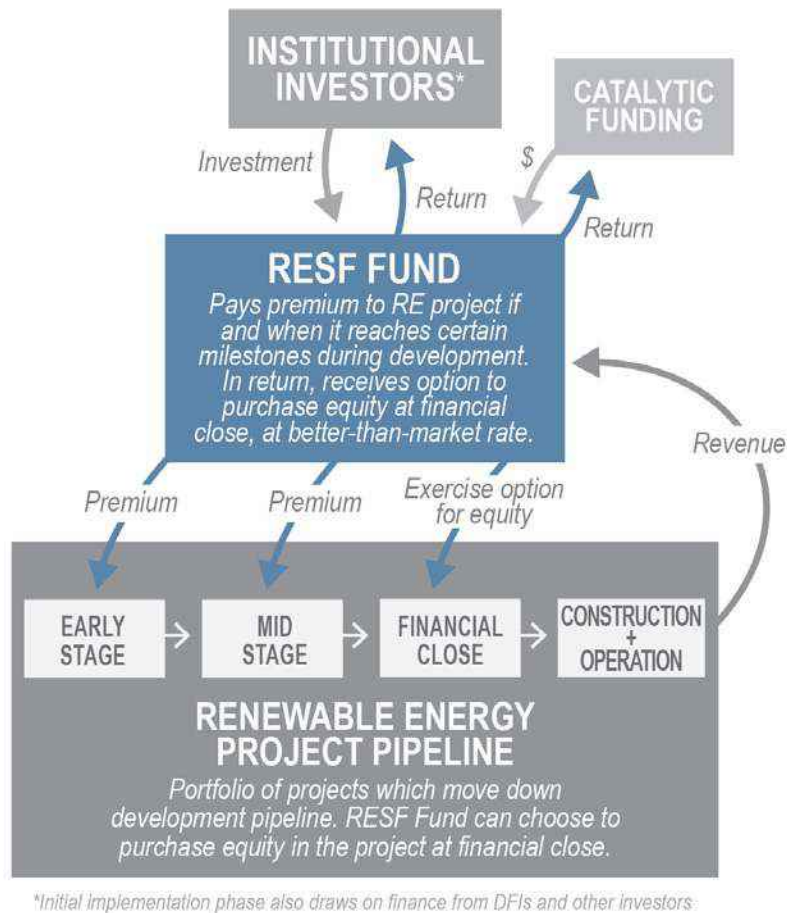
¹ According to FS-UNEP Centre and BNEF (2016), investment in developing countries was \$156 billion in 2015.

² Confirmed through stakeholder interviews with institutional and development finance investors, held March-June 2017. Also see, e.g., <http://www.privateequitywire.co.uk/2016/02/03/236186/blackrock-renewable-power-fund-completes-first-close>, noting increase in European investor interest in real assets (including renewable energy).

³ See, e.g., <https://www.environmental-finance.com/content/news/abp-introduces-internal-emissions-cap.html>

will receive through the end of the Fund’s lifetime, will be preferable relative to prevailing market conditions. The IRR pricing mechanism transfers risk of development cost overruns to project developers rather than the Facility.

Figure 1: RESF Instrument Diagram



The Facility will invest only in mature technologies, to reduce technology risk. Projects must have completed several initial steps to apply (see Table 1), including the establishment of a project Special Purpose Vehicle (SPV). There will be separate, regular solicitation windows for wind and solar projects.

The Facility can elect to make options premium payments at two to three pre-agreed project development milestones if and when they are met (see Table 1). These premium payments are made during the period in which costs are comparatively low, around 1%-5% of total project costs. The Facility’s portion of total development costs for a given project will range from 10-49%, depending on project needs expressed in developers’ proposals and ensuring that developers retain financial incentives during the development process.

2.1.2 Shares in Successful Projects

If and when a project reaches financial close, the Facility will have the option to invest equity in the project, at a share price that meets the pre-agreed IRR and with input from the Facility Investment Committee. At this point, the Facility will draw down investors’ committed capital. If the Facility does not exercise the option, it can sell the option to other investors or it can treat the option as a repayable loan.

The Facility will seek to maintain its shares in operational projects on behalf of its long-term institutional investors. Payments to investors will primarily come from dividends based on project revenues.

Table 1: Sample developer activities undertaken to meet each project development milestone (may vary by geography and project). Projects will typically enter the Facility’s pipeline during the Bid-Phase

Bid-Phase (Year 0)	Early-stage (Year 1)	Mid-stage (Years 2-3)	Financial Close (Years 3-4)
Pre-Feasibility	Development Milestone 1	Development Milestone 2	Options Exercise
<ul style="list-style-type: none"> • Scoping study • Electricity market information • Land access requirements • Approvals required • Team track record • Development budget • Special purpose vehicle (SPV) documentation 	<ul style="list-style-type: none"> • Resource Generation Study • Site selection • Land rights agreement • Conceptual engineering design • Technical Feasibility Study • Environmental scoping study • Permit application and other required authorizations submitted 	<ul style="list-style-type: none"> • Environmental impact assessment • In-depth financial analysis • Power purchase agreement (PPA) memorandum of understanding • Land surveys • Analysis of community development and investment requirements 	<ul style="list-style-type: none"> • Agreements for Engineering, Procurement, and Construction (EPC), and Operations & Maintenance (O&M) Services • Negotiation with debt and other equity providers • Permit approvals • PPA and grid connection agreements

2.1.3 Key stakeholders

Key actors involved in the implementation of the Facility will include renewable energy project developers, a fund manager, private and public investors, other existing platforms with which the Facility can partner, and technical service providers with specialized knowledge (e.g. social and environmental impact assessments). **Renewable energy project developers** will propose projects to the Facility for early stage and equity funding. The Facility will initially target locally-based developers that are likely to have lower access to capital than large international players, but have strong local knowledge. The **fund manager** will gather interested investors for participation in the Facility; source potential early-stage projects for options premium financing, also performing due diligence on them; and, with input from an Investment Committee, make decisions on further investment at development milestones and at financial close. The fund manager will need local presence in order to maintain a low-cost structure to undertake these activities and engage with policymakers and regulatory agencies, and will require in-house team members with both technical and financial expertise.

2.1.4 Investors Targeted

The objective of the Facility is to attract long-term, low-risk domestic and international institutional investors, such as pension funds, into earlier stages of project development. Currently, these types of investors, despite a seemingly good match with the capital requirements and investment horizons for renewable energy projects, typically only invest in projects once they are operational, with some also investing once projects reach financial close (BNEF, Chatham House, Frankfurt School 2016). Therefore, an initial fund will also likely need to include philanthropic investors, development finance institutions, governments, and others in the development finance space who can help to demonstrate the efficacy of the Facility’s approach (see 2.2.1)

2.2 FIRST FUND AND STRATEGY TO PHASE OUT PUBLIC FINANCE

2.2.1 Structure of First Fund

To build the evidence base to attract institutional investors in the long term, the Facility will establish an initial, or first, fund that will target USD 110 million, in line with other first time emerging market power funds (EMPEA 2015) (see Figure 2 for the illustrative capital structure).⁴ This fund will deploy limited grants and concessional equity investment strategically to demonstrate the following results:⁵

- 1) **Generate evidence** of project success rates & development costs in the geographies in which the Facility operates
- 2) **Demonstrate commercial viability** of the portfolio diversification and options holdings approach of the Facility to de-risk early stage investment
- 3) **Demonstrate capability of fund manager** to deliver results

USD 10 million of the fund will target recyclable grant funding from donors intended to demonstrate the options mechanism. The Facility will fund the options premium payments as zero-interest rate loans to be repaid at financial close. Loan repayments will then be available to fund new projects. The Facility expects to invest 10-49% of the development costs of 12-24 renewable energy projects at early- to mid-stages of development, with around half to two-thirds, or 6-12, projects expected to reach financial close and operations.⁶

A USD 100 million equity fund will then fund equity share purchases. Fundraising will target concessional and commercial equity investors. The commercial equity tranche will target one or more anchor development finance institution (DFI) investors, as well as family offices, endowments, impact investors, and the private equity allocations of pension funds. Anchor investment from an experienced DFI or government investor with rigorous and established due diligence processes can (1) provide important certification effects to other investors, (2) help crowd-in additional private finance, and (3) ultimately demonstrate the efficacy of an innovative new approach to climate finance investment (Escalante et al., 2017 forthcoming).

The concessional equity will offset construction risk through a preferred repayment and return waterfall structure.⁷ Commercial equity investors will receive principal repayment first, followed by concessional equity investors. Then commercial investors will receive returns up to a preferred return threshold of 8%, followed by concessional equity investor returns up to this same threshold. Beyond this threshold all Limited Partners – both commercial and concessional equity investors – will receive 80% of additional returns simultaneously, with the remaining returns going to the fund manager. Management fees will be 1.5% of total commitments for the first five years of the fund and 1.25% of net investments for the remaining years. Target returns to commercial investors for the Facility's first fund will be at least 9% after fees (see 5.1 *Quantitative Modeling Results* for details).

⁴ Also confirmed in stakeholder interviews.

⁵ The European Investment Bank's GEEREF fund of funds has seen similar progressions in its investee funds, with institutional investors such as pension funds investing in follow-on funds; the potential attractiveness of such a strategy was confirmed through institutional investor interviews.

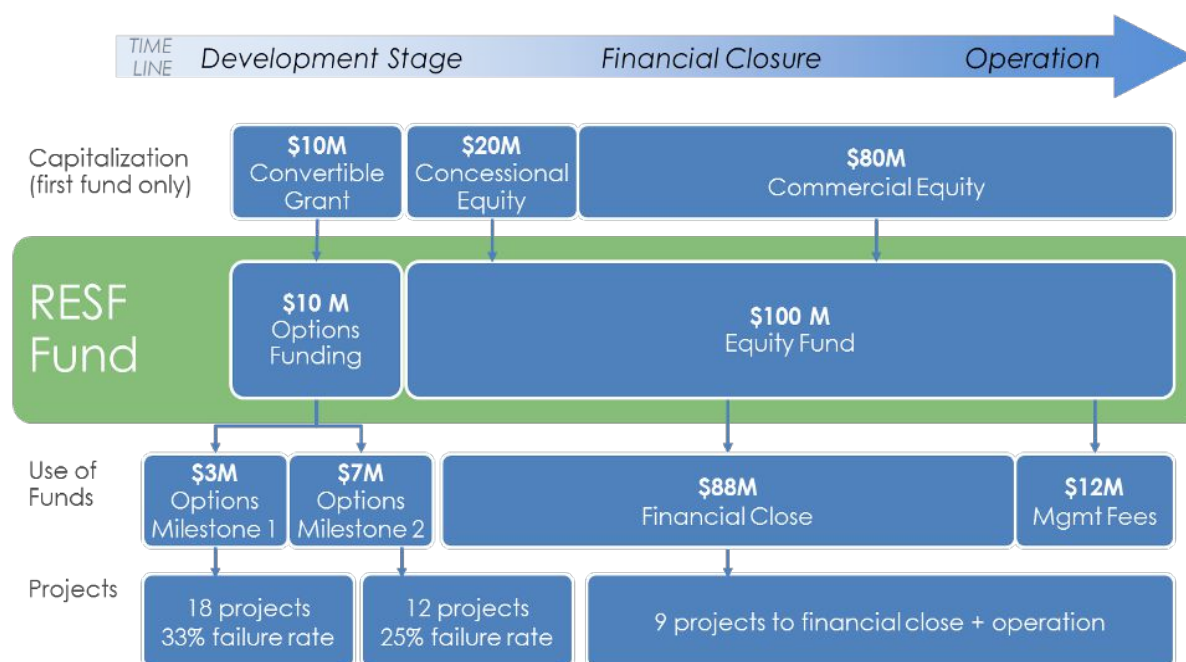
⁶ These ranges are based on stakeholder interviews with project preparation facilities, renewable energy developers, and investors. More precise estimates will need to be developed for specific localities and will also be based on developer bids.

⁷ The final waterfall will depend on discussions with potential investors. See Annex 1 for modelled returns waterfall.

2.2.2 Investment cycle

The Facility’s first fund will have a total investment horizon of between 10-15 years. The investment period will last for five to eight years, with projects expected to reach financial close during this time. All projects are expected to reach operation within five years of the end of the investment period, though most will reach operation within one to two years of financial close. Operational projects will earn revenues from the sale of electricity, which will be returned to investors as dividends. After approximately three to seven years of operation, the Facility will exit projects through sales of shares in the special purpose vehicle, and will distribute capital gains from sales to investors according to the pre-agreed pathway described in Section 2.2.1.

Figure 2: Illustrative RESF First Fund Capital Structure



*figures are rounded and for illustrative purposes only

3. INNOVATION

The innovation of the Renewable Energy Scale-Up Facility lies in the package of measures – including the options mechanism, diversification of investments, and disciplined use of milestones – that together de-risk early stage projects and grow renewable pipelines, while providing needed investment opportunities. While similar models have been deployed successfully in other industries, the Facility will be the first to deploy it for renewable energy.

3.1 RESF ADDRESSES BARRIERS TO EARLY STAGE PROJECT DEVELOPMENT FINANCING

The Facility addresses two primary barriers to early stage renewable energy investment: first, the difficulty of project developers to manage risk due to uncertainty around project viability at these early stages and the consequent shortage of capital; and second, the lack of investment vehicles for early stage renewable energy meeting institutional investor needs, including risk-adjusted return and liquidity requirements.

3.1.1 *Difficulty for developers to manage risk*

Risks in early stage project development typically stem from policy uncertainty, as well as lack of human capital. For example, regulatory, country, legal, and off-taker risks, as well as under-developed capital markets, can drive up the cost of capital in developing countries, particularly for capital intensive renewable energy projects. At the same time, project developers require specialized expertise, either on their teams or outsourced, which is often not readily available (UNEP 2011; Ramboll 2015).

As a result of the early stage risk, developers typically self-finance early stage project development, thereby limiting the number of projects they can begin. When not all projects make it to financial close, starting fewer projects reduces even more the overall number of projects that can ultimately become operational. External financing is particularly scarce at earliest stages of project development, which although a comparatively low percentage of total costs, also hold the highest risk (Ramboll 2015; BNEF, Chatham House and Frankfurt School 2016; EMPEA, 2015).

To fill this gap, a number of donors have supported the establishment of project preparation facilities to help finance early stage project development costs; these are often grant-based and not self-sustaining. These facilities also typically provide technical assistance to local developers, to help improve project success rates. Other research has noted that these facilities tend to be administratively complex and insufficiently linked to potential follow-on investors (Ehlers 2014; Ramboll 2015; Schneider-Roos et al. 2014; WEF 2015).

3.1.2 *Lack of investments meeting institutional investor needs*

On the investor side, while the long-term predictable cash flows of operating renewable energy projects should be appealing to institutional investors such as pension funds, in practice several additional barriers limit their participation. Barriers include liquidity requirements for investments as well as internal barriers for investors to increase how much of their portfolios are allocated to a single sector such as renewable energy (Nelson and Pierpont 2013). In addition, the lack of scale and pipeline of investable projects makes it difficult for institutional investors to justify building up expertise in infrastructure and renewable energy investments^{8,9}.

The barriers to renewable energy project development have led to a scarcity of projects that do meet institutional investor requirements. This is evidenced by oversubscribed renewable energy project equity sales in many emerging markets: in stakeholder interviews, investors told the Lab Secretariat that “there’s a line around the block” if a project gets to financial close, and “If a project has managed to solve those [land/grid/power purchase agreement] problems,” investors abound. In addition, institutional investors and asset managers are increasingly facing client-driven mandates for fossil fuel divestment and active renewable energy support, which is likely to further exacerbate the current lack of deal flow (OECD 2015).¹⁰

3.2 RESF EMPLOYS AN INNOVATIVE, COMPREHENSIVE APPROACH TO MANAGE RISK

A number of initiatives have sought to address gaps in early stage renewable energy development financing. The Lab Secretariat surveyed more than thirty existing initiatives and funds to understand the Facility’s value add to this field (see Annex 2). We found that the Facility’s options approach

⁸ For example, Nelson & Pierpont (2013) estimate that an institutional investor needs to have at least \$50 billion in AUM to justify building an in-house project investment team.

⁹ OECD’s 2015 Large Pensions Funds Survey describes pension fund interest in emerging markets as “opportunistic”

¹⁰ See, e.g., <https://www.environmental-finance.com/content/analysis/profile-actis-on-why-renewables-makes-sense-in-emerging-markets.html> and <https://www.environmental-finance.com/content/news/kgal-launches-fourth-renewables-fund.html>

improves on the status quo significantly, allowing investors to manage project risks more effectively in the following ways:

The Facility is the only fund to use an options mechanism to finance early-stage investment.

Options reduce liability of investors for projects that are not successful. In addition, because premium payments will be paid out according to pre-agreed milestones, the Facility's approach increases discipline for developers and investors in selecting projects to move forward. While several other funds and institutions have structured early stage investments somewhat similarly,¹¹ they typically invest once a project is relatively advanced in its development, whereas the Facility is targeting the earliest stages. At the same time, the Facility's focus on early-stage projects that already have several basic requirements in place helps to ensure that even among early-stage projects the Facility is sourcing the most viable options.

Pre-defined project development financing milestones help to ensure that successful projects move forward and receive additional financing – and unsuccessful ones do not.

The options structure allows investors to understand better a project's probability of reaching financial close and operation before investing larger sums of money or taking on the liability of owning a project outright through early equity purchases. Without such discipline, developers may keep projects in the pipeline even if they are not performing. While similar models have been deployed successfully in other industries for many years (such as venture capital), the Facility will be the first to deploy it in renewable energy project development.¹²

The Facility's options structure allows for multiple small investments to be made

simultaneously. The Facility's lower-cost exposure to a wider variety of projects at different stages of development means that the Facility can have greater portfolio diversification and mitigate risks associated with a particular developer, technology, or country more effectively than other approaches, including developer-managed platforms.

The Facility establishes a direct link between early stage investments and equity investment at financial close.

The Facility's first fund builds upon existing donor-led initiatives by providing a clear pathway from initial donor-supported early stage development financing to private sector investment, through the establishment of an equity investment fund. This link permits the selected early stage investments to develop with clear outlets for investment and alignment with potential investors. Recent successful grant-based project preparation facilities, such as U.S. OPIC's Africa Clean Energy Facility,¹³ have noted the importance of such a link.

Finally, the Facility is unique in its objective of de-risking long-term institutional investors to finance projects at earlier stages.

Most emerging market funds that the Lab Secretariat surveyed were *either* growth funds that sell off assets once operational for higher returns, *or* yield-based funds that purchase operating assets once fully de-risked. The Facility is one of the only private funds that seek to attract long-term yield-based institutional equity commitments beginning at the development stage of renewable energy projects. The Facility's design, once proven, will unlock new sources of investment with minimal additional risk to long-term investors.

3.3 CHALLENGES TO INSTRUMENT SUCCESS

The key challenge for the Facility will be to draw in institutional investors to renewable energy investment at earlier stages than is otherwise typical for them, as well as into emerging markets. This

¹¹For example, the Africa Finance Corporation and several GEEREF investee funds finance project development in exchange for the right of first refusal to buy equity at financial close.

¹² Stakeholder interviews conducted February-March 2017

¹³ See ACEF Fact Sheet at <https://www.opic.gov/sites/default/files/files/ACEF%20Factsheet.pdf>.

will require demonstrating that the options approach meets their investment needs better than the status quo. However, the Facility will face several challenges in doing so, as detailed in Table 2 below.

Table 2: Challenges to the Facility's Success in Attracting Institutional Investment

Challenge	Potential Solutions
<p>Uncertain investment timing and success rates:</p> <ul style="list-style-type: none"> Project development is highly uncertain in most markets. This uncertainty is reflected in the time it takes for a project to reach financial close, and that not all projects started ultimately make it to financial close. Even though investor funding for the first fund is not drawn-down until the financing is needed at financial close, commitments effectively limit the use of investors' funds for other purposes, and that opportunity cost must be taken into account when calculating fund returns (See Annex 1). This problem could compound if fewer projects than expected reach financial close. 	<p>For the first fund, the Facility could establish an investor club that commits to review potential investments and pool capital for projects for which options are exercised, without committing specific capital at the fund launch. In either case, a fund with equity investors committed in advance offers benefits – both to developers, who may be more likely to participate if they see a clear pathway to investment, and to investors, who can use the fund structure to improve understanding of the markets and specific projects before the equity is purchased.</p> <p>For the first fund, the Facility could commit to projects at a later stage of development to test the options mechanism and reduce risk of significant delays or failures.</p>
<p>Ticket sizes:</p> <ul style="list-style-type: none"> Institutional investors require the same amount of due diligence regardless of investment size, and hence are hesitant to invest in smaller funds such as the Facility's first fund (Nelson and Pierpont 2013). 	<p>The first fund should likely focus on investors such as private equity groups, impact investors, and family offices. Follow on funds would be larger and more likely to attract long-term institutional investor capital.</p>
<p>Emerging market focus:</p> <ul style="list-style-type: none"> The Facility's focus on emerging markets introduces risks for international institutional investors, many of whom are focused on developed country markets (OECD 2015).¹⁴ Investments therefore need to be de-risked and/or offer higher returns in compensation. 	<p>Development finance anchor investments and concessional co-investments will be critical to reducing emerging market risk and enhancing credibility of the fund.</p> <p>For the first fund, the Facility should select countries with the best renewable energy policy environments¹⁵. The Facility's initial focus on middle income emerging markets and mature, competitive technologies is to promote institutional investor participation.</p>

¹⁴ For example, OECD's 2015 Large Pensions Funds Survey notes that overall, infrastructure allocations range from 1 to 20% of portfolios. Furthermore, of total foreign unlisted infrastructure investment, emerging market allocations were between 0% and 35%.

¹⁵ This will allow it to have a less concessional investor returns waterfall structure than other comparable and complementary funds like the European Investment Bank's GEEREF fund of funds and the Danish Climate Investment Fund (DCIF).

FIRST FUND AND BEYOND

4. IMPLEMENTATION PATHWAY AND REPLICATION

Early stage financing gaps are prevalent in many developing countries, and RESF offers a highly replicable approach to addressing these gaps in multiple countries. Once the concept is demonstrated, RESF expects to be fully financeable and sustainable without public financing.

4.1 FIRST FUND

4.1.1 Target Countries & Replication

The Facility's first fund will target developing countries that have comparatively attractive investment environments for institutional investors and significant potential for renewable energy development, as indicated by the countries' renewable energy policy and publicly announced capacity and generation targets. The Lab Secretariat scored countries on the basis of their general investment environment, including their sovereign credit rating, and their renewable energy enabling framework.¹⁶ Beyond these requirements, the Facility should also target countries with established or planned independent power producer markets. Based on this research as well as Proponent input, the Facility could initially target early-stage renewable energy projects in Latin America, particularly Brazil, Colombia, and Peru, in Middle East North Africa, particularly Jordan, Morocco, and Tunisia, and in Southeast Asia, particularly Indonesia and Vietnam.

Follow-on funds could expand to other countries in these regions with strong renewable energy enabling environments but somewhat less attractive general investment environments, including among others El Salvador, Ghana, Guatemala, Honduras, Kenya, Nicaragua, Rwanda, Senegal, and Uganda.

4.1.2 Milestones & Implementation Pathway

To move toward a first fund, the Facility will first need to secure USD 600,000 to undertake an in-depth feasibility study for a single region and prepare for its launch. The feasibility study, to take 3-6 months, will include the signing of MOUs¹⁷ with local partners, project pipeline development, and financial modeling with highly localized data, and will form the basis for fundraising the Facility's first fund. The first fund could launch within a year (e.g., Summer 2018). See Table 3 below for more details.

¹⁶ Data sources include Climatescope, IESE, World Bank, S&P, Moody's

¹⁷ Memoranda of Understanding

Table 3: RESF Implementation Pathway

MILESTONES	2017	2018	2019	2020	ACTIVITIES
Region-specific feasibility study					<ul style="list-style-type: none"> • Refinements of design & financial modeling • Identify implementing partners
Raise capital and set-up fund					<ul style="list-style-type: none"> • Legal & financial set-up • Formalization of partnerships • Build options application platform • Identify detailed project pipeline
Fund close					<ul style="list-style-type: none"> • Donor, DFI, and private sector finance raised for \$100 million equity fund and \$10 million options fund
Project development					<ul style="list-style-type: none"> • Launch window for applications • First options purchased • Project milestones met and projects receive additional options premiums
Equity phase					<ul style="list-style-type: none"> • First investments reach financial close • Equity investments deployed
Replication & Scale-Up					<ul style="list-style-type: none"> • Begin fundraising follow on fund (e.g., “RESF 2”) with lower or no concessional funding

4.2 IMPLEMENTATION CHALLENGES

Given increasing competition for investors in the renewable energy sector, as well as the need to develop relationships with local project developers, the Facility will need establish a low-cost process, local presence, and local partnerships for originating projects and for providing technical services to those projects to enhance their ability to reach financial close. In addition, with much public attention on renewable energy development, the Facility should take advantage of existing institutions and partnerships at the investor level – including among development finance institutions, donors, and private investors – in order to be able to further reduce transaction costs and duplication¹⁸.

5. IMPACT

The design of RESF increases investors' returns over the status quo, while leveraging 25 dollars of commercial investment for every one of public investment.

¹⁸ For example, RESF can offer projects for investment to development finance institutions and other initiatives including the Danish Climate Fund, the upcoming Danish Sustainable Development Goal fund, and in partnership with the Renewable Energy Performance Platform.

5.1 QUANTITATIVE MODELING RESULTS

To assess how the instrument addresses barriers, the Lab Secretariat compared results from the Facility's proposed first fund with results from more standard investor portfolios, which typically include only projects that have already reached financial close (see Annex 1 for detailed methodology, assumptions, and results)^{19,20}.

In the central case of the Lab's model, the option structure allows somewhat higher returns to investors to those they would obtain by investing directly at financial close, making their engagement earlier in the development process more financially attractive. The Facility's expected equity IRR is 17.5% for the fund, and 15% to investors net of fees, compared with 14% for the fund and 12.75% to investors net of fees for comparable investments initiated at financial closure. Longer repayment periods in the option instrument are, in this case, more than offset by the offer of a discounted acquisition price to investors in the option instrument.²¹ However, uncertainty deriving from variable project success rates could lead to a larger range of possible returns. In addition, it may be difficult for the fund manager to correctly size the equity fund given variable project success rates (see Annex 1 for a full discussion).

5.2 PRIVATE FINANCE MOBILIZATION

Under the aforementioned modeling scenarios, approximately USD 30 million of public concessional finance would be invested in the first fund (between convertible grants and public concessional equity), which would mobilize USD 80 million private sector commitments at fund level, or a 1:2.7 ratio of public to private investment²². Expanding beyond the direct fund leverage, the first fund is expected to mobilize a total of approximately 25 dollars of commercial investment, including from other equity and debt investments in the projects, for every one of public concessional investment.

5.3 ENVIRONMENTAL AND SOCIAL IMPACT

The Facility holds significant potential to contribute to clean energy and environmental objectives in pilot countries during a first phase. The Lab Secretariat estimates that the Facility's first fund could support the deployment of 370 megawatt (MW) of solar and wind, abating and avoiding 12.6 million metric tons of CO₂ over the lifetime of the projects in pilot countries targeted²³. Electricity generated from these projects could be more than 1,230 GWh each year – roughly the annual electricity consumption of more than 850,000 people in Vietnam – for their 25-year estimated lifespan²⁴. However, the Facility's impacts will vary based on the actual number of projects that ultimately reach financial close and other project variables. Annex 1 includes the full range of possible results. In addition, in markets where intermittency is a problem and power outages are common, or that are reliant on hydropower for electricity – such as many parts of Latin America and South East Asia – the

¹⁹ Instrument impact analysis relies heavily on CPI Finance Modeling which consolidates more than 5 years of experience on project-level, ex-ante, and ex-post analysis of climate-related projects, fund-instruments and related portfolios, as well as financial instruments and policies supporting them. CPI Finance Modelling applies to a wide range of low-carbon technologies and climate-resilient projects, allowing for in-depth analysis of how external technology and country-specific conditions and risks, as well as specific design aspects of policy and financial instruments, can impact on target metrics for private and public actors.

²⁰ Results presented depend significantly on assumptions made with respect to underlying project finance data such as capital expenditure required/MW and capacity factor, proportion of solar versus wind in the portfolio, project success rates at each milestone, and local market conditions such as debt interest rates and tenors, and electricity tariffs. All assumptions are detailed in Annex 1. Modeling will need to be updated with more robust project-level data once one or more target regions are identified for an in-depth feasibility study.

²¹ Discount is meant to target an IRR 3% higher than in the market at fund level, see assumptions.

²² The amount of private investment could also include some investment from development finance institutions, if invested under the same terms as the private investment. The Lab did not analyze how much DFI commercial investment could be expected.

²³ Based on Combined Margin (Average) emissions factors in Brazil, Peru, and Colombia. See Annex 1 for additional details.

²⁴ Based on annual per capita electricity consumption in Vietnam. See Annex 1 for additional details.

expansion of renewables can have indirect benefits for the grid, increasing resiliency, including to climate change, and reducing costly and dirty diesel backup generation. In addition, in many North African countries, expanding renewable energy generation can reduce countries' exposure to costly energy imports. Finally, the Facility's approach to supporting early-stage project development can catalyze growth of renewable supply chains and expand needed local capacities for project development in pilot countries.

5.4 REPLICATION AND SCALE UP

Within six of the potential markets for the first fund, current operational renewable energy capacity and planned and under construction projects are vastly insufficient to meet Nationally Determined Contributions (NDCs) and other publicly announced renewable energy targets by 2030. As analyzed by the Lab Secretariat, the nearly 13,000 MW difference between existing renewable energy capacity and the targets in these markets²⁵ represents a significant need for pipeline creation and more than USD 15 billion in market value. If the Facility is able to capture ten percent of this market as it scales up, it would mobilize roughly 1300 MW of renewable energy and USD 1.5 billion of investment.

6. KEY TAKEAWAYS

The Facility employs an options mechanism to catalyze private investment into the earliest stages of renewable energy projects in emerging markets and grow project pipelines. It meets the Lab's key criteria for endorsement in the following ways:

- **Innovation:** It introduces a novel approach to de-risking institutional investment in early stage, renewable energy project development through its unique combination of options financing, diversification of investments, and disciplined use of milestones.
- **Catalytic impact:** It has the potential to leverage significant concessional-to-commercial investment ratios of 1:25 through a first fund.
- **Financial sustainability:** Employing concessional finance only to demonstrate the value of the approach and reinforce the concept by reducing investor risks, with a clear path to fully private implementation in subsequent iterations.
- **Actionability:** It will be ready in the near-term, reflecting the urgency of the climate challenge and the need to grow project investment pipelines in emerging economies. The model can be deployed very quickly once investment is raised.

²⁵ The Lab examined targets and existing pipeline in Brazil, Peru, Colombia, Jordan, Tunisia, and Morocco.

7. REFERENCES

- BNEF, Chatham House, FS-UNEP Centre. 2016. *Finance Guide for Policymakers: Renewable Energy, Green Infrastructure*. Available at: <http://fs-unep-centre.org/publications/finance-guide-policy-makers-renewable-energy-green-infrastructure>
- Ehlers, T. 2014. *Understanding the challenges for infrastructure finance, BIS Working Papers No 454*. Available at: <http://www.bis.org/publ/work454.pdf>
- EMPEA. 2015. *Private Investing in the Power Sector in Emerging Markets*. Available at: <http://empea.org/research/empea-data-insights-q4-2016-2-2/>
- Escalante D., Abramskiehn D., Hallmeyer K., Brown J. 2017 forthcoming. *Assessing the Additionality of Climate Investments*. Climate Policy Initiative.
- FS-UNEP Centre and BNEF. 2016. *Global Trends in Renewable Energy Investment 2016*. Available at: http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2016lowres_0.pdf
- IRENA. 2016. *Renewable Energy Market Analysis: Latin America*. IRENA: Abu Dhabi. Available at: http://www.irena.org/DocumentDownloads/Publications/IRENA_Market_Analysis_Latin_America_2016.pdf
- Nelson, D. and Pierpont, B. 2013. *The Challenge of Institutional Investment in Renewable Energy*. Available at: <https://climatepolicyinitiative.org/wp-content/uploads/2013/03/The-Challenge-of-Institutional-Investment-in-Renewable-Energy-CPI-Webinar-Slides.pdf>
- OECD. 2015. *Mapping Channels to Mobilise Institutional Investment in Sustainable Energy*. Available at: <https://www.oecd.org/g20/topics/energy-environment-green-growth/mapping-channels-to-mobilise-institutional-investment-in-sustainable-energy-9789264224582-en.htm>
- OECD. 2016. *Annual Survey of Large Pension Funds and Public Pension Reserve Funds, 2015*. Available at: <http://www.oecd.org/daf/fin/private-pensions/2015-Large-Pension-Funds-Survey.pdf>
- Ramboll. 2015. *Analysis of Renewable Energy Project Preparation Facilities in Sub-Saharan Africa*. Available at: <http://www.sida.se/globalassets/sida/sve/sa-arbetar-vi/utvecklingsfinansiering/analysis-of-project-preparation-facilities-in-sub-saharan-africa.pdf>
- Schneider-Roos et al. 2014. *Unleashing Private Capital Investments for Sustainable Infrastructure Greenfield Projects*. Available at: <http://www.gib-foundation.org/content/uploads/2014/05/Scoping-Study-for-the-Early-Phase-Project-Preparation-Phase.pdf>
- UNEP. 2011. *Catalysing Early Stage Investment*. Available at: https://www.scaf-energy.org/sites/default/files/public/downloads/files/Catalysing_Early_Stage_Investment.pdf
- World Economic Forum. 2015. *Africa Strategic Infrastructure Initiative: A Principled Approach to Infrastructure Project Preparation Facilities*. Available at: http://www3.weforum.org/docs/WEF_African_Strategic_Infrastructure_Initiative_2015_IPPF_report.pdf
- World Economic Forum. 2017. *Renewable Infrastructure Investment Handbook: A Guide for Institutional Investors*. Available at: http://www3.weforum.org/docs/WEF_Renewable_Infrastructure_Investment_Handbook.pdf