CIF CLIMATE INVESTMENT FUNDS

SREP CO-FINANCING RATIO BY GRID CONNECTION TYPE

An in-depth analysis of co-financing mobilized for the different grid connection types in the SREP portfolio

// June 2023

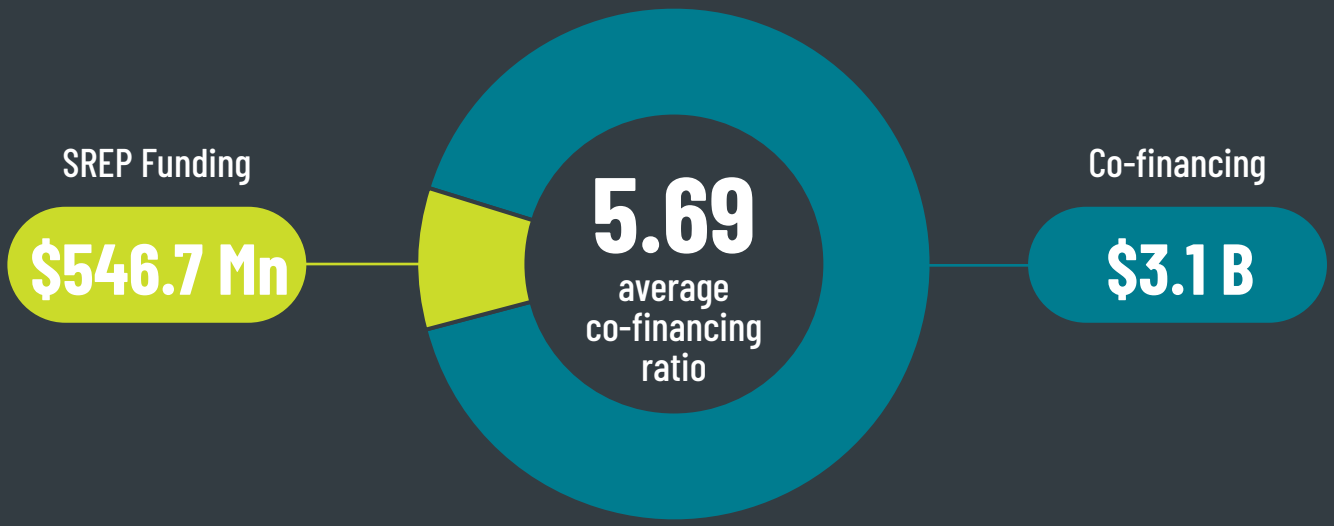
RESULTS DEEP DIVE SERIES//

CIF Program: Scaling Up Renewable Energy Program in Low Income Countries (SREP)

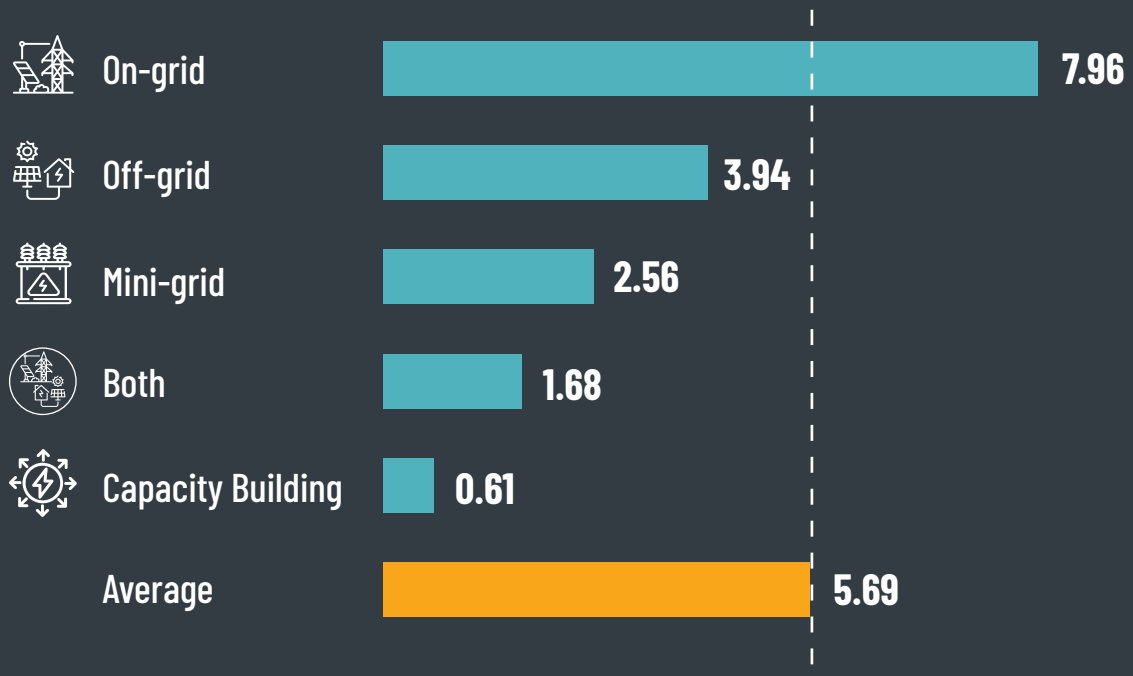
TOPICS

- Results and Impact
- Energy Access
- Climate Finance

SREP: MOBILIZED CO-FINANCING RATIO



EXPECTED AVERAGE SREP CO-FINANCING RATIO BY GRID CONNECTION TYPE



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00	Initial publication	June 2023			Tariye Isoun Gbadegesin CEO, Climate Investment Funds
01	Page 5, Paragraph 2 "...as the CIF has supported the extension of electricity access to over a million people since its inception in 2009."	Aug 2024	Updated number of people to make it more accurate from over a million people to 1.8 million people.		Tariye Isoun Gbadegesin CEO, Climate Investment Funds

RESULTS DEEP DIVE SERIES

The Climate Investment Funds (CIF) is committed to rigorous and inclusive monitoring and reporting (M&R) on investments' contributions toward net-zero emissions and adaptive, climate-resilient, just, and socially inclusive development pathways. The M&R Results Deep Dive series is a supplement to CIF's annual results reports — while annual M&R provides a systematic synthesis of portfolio performance against each program's core indicators, the Deep Dives provide in-depth reviews of these results within specific thematic or developmental dimensions of climate change. As such, they offer greater granularity on the drivers and implications of various performance characteristics.

1. INTRODUCTION

This Results Deep Dive focuses on expected results in mobilizing co-financing through the Scaling Up Renewable Energy Program in Low Income Countries (SREP) of the Climate Investment Funds (CIF). SREP aims to enable the world's poorest countries to foster transformational change and pursue low-carbon energy pathways.[1] It seeks to increase overall energy access for the populations of partner countries; deliver economic uplift; reduce reliance on fossil fuels; and minimize greenhouse gas emissions. SREP, alongside CIF as whole, plays a vital role in mobilizing co-financing from a variety of sources in order to meet these pressing goals. This Results Deep Dive examines the co-financing mobilized for each dollar of SREP funds, calculating the co-financing ratio for the different kinds of grid connections—on-grid, off-grid, and mini-grids—in the current portfolio.

Providing access to clean, affordable energy is critical to mitigating climate change while also improving the lives of millions of people around the world. It therefore constitutes a vital part of CIF's mission, as the CIF has supported the extension of electricity access to 1.8 million people since its inception in 2009. SREP focuses on a group of largely low-income and lower-middle income countries, aiming to fill a persistent gap developing countries face—namely a shortfall in financing for transitions to clean, renewable energy.[2,3] Developing countries experience a range of barriers to mobilizing such investment, including financial market development, lack of alignment in regulatory frameworks, and institutional capacity challenges.[4] The countries in SREP's portfolio have been "underserved in terms of concessional finance"[5] and in many cases encounter outsized hurdles in operationalizing projects, including fragile and conflict-affected situations (FCS), natural disasters, governance challenges, and "immature market structures."[6] As a result, SREP portfolio countries often have a limited track record for investments in clean energy and renewable technologies. Thus, SREP plays an important role in taking the first mover risk and investing in riskier components and aspects of projects in order to mobilize additional financing from other sources.

Solar facility in Kolondiéba, Mali

1.1 Different Types of Grid Connection in the SREP Portfolio

SREP projects encompass three major types of grid connections:

On-grid — additional connections as a result of SREP are connected to the existing power grid;

Off-grid — additional connections as a result of SREP are separated from the main power grid;

Mini-grid — additional connections as a result of SREP are connected to an individual power grid, which can be either connected to the main power grid or operate in isolation of the main grid.

Each type of grid connection has advantages and disadvantages depending on the overall context and other variables. For example, on-grid projects are more efficient in larger areas where, due to the concentration of population in the area, it is feasible to extend connections to previously unserved households, businesses, or populations. This may hold true even in cases where the project starts from zero to develop an entire grid. On the other hand, off-grid connections may be more useful for rural areas with lower population density, that are further away from the main grid. In such areas, grid connections are not cost-effective and transmission lines are harder to construct.[7] Mini-grids exhibit features of both these options, and are often deployed where a sizeable community is too remote to be connected to the main grid, making it more financially viable to create its own grid connection.[8]

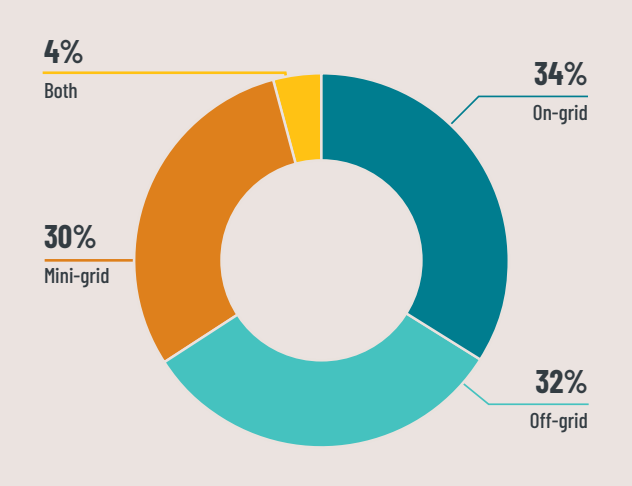

FIGURE 1. Division of grid technologies in the SREP portfolio as a percentage of SREP financing

Based on the SREP portfolio as of December 2022

An off-grid project supports clean cookstoves in Honduras

2. RESULTS IN DEPTH: CO-FINANCING RATIO BY GRID CONNECTION TYPE

This section explores the ratios of expected co-financing mobilized for different types of grid connections. It also examines the key drivers of the differences between the ratios. The analysis is based on 46 multilateral development bank (MDB)-approved SREP projects between 2011 and 2022.

Disaggregating projects by grid connection type—while excluding capacity-building projects—reveals that traditional on-grid projects have the highest expected co-financing ratio, whereas mini-grid projects have the lowest. Table 1 shows the expected co-financing ratios, by technology, for the projects analyzed.

Solar panels in the Maldives

TABLE 1. Expected average SREP co-financing ratio by grid connections

Grid Connection Type	Average SREP Co-financing Ratio
On-grid	7.96
Off-grid	3.94
Mini-grid	2.56
Both[9]	1.68
Capacity Building	0.61
Average	**5.69**

Based on the SREP portfolio as of December 2022

On-grid projects have the highest average expected co-financing ratios mobilized because of the overall costs associated with such projects. SREP financing for on-grid projects supports traditional energy access projects to improve grid connections in densely populated areas. It also supports the exploration phases of geothermal projects such as the Menengai Geothermal Development Project (AfDB) in Kenya and the Geothermal Sector Development Project (World Bank) in Ethiopia.[10,11] The exploration phase of a geothermal project can account for over 30 percent of the total cost and represents the component with the greatest risk.[12,13] Such projects have much higher costs and risks than other electricity access projects (for example, developing a solar-diesel hybrid system in Mali).[14] Geothermal projects, however, offer multiple advantages once they are operational, as they are expected to generate more electricity than other technologies.[15] Geothermal energy is not variable,

so it can provide reliable, stable, and flexible clean electricity[16] to the highest number of people. In geothermal projects, SREP financing is used to finance the riskiest aspects of the project, while crowding in financing from other sources to support less risky components.

Mini-grid projects tend to have lower average expected co-financing ratios mobilized as they are less resource intensive than other connection-type projects and, therefore, require less overall financing. Mini-grid projects are generally smaller than on-grid projects, with limits on their size and cost shaped by the contexts in which they are typically used: smaller communities in remote areas where it is more economical to build a new grid with an independent source of power than to connect the communities to the main power grid.[17] Generally, mini-grid projects do not require additional components that are often found in other kinds of projects, and which may necessitate additional financing, such as the large renewable energy plants—common in on-grid projects—required to connect large numbers of people in a concentrated area. For example, the SREP-supported on-grid project National Solar Parks (ADB) in Cambodia involves the construction of a large scale 100 MW (expected) solar park.[18] On the other hand, off-grid systems often need a dedicated battery storage system—which adds another level of cost and risk—to accommodate the variable changes in renewable energy produced throughout the day.[19]

At the other end of the co-financing mobilization ratio spectrum, capacity-building projects do not directly contribute to energy access and have a low co-financing ratio but can play a crucial role in indirectly increasing investments in clean energy access. Many SREP countries lack a business environment that is conducive to investments in clean energy access. To address this challenge, SREP offers support for developing vitally important policy incentives. For example, the capacity-building, SREP-supported Lighting Ethiopia (IFC) project indirectly improved electricity access among over eight million people. The project's primary objective was to address various market barriers by developing a market intelligence mechanism to enhance distributors' understanding of the national off-grid lighting market and providing business development support to various parties.[20]

Menengai Geothermal Development Project, Kenya.

3. CHALLENGES AND CONSIDERATIONS

The ability to mobilize significant co-financing, as measured by high co-financing ratios, is only one of many aspects that can help determine the connection type that will best extend and expand electricity access in a particular project. While on-grid projects show the highest average co-financing ratios, there are cases where they are not practical or financially viable, such as interventions that aim to extend access to smaller and more remote communities. In such cases, policymakers may turn to other connections that show a lower co-financing ratio and are less costly overall, such as mini-grid or off-grid projects. Connecting remote rural communities to main grid lines often introduces additional costs for components such as transmission lines. Instead, developing a smaller but self-sustaining grid (as in mini-grid projects) or installing batteries for energy storage (as in off-grid projects) can provide a more efficient pathway to expanding access.[21,22]

Since all three types of grid connections play a crucial part in providing sustainable energy access, with good practices for which connection type to deploy shaped by project context, SREP has a critical role—to mitigate the risks associated with all types of technologies and grid connections. As discussed above, each technology and type of grid connection comes with its own set of risks and trade-offs; and SREP's work contexts may entail additional risks and uncertainties given these countries' limited experience with such technologies. It remains vital to drive down costs and mitigate risks while crowding in investments from different sources. This will enable investments in electricity access to become, in the long term, financially viable without the support of concessional financing .

A solar power plant in Honduras

ENDNOTES

1. For more information about the SREP, see the program's website at https://www.cif.org/topics/energy-access.
2. Ibid.
3. World Bank. 2023. Scaling Up to Phase Down: Financing Energy Transitions in the Power Sector. Washington, DC: World Bank. https://openknowledge.worldbank.org/server/api/core/bitstreams/a7c096b2-1234-42eb-9d9a-7e185370c59f/content.
4. Ibid.
5. ICF. 2022. Evaluation of the Scaling up Renewable Energy Program in Low-income Countries: Evaluation Report. https://www.cif.org/sites/cif_enc/files/knowledge-documents/srep_evaluation_report.pdf.
6. Ibid.
7. Phillips, Jonathan, Davies, Gabriel, and Plutshack, Victoria. 2020. "An off-grid energy future requires learning from the past." The Brookings Institution (blog), May 4, 2020. An off-grid energy future requires learning from the past (brookings.edu).
8. For more information about off-grid electricity systems, see the Alliance for Rural Electrification's website at https://www.ruralelec.org/grid-electricity-systems.
9. Only one project in SREP's portfolio deployed two types of grid connections—on-grid and off-grid. This project represented a unique case: ERUS — Solar-Powered Mobile Health Units for Honduras was implemented to respond to special circumstances, as it sought to mitigate the effects of the COVID-19 pandemic on the healthcare system in Honduras.
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14. World Bank. 2013. Proposed Credit in the Amount of SDR 16.3 million (USD 25 Million Equivalent) and a Proposed SCF-SREP Grant in the Amount of US$ 14.9 Million and a Proposed GPOBA Grant in the Amount of USD 5.0 Million to the Republic of Mali for a Rural Electrification Hybrid System Project. Project appraisal document, Washington, DC. https://documents1.worldbank.org/curated/en/173911468052814928/pdf/PAD6880PAD0P13010Box379866B00OUO090.pdf.
15. On-grid projects in the SREP portfolio are expected to produce on average 174,554 MWh whereas off-grid and mini-grid projects are expected to produce 88,662 MWh and 23,906 MWh, respectively.
16. IRENA and IGA. 2023. Global Geothermal Market and Technology Assessment. Abu Dhabi: International Renewable Energy Agency; The Hague: International Geothermal Association.
17. CIF. 2014. Increasing Rural Energy Access through Mini-Grids. Knowledge Note, CIF Learning Publication. Washington, DC: Climate Investment Funds. https://www.cif.org/sites/cif_enc/files/knowledge-documents/kn-srep-_increasing_rural_energy_access_through_mini-grids_0.pdf.
18. For more information about the National Solar Park Project in Cambodia, see the Asian Development Bank's website at https://www.adb.org/projects/51182-001/main.
19. For more information about the off-grid or stand-alone renewable energy systems, see the Department of Energy's government website at https://www.energy.gov/energysaver/grid-or-stand-alone-renewable-energy-systems.
20. For more information about the Lighting Ethiopia project, see the International Finance Corporation's (IFC) website at https://disclosures.ifc.org/project-detail/AS/600201/lighting-ethiopia.
21. For more information about the cost-effectiveness of mini-grids, see USAID's website at https://www.usaid.gov/energy/mini-grids/economics/cost-effectiveness.
22. Hauser, Zachary. 2017. "Rural Access to Electricity: A Challenge of Dollars and Sense." Chemonics (blog), October 24, 2017. https://chemonics.com/blog/rural-access-electricity-challenge-dollars-sense/.

THE CLIMATE INVESTMENT FUNDS

The Climate Investment Funds (CIF) is one of the largest multilateral climate funds in the world. It was established in 2008 to mobilize finance for low-carbon, climate-resilient development at scale in developing countries. Fifteen contributor countries have pledged over US$11 billion to the funds. To date CIF committed capital has mobilized more than $64 billion in additional financing, particularly from the private sector, over 70 countries. CIF's large-scale, low-cost, long-term financing lowers the risk and cost of climate financing. It tests new business models, builds track records in unproven markets, and boosts investor confidence to unlock additional sources of finance. Recognizing the urgency of CIF's mission, the G7 confirmed its commitment to provide up to $2 billion in additional resources for CIF in 2021.

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