

POLICY TOOLKIT

Financing and de-risking tools and approaches for solar mini grid projects in fragile contexts

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Solar mini grids are an increasingly competitive and financially viable option to meet the significant energy deficits in fragile settings, but affordability constraints remain prevalent. This toolkit explores a range of innovative financing mechanisms and de-risking tools that could be leveraged to help overcome affordability constraints and ensure that mini grids can reach people living in settings of fragility and displacement.

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In this paper

This paper provides evidence to inform policy decisions around financing solar mini grid projects and structuring private sector involvement in distributed renewable energy (DRE) projects in fragile and conflict-affected situations (FCS). It is intended to help equip policymakers in fragile settings with an understanding of the key financial challenges facing the DRE sector in FCS and information on financing and de-risking tools and approaches they can work with mini grid project funders to leverage in order to better support economic viability and sustainability of mini grid projects in their countries. To progress DRE investment in fragile settings, collaborative efforts are required from a range of stakeholders, including donors, development finance institutions (DFIs), philanthropic entities, private investors (both domestic and international), and energy project developers. Consequently, this paper outlines important lessons for other key stakeholders too.

The technological scope of this toolkit focuses on solar mini grids. However, these are only part of a necessary wider, integrated energy strategy that should include additional off-grid and grid-based technologies. Where relevant, we draw lessons from other technologies, such as solar home systems, and endeavour to ensure that this toolkit has lessons that can also be applicable for other technologies beyond the core focus of mini grids.

List of abbreviations

Abbreviation	Meaning
DART	Demand Aggregation for Renewable Technology
DFI	Development finance institution
DRE	Distributed renewable energy
EDFI	European Development Finance Institutions
FCS	Fragile and conflict-affected situations
GEAPP	Global Energy Alliance for People and the Planet
IFC	International Finance Corporation
MIGA	Multilateral Investment Guarantee Agency
NGO	Non-governmental organisation
PPP	Public-private partnership
RBF	Results-based financing
SME	Small- and medium-sized enterprise
TCX	The Currency Exchange Fund
T&C risk	Transfer and convertibility risk
USD	United States dollar

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Financing and de-risking tools and approaches for solar mini grid projects in fragile contexts

Executive summary

The financing needed to extend electricity access to the over 685 million people worldwide who currently lack electricity access is considerable, with financing challenges being particularly high in countries characterised as fragile, where a vast majority of people without electricity access live.¹ Renewable energy technologies, and **solar mini grids** in particular, are an **increasingly competitive and financially viable option** to meet the significant energy deficits in fragile and conflict-affected situations (FCS). This is driven in large part by **notable cost reductions** in solar technology, with solar solutions already outperforming fossil fuel options on price. Although this paper focuses on solar mini grids, much of the information included here is relevant for mini grids powered by other energy sources (such as wind and small-scale hydropower).

Despite the huge potential of wide-ranging distributed renewable energy (DRE) technologies, financial commitments in off-grid solutions in countries with the largest energy access gaps remains staggeringly low. Public financial flows to developing countries for clean energy started decreasing before the COVID-19 pandemic and continued to decline until 2021. These financial flows amounted to USD 10.8 billion in 2021, being only 40% of the 2017 peak of USD 26.4 billion.² They increased to USD 15.4 billion in 2022.³ Funding from development finance institutions (DFIs) funding for decentralised electricity projects in developing countries falling sharply from USD 260 million in 2018 to USD 34 million in 2019.⁴ These figures portray a dire situation in terms of financing for renewable energy projects in the countries with the greatest energy deficits, many of which are FCS.

Financing DRE development in FCS is not straightforward. Making mini grids viable in rural, sparsely populated areas, or contexts affected by fragility and conflict will require **leveraging innovative financing mechanisms and de-risking tools** to reach customers who would otherwise not be able to afford solar products or services. Certain types of investments offer particular value in FCS, where the **higher costs and risks of investing** necessitate **financing that is flexible, patient, and risk tolerant**. This would include:

- **Grants and highly concessional loans** comprising a significant portion of project funding to enable overall returns that satisfy private investors. Concessional funding would involve the use of subsidies in instances where a public economics case exists, i.e., when a project has the potential to achieve development impact but the returns to society exceed the private returns on investment.⁵

1 IEA et al., 2024. Figure is for 2022, the most recent year for which figures are available.

2 IEA et al., 2023.

3 IEA et al., 2024. Figure is for 2022, the most recent year for which figures are available.

4 SEforAll and CPI, 2021.

5 Carter, 2021.

- **Greater equity participation** (and a reduction in reliance on loans), which will require raising the risk tolerance of lenders. Equity financing allows for longer investment time horizons, pursuit of higher growth strategies, and more sustained engagement through the inevitable cycles of volatility in FCS.⁶
- **Working with local intermediaries**, such as local financial institutions, provides a route to enable financing of projects in local currency, allows foreign lenders to achieve deeper contextual understanding of local markets, and strengthens local financial institutions and local financial markets more broadly. This is essential to support sustainable scale up of mini grid financing in FCS.⁷

In addition to conventional sources of financing (grants, equity, and commercial and concessional loans), there are a number of **innovative and emerging funding sources** that can be leveraged for mini grid development in FCS, including:

- **Impact investments and impact bonds**, which support the use of investment capital to achieve positive social or environmental results (which align with investors' preferences), as well as a financial return.
- **Structured financing**, which aims to standardise project documentation, aggregate small-scale projects together, and securitise renewable energy assets to enable trading in capital markets, thereby freeing up capital for investment and lowering the cost of financing.
- **Diaspora finance**, which draws on diaspora populations of FCS as a source of finance, as well as technical expertise and valuable tacit knowledge of local markets in home countries.

A number of tools and approaches can be used to de-risk investments in FCS, serving as critical complementary mechanisms alongside financing sources. De-risking tools **strategically allocate risk** across the public and private financiers of a project and may also use public finance to **de-risk investments and crowd-in private finance**. However, the rhetoric around leveraging public finance to crowd-in private finance does not yet reflect reality in FCS. With continual developments and more initiatives demonstrating success with different tools and approaches, it is anticipated that there will be more progress in coming years. Some of the most notable de-risking tools and approaches include:

- **Grants** provided by DFIs, bilateral donors, or philanthropic funders to mitigate risks, particularly costs associated with early-stage project development.
- **Blended finance**, which combines concessional public finance with commercial private finance for projects intended to attain developmental or social impact. Public finance is used to absorb risks or provide guarantees to enable private investors to participate on de-risked terms, thereby achieving overall returns in line with market expectations.
- **Results-based financing** schemes provide a financing mechanism enabling pre-agreed financial incentives and rewards to be paid to mini grid developers if they achieve pre-agreed results. Achievement of outcomes generally needs to be independently verified.
- **Guarantees** involve a third party agreeing to compensate lenders in the event that a borrower (a mini grid developer) defaults on its loan repayment obligations, thereby absorbing (at least part of) the loss that the lender may otherwise bear.

⁶ Collier et al., 2021.

⁷ Ibid.

- **Local currency financing** is critical in FCS to avoid borrowers having to bear currency risk in contexts often characterised by macroeconomic instability and local currency depreciation, as this imperils the financial health of projects, developers, and potentially whole sectors of FCS economies. A shift towards more local currency financing will be integral to any sustainable scale up of investments in FCS, including in mini grid development, and collaboration across DFIs (and other impact-driven lenders) on joint solutions is necessary for more affordable options to be scaled up.
- **Concessions** can also be used to facilitate private sector participation in mini grid projects in FCS. They provide strong incentives for improved performance and autonomy over delivery and are particularly effective when they cover both electricity generation and distribution elements of electricity provision.
- **Collaborations between DFIs and humanitarian organisations** are emerging with the aim of jointly mobilising investments in contexts affected by fragility, conflict, and displacement through drawing on their complementary expertise and resources.

As much as conventional and emerging sources of financing and de-risking tools and approaches are critical for financing mini grid project development and initial operations, developing a **business model based on market fundamentals** is essential for successful mini grid operation, profitability, and sustainability.⁸ Acquisition of enough customers who are willing and able to pay for electricity consumption; collection of sufficient, stable revenues; and attaining 100% utilisation rates as quickly as possible after projects become operational are all vital.

Greater transparency and more sharing of data and information on mini grid projects is also needed to build the evidence base on what works (and what does not) for mini grid developments in FCS, offering value to all actors involved in the sector.

Ultimately, moving the needle on investing in solar mini grids in FCS at scale will require **governments to establish more conducive investment environments**. Responsibility also rests on government to enable financing and de-risking mechanisms, such as by:

- Establishing principles to guide the use of concessions in a coherent and consistent manner.
- Integrating DRE into national electrification plans and developing policy and regulatory frameworks to enable private sector participation in the sector.

With concerted efforts from all actors involved in financing mini grid projects in FCS – DFIs, private investors, philanthropies, mini grid developers, energy sector organisations, and governments – and strategic utilisation of existing and emerging financing sources and de-risking tools and approaches, it is possible to significantly scale up mini grid development in FCS and extend energy access to those living in some of the world's most challenging places.

8 Interview with Nuru on July 15, 2022; interview with MIT Energy Initiative on June 17, 2022.

1. Introduction

The financing needed to extend electricity access to the over 685 million people worldwide who currently lack electricity access is considerable, with financing challenges being particularly high in countries characterised as fragile, where a vast majority of people without electricity access live.⁹ Renewable energy technologies, and solar mini grids in particular, are an increasingly competitive and financially viable option to meet the significant energy deficits in FCS.¹⁰ Cost reductions in solar technology has made this an increasingly attractive energy solution. Although these cost reductions have not yet carried across to developing countries and FCS fully, renewable energy solutions already outcompete fossil fuel options on price and are becoming more affordable every year.¹¹

Despite the huge potential of wide-ranging DRE technologies, financial commitments in off-grid solutions in countries with the largest energy access gaps remains staggeringly low. Public financial flows to developing countries for clean energy started decreasing before the COVID-19 pandemic and continued to decline until 2021. These financial flows amounted to USD 10.8 billion in 2021, being only 40% of the 2017 peak of USD 26.4 billion.¹² They increased to USD 15.4 billion in 2022.¹³ Funding from development finance institutions (DFIs) for decentralised electricity projects in developing countries also fell sharply from USD 260 million in 2018 to USD 34 million in 2019.¹⁴ As these figures are for developing countries in general, the values for FCS specifically are even lower. And while energy investment increased by around 8% in 2022 amid the global energy crisis, almost half of the increased investment is thought to be due to higher costs.¹⁵ These figures portray a dire situation in terms of financing for renewable energy projects in the countries with the largest energy deficits, many of which are FCS.

This may be explained in part by the **numerous unique financial challenges** associated with investing in FCS, including in solar mini grid projects, including:

- **Disproportionately high project preparation costs** as greater upstream and project preparation work is needed in these typically undeveloped markets before projects can be realised.¹⁶
- **Smaller investment ticket sizes**, reflecting relatively smaller projects, result in overheads constituting a higher portion of project costs. Combined with higher project preparation costs, this imperils project profitability.¹⁷

⁹ IEA et al., 2024. Figure is for 2022, the most recent year for which figures are available.

¹⁰ Logan & Sacchetto, 2021.

¹¹ Malchman, J., 2022.

¹² IEA et al., 2023.

¹³ IEA et al., 2024. Figure is for 2022, the most recent year for which figures are available.

¹⁴ SEforAll and CPI, 2021.

¹⁵ IEA, 2022b.

¹⁶ Logan & Sacchetto, 2021.

¹⁷ Ibid.

- **Undeveloped local financial markets with limited liquidity** are common in fragile contexts. This makes it more difficult for investors to sell assets or to access the credit needed to enter markets as local credit is rarely available; or, if available, is subject to high interest rates and short repayment periods. As a result, there is often a high reliance on foreign funding to finance projects. However, foreign finance can be expensive due to a number of factors, including currency risk and high risk premia applied to fragile settings.¹⁸
- **Currency risk**, which results from volatility in exchange rates, is notably higher in fragile contexts experiencing macroeconomic instability or in economies heavily reliant on remittances or export of commodities (which dynamics are common in fragile settings). This raises uncertainty and the risk that investors will not receive anticipated returns on their investment. Transfer and convertibility (T&C) risk is also a big issue in many FCS, often due to currency controls imposed by governments or central banks to limit repatriation of profits to investors' home countries or conversion of profits from local currency into foreign currency.
- **Few reliable off-takers or customers at scale**, such as national utilities and larger industrial enterprises, exist in FCS to act as anchor customers for mini grid projects. In FCS, national utilities are often insolvent and fewer larger industrial firms operate in these settings.
- **Lower purchasing power** and **relatively lower consumer demand** for energy among populations of areas affected by conflict and fragility compared to less fragile areas, with many consumers in fragile settings experiencing precarious income situations. This limits the viability of pure market-based solutions.
- **High import duties on equipment**, including solar mini grid equipment, in many countries. While some countries have waiver programmes for imports of renewable energy equipment, these may not always be recognised and applied consistently by customs authorities.¹⁹ Import costs can also increase significantly when local currency depreciates against hard currencies, which happens more frequently in FCS.²⁰
- **Weak investor protections** arising from undeveloped or inconsistent legal and regulatory frameworks expose investors to risks such as difficulties enforcing property rights or securing compensation for policy changes that adversely impact investments.

¹⁸ Ibid.

¹⁹ Interview with All On on July 18, 2022.

²⁰ Interview with SmartPower Myanmar on December 8, 2022.

As a result of the above financing challenges, new partnerships, efforts, and approaches are needed if we are to significantly scale up the funding available for mini grids in FCS. Understanding what financing mechanisms and de-risking tools and approaches exist and which hold greatest potential for scaling up mini grids in FCS is critical.

This paper will outline financing types and sources that can be leveraged for mini grid investment in FCS, as well as tools and approaches that have demonstrated particular relevance for de-risking investments in and attracting private finance into FCS. Examples of how these facilities have been used will be included to demonstrate their operation in practice. Finally, this paper will outline recommendations of steps that different stakeholders can take to support the scale up of renewable energy projects in FCS.

2. Financing types and sources

2.1 Conventional financing types and sources

Solar mini grid projects in FCS can draw on conventional financing types – grants, equity, and loans (on either commercial or concessional terms) – as well as guarantees and insurance tools:

- **Grants** are funds provided without the expectation of repayment, usually from public sector funders (governments, bilateral donors, DFIs) and philanthropic and non-governmental organisations (NGOs) and are typically given to support early-stage project development. They often have eligibility criteria, high competition for the limited funds available, and are usually subject to significant reporting and other administrative requirements.
- **Equity** financing mobilises capital through the sale of shares, i.e., shareholding or ownership, in a company. Share purchase is often made through private equity firms or venture capital investors, or public stock exchanges for publicly listed companies. Equity investors share in company profits and losses alongside other shareholders and have a say in company decisions, thereby affecting the management, direction, and decisions of the company. However, equity investors are not owed regular payments from the company, thereby allowing the company to use its capital for further investments in firm growth and productivity, for example.
- **Commercial loans** are loans offered on market terms, requiring repayment of the loan amount plus interest within an agreed period of time. Where they do exist in FCS, commercial loans often have notably high interest rates, short repayment periods, and rigid collateral requirements, making them an unattractive source of funding for mini grid projects which typically require long-term funding (over a 10 to 15-year period) with low cost of capital to enable a financially viable project.²¹
- **Concessional loans** have more generous terms than commercial loans, offering grace periods on debt repayment and/or below-market interest rates.²² This 'cheaper' finance tends to come from public finance (bilateral donors, DFIs) or philanthropic sources. Concessional funding allows private investors to participate in investments on more de-risked terms and achieves an overall higher return for private investors than would otherwise be possible.

21 USAID, n.d.

22 USAID, n.d.

- **Loan guarantees** are a commitment by a third party (guarantor) to cover some or all of the risks arising from a loan to a borrower (e.g., mini grid developer) that may not have sufficient collateral to otherwise guarantee the loan. The third party assumes the loan obligation in the event of loan default by the borrower or non-performance of an asset. Loan guarantees help borrowers gain access to loans that otherwise would be deemed too risky for lenders.
- **Insurance** products may be available to protect against certain risks, including political risk insurance that mitigates risk associated with adverse political events, such as war, government expropriation, or the introduction of new laws or regulations. For FCS, where the risk of adverse political events is high, insurance is a particularly valuable tool.

Specialised industry funds play a key role in de-risking investments and crowding in private capital for off-grid energy and productive use investments, including increasingly in hard-to-reach environments.²³ The success of these funds' operations derive from their aggregated and diversified investor base, and they are an easy entry point for new or risk-averse investors.²⁴

Development finance institutions are also seen to have a particularly important role in investments in FCS as they can use concessional finance to de-risk investments and mobilise private capital, making possible projects that would otherwise not be possible in fragile settings. DFIs' comparative advantage in FCS investments arises from their capacity to invest on favourable terms (taking on higher risk and accepting lower rates of return), their deep expertise and influence in host countries, and their explicit private sector development focus.²⁵ DFIs may lend directly to companies or invest via local intermediaries (such as banks) or specialised industry funds and can also enable greater private investor participation in investments through expanded securitisation structures or provision of loan guarantees.²⁶

However, DFIs face the challenge of pursuing three objectives that may not always be possible to achieve simultaneously, namely to:²⁷

- Reduce poverty (and, increasingly, fragility).
- Ensure adherence to the highest ESG standards and principles of prudent banking, lending, and investing.
- Realise positive investment returns.

Other investors similarly motivated by development impact are likely to face these same trade-offs, raising the need for more pragmatism around what can realistically be achieved in FCS and where compromises are needed, particularly around financial returns. However, while it is difficult to pursue all three of these objectives simultaneously,

²³ World Bank, 2022.

²⁴ Ibid.

²⁵ Collier et al., 2021.

²⁶ World Bank, 2022.

²⁷ DFI Fragility Forum 2022 event summary report.

and DFIs should not necessarily be expected to achieve all three, there are a growing number of cases that demonstrate that it can be done.

Local financing available in FCS is often subject to high interest rates. This results in reliance on a range of foreign sources of funding. Conventional foreign funders include bilateral donors, development agencies, development finance institutions, philanthropic entities, NGOs, and private investors, who make use of different financing types depending on the investment opportunity, the entities' mandate, and its investment strategy, among other things. Reliance on foreign sources of funding, however, can trigger issues around currency risk in instances where foreign financing needs to be repaid.

2.2 Financing for FCS

Financing DRE development in FCS is not straightforward. While the underserved market in FCS is undoubtedly huge, affordability is a key constraint. Market forces alone have not extended energy access beyond fairly densely populated urban areas, even in countries with relatively developed energy markets.²⁸ Indeed, no country that has achieved universal energy access has done so without the use of public finance, and expecting this to be achieved by FCS through only blended finance structures and private finance is highly unrealistic.²⁹ As a result, any efforts to extend solar mini grids to rural, sparsely populated areas, or contexts affected by fragility and conflict will necessitate leveraging a range of innovative financing mechanisms and de-risking tools to reach customers who would otherwise not be able to afford solar products or services.

2.2.1 The case for subsidies

The below-market interest rates of concessional loans provided by public entities may be attained by using subsidies. Subsidies can be justified when a project has the potential to achieve development impact yet the returns to society exceed the private returns on an investment, making a public economics case for addressing a market failure, excessive risk, or insufficient returns for private investors.³⁰ In practice, this means that subsidies should be applied to only a subset of investments where a public entity has provided concessional funding.³¹ Subsidies are normally justified on grounds of equity and efficiency as they essentially enable redistribution in kind rather than via income channels.³²

Importantly, subsidies should not be used simply to mobilise private finance; rather, they should send private finance where it otherwise would not go, with a view to achieving development impact.³³ Ideally, subsidies should be set at the "minimum uplift needed (to expected risk-adjusted returns) to induce investment without conferring economic rents (excess profits) on investors."³⁴

28 Hunt, n.d.

29 Interview with IRENA on July 4, 2022.

30 Carter, 2021.

31 Ibid.

32 Carter, 2015.

33 Ibid.

34 Ibid, p. 3.

Subsidies currently remain vital for DRE delivery, with many mini grid projects only being viable with subsidies. However, subsidies should be targeted and leveraged strategically to maximise impact in terms of the number of beneficiaries reached and quality of service achieved in a catalytic, sustainable, and scalable manner.³⁵ Subsidy programmes should be designed to promote innovation, cost reduction, and competition, ultimately being used to support a transition to a more market-driven sector. As renewable energy markets develop, there should be periodic review of subsidy programmes to assess their necessity and level(s) on an ongoing basis.

Several key challenges have emerged regarding use of subsidies for mini grid projects. First, fragmentation of instruments means many may be too small or not well-coordinated enough or not long term enough or systematic enough to actually be market shifting, thereby lowering the impact of the subsidies.³⁶ There is some recognition that alignment or aggregation of instruments is needed to overcome this issue.

Second, subsidy programmes aimed at subsidising capital expenditure (CAPEX) for mini grid projects by supporting connections or expansion of distribution networks, for example, are not tied to providing ongoing services to customers, supporting increased productive use of energy, or establishing viable or sustainable business models. In some contexts, this has led to a proliferation of developers accessing CAPEX subsidies but not properly servicing customers once they've been connected to the mini grid (with subsidies often being harder to access for ongoing repair and maintenance costs) and/or not sufficiently stimulating productive use of energy, which is vital for viable business models.³⁷ Additionally, developing a mini grid project assuming that CAPEX subsidies will be secured may undermine the centrality of establishing viable business models, therefore constraining the sustainability of systems.³⁸

Many practitioners and experts in the renewable energy space are calling instead for a kWh-based subsidy, which is seen as being a better way to incentivise ongoing service delivery to customers and to support a shift to a more utility-type approach. This could speed up mini grid deployment. The kWh subsidy level could be adjusted over time, with gradual reductions in subsidy support, and could blend funding from different sources.

2.2.2 Characteristics of financing needed in FCS

Investments of certain types offer particular value in FCS. To overcome the higher costs and risks of investing in FCS, financing needs to be flexible, patient, and risk tolerant. In practice, for solar mini grids this would include:

- **Providing grants and highly concessional loans** as a significant portion of project finance, otherwise a project may not yield the overall return demanded by private investors. In FCS, donor-supported concessional finance is vital to enable projects that otherwise would

³⁵ Hunt, n.d.

³⁶ Ibid

³⁷ Interview with All On on July 18, 2022; interview with SmartPower Myanmar on December 8, 2022; interview with SteamaCo on December 7, 2022.

³⁸ Interview with SmartPower Myanmar on December 8, 2022.

not be possible. These sources of funding offer value for developers especially in the early stages of projects when support for de-risking projects is most urgent. There is quite frequently a gap in financing schemes for initial bridging capital to carry projects from purchase and installation of equipment to the point of paying suppliers, as grant funding may only come in six or more months later.³⁹ Additionally, the funding pools for grants are limited and competition for their use is high. Longer term debt of 20 to 30 years would also contribute to lowering tariffs for end users, even more so when loans are on concessionary terms.⁴⁰

- **Achieving greater equity participation**, which will require shifting DFIs and other investors towards greater risk tolerance as it necessitates increasing equity investments while reducing reliance on loans (which tend to offer higher repayment certainty). Equity participation often allows for longer time investment horizons, for mini grid developers to pursue higher growth strategies, and for more sustained engagement between investors and developers through the inevitable cycles of volatility in FCS.⁴¹ Many mini grid developers need more equity investment as mini grid projects may take around ten years to recoup investments.⁴² As equity financing comes with its own set of challenges, including greater reputational risks for equity investors and limits posed by the illiquidity of equity over time, a balance between debt and equity is needed. However, this balance needs to overall reflect greater equity participation than is currently the case in FCS investments.
- **Working with local intermediaries**, such as local financial institutions, enables foreign funders to finance smaller ticket sizes. Working with local intermediaries also gives foreign funders 'boots on the ground' and may lower project overheads, strengthen local financial institutions and the local financial market, build trust and credibility within the local community, and enable effective use of local intermediaries' deeper contextual knowledge and understanding of local markets.⁴³
- **Investing in local mini grid developers**. Similarly, partnering with local mini grid developers, by giving them more than a contractor role, can be very beneficial in supporting development of a local renewable energy ecosystems, which is essential for sustainability of the sector in the long term.⁴⁴ Currently, funding is very skewed towards international mini grid developers as local developers struggle with the high cost of finance and challenges navigating access to investors to pitch projects and meeting financing requirements (such as demonstrated track records).⁴⁵ Opening up funding opportunities for local developers and making it more feasible for them to navigate financing processes will also be central for local ecosystem development.

39 Interview with SteamaCo on December 7, 2022.

40 Interview with Renewvia on December 5, 2022.

41 Collier et al., 2021.

42 Interview with All On on July 18, 2022.

43 Collier et al., 2021.

44 Interview with IRENA on July 4, 2022.

45 Ibid.

- **Combining financing for mini grids with financing for productive use appliances.** Productive use appliances enable income-generating (or time saving) activities and include water pumps, welding machinery, and electric pressure cookers. Currently, funding of these two highly interconnected efforts is largely siloed (sometimes even when funding comes from the same sources), which is less efficient and effective than it could be if funding was packaged together. This has created a situation in which many new mini grids are rolled out without investment for productive use appliances, while productive use initiatives later try to target mini grids already in operation.⁴⁶ In contrast, packaging funding for these efforts together would enable mini grid capacity to be better used, communities to derive greater benefit from mini grid connection, and projects to be better designed and more sustainable from the outset.⁴⁷ Additionally, it may ensure that more funding is available to stimulate productive use, which funding has been insufficient to date.⁴⁸
- **Providing adequate protection for the private sector,** including through donors and DFIs working with the private sector and the role of the private sector being aligned with the level of risk that they are willing to take on and remunerating them adequately for their contribution. Public sector contributions could be through in-kind contributions or the use of DFI funding for subsidies or guarantees.⁴⁹

To date, most commercial debt lending in off-grid energy projects has been supported by DFIs. While the need for DFI or other concessional support is expected to continue in the future, particularly in fragile contexts, commercial debt and equity are expected to gain importance, reflecting increased maturity of key industry players.⁵⁰

More strategically, FCS desperately need investments with transformative potential. These are investments that have the potential to ignite the entire local economy by establishing forward and backward linkages, lowering the cost of intermediate inputs (such as electricity), creating opportunities for knowledge transfer and capacity building, and improving the returns on subsequent investments.⁵¹ Scaling up solar mini grids offers among the most transformative investment opportunities in FCS as they present a route to unlock the possibility of significantly increasing economic activities in an area. As such, they should be prioritised by investors seeking to make a development impact and support private sector development in FCS.

⁴⁶ Ibid.

⁴⁷ Interview with SmartPower Myanmar on December 8, 2022.

⁴⁸ Interview with IRENA on July 4, 2022.

⁴⁹ Ibid.

⁵⁰ World Bank, 2022.

⁵¹ Collier et al., 2021.

Ultimately, however, moving the needle on investing in FCS will require governments of these countries to establish more conducive investment environments. Investment at scale in these countries will not be possible until their enabling environments are improved, thus bringing down levels of risk and uncertainty. Given that this takes time and is unlikely to materialise in FCS in the short- to medium-term and, considering the large financial (as well as non-financial) risks projects in these contexts face, it is necessary to have realistic expectations and for investors (both commercial and concessional funders) to be open to trade-offs and compromises around scale and returns.⁵²

We will now explore some innovative and emerging funding sources that offer notable complementarities to the more conventional sources of funding covered above.

2.3 Innovative and emerging funding sources

2.3.1 Impact investing and impact bonds

Impact investing aims to use investment capital to achieve positive social or environmental results in line with investors' preferences, as well as a financial return. Impact investing spans a number of industries, including renewable energy, and serves to increase the resources available to support more sustainable and resilient energy systems. Most impact investment is done by institutional investors such as hedge funds, private foundations, banks, and pension funds. However, there is an increasing number of web-based investment platforms and investor networks offering individual investors an opportunity to participate in impact investing. These crowdfunding platforms offer a stable source of investment for energy developers at all project stages and are an easy-to-deploy investment instrument.⁵³ A good example of an impact investor active in the off-grid sector is All On, discussed in **Box 1** below.

⁵² DFI Fragility Forum 2022 event summary report.

⁵³ World Bank, 2022.

BOX 1 ALL ON, NIGERIA

All On is a Nigeria-based impact investor that supports energy solution providers to grow and achieve scale. Their impact investment strategy uses mini grids (as well as other technology types) and aims to ensure an overall profit as well as impact around increasing access to commercial energy products and services for underserved off-grid energy markets in Nigeria. All On's work also involves leveraging capital for the Nigerian off-grid energy sector and fostering a supportive business and regulatory environment for off grid energy companies to thrive in Nigeria.

All On has invested in 50 off-grid energy companies in Nigeria, deploying funding to develop and scale mini grids as well as to roll-out solar home systems and productive use appliances. They are focused on the whole lifecycle of projects, not only on connections but also supporting sustainable growth trajectories for the companies that they invest in.

They have also set up the All On Hub, with support from The Rockefeller Foundation and GEAPP, to provide non-financial support and capacity building for start-ups in the Nigerian energy sector. Additionally, All On has recently partnered with GEAPP on the Demand Aggregation for Renewable Technology (DART) programme, which is being piloted in Nigeria. DART "aggregates demand, standardises equipment, and enables bulk procurement of renewable energy components" for the purpose of achieving lower unit costs for energy developers in Nigeria.⁵⁴

Impact bonds are innovative performance-based contracts between an investor, an outcome funder, and a service provider that is tackling a social challenge, such as a mini grid developer aiming to deploy mini grids to underserved communities. The investor provides upfront funding for the programme and, if the service provider achieves the predefined outcomes, the outcome funder repays the investor. If designed well, social goals and financial interests can be effectively aligned. The outcome funder is usually (or at least traditionally has been) a government, creating an arrangement whereby "government pays private investors a return for funding successful social projects that meet measurable outcomes."⁵⁵ Impact bonds are therefore a form of 'pay for success' model. They resemble results-based financing (RBF), which is covered below, but with impact bonds the investor bears the financial risk of non-performance (rather than the service provider, as is the case with RBF).

Impact bonds are often distinguished by their ability to attract private investors in sectors not typically recognised as bankable. They encourage evidence-based approaches to development, as well as innovation and accountability in project deployment. In fragile settings, the outcome funder could be an international organisation or development agency, rather than government. Additionally, non-

⁵⁴ GEAPP, n.d.

⁵⁵ Garrasi et al., 2017, page 19.

government entities could stand as a third-party guarantors for impact investors in the event that government is unable to make payment when government is the outcome funder.⁵⁶

One downside of impact bonds is that they may have disproportionately high overhead costs occasioned by structuring and implementing a large number of relatively small loans and having to measure and verify achievement of predefined outcomes. To lower overhead costs, these small loans could be aggregated together to increase the bond size.⁵⁷ It may be necessary to establish alternative methods for measuring and verifying achievement of predefined outcomes, including remote and technology-based options, in situations affected by conflict and fragility given the difficulties of visiting project sites and affected areas in person.

2.3.2 Structured finance

Structured finance aims to address challenges arising from projects being too small, too risky or unique, and having per-project due diligence costs that are too high to be attractive to most large investors – dynamics which are common in FCS. It does this by:⁵⁸

- **Standardising project documentation** – this allows for faster and easier review processes and reduces due diligence costs for investors. Progress is needed on harmonising contracts and project documents across the renewable energy financial sector in order to enable aggregation of DRE projects.
- **Aggregating smaller-scale projects together** – this improves access to financing by reducing due diligence costs per project and helping to scale up investment volume as different tranches of assets can appeal to different investor categories, thereby widening the pool of potential investors.
- **Securitising renewable energy assets** – project developers can issue individual securities with different ratings, risks, and returns to target different investor preferences. Securitisation enables trading in capital markets and allows lenders to access a secondary market and for capital to be reinvested – this frees up capital for further DRE projects and reduces the cost of financing.

Structured finance can help scale DRE through managing risk and developing financial services for complex markets. In the case of mini grids in fragile settings, this could be in the form of working with a single funder to develop, build, and operate mini grids, thereby reducing the time, complexity, and effort needed for fundraising.

⁵⁶ Ibid.

⁵⁷ Collier et al., 2021.

⁵⁸ IRENA, 2016.

2.3.3 Diaspora finance

Fragile contexts often have large diaspora populations living outside the country. Diasporas may have an untapped potential to invest in their countries of origin to create development impact and can be important stakeholders in the sustainable growth of their home countries, especially in settings where there is a lack of formal financial institutions. The extent of this potential is still largely unknown, however, due in part to data shortcomings, but anecdotal examples suggest that this source of finance could be further developed. For example, a notable number of members of the Somali diaspora invest in Somalia, usually directly into locally-owned businesses through joint ventures, debt, equity, and public offerings, across a range of sectors, with agriculture, real estate, and construction being favoured sectors.⁵⁹ Furthermore, remittance volumes signify significant potential: in 2021, USD 45 billion was sent to sub-Saharan African countries in the form of remittances, twice the value of foreign direct investment into the region in the previous year.⁶⁰ That same year, remittances accounted for over 10% of GDP in 29 different countries⁶¹ and 2-3% of sub-Saharan Africa's GDP.⁶²

Diaspora finance offers multiple benefits to the recipient country, including expanding and enabling access to less costly credit, encouraging greater non-diaspora investor confidence, and providing funding that is relatively resilient to global uncertainty. Diasporas are a source of finance, technical expertise, and much-needed tacit knowledge, and engagement with them can initiate opportunities for trade, innovation, expansion of professional networks, and further investment. Importantly, diaspora investors may be more tolerant of risks and lower rates of return and be more patient with longer investment horizons before recouping their investment.⁶³

Although remittance flows have significant impact at both the household and macroeconomic level, these funds have historically generally been utilised for subsistence consumption rather than investment. In 2018, The Commonwealth found that 83% of the diaspora members they surveyed were both interested in and had the resources to invest in their country of origin, yet faced a range of challenges in doing so, including perceived corruption, poor governance, fluctuating currencies, and a lack of information.⁶⁴

To address barriers to diaspora investing, a growing number of governments and development partners have turned their attention to fostering more conducive enabling environments for these investments. This includes action around (i) institutional engagement with diasporas, (ii) extending rights to and recognising contributions of diasporas, (iii) establishing an enabling environment, (iv) promoting investment incentives, and (v) launching initiatives to leverage resources.⁶⁵ Off-grid energy, including mini grids, has numerous catalytic benefits and is a sector that can offer diaspora investors investment opportunities with

⁵⁹ Clingendael, 2023.

⁶⁰ Schneidman et al., 2022.

⁶¹ Clingendael, 2023.

⁶² Schneidman et al., 2022.

⁶³ Clingendael, 2023.

⁶⁴ The Commonwealth, 2018.

⁶⁵ The Commonwealth, 2018.

both development impact and commercial returns, potentially as part of a blended finance model. While diasporas have not played a significant role in funding solar mini grid expansion to date, they have been important in financing productive use appliances through remittances and gifts.⁶⁶

There are a number of diaspora finance sources and instruments, including:

- **Angel investment networks** – diaspora investors are often active members of angel investor networks, which are growing in Africa, and who invest in local firms in their home countries. This is a form of direct diaspora investment and can even include investments in unincorporated businesses. The angel investment sector is estimated to invest USD 100 million a year in African start-ups.⁶⁷
- **Diaspora bonds** – these are issued by a country to its diaspora population to enable investment in discounted government debt from their home country. They are often used to fund infrastructure projects. Diaspora bonds can be significant for countries that have large diasporas who have strong knowledge of their home countries' prospects, thereby enabling diaspora investors to more accurately separate out real risks from perceived risks. Diaspora bonds can also be corporate, giving listed firms access to diaspora debt, especially for firms that are struggling to access international markets and foreign debt markets. For example, in 2017, Nigeria raised nearly USD 300 million in its first-ever diaspora bond, which promised 5.6% returns over five years and was regarded as a successful first diaspora bond as it increased investor confidence and enabled Nigerians living abroad to contribute to Nigeria's development as the country looked to fund significant capital projects.⁶⁸ To date, however, diaspora bonds have not attracted the level of the interest they potentially could due to concerns around the risk of governments defaulting on diaspora bonds and lack of confidence and volatility in financial markets in Africa (often due to high dependence on commodities).⁶⁹
- **Diaspora investment funds** – these comprise a supply of capital from numerous diaspora investors and are used to collectively invest and formally channel more diaspora money into development projects in home countries. For example, in 2020, the Kenyan Capital Markets Authority granted the first licence of its kind to allow Kenya's diaspora to invest through the African Diaspora Asset Managers, in turn providing a safe and regulated investment body for Kenyans living overseas.⁷⁰ These funds can be sector or market specific and could include renewable energy projects.

We will now explore tools and approaches that can be leveraged to de-risk investments in FCS and which serve as critical complementary mechanisms alongside the conventional and emerging financing sources covered above.

⁶⁶ Interview with IRENA on July 4, 2022.

⁶⁷ ABAN, n.d.

⁶⁸ NIPC, 2017.

⁶⁹ Schneidman et al., 2022.

⁷⁰ African Business, 2020.

3. Tools and approaches to de-risking investments in FCS

Attracting private investment is seen as a vital component of funding mini grid development as, theoretically, it can help raise funding significantly beyond that available from donor aid budgets, thereby achieving a step-change in scale up of mini grids. However, many mini grid projects in FCS have limited commercial viability for private investors due to the high risks and uncertainty around these projects, including lack of data on energy demand and consumers' willingness and ability to pay relative to capital costs, as well as limited economies of scale. More broadly, traditional private debt or equity financing is generally unaffordable or non-existent in FCS.

Therefore, de-risking tools and approaches – such as blended finance, results-based financing, and local currency financing – have been developed to strategically allocate risk across the public and private financiers of a project, thereby improving the risk-return ratio for private investors and making projects more attractive for private finance. De-risking frequently involves the use of public funds to offset the higher costs associated with risk and uncertainty in FCS, enabling private investors to participate in the investment on de-risked terms.

That said, the rhetoric around strategically leveraging a relatively small amount of public finance to de-risk investments and crowd-in relatively larger amounts of private finance does not yet reflect reality in FCS. Sufficient levels of funding on terms favourable enough to overcome the financing challenges of FCS to make viable mini grid projects that otherwise would not be viable have not yet materialised.

Furthermore, in many instances, claims of mobilising private finance have been misleading – when it costs public funders as much to catalyse private finance as to simply provide the public finance equivalent, this does not raise the *overall* levels of funding available or contribute to closing the funding gap.⁷¹ Therefore, careful assessment is needed of financial arrangements to see whether they do in fact mobilise additional finance or if they mainly serve to allocate risk across the investors involved in a project.

Although progress on mobilising private finance in FCS has been limited to date, continual developments and more initiatives using existing and emerging tools and approaches are being undertaken, which efforts are likely to demonstrate progress in coming years. Beyond financing, private sector actors are considered a key source of technical expertise for the development and operation of mini grids, and arrangements can be structured and incentives used to encourage more effective and efficient electricity service delivery with private sector involvement.

71 Carter, 2015.

The rest of this section will explore some of the tools and approaches that have been used to de-risk investments with some success, focusing primarily on those with applicability in FCS.

3.1 Blended finance

Blended finance refers to the use of concessional public finance to mobilise additional finance, including non-concessional private finance, towards sustainable development. The public finance is used to absorb risks or provide guarantees to enable private investors to participate on de-risked terms and to leverage additional finance, including technical assistance grants, for sustainable development purposes. Blending these funding sources enables the overall investment to be made on more favourable terms than would have been possible with commercial finance alone, while allowing private investors to receive their expected rates of return. It better aligns risk-adjusted returns for investors with social preferences and offers significant opportunity for progressing clean energy.⁷²

According to the Global Platform for Action, blended finance has three key characteristics:⁷³

- **Leverage** – the use of humanitarian or development finance and philanthropic funds to attract commercial finance into projects.
- **Impact** – investments are intended to drive development, social, environmental, or humanitarian progress.
- **Returns** – financial returns for private investors are in line with market expectations, based on real and perceived risks.

Fragile settings have risks associated with higher insecurity and risk of conflict, perceived low state capacity, untested or non-existent markets, and unpredictable or unevenly enforced policies and regulations. Therefore, aggregate and market-level approaches to designing and managing blended finance projects may be ineffective due to their inability to be flexible and adapt contextually to the needs and dynamics of different project sites. Instead, a more tailored project-by-project approach to designing and managing projects may work better. However, while a more project-based strategy in fragile settings and frontier markets is likely to achieve higher impact, it is also less likely to mobilise finance at scale and volume.⁷⁴ Therefore, a balance between these approaches is needed, as recognised by learnings from the Scaling Solar programme which have indicated a need for greater flexibility and less focus on standardisation to enable tailoring of blended finance requirements to specific projects and tweaking of templates as needed.⁷⁵

An example of an initiative that uses project-by-project blended finance to support aggregated blended finance solutions to close the finance gap in the energy sector is outlined in **Box 2** below.

72 Tonkonogy et al., 2018.

73 NRC, 2022.

74 Lankes, 2021.

75 Saldinger, 2023.

BOX 2 NITHIO AND USADF PARTNERSHIP

Nithio is a tech-driven platform for clean energy investment which aims to standardise credit risks to catalyse capital to address climate change and achieve universal energy access in Africa. They support investors to quantify and assess risk to inform their financing decisions. The US African Development Foundation (USADF) is an independent US government agency established to invest directly in African grassroots enterprises.

In June 2022, Nithio and USADF made available blended finance to enhance access to clean energy in Kenya. The financing was awarded to three companies that provide access to affordable and clean energy to households in Kenya. The partnership consists of both parties co-funding the early-stage companies, with USADF providing grant funding and Nithio providing loans. It is expected that the partnership will be at the forefront of scaling blended finance to the off-grid solar energy sector in Kenya by bringing together public sector de-risking capital and private sector investments to scale clean energy financing.

This example also highlights the importance of de-risking companies at an early stage and the need to build data and evidence that can be used to improve private financiers' ability to make informed decisions, thereby supporting scaling up of successful solutions.

Blended finance may also enable early-stage technical assistance to support project preparation and development, which tends to be much needed in FCS.⁷⁶ This includes institutional development and capacity building for government officials which improves expertise and technical capacity of government over time, thereby also raising the likelihood of future investments materialising. It may also play a role in strengthening trust between public and private sectors, which is often weak in many fragile contexts. Whether blended finance can play a role in trust building, however, is contingent on whether the risk sharing formula is effective, realistic, and fair.⁷⁷

Blended finance transactions have been growing, with capital of USD 213 billion committed by 2023 through a cumulative total of 1,123 transactions, with a significant uptick in frequency of blended finance transactions in recent years.⁷⁸ DFIs and multilateral development banks (MDBs) have been key drivers of greater use of blended finance, with annual values amounting to USD 2 billion and USD 4.9 billion in 2022 and 2023, respectively.⁷⁹ Despite this overall growth, little private finance has been mobilised for low-income countries, accounting for approximately only 3.6% of the total private finance mobilised in 2012 to 2015, with this figure being even lower for fragile contexts.⁸⁰ An example of a DFI-led blended finance effort is included in **Box 3** below.

⁷⁶ OECD, 2020.

⁷⁷ Canfin & Zaouati, 2018.

⁷⁸ Convergence, 2024.

⁷⁹ Convergence, 2024.

⁸⁰ Attridge & Engen, 2019.

BOX 3 THE ELECTRIFICATION FINANCING INITIATIVE (ElectriFI)

ElectriFI is an impact investment facility designed to increase access to modern, affordable, and sustainable clean energy services in developing countries. It is a EUR 275 million facility funded by the European Union and managed by the Association of European DFIs (EDFI). The investment facility has three complementary targets: (i) 701 tons of CO₂ avoidance per year, (ii) 23 million beneficiaries, and (iii) 807 GWh of renewable energy per year. So far, the initiative has made EUR 120 million worth of blended investments in 47 projects across 23 countries.⁸¹ The investments have an objective of leading to new and improved connections for populations living principally in rural and under-served areas, including regions affected by unreliable power supply in developing countries.

ElectriFI's business model was established to invest in local markets in poorer economies and fragile situations. They combine technical assistance and risk capital, allowing them to take on greater risks than other investors. ElectriFI's activities de-risk investments and allow private investors and other DFIs to deploy capital that they could not have invested otherwise.

An example of ElectriFI's investments is the EUR 1.5 million it invested in Sunkofa Energy, a company providing energy services through mini grids in Benin.⁸² The funding went towards construction costs for further mini grid development. The environment the project operates in is classified as medium high risk and the investment is likely to play a significant role in developing the mini grid sector, mobilising private finance, and providing strong additionality due to the early stage of Sunkofa Energy and the market in Benin. Importantly, it has a strong capability building component, which helps the project become more ready to absorb additional investment productively, highlighting the importance of technical assistance as a key de-risking component of blended finance.

While blended finance has the potential to lower costs and risks involved in frontier investments, measures are needed to improve its effectiveness. These include:

- **Capacity building and strategic changes** – Blended finance still comprises a relatively small share of total DFI investments, and it is thought that it would be viable for them to raise their capacity.⁸³ There's an accompanying need for fundamental strategic changes to shift more capital towards low-income countries and FCS, otherwise more blended finance may just reinforce existing patterns that skew towards middle-income countries.⁸⁴

81 ElectriFI, n.d.

82 Ibid.

83 AfDB et al., 2017; AfDB et al., 2018; AfDB et al., 2019.

84 Collier et al., 2021.

- **Impact measurement and evidence generation** – Robust mechanisms for data collection and monitoring and evaluating impact should be built into blended finance initiatives. This is critical for transparency and accountability and also to enable effective and active learning to inform future investments in FCS. More evidence is needed, for example, on the advantages and disadvantages of project-by-project versus aggregate, utility-scale approaches to blended finance in the context of mini grids. Evaluation findings would be of value to both mini grid developers and lenders (DFIs, donors, private investors), but the cost of these activities is likely best borne by DFIs and donors in order to ensure they do not impact project viability.
- **Data sharing and knowledge exchange** – Sharing of data and information on projects is critical to foster cross-institutional learning and shareholder confidence, making mobilisation of additional resources more likely as it allows more informed decision-making, may potentially lower risk premia, and could encourage more subsequent market entrants (including more risk averse investors).⁸⁵
- **Strengthening the enabling environment** – Ultimately, substantial investments are needed to improve the enabling environments in FCS to lower perception of risk in these settings if we are to see scaling of investments, including in mini grids. While the primary responsibility for this rests with the national governments of these countries, donors and DFIs have a critical role to play in funding and supporting technical assistance that can support governments to undertake necessary reforms.

3.2 Results-based financing

Results-based financing (RBF) schemes provide a financing mechanism enabling pre-agreed financial incentives and rewards to be paid to entities if they achieve pre-agreed results. RBF is typically based on a contractual agreement between a donor and implementing organisation, which clearly outlines the outputs, outcomes, and desired impact. Most RBF agreements require the achievements to be independently verified to ensure transparency and accountability. Once the results have been verified by an independent body, the payment or incentive is released by the funder to the implementing organisation. To the extent that these output-based incentives/subsidies are made open to all qualifying organisations (rather than only to pre-selected recipients), it would protect against market distortion, however, this may not always be feasible in practice.⁸⁶

The contractual agreement would typically allow the implementing organisation the flexibility and autonomy to choose *how* they achieve the desired results. RBF is a way of shifting the financial risks associated with the non-delivery of results from the funder to the implementing organisation.⁸⁷ This differentiates RBF from impact bonds, where the financial risks of non-delivery are borne by the investor. With regards to solar mini grids, RBF has the potential to play an important role in

⁸⁵ Mutambatsere & Schellekens, 2020.

⁸⁶ Carter, 2015.

⁸⁷ NRC, 2022.

incentivising implementing organisations to meet connectivity and/or payment collecting targets, especially where the market is undeveloped and there are few suppliers, as is the case in many fragile settings. RBF therefore serves as a de-risking mechanism for investors, as it passes potential losses from customer defaults on to the implementing organisation.

In FCS, RBFs can be structured to incentivise the private sector to reach specific marginalised groups or underserved communities that face certain barriers, such as lower ability to pay. Competitive bidding mechanisms can be leveraged to allocate funding to projects that offer the best combination of cost effectiveness and outcomes, thereby encouraging efficiency, competition, and innovation. **Box 4** illustrates an RBF facility, the Universal Energy Facility, which was developed by Sustainable Energy for All, which includes procurement mechanisms to increase competition and efficiency.

BOX 4 UNIVERSAL ENERGY FACILITY⁸⁸

Sustainable Energy for All (SE4All) identified that the procurement processes for mini grids and clean cooking solutions were too time consuming and imposed high administrative costs and burdens on government, donors, and project developers. In response, they established the Universal Energy Facility (UEF) in 2020, a results-based financing model designed to deliver connections faster and more efficiently, thereby providing a funding mechanism that allows for scale, speed, and efficiency across sub-Saharan Africa.

UEF is an alternative to traditional tendering processes, with initial priority focus on mini grid deployment in Benin, Madagascar, and Sierra Leone. The UEF works with organisations deploying energy solutions and providing verified end-user electricity connections and awards incentive payments to eligible organisations. The facility disburses payments to approved mini grid projects based on a results-based incentive of USD 592 per electricity connection, which connection is independently verified. This encourages private sector partners to participate in the programme based on a clear eligibility and selection criteria. It is hoped that the UEF will also increase awareness and adoption of RBF for financing energy access projects among government, financial institutions, and development communities in underserved communities, including fragile settings, to achieve SDG7.

The UEF was designed and funded through several donor partners, including The Rockefeller Foundation, IKEA Foundation, Shell Foundation, Power Africa, UK's FCDO, and others. Additionally, a range of private sector mini grid developers and industry associations supported the design of the UEF.

88 SE4All, n.d.

Outcomes to date show that significant impact can be achieved from relatively low investment values under RBF arrangements, making it likely that this financing type will expand in coming years.⁸⁹ However, while RBFs can be very effective, there are also challenges with this model. For example, because payments are only paid on achievement of results, recipient firms must have the ability to pre-finance efforts to extend energy access to often hard-to-reach communities, which in practice favours larger, more established firms with greater ability to extend upfront financial resources.⁹⁰ Smaller firms and local companies without the same level of access to finance may therefore require grant finance or loans to participate in RBF arrangements. The RBF structure requires mini grid developers to have developed a model as close to commercially viable as possible as payments from RBF subsidies cannot be guaranteed – in practice, this may constrain the number or nature of potential project sites and exclude smaller and local companies from participating.⁹¹

Verification of results for RBF schemes can also be complex, even more so when beneficiaries are in areas affected by conflict or instability, necessitating use of alternative methods to verify outcomes, such as remote and technology-based options. As a result, verification processes may be slow and payment for results may be delayed, which can negatively impact (or exclude entirely) companies unable to withstand cash flow delays from participating in RBF schemes.

A 2021 study by EnDev looking at RBF programmes in 14 countries found that key success factors for RBF schemes include (i) having a deep understanding of the market barriers that exist in the relevant context, (ii) an ability to design an appropriate RBF scheme to address these market barriers, and (iii) a clear business proposition that will persuade participating companies to integrate the RBF scheme into their operational and financial planning processes.⁹² Additionally, it's essential that RBF programmes are designed to enable effective measurement and verification of results, including in unstable contexts, as well as equitable distribution of incentives among potential implementing organisations.

It is also important to ensure accountability and consumer protection, so a balanced approach should be taken that protects consumers from aggressive sales approaches or uninformed financial decisions. Therefore, complementary activities that better inform customers' decision-making is important, such as financial literacy initiatives, local level sensitisation of products by representatives from the target community, and publishing of the RBF terms.

89 World Bank, 2022.

90 Ibid.

91 Interview with Nuru on July 15, 2022.

92 World Bank, 2022.

3.3 Guarantees

Guarantees are a legal undertaking by a third party (guarantor) for the payment of a borrower's debt or other obligation in the event that the borrower (e.g., mini grid developer) defaults on performance, thereby reducing the lender's risk of non-performance. There are different guarantee tools, several of which are used in the context of financing solar mini grids, including:

- **First loss guarantees** entail a third party agreeing to compensate lenders up to a certain percentage of their loan if a borrower defaults on its loan repayment obligations, thereby absorbing the first tranche of loss that the lender would otherwise bear. First loss guarantors are usually motivated to underwrite loans because of the development impact that a project may achieve.
- **Pari passu partial guarantees** involve the guarantor and the borrower sharing the loss arising from non-performance of a loan, with the loss usually being shared equally or otherwise according to an agreed split, e.g., 60% guarantor and 40% borrower.
- **Full (100%) guarantees** would see the guarantor undertaking to cover the full outstanding loan obligation in instances of non-performance and would mostly be seen only with the highest risk investments where greater de-risking was required by investors.
- **Off-take guarantees** are often used in the energy sector, including with solar mini grids, whereby an off-taker commits to the purchase of an agreed amount of electricity at an agreed price for a certain period of time. This ensures predictable revenues for the mini grid developer from the off-taker and serves to buttress the financial viability and sustainability of a mini grid project.

Guarantee tools share risks between the lender and the guarantor and help to improve investors' balance sheets and support funding of riskier projects (or enable participation of more risk averse investors) than may otherwise be the case.⁹³ These arrangements can promote lending from a broader base of lenders while relying on the guarantor's underwriting capabilities. They can also be critical to the scale up of specialised industry funds, including those financing solar mini grids.⁹⁴ Examples of how guarantees from bilateral donors, DFIs, and philanthropic funders can be used to support mini grid development are included in **Box 5** below.

⁹³ USAID, n.d.

⁹⁴ World Bank, 2022.

BOX 5 GUARANTEE EXAMPLES FROM MINI GRID PROJECTS

***Pari passu* partial loan: Kalangala Infrastructure Services on Bugala Island in Uganda**

Kalangala Infrastructure Services is a mixed utility company that drives projects improving ferry services, distributing clean water, and providing electricity from solar-diesel hybrid mini grids on Bugala Island in Uganda.⁹⁵ USAID's Development Credit Authority (DCA) provides loan guarantees to local banks and offered a joint loan guarantee with GuarantCo (a donor backed guarantee company) to InfraCo Africa, which developed an innovative blended finance package that included Kalangala Infrastructure Services securing a commercial loan from Nedbank. The guarantee was key in reducing investor risk in the project. This initiative warranted a partial guarantee as multi-sector infrastructure development on small islands generally deters private investors due to complexity and low risk-return profile of projects, yet the social benefits of these projects are notable.⁹⁶

First loss guarantee: Power Africa's guarantee to CrossBoundary Energy

USAID, through Power Africa, provided a repayable USD 1 million first loss guarantee to CrossBoundary Energy (CBE) to finance mini grid development, on the condition that CBE could raise USD 8 million from other investors, which it successfully did. This arrangement helped CBE to achieve a net internal rate of return that satisfied private investors and demonstrated the value of blended finance mechanisms. CBE proceeded to later fund rounds and repaid Power Africa the USD 1 million guarantee value plus interest.

3.4 Local currency financing

Some 80-90% of DFI lending to developing countries takes place in foreign currency.⁹⁷ At the best of times, this is risky for borrowers in developing countries as it creates currency risk, which arises from fluctuations between the local currency vis-à-vis the foreign currency and can result in borrowers' repayment obligations becoming much more expensive in local currency terms than they were when the loan agreement was signed. This can endanger the financial viability of projects and developers. Currency risk is particularly problematic for sectors such as renewable energy where loans often have long-term maturities and borrowers' project revenues and cash flows are in local currency. The vulnerability arising from high foreign currency borrowing can permeate whole sectors or even whole economies in FCS, where currency risk is notably higher due to more frequent and severe macroeconomic instability and local currency depreciation, greater economic dependence on commodities and remittances, and poorly diversified economies and exports.⁹⁸

⁹⁵ USAID, retrieved from <https://www.pidg.org/project/kalangala-infrastructure-services/>

⁹⁶ Kalangala Infrastructure Services, retrieved from <https://www.pidg.org/project/kalangala-infrastructure-services/>

⁹⁷ Kapoor et al., 2021.

⁹⁸ Fink et al., 2023.

The reason why financing persists in foreign currency despite the obvious risk to local borrowers and FCS economies is that lending in local currency tends to be very expensive – particularly because the interest rate on local currency is generally significantly higher than on foreign currency and hedging against currency depreciation can be costly. As a result of these risks, lenders often shift the currency risk onto the borrower, who is generally unhedged and unable to bear this risk, thereby imperilling the borrowers' financial health as well as potentially having broader destabilising impacts on local economies in FCS.⁹⁹

Additionally, transfer and convertibility risk (T&C risk) remain key challenges in FCS, i.e., risks around the inability to transfer funds to the offshore lender and the inability to convert local currency into foreign currency at the repayment date, respectively.¹⁰⁰ T&C risk arises primarily from governments or central banks imposing exchange rate restrictions, an occurrence more common in FCS than elsewhere.¹⁰¹

It will not be possible to significantly scale up investments in the DRE sector without increasing local currency financing, and DFIs and other development impact-driven investors appear to recognise this and be increasingly willing to do so. Additionally, since the cost of electricity is directly linked to the cost of servicing debt payments, as local currency depreciates against the hard currency of DFI financing, the cost of electricity will need to increase – working against the goal of providing inexpensive, reliable electricity. Therefore, more accessible and affordable solutions to mitigate the costs associated with currency depreciation risk are critical if investment in DRE is to be scaled up and made more sustainable. Undoubtedly, increasing local currency financing in key sectors is also essential from a responsible banking perspective, especially in the context of future increases in climate- and SDG-related financing.¹⁰²

3.4.1 Options to increase local currency lending in FCS

To significantly scale up DRE investment in local currency in FCS, the following complementary solutions could be considered as part of DFIs and other lenders adopting an approach characterised by informed flexibility and prudent risk-taking:¹⁰³

- **Grants to absorb currency risk** when developers need liquidity to manage currency risk.
- **Local currency credit guarantee for FCS**, which guarantee takes on the credit risk of local currency loans or counterparty credit risk. This could involve creation of a vehicle to pool risk across a portfolio of guarantees or a guarantor (donor or sovereign) backing the guarantee.
- **Technical assistance for central banks of FCS** to support macroeconomic stability, enable improved bank liquidity and balance sheet management, facilitate cross-currency swaps, and develop local money markets. Policy dialogue and capacity building would complement the technical assistance provided.

99 Ibid.

100 Ibid.

101 Ibid.

102 Ibid.

103 Ibid.

- **TCX Portfolio Return Guarantee focused on FCS**, which would use donor funding to support concessional hedging for FCS transactions, thereby guaranteeing a minimum return for a portfolio of FCS hedges.
- **Local currency platform as an onshore treasury capability in FCS.** This would involve setting up onshore infrastructure to source local currency and centralise liquidity management across all DFIs, for example. It could enable access to cheaper hedging and mitigate convertibility risk.

Additionally, for DFIs to increase their investments in FCS, including in DRE, several notable internal organisational reforms are also needed. These would include reviewing their organisational culture, practices, and strategies to, for example adjust their credit and market risk mitigation policies and liquidity management to cater for higher risk scenarios of local currency financing, and adopt new incentive mechanisms that reward investment teams for undertaking transactions in local currency (which tend to be more complex and time-consuming than transactions in foreign currency).¹⁰⁴ Using aid funding to take on some of the currency risks associated with financing DRE projects would allow DFIs and MDBs to provide lower cost financing.

3.5 Concessions to facilitate private sector participation in solar mini grids in FCS

There are several contractual arrangements used to facilitate private sector participation in the energy sector, including management contracts, service provider contracts, wheeling, and various concession options.¹⁰⁵ The type of technology and context of operation defines which arrangement would be most appropriate. For solar mini grids in particular, concessions offer a viable model. Concessions are generally authorised by a national or sub-national government with the aim of facilitating private sector participation in the energy sector as part of a broader electrification strategy. Concession contracts give private sector entities exclusive rights to implement and operate mini grids for a specified period of time, in a defined geographic service area. It is essentially a form of public-private partnership (PPP) that incentivises the private sector to invest in supplying electricity in areas where the cost of extending the national grid cannot be justified or undertaken in a timely manner.¹⁰⁶ Concessions are most viable if they are structured to cover both electricity generation and distribution, as this structure has been seen to provide strong incentives for improved performance and autonomy over delivery.¹⁰⁷ Mini grid concessions have been seen to “attract long term infrastructure financing if the risks are addressed and funding and financing stapled (in sensible timeframes).”¹⁰⁸

¹⁰⁴ Ibid.

¹⁰⁵ For an overview of these arrangements, see McCulloch et al., 2023.

¹⁰⁶ Hosier et al., 2017.

¹⁰⁷ McCulloch et al., 2023, p. 15.

¹⁰⁸ Hunt, n.d.

Pre-validation of chosen sites that are appropriate for mini grid electrification and bundling of multiple sites to raise developers' economies of scale and lower unit costs and tariffs are key benefits of the concession model.¹⁰⁹ The concession should extend over a reasonable duration, e.g., ten years minimum, to enable a horizon of contractual certainty and lower loan costs, which can help reduce tariffs too. Concessions should also form part of a broader, integrated electrification strategy in a country in order to reduce the likelihood of grid extension reaching mini grid sites, thereby protecting the financial viability of mini grids.

However, in many fragile settings, PPP laws to govern government-private sector cooperation are underdeveloped or non-existent and fail to encourage private sector investment or adequately organise partnerships between public and private sector actors. To address this and develop a regulatory framework tailored for a country's specific context takes time and requires notable technical capacity within government and may not be possible in the short- or medium-term, necessitating some degree of 'regulation by contract' in the short-term. This would involve the terms of concession contracts standing in for undeveloped regulatory frameworks as a temporary measure.

Concessions allow for regulatory development in a practical, bottom-up manner. Properly structured and incentivised concessions can provide a legal structure for effective PPPs which, over time, could help with developing the enabling environment for subsequent investments.¹¹⁰ Replication of bottom-up efforts was seen in the case of Mali, outlined in **Box 6** below. However, it must be emphasised that this process must be actively managed by government, or else a proliferation of decentralised efforts will create uncertainty rather than regulatory development.¹¹¹

BOX 6 PCASER PROGRAMME IN MALI

After several failed attempts of top-down zonal concessions and tenders for mini grid concessions, Mali's Rural Electrification Agency (AMADER) created a mechanism to receive spontaneous local proposals, which successfully attracted interest from local entrepreneurs. This new mechanism, PCASER, saw the realisation of a series of bottom-up mini grid concessions, which were authorised and subsidised by AMADER. Through this, Mali has successfully built approximately 250 small power projects, which are operated by around 68 private operators and have connected some 78,000 rural households in the country since 2003.

AMADER acted as both a promoter and regulator in the PCASER programme. They successfully promoted mini grids as a viable technology and solution, as well as subsidised 75% of the capital investment cost of new installations, with private operators financing the remaining 25% (which they could recover through tariffs). This combination of promotion and financial commitment proved successful in drawing in private finance.

¹⁰⁹ Ibid.

¹¹⁰ Hosier et al., 2017.

¹¹¹ Tenenbaum et al., 2014.

PCASER demonstrated the potential for replicating bottom-up concessions at speed, which would enable Mali to tap into both national and international entrepreneurs and capacity. However, project approval speed should not come at the expense of good governance, as this could create scope for violation of relevant standards, such as environmental, social, and governance (ESG) standards, and increase the risk of project failure.

Although most of these projects were fossil fuel-based when they began, some concessionaires are now exploring solar hybridisation through participating in the World Bank's Rural Electrification Hybrid System Project. Hybridisation has taken on greater urgency amid high fossil fuel prices, which have impacted the commercial sustainability of these projects.

Although there are many advantages to concessions, they can also become excessively bureaucratic and slow to establish due to legal issues and political contestation.¹¹² These challenges must be actively mitigated, including through use of auctions to streamline the awarding process, for example. Government could also minimise complexity arising from many concession contracts by making use of standardised contracts – for example, those developed under the Scaling Mini Grid programme by the IFC, the World Bank and MIGA, which include standardised templates for the clean mini grid market that can be customised and localised for each country.¹¹³ Bundling 25-30 mini grids into concessions for auction would also streamline the procurement and contracting process and has been seen to attract private sector interest, as demonstrated by the Sierra Leone mini grids programme.¹¹⁴ Additionally, it is vital that concession agreements are published to enable oversight, transparency, and accountability on the local level.

In practice, the experience of concessions has been mixed, with some performing well and others less so. Concessions' effectiveness is ultimately dependent on their design, which must create a viable business model tailored to the needs of a specific context.¹¹⁵ Utility concessions, which give a private company responsibility to manage both the generation and distribution elements of service provision within a specific area and for a specific period of time, have shown the greatest success to date.¹¹⁶ A study of concession agreements in Africa's power sector shows that mini grids have been successful in engaging local investors and increasing the number of rural consumers. However, the concession opportunities have rarely attracted international investors due to concerns around profitability within the time frames normally considered attractive to the private sector.¹¹⁷ Some of these challenges can be seen from Uganda's experience in **Box 7** below.

112 Hunt, n.d.

113 IFC, n.d.

114 Hunt, n.d.

115 McCulloch et al, 2023.

116 Ibid.

117 Bazilian et al., 2017.

BOX 7 SMALL GRID EXTENSION IN UGANDA

Uganda has been through several phases of concessions. Notably, although not a mini grid, UMEME, Uganda's largest electricity distribution company, has operated a successful 20-year distribution concession and has been responsible for approximately 75% of new rural connections. Allocating distribution to UMEME enabled the Rural Electrification Agency (REA) to focus more on grid extension to rural areas to expand connectivity. In 2006, REA set up the small grid extension concession programme to utilise mini grids to enable energy access in rural settings, with the view to future grid connection.

In Uganda's case, a purely bottom-up approach did not work. Private players were not coming forward to request concessions to build new networks. Therefore, REA decided to finance and build new networks and lease them out individually to private concessionaires to operate the mini grids. This approach reduced the risk to concessionaries through public financing of construction, thereby lowering initial capital requirements for the concessionaire. Five local entrepreneurs were granted responsibility for the five new mini grids, which have successfully distributed electricity to 31,600 new connections in rural areas of Uganda. Having local entrepreneurs play a significant role in electrification is important, especially in fragile settings, to tap into their contextual understanding.

However, this approach has significant budgetary implications for the government and therefore any decision-making must take account of potential fiscal impacts. Nonetheless, it demonstrates that a collaborative effort is required from the public sector to decrease risks and incentivise private sector involvement, including leveraging support from donors to overcome high upfront costs of connectivity.

Evidence suggests that the following six characteristics are crucial in determining the success of a concession:¹¹⁸

- **Financial viability** – Concessions must have a good balance of financial returns for the concessionaire and affordability for consumers. This typically requires a combination of subsidies (including cross-subsidies) and an effective tariff regime.
- **Pre-investment support** – The public sector must actively support prospective concessionaires to access data and information that could help them make well-informed decisions. Where data and information does not exist, as in many fragile settings, joint efforts to understand the environment and pave the way for securing new data is important.

118 Ibid.

- **Clarity on rights and responsibilities** – These should be clearly defined and adhered to, which often depends on adequate regulations, such as PPP laws. Additionally, an environment that supports the implementation and enforcement of regulations and contractual obligations is critical.
- **Detailed contracts** – Contracts outline legally binding rules and parameters of operation, including when protection for investors would be given, which may give concessionaires confidence.
- **Reasonable cost of compliance** – Costs should be reflective of the nature and size of the concession being implemented.
- **Timely payments** – Public authorities should budget and disburse necessary payments in a timely manner to ensure cashflow certainty and confidence of private sector partners.

Additionally, in more fragile environments, paying close attention to inclusion and equity is vital – consider who is connected and where and ensure key groups are not excluded from benefitting.¹¹⁹

3.6 Partnerships between DFI and humanitarian organisations

There are emerging innovative collaborations between DFIs and humanitarian organisations to jointly mobilise investments in situations affected by fragility, conflict, and displacement, stemming from a recognition that there's a "need and opportunity to complement traditional humanitarian response with long-term and market-driven solutions that support the resilience of vulnerable communities."¹²⁰ Ultimately, these partnerships aim to bring in private financing to investment opportunities they jointly develop.

In these partnerships, the DFIs bring concessional finance, experience of working with and lending to private sector entities, connections and influence with government, regulatory and policy knowledge, and expertise in managing financial risks.¹²¹ The humanitarian organisations bring access and proximity to populations living in fragile settings, understanding of local dynamics and the potential of local markets, knowledge of the refugee space and financial inclusion, and expertise in managing non-financial risks, providing 'boots on the ground' to implement joint projects.¹²² This, as well as humanitarian organisations' solid reputations (and, often, protection mandates) enable the partnership to mitigate reputational risks associated with projects. Together, by leveraging their respective strengths, the DFIs and humanitarian organisations are able to identify and create opportunities for the private sector to invest in displacement settings.

These innovative collaborations span different sectors and involve a range of stakeholders. Some began with private sector involvement from the start, while others aim to attract in private sector actors to

¹¹⁹ McCulloch et al., 2023.

¹²⁰ World Economic Forum, 2023b.

¹²¹ Ibid.

¹²² Ibid.

enable them to, ultimately, exit from these investments. These efforts demonstrate that, to truly leverage the potential for positive and sustainable social impact, new ways of collaboration across sectors and stakeholders are needed. An example of a joint effort focused on contexts of forced displacement is given in **Box 8** below.

BOX 8 IFC-UNHCR JOINT INITIATIVE ON CREATING MARKETS IN FORCED DISPLACEMENT CONTEXTS

According to the UNHCR, approximately 103 million people were forcibly displaced in mid-2022, with many of them hosted in communities who are themselves facing development challenges.¹²³ The Global Compact on Refugees calls for greater engagement from a range of stakeholders to support both forcibly displaced people and their host communities and it promotes a greater role for the private sector, recognising their expertise in developing economic opportunities and providing innovative and cost-effective services.¹²⁴

UNHCR and IFC first began working together in Kakuma Refugee Camp in northern Kenya, jointly developing a project that invested in around 52 SMEs to enable them to provide enhanced services for both refugee and host communities. Through this successful engagement, they began to identify new opportunities in other contexts of displacement, which led to the organisations signing a global arrangement and providing dedicated resources to design, fund, and pilot innovative, impactful, and scalable private sector solutions for forcibly displaced populations and their host communities.¹²⁵

Joint projects that have emerged after the Kakuma project include job creation in displacement settings in Brazil, financial inclusion of displaced Venezuelan nationals in Colombia, and a consumer market study in refugee host communities in Uganda.¹²⁶ The Joint Initiative also aims to develop an evidence base of what has worked (and not worked) with engaging the private sector in investments in displacement settings.

The experience of those DFIs and humanitarian organisations that have participated in the first collaborations of this nature suggest that much more is possible in this space and that these partnerships are an effective way to identify and build out a pipeline of potential projects in situations of fragility, conflict, and forced displacement. Capturing the evidence of what has worked (and not worked) will be critical to supporting more organisations to participate in these efforts and securing support from the leadership of these organisations would enable technical staff to take more initiative to create opportunities for investments in challenging contexts.

¹²³ World Economic Forum, 2023a.

¹²⁴ Ibid.

¹²⁵ Ibid.

¹²⁶ Ibid.

4. Models as close to commercially viable as possible

As much as conventional and emerging sources of financing and de-risking tools and approaches are critical for financing mini grid project development and initial operations, developing a business model based on market fundamentals rather than relying on subsidies to make projects work is essential for successful mini grid operation, profitability, and sustainability.¹²⁷ Acquisition of enough customers who are willing and able to pay for electricity consumption; collection of sufficient, stable revenues; and attaining 100% utilisation rates as quickly as possible after projects become operational are all vital.

An anchor-business-community approach can be effective for boosting revenues and ensuring stable cash flow early on in mini grid operations.¹²⁸ This approach secures anchor customers who have a significant and steady energy demand *before* the project starts, requiring them to commit to join the mini grid on agreed terms (including electricity supply, pricing, duration, etc.) and to remain as long-term customers until the end of the project, thereby ensuring a minimum of revenue certainty and increasing broader trust in the project.¹²⁹ The anchor customer essentially provides an off-taker guarantee, enabling a level of predictable revenues for mini grid developers. The technical design and sizing of the mini grid is based on the anticipated electricity demand of the anchor customer (with a certain portion of designed capacity of the system being allocated to them), as well as other additional customers that may be added once the mini grid is operational.

Anchor customers should, ideally, be industrial or larger commercial entities, such as cold storage warehouses, saw mills, telecommunications infrastructure, farms, mines, or village markets – entities that typically have higher energy demand (particularly during the day) and greater ability to pay, which allows them to financially carry other customers who are less able to pay. United Nations' agencies or large NGOs could play this role in settings of displacement or conflict, or businesses in host communities could be anchor customers for a project serving both displaced and host populations. Unfortunately, government entities in many developing countries have a bad reputation for not paying their electricity bills on time (or at all), making them a poor choice for an anchor customer.

There are also several new potential users of generated energy, including cryptocurrency mining and artificial intelligence data processing centres, which may play the role of anchor customers or guaranteed off-takers for renewable energy projects, particularly where electricity can be generated at very low cost. A pilot project undertaken by SustainSolar, Earth Wind and Power, and INENSUS in a rural area in

¹²⁷ Interview with Nuru on July 15, 2022; interview with MIT Energy Initiative on June 17, 2022.

¹²⁸ Vivid Economics, 2019.

¹²⁹ Ibid.

Uganda has shown that cryptocurrency mining could be sustainable and generate vital revenues for rural mini grids across the African continent.¹³⁰ Although cryptocurrency mining may not be a guaranteed source of revenues for developers in the long term as it relies on very low cost electricity, it could play a key role in ensuring financial viability of mini grids in the short term while energy demand from other productive uses of energy increases.

Once anchor customers have been secured, smaller business entities and households, as well as service provision facilities such as clinics and schools, should then be acquired as customers once the project is operational, preferably those with a sufficient willingness to pay because they have current demand for energy and recognise that grid extension to their area is unlikely in the near future.¹³¹

Importantly, the anchor-business-community approach, and development of close to commercially viable mini grids more generally, is fundamentally underpinned by sufficient population densities and some degree of existing economic activity and productive use of energy in close proximity to mini grid sites. Where this is not the case, such as in sparsely populated rural areas with little existing productive use, mini grids are unlikely to be the optimal energy solution for that site (as the tariffs required to support such projects, even with subsidies, would be unacceptably high). Rather, stand-alone solar systems may be a more viable approach for such settings.

130 AFSIA, 2022.

131 Vivid Economics, 2019.

5. Recommendations

While there is considerable potential to scale up investments in DRE in FCS, the difficulties around this should not be understated. Ultimately, reaching the poorest households or those living in conflict or displacement settings is not possible on a purely market basis, necessitating the use of subsidies and innovative financing mechanisms to improve affordability. This will require efforts from and coordination among a range of stakeholders, including government, investors, donors, DRE project developers, productive use appliance distributors, and others. Although roll out may be slow, mini grids will still reach unconnected populations in fragile settings before the grid, which may never be extended to these areas.¹³²

5.1 Recommendations for funders

1. DFIs and other providers of concessional finance should **scale up their blended finance capabilities**, making more funding available for deployment of mini grids and mobilising more private capital from these resources. They also need to strategically **shift their capital towards low-income countries and FCS**, otherwise more blended finance will just reinforce existing patterns that skew towards middle-income countries. New sources of capital, such as carbon credits and carbon financing, can increase financing available for clean energy investments.¹³³ The use of concessionary finance to support innovative, proven approaches should be scaled up.
2. Mini grid projects in FCS need **finance that is flexible, patient, and risk tolerant**. In FCS, this would often be **grants and concessional financing** comprising a greater portion of project finance and **more equity participation** as this enables longer funding horizons and more sustained engagement through cycles of volatility, which are to be expected in FCS. Equity investors often bring in critical market, financial, and technical expertise too. Additionally, **working with local financial intermediaries** would allow foreign lenders to leverage their deeper contextual knowledge, facilitate more local currency financing, enable more local financial market development, and make smaller ticket sizes possible.
3. **Greater transparency** and more **sharing of data and information** on projects is critical to build the evidence base on what works (and what does not work) with mini grid investments in FCS. Data sharing fosters cross-institutional learning and increases shareholder confidence, likely enabling increased mobilisation of additional resources as it allows for more informed decision-making, may potentially lower risk premia, and could encourage more subsequent market entrants (including lower-risk investors). Learning is especially needed around emerging efforts, such as DFI-humanitarian partnerships to mobilise investments in very challenging contexts.

¹³² Hunt, 2017.

¹³³ IEA, 2022a.

4. International development organisations and other non-government entities should consider **greater use of the impact bond model**, either as outcome funders themselves or by providing a guarantee to other impact investors to ensure that they receive payment in instances where government (as the outcome funder) is unable to meet these obligations. Impact bond managers could also endeavour to aggregate small loans to increase the bond size and lower overhead costs of bond structuring and implementation. Similarly, more use of **results-based financing** would be very beneficial, although some measures to facilitate participation of smaller and local developers active in FCS may be necessary.
5. **More local currency financing** is needed for developers operating in FCS to ensure that their repayment obligations do not balloon as a result of macroeconomic instability in these settings. To enable this, DFIs and other investors need to **collaborate on joint solutions to address currency risk**, as portfolio diversification and economies of scale are needed to provide more de-risking and therefore bring down the cost of solutions. Potential complementary options include providing (i) grants to borrowers to mitigate currency risk, (ii) technical assistance to central banks of FCS, (iii) local currency credit guarantees to take on the risk of local currency loans and counterparty credit risk, (iv) using donor funding to support concessional hedging for transactions in FCS through a portfolio return guarantee of TCX, and (iv) establishing a local currency platform to serve as onshore treasury capability in FCS across DFIs (and other impact-driven investors).
6. **Innovative partnerships** between DFIs, humanitarian organisations, and others to mobilise projects in contexts of fragility, conflict, or displacement represent the out-of-the-box thinking needed to move the needle on scaling energy access in FCS. Relevant organisations should actively seek out these collaboration opportunities and learn from similar approaches and experiences in order to ready their organisations for these efforts.
7. Investors to make more use of **guarantees**, which can crowd in private finance without necessarily resulting in increased spending as guarantees are not always called upon.

5.2 Recommendations for governments of fragile states

1. It is essential that projects reflect the needs of local communities and government has a critical role to play in **representing the interests of local communities** around mini grid projects. This necessitates government engagement with local communities throughout the project cycle, from initial consultations through to project operations.
2. Governments of fragile states should **engage more with their diaspora populations** and create credible opportunities for them to invest in projects with both financial return and development impact in their home countries, such as in DRE projects. Governments could consider **issuing diaspora bonds** to mobilise funding for renewable energy projects, and facilitate other diaspora investment efforts such as **licensing diaspora investment funds**.

3. While concession agreements should be tailored in a context specific manner, government should **develop guiding principles for concessions** to ensure consistency in terms across concession agreements and clarity in the awarding process. A good concession approach can provide certainty and predictability even in the absence of robust regulatory frameworks.
4. **More political attention and support should be given to mini grids.** Focusing mainly on grid extension has some political benefits but will result in more limited electrification gains, particularly in FCS. DRE should be integrated into national electrification plans and frameworks should be developed to enable private sector participation in the sector.
5. Ultimately, achieving investment at scale in FCS will only be possible if the governments of these countries are credible partners in these efforts. This involves **creating a more conducive investment environment**, which will require substantial efforts from government to develop their policy and regulatory frameworks and improve their policy implementation capabilities. This is essential if we are to lower the risk and uncertainty associated with investing in these contexts. Donors should be engaged to provide technical expertise and financial support to government for this reform process. It also necessitates ensuring **cross-ministerial buy-in for mini grid programmes** in order to give confidence to funders.

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State Fragility initiative

IGC

The **State Fragility initiative** (SFi) is an International Growth Centre (IGC) initiative that aims to work with national, regional, and international actors to catalyse new thinking, develop more effective approaches to addressing state fragility, and support collaborative efforts to take emerging consensus into practice. SFi brings together robust evidence and practical insight to produce and promote actionable, policy-focused guidance in the following areas: state legitimacy, state effectiveness, private sector development, and conflict and security. SFi also serves as the Secretariat for the Council on State Fragility.

theigc.org/statefragilityinitiative

