

# Ex-post Evaluation of the Beyond the Grid Fund for Zambia (BGFZ)

May 2024



*Cover photo: Jason Mulikita for BGFZ*

Prepared for the Nordic Environment Finance Corporation (NEFCO)

**NEFCO**

**BEYOND THE GRID**  
FUND FOR ZAMBIA

By Greencroft Economics

**Greencroft**  
Economics

# Acknowledgements



Nefco acts as the Facility Manager of the Beyond the Grid Fund for Africa (BGFA). In this context, Nefco was assigned the mandate to manage the Ex-Post Evaluation of BGFZ on behalf of the programme financiers.

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This evaluation was led by a Greencroft Economics led consortium of energy access and evaluation experts. Greencroft Economics is an economic consultancy founded in 2019.

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# ABBREVIATIONS

<b>ACE TAF</b>	Africa Clean Energy Technical Assistance Facility	<b>NEFCO</b>	Nordic Environmental Finance Corporation
<b>AECF</b>	Africa Enterprise Challenge Fund	<b>OGTF</b>	Off-Grid Task Force
<b>BGFA</b>	Beyond the Grid Fund for Africa	<b>OPM</b>	Oxford Policy Management
<b>BGFZ</b>	Beyond the Grid Fund for Zambia	<b>PAYGo</b>	Pay-as-you-go
<b>CE4PR</b>	Clean Energy for People Resilience	<b>PROSPECT</b>	An open-source data platform for the energy access sector
<b>CEEEZ</b>	The Centre for Energy, Environment and Engineering Zambia	<b>PUE</b>	Productive use of energy
<b>ECS</b>	Emerging Cooking Solutions	<b>RBF</b>	Results-based finance
<b>EDISON</b>	Energy data and intelligence system for off-grid networks	<b>REACT</b>	Renewable Energy and Adaptation to Climate Technologies
<b>ESP</b>	Energy service provider	<b>REEEP</b>	Renewable Energy and Energy Efficiency Partnership
<b>ESS</b>	Energy service subscriptions	<b>SEK</b>	Swedish Kroner
<b>GESI</b>	Gender and social inclusion	<b>SHS</b>	Solar home system
<b>GOGLA</b>	Global off-grid energy industry association	<b>Sida</b>	Swedish International Development Cooperation Agency
<b>KII</b>	Key informant interview	<b>SMG</b>	Standard Microgrid
<b>KPI</b>	Key performance indicator	<b>ToC</b>	Theory of change
<b>LPG</b>	Liquid petroleum gas	<b>TOR</b>	Terms of reference
<b>MCFA</b>	Modern Cooking Facility for Africa	<b>UNCDF</b>	United Nations Capital Development Fund
<b>MRV</b>	Monitoring, reporting and verification		

## Executive Summary

**The Beyond the Grid Fund for Zambia (BGFZ) ran from 2016 to 2022 and (1) offered RBF grants to four energy service providers (ESPs), (2) established an Off-Grid Task Force (OGTF), (3) developed the EDISON data and MRV system.** It was developed at a time of optimism around the potential for the off-grid solar sector, with the Off-Grid Solar Market Trends Report 2016 predicting over 30% annual growth. Since, the sector has seen sales level off, and the sector has had to face the supply chain and demand side challenges caused by the Covid-19 pandemic.

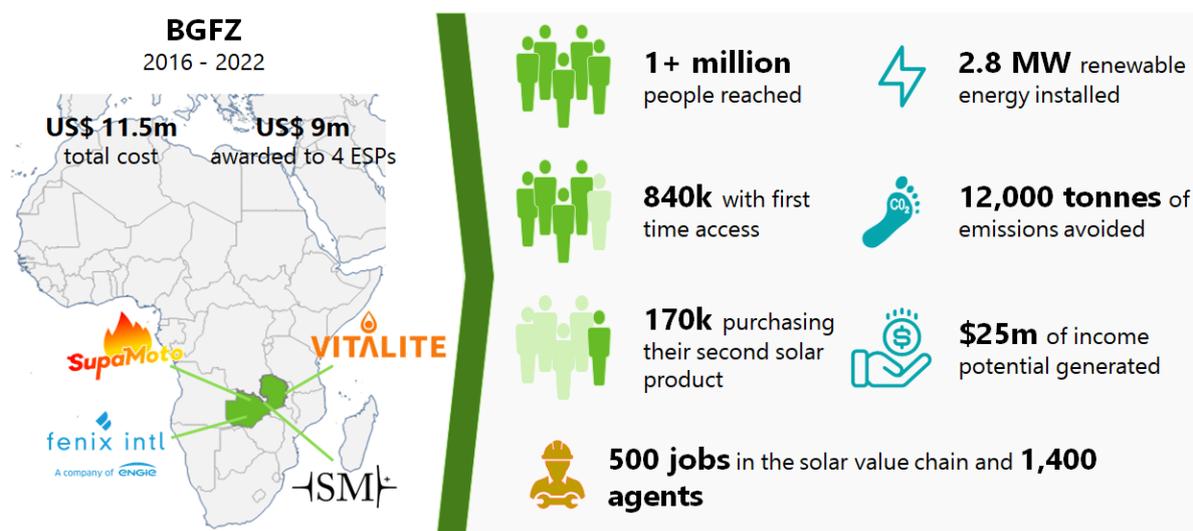
**This ex-post evaluation covers all three pillars of BGFZ and informs ongoing implementation of the Beyond the Grid Fund for Africa (BGFA).** It is based on a detailed review of BGFZ programme documentation, benchmarking to external data sources, and thirty key informant interviews carried out between February and March 2024.

### Impact

**BGFZ has been highly impactful through the increased reach of the four ESPs.** Over one million people were reached by the end of 2022, of which around 840,000 accessing an off-grid energy product for the first time. This has delivered almost 3 MW of installed renewable energy capacity and around 12,000 tonnes of CO2 emissions avoided by replacing kerosene lamps and dirty cooking fuels. The ESPs have created 500 jobs within the companies, which have also engaged 1,400 sales agents.

**The design of BGFZ was gender-sensitive, and has contributed to positive trends towards greater gender equality.** At the nascent stage of development that characterised the Zambian off-grid solar market in 2016, gender targets were not built into BGFZ, but disaggregated data on gender was collected on end users and across the companies' workforces. This shows improvement in employment trends; by the end of BGFZ women represented 40% of managers and 40% of employees, although just 27% of the agents. Among end users, 34% are women, and women are also likely to benefit even where the purchaser was a man.

**Social inclusion has proved harder to achieve.** Although BGFZ was only available for scale up in rural and peri-urban areas, the average household reach is just above average Zambian income levels. These people remain poor – with 60% living below \$3.10 per day. The challenge to reach further into poorer and poorest communities is that they are often both higher cost to serve, as in more remote locations, and lower revenue potential, as lower income.



## Summary of findings

**BGFZ was highly relevant and coherent with other programmes.** It played a key role in supporting energy access objectives for Zambia, and is a cornerstone of Sida's Power Africa project, helping inform other pillars of Sida's work and leading to the expansion into the subsequent BGFA and MCFA programmes. It has proved a success in coordinating not only its own activities, but also improving coordination between development partners and engagement with Zambian policy makers.

**Overall BGFZ achieved its objectives.** Across the four ESPs the total people reached exceeded the target of one million, and the co-finance ratio of 4:1 was also exceeded. The OGTF was highly successful in coordinating policy reform.

**Success was driven by one of the four ESPs.** The other three fell a long way short of their targets. While this speaks to the importance of taking a portfolio approach, it also points to the risks; had Fenix International not entered Zambia following its successful rollout in Uganda, the success of BGFZ might have been much weaker.

EQ 1	Was the programme design relevant to the context and changing market conditions?		2.5
EQ 2	Did the BGFZ programme align with strategic priorities (of GoZ, of SIDA)?		2.3
EQ 3	How relevant/ appropriate were the BGFZ programme's components?		2.5
EQ 4	How well did the BGFZ consider other interventions in Zambia in its design and implementation?		3.0
EQ 5	To what extent did the BGFZ achieve its objectives as a whole		2.3
EQ 6	To what extent did each sub-component achieve its objectives?		1.9
EQ 7	How consequential was BGFZ's contribution to the realisation of the objectives and outcomes?		1.7
EQ 8	Did partner agencies increase their capacities as a result of BGFZ?		2.0
EQ 9	How effective / cost-effective was the administration of BGFZ?		3.0
EQ 10	How cost-effective was each BGFZ component?		1.3
EQ 11	How impactful was BGFZ deployment of off-grid solar products on end users (households)		2.0
EQ 12	How likely is it that will outcomes will be sustained / continue to increase after BGFZ ends?		0.7

**BGFZ was highly determinant in the realisation of these outcomes.** Each of the ESPs supported was only able to achieve their scale up, or remain viable entities, thanks to the support provided BGFZ. No other grants of this scale or nature were available, and the regular cashflow provided by the annual payments was an essential match to the PAYGo business model.

**The outcomes achieved remain fragile and will need continued grant support.** None of the three pillars has reached sustainability yet, nor a clear path to sustainability. This is not surprising given the market context, but does mean that for the four ESPs to maintain their service to existing customers acquired, and to scale up further, will likely require substantial further grant support.

**The data system proved complex and is yet to fully bear fruits.** The idea behind EDISON is visionary and potentially highly valuable, and continues development in the form of Prospect, an open-source software which is being used for MRV in BGFA and has a wide range of other possible applications for industry stakeholders. However, this remains an intention rather than a fully operational tool; which has not yet achieved the functionality of its core purpose as a digital MRV platform for the BGFZ (and now BGFA) companies, and through BGFZ it has become apparent that delivery of such a sophisticated data tool or platform takes a lot of time and resources.

## Recommendations

- 1. Stay close to grantees and show pragmatism** – close working relationships and pragmatic funding is essential at a nascent stage of market development.
- 2. Take a portfolio approach and have a high tolerance for failure** – there is no blueprint for success, so trialling a range of technologies, business models, and company types is important to build an ecosystem built for success, acknowledging some companies will fail.

3. **Take it slow and steady when it comes to raising co-finance** – companies should only raise commercial finance when they have strong and stable revenues and robust management to keep costs under control.
4. **Focus on establishing a viable commercial market which can provide a launchpad to target subsidies to boost impact.** This means financiers need to be explicit in the trade-off between commercialisation and impact – sustainable companies are essential to deliver long-run impact, but there is a tension that needs to be managed between driving companies to be profitable, and pushing them to serve higher-cost and lower-revenue customer segments. If a core commercial market can be established – even if initially serving lower impact customers and products – this can be built on to better target subsidies to enhance impact.
5. **Credibly commit to non-disbursement of funds** – companies must face a hard incentive to ensure the sector does not become dependent on chasing grants, and perceiving grant funding as no-strings-attached free money.
6. **Explore solutions to local currency lending to support PAYGo cashflows** – PAYGo companies are highly exposed to local currency depreciation, so need either some form of hedging or availability of local currency lending.
7. **Dedicate resources to help overcome gender barriers in the workforce** – there are barriers to employing women at certain points in the value chain, which impose higher costs on companies. These may need to be addressed with grants from cooperation partners if companies are to be able to keep costs and end user prices as low as possible.

# 1. Introduction

**The purpose of this evaluation is to inform the implementation of the Beyond the Grid Fund for Africa (BGFA) and to deliver learnings for other sector stakeholders.** Following the Beyond the Grid Fund for Zambia (BGFZ) pilot, BGFA is being rolled out in Burkina Faso, the Democratic Republic of Congo, Liberia, Mozambique, Uganda and Zambia.<sup>1</sup> The objective of this evaluation is to support Sida, REEEP, Nefco and contributing donors to BGFA, as well as other off-grid energy stakeholders, to understand which elements have been key in BGFZ's contribution to market development outcomes in Zambia and to identify lessons on what may need to be adapted or avoided in future programme design and implementation.

**The scope covers all activities carried out by BGFZ from its design and implementation between early 2016 to the end of 2022.** BGFZ was launched in 2016, with contracts signed with the four participating energy service providers (ESPs) in early 2017. The programme was initially expected to run until 2020, but was extended and the targets modified in response to the global Covid pandemic, to run until the end of 2022. The pillars around which BGFZ was implemented and which are evaluated here are : (1) grants and technical support to four ESPs, (2) a platform for market change, through the operationalisation of the Off-Grid Task Force, and (3) improved market information and analytics, with the development and piloting of the EDISON data system.

**The main sources of evidence for this evaluation are 30 key informant interviews and BGFZ documentation.** Much of the assessment on the effectiveness of BGFZ comes from 30 semi-structured interviews with private sector, investors, development cooperation partners, and the BGFZ funders and implementing team. This is supplemented by existing documentary evidence provided by BGFZ, including annual progress reports from the energy service providers, impact assessments, and internal evaluations.

**The remainder of this report proceeds as follows:**

- **Section 2** summarises the off-grid solar market context in which BGFZ operated and sets out a high-level programme theory of change.
- **Section 3** sets out the approach followed in undertaking this evaluation.
- **Section 4** presents evaluation findings, organised by Evaluation Question.
- **Section 5** draws overall conclusions on the strengths and weaknesses of BGFZ.
- **Section 6** steps back and draws overall lessons learned relevant for other programmes.
- **Section 7** provides seven key recommendations to consider for consideration for future programme design and implementation.
- **Annex 1** is the original Terms of Reference for this evaluation.
- **Annex 2** provides more details on methodology, in particular on (1) scoring for each of the sub-evaluation questions, (2) financial attribution analysis, (3) impact calculations.
- **Annex 3** has overview of documentary evidence reviewed and how it informs the findings.
- **Annex 4** lists the key informant interviews.

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<sup>1</sup> For more information see <https://beyondthegrid.africa/>

## 2. Overview and Context of BGFZ

### 2.1. Global and regional off-grid solar market context

#### Globally off-grid solar market potential has flattened since 2015

**By 2016 the off-grid solar sector was showing signs of take-off and there was high optimism about expected growth rates.** The sector had gone from a near-standing start a decade earlier to over 100 active companies and cumulative sales of 30 million lanterns and solar home systems.<sup>2,3</sup> This growth was largely driven by East African markets, in particular Kenya, Tanzania, and Uganda. Unit sales were projected to continue to grow at 34% per year (CAGR) for the coming five years.<sup>4</sup>

**Since 2015 sales volumes have flattened, with off-grid solar markets falling short of the high growth rates predicted.** Sales volumes have levelled-off around 30 million per year since 2015.<sup>5</sup> Of the three early movers in East Africa, only Kenya has continued to see market growth, with sales volumes of around 2 million products per year, while sales in Tanzania have dropped and then flattened out, while in Uganda sales volumes have remained stable.

**The context in which BGFZ was conceived was one of high optimism around off-grid solar market development, driven by East African markets.** The findings of this evaluation should be read with this change in the realities and expectations for off-grid solar market development potential in mind. The Theory of Change for BGFZ was developed at a time when hopes and expectations were high, whereas the reality of the development of off-grid solar markets across Africa has fallen short of those expectations.

#### Zambia has seen a significant scale up in market size as have other markets following RBF programmes

**Zambia's off-grid solar market has shown signs of strong growth since 2017.** There were around 55,000 unit sales in Zambia recorded by GOGLA in 2016, which have picked up since the first half of 2018, albeit with a slow-down in 2020 which coincided with the Covid-19 pandemic which caused major disruption to global and local supply chains. By 2022, sales have grown almost 10-fold compared to 2016, reaching over 500,000 units.

**In the region, Malawi and Mozambique have also seen market growth, with both benefitting from market development programmes.** In Mozambique, sales started to take off with the introduction of the UK FCDO and Embassy of Sweden funded BRILHO RBF programme,<sup>6</sup> while in Malawi the USAID KickStarter and World Bank ACCESS programmes have supported scale up.<sup>7</sup> In West Africa, Nigeria provides an example of RBF helping drive market scale up, with the NEP and associated RBF windows for solar home systems coinciding with a rise in annual sales which were flat at around 300,000 per year between 2016 and 2020, rising to almost 1.2 million in 2022.

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<sup>2</sup> Lighting Global (2016) "Off-Grid Solar Market Trends Report 2016", [Link](#)

<sup>3</sup> Lighting Global (2020) "Off-Grid Solar Market Trends Report 2020", [Link](#)

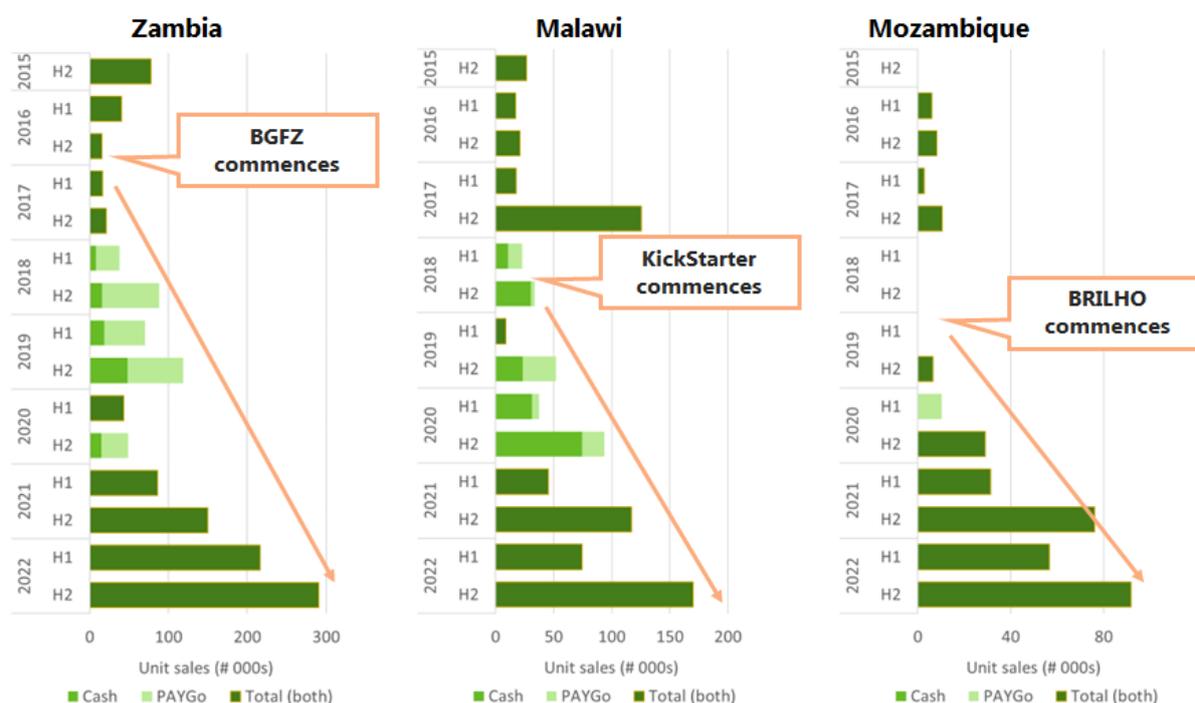
<sup>4</sup> Lighting Global (2016) "Off-Grid Solar Market Trends Report 2016", [Link](#)

<sup>5</sup> Lighting Global (2022) "Off-Grid Solar Market Trends Report 2022", [Link](#)

<sup>6</sup> ACE TAF (2021) "Stand Alone Solar (SAS) Market Update Mozambique", [Link](#)

<sup>7</sup> ACE TAF (2021) "Stand Alone Solar (SAS) Market Update Malawi", [Link](#)

**Figure 1: Off-grid solar unit sales growth in Zambia and select comparators**



Source: Greencroft Economics based on GOGLA half-yearly sales data

### Zambia off-grid market development context 2016-2022

Various other development partners were active in promoting adoption of off-grid energy over the same period as BGFZ. Most notably these included the following initiatives, although it is worth noting none of these directly provided financing to increase off-grid energy connections:

- **The EU's Increased Access to Electricity and Renewable Energy Production (IAEREP) project**, which led support to develop mini-grid regulations and a gender study and action plan for the Ministry of Energy, and development of the National Energy Policy 2019.
- **USAID's Southern Africa Energy Programme (SAEP)**, which led an assessment of customer affordability.<sup>8</sup>
- **The Africa Clean Energy Technical Assistance Facility (ACE TAF)**, which produced five knowledge products,<sup>9</sup> led development of a customs handbook,<sup>10</sup> a geospatial energy access explorer tool,<sup>11</sup> and a fiscal impact assessment tool to support policy engagement around border tax exemptions for standalone solar products.
- **GIZ's Green Peoples Energy Project**, which for example developed a Technical and Vocational Education and Training (TVET) curriculum in solar and Productive Use of Energy (PUE) in the agriculture sector.

<sup>8</sup> USAID Power Africa Project (2019) "Can Zambian Households Afford SHS? Insights From a Local Survey", [Link](#)

<sup>9</sup> ACE TAF, Zambia page, [Link](#)

<sup>10</sup> ACE TAF (2022), "Customs Handbook for Solar PV Products in Zambia", [Link](#)

<sup>11</sup> Zambia Ministry of Energy (2021), "Energy Access Explorer", [Link](#)

## 2.2. Sida and Embassy of Sweden context

Sida launched its Power Africa programme in 2015, to explore ways for public and private sector to work together to increase electricity access.<sup>12</sup> Through the programme, Sida has supported challenge funds to provide seed capital for early-stage ventures, for example as one of the funders of AECF REACT. Sida has also used its guarantee instrument to share risk with debt providers such as Trine, SunFunder and SIMA. Sida has also supported technical assistance and advisory services through the Private Financing Advisory Network (PFAN). Results based finance is another major pillar of Power Africa, with the BGFZ pilot at its core.

## 2.3. Overview of the Theory of Change (ToC)

The Evaluation Questions were structured around a BGFZ Theory of Change (TOC). The TOC presented in Figure 2 was developed for this evaluation drawing on BGFZ programme design documents, the expected results framework, and an understanding of how the programme evolved during implementation.

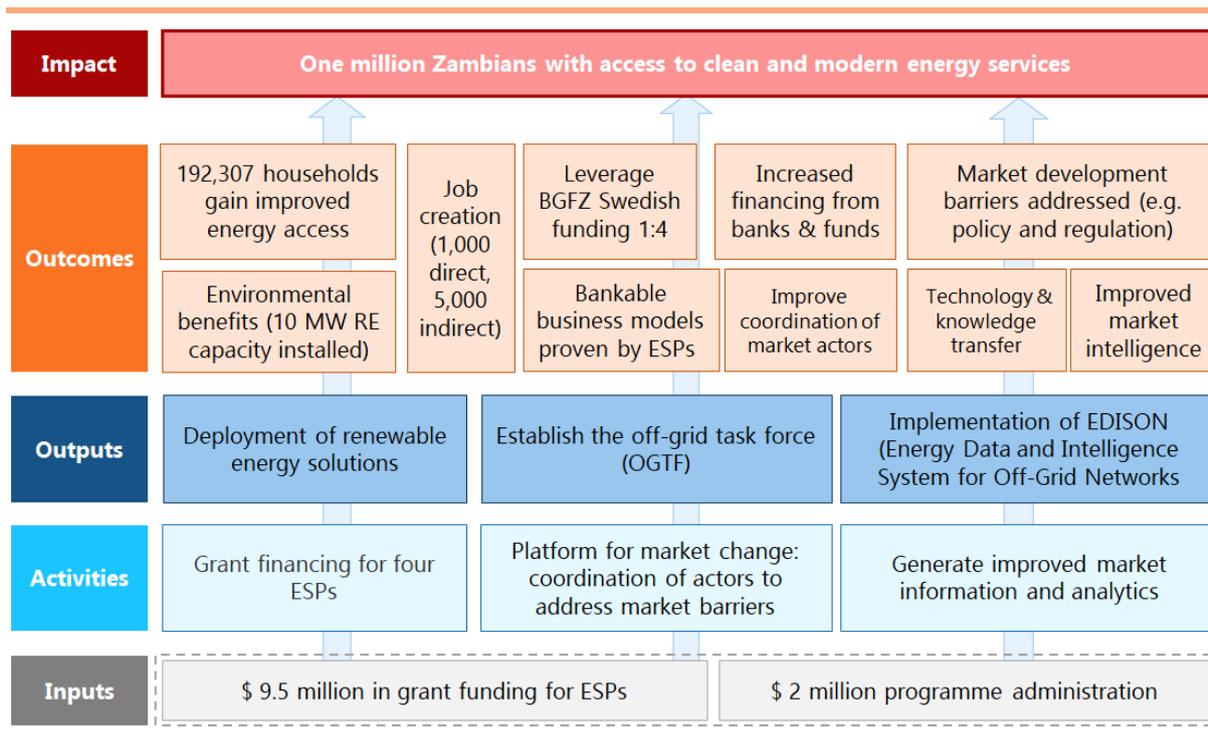
**The BGFZ programme design documentation identified barriers to market development which would need to be overcome to catalyse growth in the off-grid energy market in Zambia:**

- *Nascent off-grid market:* only a handful of players were piloting PAYGo, struggling to raise finance for growth.
- *Immature business models:* PAYGo and SHS in general were still in pilot phase and adjusting to Zambia market context.
- *Absorption capacity:* Zambian ESPs were small and unable to mobilize/absorb significant funding.
- *Limited access to finance:* both local and international finance, debt, equity and grant.
- *Lack of coordination:* despite several energy sector initiatives planned and funded, there was a lack of strategic coordination and dialogue between market stakeholders.
- *Poor/limited market data:* to inform private sector investors.
- *Weak national policy environment:* the policy and regulatory environment was not yet incentivizing the growth of the sector.
- *Affordability:* serving rural households would necessitate cross-subsidization by productive use and/or institutional clients, while low ability to pay limits uptake of both SHS and for PUE.
- *Low public awareness:* of off-grid energy technologies and business models, and their potential benefits.
- *Inactive demand:* which would likely require demand stimulation for energy access in rural areas, where there is low awareness and ability (or willingness) to pay.
- *Demand creation for PUE:* high upfront costs limit uptake of PUE systems; deployment of PUE may require increased consumer finance to overcome upfront costs.

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<sup>12</sup> <https://www.sida.se/en/for-partners/private-sector/power-africa>

Figure 2: BGFZ programme Theory of Change



Source: Greencroft Economics, based on BGFZ programme documentation received from NEFCO

## RBF grants and technical assistance to the four ESPs

**Grant-funding of around US\$ 2-3 million was provided to each of the four ESPs, disbursed in tranches throughout implementation.** The grant amounts were determined by a reverse auction. Disbursement was then based on a 'soft' RBF approach (see Box 1 below), with companies reporting against target sales volumes, and annual disbursement decisions based on a holistic assessment of company performance and company business plans. The ESPs also had targets to raise co-finance, with a target ratio for the programme of leveraging the BGFZ funding 4:1.

**Business advisory support was provided alongside the funding awards.** Investment support was offered to all companies to advise on mobilising finance, as was technical support to implement the data reporting systems, and monthly meetings with senior management of each company to discuss business plan progress.

**The design of BGFZ was intentional in targeting a small portfolio of companies.** A medium-sized portfolio was targeted which could both (1) provide large enough grants per ESP to be catalytic, while (2) support a sufficient number and diversity of companies to allow for a failure rate and to maximise learnings across different types of recipients. Each of the four grantees has a very different profile: Fenix International was a well-established SHS provided in Uganda entering its second market, Vitalite was a Zambian SHS at small scale looking to scale up, ECS/Supamoto had initially focussed on clean cooking and was looking to enter a new product space, while Standard Microgrid deployed small-scale micro-grids.

### **Box 1: RBF or grant? Revenue stream or investment?**

**BGFZ was not designed as a traditional RBF** – and was intentionally pragmatic in how it offered financial and non-financial support to the ESPs. While it had sales objectives, these were not the only part of the assessment and disbursement decisions, which also took into account each ESP’s circumstances and progress towards sustainable business planning.

**This evaluation describes BGFZ as a ‘soft’ RBF** – on the basis that it shares the key characteristics of RBF in that it has targets for sales, and payment depending on results, but is not a traditional RBF in that there was considerable discretion in how to interpret the achievement of results through a holistic assessment of the ESPs business planning. In this sense, the BGFZ is to some extent closer to a typical grant-based accelerator for young companies, where the grant funding is committed upfront, taking progress on milestones into account, and without specified use of funds, allowing companies to use that funding as they see fit to pilot their product and attempt to develop in order to be able to subsequently attract investment capital.

**This type of funding is a blend of investment and/or a revenue stream** – in some ways the finance is provided similar to several tranches of equity as it is accompanied by a long-term relationship between the financier (BGFZ) and the company. However, where part of the BGFZ funding was used similar to how equity would be used – to invest in strengthening the company in general – it is not equity in that there is no expectation of return, and the funding could also be used akin to working capital or a revenue stream, for instance to buy inventory or to repay other investors.

### **Platform for market change - the Off-Grid Task Force**

**The OGTf was operationalised in 2018, to provide coordination and oversight of government and development partner initiatives in Zambia’s off-grid energy sector.** The OGTf was identified as the best approach to implementing the objectives of the platform for market change pillar during the first year of implementation, and first met in 2018. Its objective was to provide a platform for coordination and information sharing in order to identify opportunities to improve the policy and regulatory environment, and to help the private sector engage with policy makers and with potential financiers.

### **Market information and analytics (EDISON)**

**EDISON was identified as the appropriate data system solution to fulfil both reporting requirements and provide improved market information.** As with the OGTf, EDISON was identified as the best approach to implementing the objectives of BGFZ pillar 3 during implementation. The objectives of EDISON included providing a low-burden reporting system for the four ESPs to track active systems in use by households, and supporting improved information for programme management for BGFZ and for the companies. It also aimed to generate market intelligence to improve information and transparency for use by government, companies, investors, and wider sector stakeholders.

## **2.4. Assumptions and risks underpinning the TOC**

**Seven assumptions were made that would need to hold for BGFZ to achieve its intended outcomes:**

- A sufficient number of companies apply and pass due diligence.
- There is sufficient demand – the technologies respond to the needs of rural and peri-urban customers who are aware and can afford the price of products offered.
- ESPs have the capacity to implement the BGFZ project, including all the additional reporting requirements.
- ESPs are able to absorb the volume of finance provided by BGFZ + co-finance and scale up operations.
- Political commitment to energy access exists, with willingness to engage in policy or regulatory reform if necessary.
- Sufficient number and type of anchor clients exist to support productive use of energy applications, which may then cross-subsidize household energy access.
- Market barriers can be overcome sufficiently through the BGFZ activities to enable success for the ESP grantees.

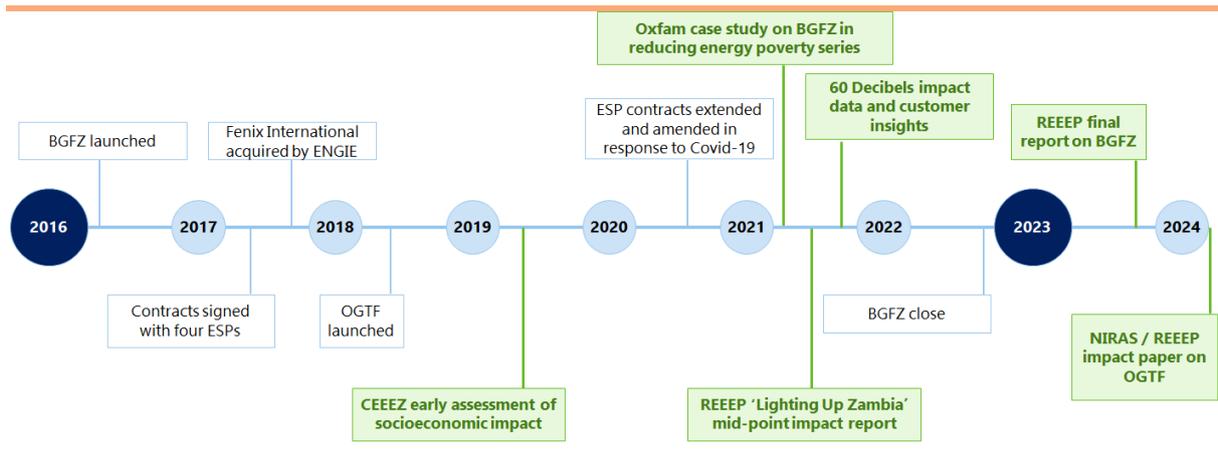
**Six key external risks to successful delivery of BGFZ were identified:**

- Political / national instability and insecurity.
- Global instability which disrupts international supply chains.
- Regulatory risks: changes in / inability to reform policies, regulations, legal frameworks to provide supporting enabling environment.
- Bureaucratic burden: lengthy administrative processes (e.g. related to securing land rights for micro-grid deployment).
- Inconsistent implementation of regulations: e.g. inconsistent application of duties, fees and taxes on solar equipment by customs, or delays to importing equipment.
- Currency volatility, which poses a challenge especially when financing provided in hard currency, but customer repayments in Zambian Kwacha.

## **2.5. BGFZ timeline, roles and responsibilities**

**BGFZ launched in 2016 and closed in 2022.** The four ESP grantees were contracted in mid-2017, while the OGTF was launched in early 2018. Various interim evaluations and case studies have been undertaken over this period, which have informed this evaluation.

**Figure 3: BGFZ timeline**



Source: Greencroft Economics, based on BGFZ programme documentation received from NEFCO

**BGFZ was financed and implemented by a consortium of Sida, Embassy of Sweden Lusaka, REEEP, and Nefco.** The funding was provided by the Embassy of Sweden in Lusaka, which also held and managed contracts. REEEP was the delivery partner which implemented each of the three pillars. Nefco joined the consortium during implementation to lead on management of contracts and finances since mid-2019, and on implementation of the OGTF since mid-2021.

## 3. Evaluation Approach

### 3.1. Evaluation Questions and research methods

The Evaluations is structured around 13 Evaluation Questions and 44 sub-questions. The sub-questions are provided and scored in Annex 2. Findings organised under each EQ are provided in Section 4.

Table 1 Evaluation Questions by OECD DAC criteria

#	Evaluation Question
<b>Relevance</b>	
EQ 1	Was the programme design relevant to the context and changing market conditions?
EQ 2	Did BGFZ programme align with strategic priorities (of the government of Zambia, and of Sida)?
EQ 3	How relevant and appropriate were the BGFZ programme's components?
<b>Coherence</b>	
EQ 4	Did BGFZ consider other similar or related interventions in Zambia in its design and implementation?
<b>Effectiveness</b>	
EQ 5	Did BGFZ achieve its objectives as a whole
EQ 6	Did each sub-component achieve its objectives?
EQ 7	How consequential was BGFZ's contribution to the realisation of the objectives and outcomes?
EQ 8	Did key external partner agencies increase their capacities as a result of BGFZ?
<b>Efficiency</b>	
EQ 9	How cost-effective was the administration of BGFZ?
EQ 10	How cost-effective was each BGFZ component?
<b>Impact</b>	
EQ 11	What were the key programme impacts on end users (households)?
<b>Sustainability</b>	
EQ 12	Is service provision likely to continue to be sustained after the end of BGFZ?
EQ 13	What lessons can be drawn from the Zambia experience for other markets?

Source: Greencroft Economics

**To answer the evaluation questions, a combination of document review, external literature, and key expert interviews were used.** An overview of internal programme documents that were used in this review is provided in Annex 3, and published literature used in the review are provided in the reference list at the end of this report, and footnoted when used throughout. Thirty key informant interviews (KII) were carried out, as detailed in Annex 4.

**Sources to answer each question were identified in an Evidence Matrix.** A mapping of expected source data to inform our response to each EQ and sub-EQ was developed in the inception phase of

the project, and used to identify priority questions where further information would be needed. For these questions, either third-party publications were sought which could help answer the question, or these were incorporated into the questions for the KIIs.

**Before each KII a detailed topic guide was developed, and each interview was conducted as a semi-structured interview.** Detailed notes were taken during the interview, and shared with respondents to approve the summary notes to ensure they accurately reflected the discussion. All interviews were carried out on a confidential basis – none of the findings are based on any particular interviewee's response, and findings are only reported where there is sufficient commonality of feedback received across multiple KIIs.

## 3.2. Limitations

**The evaluation strikes a balance between defining ex ante evaluation criteria while acknowledging an agile approach to implementing BGFZ.** Given the evolving global market context described in Section 2.1, and the fact that BGFZ was one of the early RBFs in the off-grid solar sector, BGFZ's implementation adapted to suit the needs of the ESPs. While the EQs are intended to test hypotheses from the initial design of BGFZ, they also seek to find a balance between recognising that BGFZ had to evolve during implementation – indeed pragmatism was one of the key attributes of the programme that participants valued highly.

**The emergence of Covid-19 in early 2020 means judging market evolution against initial targets is challenging.** The pandemic pushed up the cost of international supply chains, resulted in supply chain bottlenecks and shortages, and made running local customer-facing distribution networks extremely challenging. BGFZ adjusted its targets for the four ESPs accordingly, but it is impossible to evaluate BGFZ's performance against the initial expectations, which could not price in the risk of a worldwide pandemic.

**While we had a good response rate to interview requests, we were unable to speak with all respondents.** We were unable to speak with representatives of one of the four ESP grantees (Standard Microgrid). We also were unable to meet with a handful of other interviewees shortlisted, including for example the EU IAEREP programme manager, or GIZ.

**The scoring approach is used to provide a basis to identify lessons learned, and is not intended to reflect poor performance of BGFZ.** The scoring criteria per sub-EQ set out in Annex 2 are by their nature subjective. They should be interpreted as providing an illustrative assessment of how well the programme performed against each question, not how well it *should* have performed. On the one hand, the findings in Section 4 show strong scores for EQs relating to Relevance and Coherence, which are positive but were largely within the control of BGFZ. On the other hand, lower scores on some of the Effectiveness-, Efficiency-, and Sustainability-related EQs illustrate that these are difficult objectives to achieve fully, and may not have been either (1) realistic or intended by BGFZ, or (2) fully within the control of BGFZ.

**The impacts reported have been estimated by previous studies – we have not verified any underlying data or methodology.** The key impact metrics on people reached and jobs come from BGFZ reporting, which we have not verified – although previous studies have looked at this, and a manual verification to the digital reporting systems provided a high match to provide confidence in these results. Indirect impacts are reported as estimated by the BGFZ programme team, or by adapting GOGLA's standardised impact metrics approach, as described in Annex 1.2.

## 4. Findings

### 4.1. Relevance

**EQ 1** To what extent was the programme design relevant to the context and changing market conditions?  — 2.5

**BGFZ was highly relevant given global and national energy access context in Zambia in 2016.**

Off-grid solar markets were showing signs of take-off in East Africa, particularly in Kenya but also with initial signs of growth in Uganda and Tanzania. The Pay-as-you-go (PAYGo) business model was a relatively recent innovation, which offered a potential solution to low ability to pay for customers with both low incomes and low ability to save or access credit. In Zambia, rural electricity access rates remained low at less than 5% of the population.

**The theory of change for BGFZ was developed to address clearly identified market failures, and was adaptive to maintain relevance in an evolving market context.** While the three core pillars of BGFZ were identified from the beginning, the approach within each pillar was highly flexible and adaptive. The RBF grants and TA took a soft approach to disbursements and worked in close collaboration to support companies at a very early stage of growth. The off-grid task force and EDISON data systems were identified as the best ways to approach pillars 2 and 3 during implementation, and responded to identified needs of sector stakeholders. BGFZ responded quickly and flexibly throughout implementation, as illustrated by the reassessment of targets and additional funding provided to help the ESPs cope with the effects of the Covid-19 pandemic.

**In a few cases, external risks were identified but could not be fully brought within the programmes control.** For example, currency fluctuations pose a major challenge to the PAYGo business model (in general), as companies receive upfront finance in hard currency and then receive payments from their customers over time in local currency. In the case of Zambia, this risk proved acute and had a material impact on companies' ability to repay commercial finance in hard currency, with no real solution identified or support provided. On the mini-grid side, regulatory barriers around licensing and land rights proved a serious challenge to deployment and contributed to challenges for Standard Microgrid to achieve the scale up in rural areas intended.

**EQ 2** Did the BGFZ programme align with strategic priorities of the Government of Zambia and of Sida?  — 2.3

**While there is strong alignment to Government of Zambia priorities, GoZ did not have a major role in design or implementation.** The drive to increase energy access clearly aligns to Zambian Government priorities, and the establishment of the Off Grid Task Force was designed and was successful in engaging the Ministry of Energy and a range of other government departments. However, BGFZ – for various practical reasons – was not substantially co-designed or co-implemented with GoZ and the chain of decision-making was clearly through the funders (Embassy of Sweden / Sida) and the implementing team (REEEP and Nefco).

**Sida's objectives were strongly built into the programme and it has been a major contributor to Sida's broader Power Africa programme.** It was an intentionally risky approach and end became a turning point for how Sida works with energy access and starting to work more with the private sector in poverty contexts.

**The programme design was gender sensitive, but not proactive in gender mainstreaming or transformation.** BGFZ was set up from the outset to collect disaggregated information on

employment in the value chain by gender, and on people reached by gender. However, gender inequalities were not explicitly addressed in BGFZ, and there was no specific direct or indirect support to companies to enhance gender outcomes. However, the data collected under BGFZ has been a major contributor to subsequently incorporating more action-oriented gender elements into the Beyond the Grid Fund for Africa.

### EQ 3 How relevant/ appropriate were the BGFZ programme's components?

2.5

**Finance design was highly relevant – a much needed product with no comparable alternatives available.** ESPs in Zambia were thinly capitalised and either reliant on small scale patient equity or on the resources of their founders. No grants of sufficient scale to enable a substantial scale up were available to Zambian energy access companies, and the design with a regular flow of the RBF funding year by year was essential to support deployment of the PAYGo business model.

**The focus on larger systems and on the PAYGo business model may have missed an opportunity for high impact and for simpler products and business models.** Globally, sales of lanterns sold cash upfront continue to dominate off-grid solar sales, and the latest 60 Decibels sector impact report highlights lanterns as delivering high impact potential.<sup>13</sup> Lanterns also make up a high share of the 500,000 units sold recorded by GOGLA in Zambia in 2022. Some respondents felt that the focus on RBF and on supporting only the PAYGo business model for larger systems may not have been the best way to achieve impact or to catalyse commercially viable companies, for which cash over-the-counter sales can form a significant share of revenues and limit e.g. exposure to forex risks and customer repayment risks.

**Technical assistance and advisory to companies was essential to support agile programme management and sought to respond to a clear need for the companies.** Given the nascent stage of market development and small scale of the four ESP grantees, developing a close working relationship with the ESPs and providing a source of external advice and challenges was essential to be underpin disbursement decisions and to make sure awards were based on agreed business plans each year. The focus of TA on sustainable business plans and on raising finance to support scale up were appropriate. On the other hand, there was limited scope for companies to request demand-led TA packages; the TA and advisory was delivered more top-down.

**The OGTF was a highly appropriate solution to a clearly identified barrier.** Lack of coordination among development partners, and lack of engagement with government agencies were identified consistently as a major challenge prior to BGFZ, which the OGTF effectively sought to address.

**EDISON and the data analytics responded to an identified gap in the market, although turned out too complex to be operational to respond to the intended uses during BGFZ.** As discussed further in Section 4.3 and 4.6, the data system turned out not to be fully appropriate to respond to the short-term intended uses for BGFZ. It was not designed such that it could provide data that companies could use, nor improve transparency and data analytics for other market stakeholders. On the other hand, it does respond to a broader need within the off-grid solar to generate and standardised better-quality data on PAYGo active users and repayment rates, and it may go on to become a highly useful approach in future programmes.

<sup>13</sup> 60 Decibels (2024) "Why Off Grid Energy Matters", [Link](#)

## 4.2. Coherence

### EQ 4 Did BGFZ consider other similar or related interventions in Zambia in its design and implementation? 3.0

**BGFZ was highly coordinated with other energy access programmes in Zambia.** Especially through the OGTF, BGFZ was well coordinated with other cooperation partners and energy access programmes. It sought to improve coordination among other cooperation partners' programmes.

**There was limited risk of duplication, although could have improved connection with government planning systems.** There was also no other initiative of a similar scale, so low risk of duplication in terms of the grant financing or technical assistance. The OGTF was a newly created structure that filled a clear niche, although there may be a need in future to coordinate with other structures covering both off-grid and grid-connected energy.

**It has been a major programme as part of Sida's Power Africa work.** While at the time BGFZ was a standalone initiative for Sida and the Swedish Embassy in Lusaka, it has since become a major contributor to Sida's wider work in the off-grid sector across Sub-Saharan Africa. Sida has gone on to provide guarantees to two crowd-funding platforms lending to off-grid solar companies, and to sector-specific funds such as SunFunder's Solar Transformation Fund, the SIMA Energy Access Relief Fund in response to COVID, and the Mirova Gigaton Fund. Lessons learned from BGFZ have contributed to shaping Sida's understanding of the off-grid sector and the role of debt financing and where guarantees can be effective.

## 4.3. Effectiveness

### EQ 5 To what extent did the BGFZ achieve its objectives as a whole 2.3

**Overall BGFZ achieved its objectives and delivered the impact it set out to secure.** The core targets in terms of people reached and co-finance raised were exceeded across the portfolio of four ESPs. The OGTF significantly improved coordination, secured political engagement and made a major contribution to successful policy reform.

**Most of the pre-implementation assumptions proved reasonable and to a large extent held.** As set out Table 2, most assumptions were reasonable and were borne out in practice, with three exceptions. First, the medium-sized portfolio was a smaller than would have been optimal, and not all available funds were committed. Second, three out of four ESPs struggled to absorb the significant increase in financing and scale up objectives. Finally, the ambition to explore productive use, with the potential to cross-subsidise household access – did not hold and was not pursued.

Table 2: Ex-post assessment of BGFZ assumptions

#	Assumption	Rating**	Commentary
1	A sufficient number of companies apply and pass due diligence.	1 – somewhat held	Four companies received grants, which was on the low side of the intent for a medium-sized portfolio. Not all available funds were committed – indicating potential to have gone further had there been a stronger pipeline of applicants.

#	Assumption	Rating**	Commentary
2	There is sufficient demand – the technologies respond to the needs of rural and peri-urban customers who are aware and can afford the price of products.	2 – mostly held	Overall sales targets were met, indicating demand. However, ability and willingness to pay full commercial prices remains limited and three out of four ESPs fell substantially below sales targets.
3	ESPs have the capacity to implement the BGFZ project, including all the additional reporting requirements.	2 – mostly held	Several ESPs were capacity constrained and struggled to meet reporting requirements, but all continued to operate and meet the BGFZ requirements.
4	ESPs are able to absorb the volume of finance provided by BGFZ + co-finance and scale up operations.	1 – somewhat held	At least two ESPs struggled to cope with the fast scale up in sales volumes and in commercial finance raised, which at times posed a risk to business continuity.
5	Political commitment to energy access exists, with willingness to engage in policy or regulatory reform if necessary.	3 – held	Political engagement was successful and reforms successfully implemented.
6	Sufficient number and type of anchor clients exist to support productive use of energy applications, which may then cross-subsidize household energy access.	0 – did not hold	Productive use technologies were not successfully deployed by BGFZ – the programme refocussed entirely on household systems.
7	Market barriers can be overcome through the BGFZ activities (e.g. OGTF is sufficient to make a difference on influencing policy space).	3 – held	The OGTF was able to catalyse successful policy reform, enhancing the effectiveness of other development cooperation partners and engagement with Zambian Government.

Notes: \*\* scores range from 0 = did not hold, to 3, firmly held

**BGFZ has successfully made progress on most of the market barriers identified.** There is now a successful proof of concept for SHS providers and the PAYGo business model. Several KII respondents told us the success of the BGFZ grantees helped inform their decision to enter or seek to scale up in Zambia. There is also much improved policy coordination and an improved national policy and regulatory environment for both SHS and for mini-grids compared to 2016, and the OGTF has continued to be a platform to coordinate and secure buy-in for policy and regulatory change since the end of BGFZ in 2022 (e.g. with new regulations for small mini-grids approved in 2023).

**Some of the market barriers persist.** There is still a shortage of finance for Zambian ESPs, and local banks are not active in financing local off-grid energy companies. Affordability remains low – creating a need for ongoing grants to help lower prices and make products affordable for Zambian households. There is still limited centralised market data and intelligence specific to Zambia, although the OGTF has helped coordinate information sharing among cooperation partners and the government. Uptake of productive use of energy technologies remains limited.

**Of the external risks identified, three manifested and posed significant challenges, of which BGFZ played a major role in addressing the policy and regulatory risks.** The Covid-19 pandemic caused major disruption to international and local supply chains, which BGFZ helped companies overcome by downscaling sales targets and providing additional funding. Regulations proved a major constraint to mini-grid project development, which the EU IAEREP programme has helped address through revised mini-grid regulations (approved since the end of BGFZ), but this posed a

major barrier for Standard Microgrid throughout the implementation of BGFZ. Currency volatility and depreciation of the Kwacha was a major challenge for companies using the PAYGo model, as their customer receipts once collected were worth less than the initial hard currency costs incurred.

## **EQ 6 To what extent did each sub-component achieve its objectives?**

1.9

### ESP grants and business advisory support

#### **The success in scale up across the portfolio was substantially driven by Fenix International.**

Fenix expanded into Zambia following its success in Uganda, and brought the same product offering and business model to Zambia, albeit with a concentration of sales among its lower tier products. Fenix successfully scaled up to well over 100,000 active energy service subscriptions before the acquisition of their international company by ENGIE Energy Access.

#### **The three Zambian-based companies fell significantly short of their sales volume targets; success for the portfolio was driven by the only company that had achieved scale elsewhere.**

Despite the overall success at portfolio level, the other three ESPs fell a long way short of their targets for people reached. This failure rate was within the tolerance level of funders and the BGFZ implementation team, but nonetheless highlights poor performance and the risks of RBF funding in such an early-stage market context. The success of BGFZ was driven by attracting a company that was already established in another market to enter Zambia and deploy a proven technology and business model combination.

**Several respondents cited the success of Fenix International as a sign of confidence and proof of the viability of the Zambian market.** At the time Fenix started to scale up they captured a high share of the market by sales volume. Since then, they have seen their market share fall as other companies have entered and scaled up with recorded sales of solar lanterns and solar home systems rising steadily from under 40,000 in 2017, to over 500,000 in 2022.<sup>14</sup> By the time BGFA opened in 2020, companies had seen the potential set by Fenix, and there now begins to be a broader ecosystem of solar home system providers in Zambia.

**The ESPs were not able to successfully scale up tiers as intended.** The ESPs ended up selling more lower tier systems than originally intended in their business plans, or abandoning higher tier products entirely, as the affordability for end-users proved too difficult. As noted above, the overall off-grid solar market in Zambia is dominated by low tier products, mostly pico lanterns.

**All of the companies exceeded their co-finance targets.** Indeed, investors have been better able to judge the realism of business plans given some of the over-estimates in the original BGFZ business plans, which has helped them to make decisions and offer up finance to the companies.

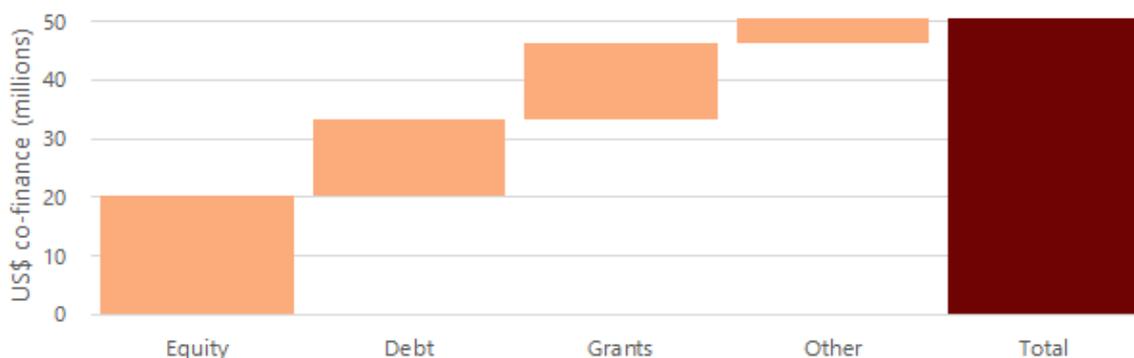
**Much-needed equity has proved hard to come by.** While across the portfolio, equity represents around 40% of co-financing raised, almost all new equity was from Engie Energy Access's acquisition of Fenix. The remaining equity came predominantly from existing investors or founders.

**Most of the co-financing mobilised is debt at concessional rates, and grants.** Much of the debt raised is from concessional lenders offering interest rates well below market rates. While raising co-finance was a core objective of BGFZ, it may be worth considering how to define success in a context where ESPs are accessing multiple layers of grant financing but still struggling to reach the targets on people reached (see further discussion under EQ10).

<sup>14</sup> GOGLA half yearly sales data, as presented in Figure 1

**Where ESPs did raise commercial debt, it posed operational challenges.** Participation in BGFZ meant companies could better establish and demonstrate track record and show a certain level of performance, which was helpful in engaging with other financiers. On the other hand, commercial debt posed challenges for ESPs which found themselves saddled with interest to service, which has in turn had knock-on consequences in inhibiting equity raises.

**Figure 4: BGFZ co-financing raised**



Source: Greencroft Economics, based on BGFZ programme documentation received from NEFCO

**BGFZ funding was seen as both (1) de-risking, and (2) impact-enhancing.** Lenders perceived the BGFZ grant funding as increasing the likelihood their loans would be repaid, as companies had a source of income even if their projections of customer revenue collections proved optimistic. Investors were also reassured that the BGFZ funding would help companies fulfil their impact focus, allowing the businesses to focus on trying to improve commercial sustainability.

**ESPs that were not receiving BGFZ funding in Zambia perceived the grantees to have a significant advantage in fundraising.** This was partly because of the scale up the grantees could realize where the non-grantees had slower pace in scale up. Besides this, the network of and access to additional financiers was seen as a huge advantage. Other ESPs that were already successfully attracting (typically smaller scale) grant funding did not notice a difference in investor perceptions or willingness to finance Zambian companies.

**Local banks are still not financing off-grid ventures.** There was a strong view expressed that this has nothing to do with an oft-cited risk *perception*; local banks understand the risks of offering consumer finance products to rural customers, and that risk is real and probably accurately assessed. This risk-level has not changed substantially because of BGFZ, and the off-grid ventures remain essentially high-risk, high transaction costs, and low potential returns.

**The TA and advisory work with companies was highly pragmatic and was an important component of successful working relationships with the four ESPs.** The close relationship with companies meant BGFZ was able to be highly flexible to changing circumstances, for example working with ECS Supamoto to try to focus on a core product segment and business model.

**The advisory support helped engage with the ESPs on strategic decisions and identify risks.** For example, the advisory work helped identify organisational capacity weaknesses, and supported business strategy development.

**However, the ESPs did not point to specific changes made in their operations as a result of the TA.** None of the ESPs told us about concrete changes they had made as a result of the BGFZ advisory support, and two of the three grant recipients did not feel they needed advice, while the third recognised the need but was not sure what they had done differently as a result.

## Platform for Market Change (the OGTF)

**The OGTF has proven to be a useful forum for development cooperation partners to engage and coordinate, and to secure political engagement with the Government of Zambia.** All the development cooperation partners interviewed spoke very highly of the role of the OGTF in helping them stay informed and coordinate actions. For new initiatives the OGTF is a highly valued entry point to get quickly up to speed on who is doing what in the sector and avoiding duplication.

**Several major policy and regulatory reforms were secured between 2016 and 2022, facilitated by the OGTF.** These include:<sup>15</sup> (1) a Customs Handbook for importing SHS, (2) updated tax exemptions and codes for SHS, (3) tax exemptions for lithium-ion batteries, (4) development of mini-grid regulations, (5) a new national energy policy 2019 and (6) a gender action plan for the Ministry of Energy.

**It also helped partners identify gaps and focus their efforts.** For example, USAID's BEP identified the lack of a group working on gender, and so sponsored a conference on women in energy, and helped set up a gender sub-group within the OGTF.

**However, the OGTF struggled to maintain operational capabilities through the challenging environment during Covid-19.** The key person driving providing the energy and connections to set up and ensure a dynamic and well-engaged OGTF passed away during the pandemic, and the OGTF struggled to keep its relevance without this driving force.

**It may also have lacked the depth of engagement hoped for with private sector participants.** One of the objectives of the OGTF was to improve information for private sector operators and to support their efforts to raise finance. Several participants noted a lack of voices representing the private sector in the OGTF meetings, which were dominated by cooperation partners. None of the interview respondents felt that the OGTF had played a role in helping companies raise finance or connecting with financiers. While the improvements to the policy and regulatory environment are valuable contributions to market development, and may help companies' potential to raise finance, this effect has not yet been observed (as probably too early).

## Market data and analytics (EDISON)

**A few examples where stakeholders pointed to EDISON data helping inform decisions include:**

- Analysis during COVID on initial drop and then speed of rebound in customer payments.
- Showing the effect of FX fluctuations based on the actual timing of customer repayments.
- Some non-BGFZ participants mentioned seeing the public facing dashboard and wanting to know more, but subsequently no longer being able to access the data.
- REA is in the process of integrated EDISON (or a version of) into its energy access tracking systems to be able to track both grid and off-grid electrification.

**EDISON was not widely used by external stakeholders, but played an important role in internal programme management.** There was lots of support of support for the concept – and indeed there continues to be continued support for Prospect (built from the learnings from EDISON). However, there were significant issues integrating the ESP backend systems with EDISON, with a lot of time required to adjust manual reporting into the format needed, and on data cleaning and verification. Due to issues around data protection and GDPR, the granular data for each ESP was only available

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<sup>15</sup> Noting some of these regulations were approved post completion of BGFZ in 2022, such as the lithium ion tax exemptions, but were coordinated through the OGTF including during the period of implementation of BGFZ, and so are included here

to the BGFZ implementation team. The four ESPs did not use automated key performance indicators (KPIs) from EDISON directly, and no investors, government entities, or other private sector companies were aware of or had used data from EDISON to inform their decision making.

**EDISON is continuing to be developed under Prospect.** Prospect will be used as part of the BGFA data collection and monitoring programme, and has various other use cases being explored as part of other RBF programmes and with GOGLA. So it may be that the value in EDISON is yet to be fully realised, as a pilot and learning exercise through BGFZ which has resulted in a tool available, and which will be used in future by other programmes.

## **EQ 7** How consequential was BGFZ's contribution to the realisation of outcomes?

1.7

**The BGFZ grant awards were the main catalyst for the successful scale up of the ESPs.** It is extremely likely that at least one, if not several, of the ESPs would have faced serious financial challenges without the BGFZ support and might not exist, never mind have succeeded in scaling up. BGFZ was the key determinant in attracting Fenix International to enter the Zambian market and successfully scale up prior to acquisition by Engie Energy Access.

**In some instances it has been a key part of attracting co-finance, although with mixed success.** In a handful of cases, investors highlighted the importance of BGFZ in helping the companies establish the track record needed to give non-grant equity investors and lenders the confidence to invest. However, this is a double-edged sword, with some of the ESPs then struggling to meet the expectations of more commercially minded investors. For most financiers, BGFZ did not come up as a major part of their financial due diligence.

**Business advisory and technical assistance was not highlighted as a major contributor to outcomes.** The close cooperation with the four ESPs was an essential part of programme design and was necessary to be able to implement the grant funding. However, it was not highlighted by the recipients as significantly affecting their decisions, and the ESPs could not point to specific operational changes they made as a result of the TA. In several instances the advisory work highlighted areas where ESPs may need to improve, but in most cases those challenges appear to have persisted. While this means the TA was not immediately a major contributor, it may also reflect that to really impact on the operational level of companies might require a deeper engagement with TA to resolve problems – which was not available within the scope of BGFZ.

**The OGTF was highly influential in securing improved policy and regulatory reforms.** Without the OGTF several development partners and the government institutions told us it would have been much harder – if not impossible – to secure the policy reforms that occurred between 2016 and 2022. The OGTF was the main (only) coordinating platform and was consequential in achieving Ministry of Energy, and cross-ministerial (e.g. with Customs and Ministry of Finance) engagement. For example, the Customs Handbook was noted as a major contributor to improved border policy implementation, as were the tax exemptions and revisions for SHS and for lithium-ion batteries.

**However, the OGTF was not the main driver of these reforms, nor did it succeed in engaging the private sector as well as hoped.** While the OGTF was the main coordinating body, the development and proposition of new policies was substantively led by other development partners and bodies. For example: ACE TAF led on the Customs Handbook, SHS tax exemptions, quality standards and local product testing capabilities; SIAZ led on lithium-ion battery tax exemptions; while the EU led on the updated National Energy Policy 2019 and on mini-grid regulatory reforms.

**EDISON was not influential in contributing to ESP success nor to wider sector stakeholders.** It remains a potentially valuable product, but during BGFZ did not fully operationalise and was a

complex and resource-intensive toolkit to design and build. It did not influence ESP decision making, nor was it useful to external stakeholders.

## EQ 8 To what extent did key external partner agencies increase their capacities as a result of BGFZ? 2.0

### **BGFZ supported achievement of government goals and capacitation of government agencies.**

The increase in energy access is an important contributor to progress towards universal electricity access in Zambia. The central role of the Ministry of Energy as the secretariat of the OGTF has enhanced their ownership of, and the pro-activeness, of their role in promoting off-grid energy access. As a result of the policy work of the OGTF, the Rural Electrification Agency (REA) is formally responsible for coordinating rural electricity access, including both grid and off-grid electrification. REA is also looking at using a data platform to track off-grid electrification, building on EDISON.

**The REA and MoE were limited in their role in implementing BGFZ, which may have reduced potential to increase local capacities.** Neither MoE nor REA had access to the underlying EDISON data, which meant they could not integrate this into other geospatial energy access planning tools. They were not directly involved in the design or management of BGFZ, despite being responsible for coordinating electricity access interventions nationwide.

**Sida has scaled up its activity as a financier for the off-grid sector as a result of BGFZ.** Sweden has led development of the BGFA and MCFA programmes, raising funding from other donors which builds on the success of the BGFZ pilot. BGFZ has also contributed to Sida's broader refocus on how best to reach poor communities, and to understand how pro-poor objectives can be paired with a desire to mobilise the private sector and leverage other sources of financing.

## 4.4. Efficiency

## EQ 9 How cost-effective was the administration of BGFZ? 3.0

**It is hard to compare the cost-effectiveness of BGFZ as there are no direct comparators and limited publicly available benchmarks.** BGFZ is one of a small number of RBFs in the energy access sector over the period, and each intervention has its own specific context. Different interventions target different customer segments, with different eligible products, and with a different baseline context in terms of market readiness. We did not identify any studies relevant to the off-grid sector that publish comparable benchmarks either in terms of cost per system deployed, nor in terms of programme management costs.

**For illustrative purposes, we compare the BGFZ programme costs and cost-per-system to two similar off-grid interventions:**

- **Africa Enterprise Challenge Fund (AECF) REACT** financing for off-grid solar technologies, based on a 2015 midterm evaluation.<sup>16</sup> REACT aimed to bring clean energy to off-grid, low-income households by de-risking business models. It has supported investees in Burkina Faso, Ethiopia, Kenya, Liberia, Mali, Mozambique, Zimbabwe, and Somalia.
- **UNCDF Clean Energy for People Resilience (CE4PR) Burkina Faso.**<sup>17</sup> The Renewable Energy Fund for Resilience in Burkina Faso (FERR-BF) ran between 2019 and 2023 aiming to develop an ecosystem of private and public actors to build the off-grid renewable energy

<sup>16</sup> Ecorys & Carnegie Consult (2015) "Africa Enterprise Challenge Fund (AECF): Mid-term review 2008-2015", [Link](#)

<sup>17</sup> Microfinanza MFR, MDR, Timpoc (2023) "Évaluation Programme Pays IDE – Burkina Faso", [Link](#)

market. It sought to mobilise public actors and supported energy service companies (ESCOs), developers and distributors, incubators, microfinance institutions and other financial service providers, through technical assistance, grants, and loans.

**Overall, the BGFZ programme has appears to have been cost-effective.** In absolute terms, a cost of around US\$ 50 per active energy service subscription appears in line with – indeed better than – the two comparator programmes.<sup>18</sup> Programme management costs at 28% appear to be in line with, again rather on the low end, of comparable programmes. It is also worth noting that the programme management costs increased compared to pre-implementation expectations, while disbursements to companies were much lower at just 60% of available funding, which pushed the share of programme management up from 15% to 28% of funding to the four recipients.

**Table 3 Comparison of BGFZ cost-effectiveness**

#	AECF REACT	UNCDF CE4PR	BGFZ
Programme management as a share of funds deployed <sup>[1]</sup>	30%	50%	28%
Cost per energy service connection <sup>[2]</sup>	\$ 98	\$ 289	\$ 52

Notes: [1] these are our calculations based on the impact evaluations and our analysis of BGFZ outturn expenditure.

[2] this is not calculated the same way across the three programmes – for BGFZ active users are reported, whereas for AECF and UNCDF it is based on unit sales, so these are “harsh” as comparisons for BGFZ

**The clarity and speed of disbursement and the pragmatism of BGFZ were consistently highlighted as major advantages.**

All participants appreciated how swiftly BGFZ was able to adapt to circumstances, and the depth of understanding and pragmatism shown to help companies work through issues, which underlines the value of the soft RBF approach. These statements were made not only in absolute terms, but also relative to other grant programmes and other financiers. The ESPs all appreciated the reactivity of BGFZ to their circumstances, and consistently highlighted the importance of the availability not only of the funding, but also the way the relationships were managed with a focus on supporting the companies to develop.

**EQ 10 How cost-effective was BGFZ component?**



**ESP grant funding**

**Overall, the grant funding from BGFZ provides a strong value for money (VfM) coefficient.**

Across all four ESPs, the target VfM coefficient, adjusted for revisions to targets during programme implementation for example in response to Covid-19, was \$39.<sup>19</sup> The post-implementation VfM is around \$52, which although 30% higher than the target represents a very reasonable cost per active energy service subscription. This contrasts with previous Sida experience on electrification of rural areas through grid-extension projects, which can run into several thousand dollars per connection and only reach relatively wealthier households in small towns located near to current grid lines.

**This masks high variation across the four ESPs, which speaks to both the importance of a portfolio approach but also highlights areas of underperformance.**

Of the total ESS provided by the BGFZ grantees, Fenix international accounts for a large majority and has a highly favourable VfM coefficient. All the other ESPs fell substantially short of their targets, which also means the cost-

<sup>18</sup> Note given the limited number of comparator datapoints, and the differences across the three programmes, we cannot robustly conclude that BGFZ provides better VfM than comparators, but is certainly no worse than.

<sup>19</sup> The VfM is essentially the cost per active energy system subscription (ESS), adjusted by Tier level such that below Tier 1 gets only a half-point weight, Tier 1 a full point, and higher Tiers larger weights.

effectiveness for three of the four grantees was relatively poor, with a large volume of public funding used to secure few active connections.

**BGFZ was not the only source of funding or financing received by the ESPs, and the contribution of other financiers to the same sales should be acknowledged.** To illustrate this, we estimate the VFM coefficient adjusted to reflect the share of BGFZ funding as a contribution to the overall capitalisation of each ESP (full methodology in Annex A2.4). The benefit of this approach is that it attributes outcomes achieved by each ESP to its respective financiers such that there is no double counting of outcomes claimed by different financiers. The drawback is that it considers all funding as equivalent – i.e. grant, debt, and equity are given equal weighting.

**The result of this attribution analysis shows that the fully attributed VFM would be \$ 399 per active ESS.** This means that a total of \$ 399 of funding or financing has been needed for each active ESS across the BGFZ portfolio. To some extent BGFZ is a victim of its own success – companies succeeding in reaching their cofinancing objectives has the effect of ‘watering down’ the BGFZ attribution in this analysis.

**The theory of the reverse auction was appealing, with several respondents positive about the concept.** The rationale for the reverse auction approach is clear; with companies bidding for the lowest subsidy amount per ESS (adjusted for the tier of service provided), it should reveal the subsidy need and provide for the lowest amount of public money used per ESS. Several respondents noted being attracted to the idea in theory – including some (although not a majority) of the private sector interviewees. A major advantage of the reverse auction is that it avoids fixing subsidy levels which can be hard to estimate and allows variation by product and customer segment to be driven by a market-based approach.

**It is not clear that participants are able to accurately assess their subsidy need, nor that bids are clearly linked to actual needs.** Several companies – both BGFZ and non-BGFZ recipients – told us they did not bid based on a sophisticated (or even a simple) calculation of the amount of subsidy that would be needed per connection. Given the nascent market context in Zambia, it is not clear that the companies were able to assess this – so one of the main rationales for an effective reverse auction (price revelation, on the basis that the auction respondents have information that the auctioneer does not have) does not hold. Most respondents perceived the grant opportunistically and bid in the hope of being awarded, to then work out how to implement. Several private sector participants told us it added another layer of unwelcome complexity in an already challenging market context, and one where they were not making huge profits off the back of public funders.

**On the RBF, as it was implemented as a reasonably soft target-based approach, the ‘results’ element was not highly consequential.** Only one of the four ESPs met their targets, but all companies continued to receive almost all disbursements, on the basis of an overall assessment of their business plan.

## BGFA and EDISON

**We have not been able to assess the cost-effectiveness of the OGTF but suggest it has been good value for money.** It is one of the clear successes of BGFZ, and from our understanding comes at relatively low operational cost. We do not have external benchmarks against which to compare the costs of operationalising the OGTF, but given the highly effective scoring for the OGTF in EQ6 and EQ7, it would appear to have been highly impactful for a small share of the overall budget.

**The costs of EDISON were broadly in line with comparable data analytics systems, although it has needed substantial further funding and is yet to fully operationalise.** One of the key lessons-learned from the BGFZ experience is that it is complex to build a new type of data interface and

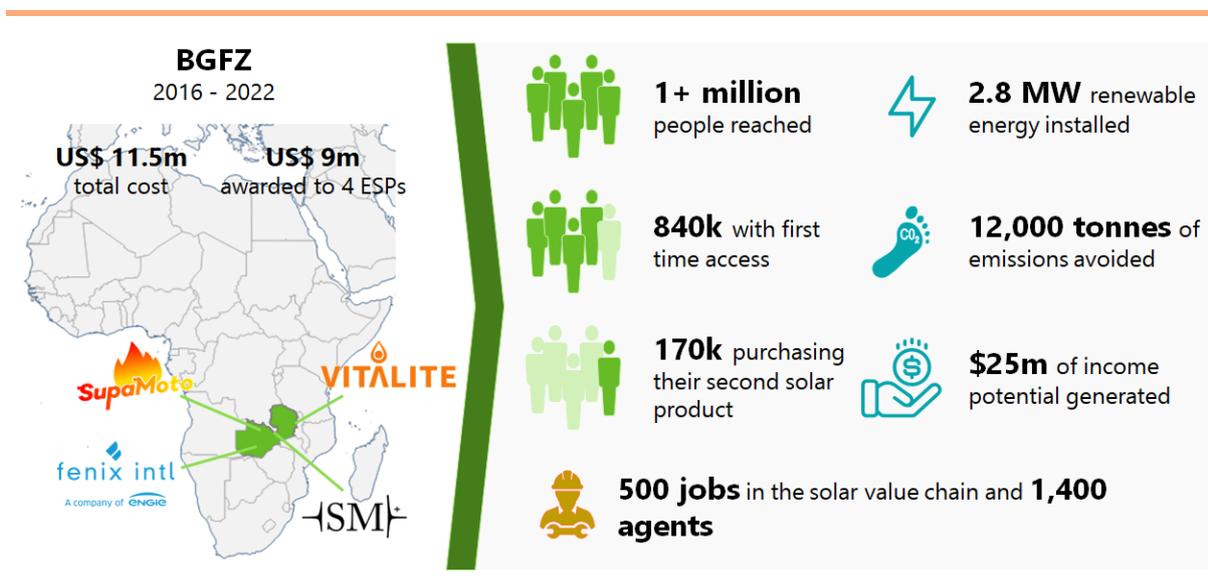
analytical system from scratch, and that this type of digital infrastructure does not come cheap. A significant budget and effort have been expended on trying to get EDISON, and its subsequent operationalisation through Prospect, up to its operational objectives. As well as the BGFZ funding, additional financing has been raised, on the basis that once successful it should become a highly valuable public resource, open source and available to all online. However, this remains an ambition rather than a realisation – we are optimistic that future reviews will find it delivers high value for money, but that it did not within the period of implementation of BGFZ,

## 4.5. Impact

### EQ 11 What were the key programme impacts on end users (households)



Figure 5: Overview of BGFZ impact



Source: Greencroft Economics, based on BGFZ programme documentation and GOGLA standardised impact metrics

**The BGFZ grantees have delivered a significant increase in energy access reaching over one million people, with corresponding economic and environmental benefits.** The programme met its objectives in terms of people reached, despite the challenges posed by Covid-19, albeit needing to extend the programme to run to the end of 2022. For 83% of these households, the systems provided by the BGFZ grantees were the first access to clean and modern energy services.<sup>20</sup> The ESPs have installed around 2.8 MW of renewable energy capacity, and delivered an estimated 12,000 tonnes of annual mitigation of CO2 emissions avoided.<sup>21</sup> The use of BGFZ products could have supported up to US\$ 25 million in increased earning potential for beneficiary households.<sup>22</sup>

**BGFZ reached poor populations, although above the Zambian median income.** 60% of people reached live on under US\$ 3.10 per day. However, the households reached have slightly higher

<sup>20</sup> 60 Decibels (2021) "Beyond the Grid Fund for Zambia – Verification & Customer Insights", [Link](#)

<sup>21</sup> This is based on internal estimates of CO2 emissions reductions, with the vast majority provided by clean cooking devices rather than the solar products that were the primary focus of BGFZ. This is higher than the estimates we find from application of the GOGLA standardised impact metrics, of 4,400 tonnes CO2 emissions avoided in total, but note that it is driven by clean cooking which is not captured in the standardised metrics, so we consider this a reasonable estimate

<sup>22</sup> Based on an adapted application of the GOGLA Standardised Impact Metrics, as set out in Annex A2.5

income than the national average,<sup>23</sup> which reflects the challenges of expanding into relatively poorer more higher cost to serve rural communities. This was reinforced in interviews, where there was a general perception that BGFZ had mostly served peri-urban, or rural communities in close proximity to towns and road infrastructure.

**Most households are using low tier systems and there is limited evidence of catalysing movement up the energy ladder.** Most systems deployed fall under the GOGLA ‘partial’ Tier 1 category of multi-light systems (3 Wp to 11 Wp), or small SHS which provide full Tier 1 access for a household (11 Wp to 30 Wp). The ESPs struggled to sell higher tier systems, and the low-income nature of the Zambian customer base meant low price and lower tier products were favoured.

**Some respondents felt that the insistence on relatively higher capacity systems and the PAYGo business model missed the real market potential.**<sup>24</sup> Several respondents questioned whether PAYGo is the best approach for low-income households, as while it spreads payments it increases total cost of ownership. Lanterns can be highly impactful – the 60 Decibels ‘Why Off Grid Energy Matters’ highlights lanterns as the most impactful segment with highest customer satisfaction.<sup>25</sup>

**Both companies and investors underlined that BGFZ was a major contributor to outcomes realised.** Companies would not have served the customers without the BGFZ support, and commercial investors saw BGFZ as both improving the cashflow of the businesses and also providing funding needed to enhance impact, allowing commercial lenders to see a prospect for commercial returns serving a customer base that would not otherwise have been viable.

**This impact would not have been achieved and sustained without BGFZ.** As described in response to EQ6 and EQ7, BGFZ was a major contributor to the scale up of the four ESPs. Without the ongoing and pragmatic BGFZ support, several ESPs would likely have scaled back their services, and may have ceased to operate which would have had a highly detrimental impact on customers who had bought a system (but which may no longer have been serviced and maintained).

**It is less certain that BGFZ had indirect spillovers that may have delivered further impact.** Responses were mixed as to whether the broader ecosystem has been catalysed as a result of the proof of concept from the four BGFZ investees. Most respondents felt that only the four grantees benefitted from BGFZ, with no spillover to others in the Zambian ecosystem being able to scale up or access finance which would enable them to deliver impact as a result.

**BGFZ has had a relatively strong impact on gender outcomes.** Companies have achieved a rate of 40% women among their direct employees, and this is also reflected in management positions. It has proved harder to hire a high share of women sales agents, with various challenges highlighted in the interviews (see Box 2). When it comes to customers, 34% are women, and this masks a high share of women users and beneficiaries behind the 66% of men who purchased the system.

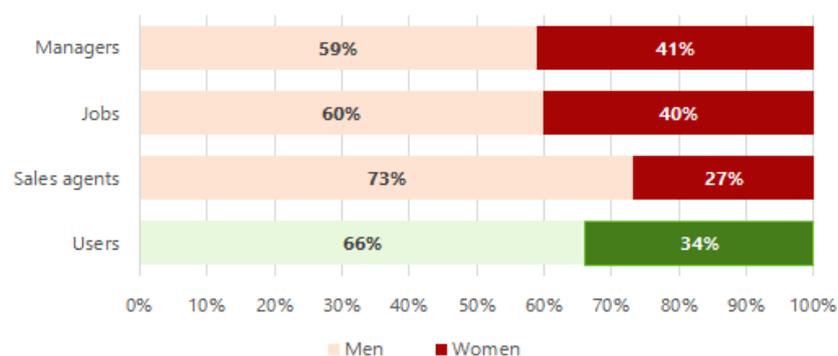
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<sup>23</sup> 60 Decibels (2021) “Beyond the Grid Fund for Zambia – Verification & Customer Insights”, [Link](#)

<sup>24</sup> The PAYGo model was a requirement to allow for digital monitoring and tracking of usage of systems, which reduces the risk of fraud or leakage into non-target beneficiary markets

<sup>25</sup> 60 Decibels (2024) “Why Off Grid Energy Matters”, [Link](#)

Figure 6: Gender outcomes of BGFZ



Source: Greencroft Economics, based on BGFZ programme documentation and GOGLA standardised impact metrics

### Box 2 – Gender and Social Inclusion Insights

**Data is key** – the information from BGFZ made it possible to design appropriate employment and end user targets for BGFA.

**There can be tangible benefits to using women sales agents.** Anecdotally, companies told us their female agents performed well on sales and customer retention. This is echoed in some recent studies.<sup>26</sup>

**Companies face several challenges to using female sales agents** – for example:

- Women are less likely to ride motorbikes, which is essential for travelling the distances between communities in rural locations.
- While male agents can work alone including shifts after dark, this can pose a security concern for women.
- Women have an extra day's leave per month in Zambia, which while beneficial for women makes it harder for employers, who get less days' work for the same salary.

**The result is some higher costs.** This begs the question of who is best placed to bear these costs. In a highly price sensitive market, how can companies be supported to integrate high shares of women in the workforce and to develop and implement forward-thinking policies for woman, without passing any extra costs on to customers – which risks reducing impact for end users (among which women are one of the main beneficiaries).

**It proved difficult to serve remote regions and people with a commercially viable business model.** The cost multiplier to serve remote areas is significant. Although for some financiers it is the main reason to support a company, in general both companies and financiers are looking for commercial solutions to serve rural and hard to reach communities which is hardly sustainable without concessional forms of finance.

**This means the overall reach of BGFZ, while connecting people in poverty,** is in line with Zambian national average. By excluding urban areas, the higher end of the income distribution was

<sup>26</sup> See for example this 60 Decibels blog "Women's Vital Role in the Off-Grid Energy Sector" ([Link](#)), and the Shell Foundation blog "Lighting the way for women" ([Link](#))

excluded. Given this, relatively wealthier (eligible) households are the ones that bought an energy service from the BGFZ grantees. It would have been far costlier to go further into rural areas, where ability to pay is also likely to decline – so while for impact this may have been desirable, it runs into challenges for commercial viability and sustainability, and risks creating aid dependency.

## 4.6. Sustainability

### EQ 12 **Have outcomes been (and are likely to continue to be) sustained since the BGFZ ended?** 0.7

**The energy service providers continue to be highly reliant on grant funding.** This is true both to maintain service to existing customers, and to reach further into harder to reach and lower ability to pay customer groups. As noted in Section 4.5, the ESPs have for the most part reached customers with relatively higher income levels and close to urban or peri-urban areas. The ESPs that participated in BGFZ are still going to a large extent from grant-to-grant funding.

**Serving the most remote customers increases costs by an order of magnitude, so commercial sustainability may not be a realistic near-term aspiration.** KII respondents estimated that the cost differential to serve the most remote rural customers, versus rural customer proximate to major urban distribution hubs, is of the order of between two to four times the baseline retail price. Encouraging companies to scale up in harder to reach areas needs to bridge both higher costs and a rural customer base with increasingly limited resources to pay for their systems.

**There may be a risk of companies chasing grants rather than commercially viability.** There was a broad perception among the private sector operators that grants are determinant to successful scale up of their business, and that they focus a lot of effort on accessing grants, without as much concern about meeting targets associated with that funding (not just BGFZ). All companies effectively use the grants to reduce end user prices, and would struggle to raise their prices if the grant funding was no longer available.

**The reliance on grant funding may distort markets and pose a challenge for longer term sustainable market development.** Companies receive different amounts of grant finance per unit under the reverse auction approach, and each company has a different blend of grant support from other funders, all of which is effectively enabling them to reduce their end user prices. This means the playing field across off-grid solar providers is not level – the recipients of BGFZ clearly have an advantage over non-BGFZ recipients. While this is unavoidable, and the market development merits likely outweigh the risk of disbenefits to non-BGFZ grantees, it does mean BGFZ may have contributed to not only picking “winners”, but also to making it harder for other companies to compete. It also means that consumers are being served by highly subsidised prices, which may pose a challenge if companies at some point have to raise their prices if grant funding scales back.

**ESPs struggled to raise commercial finance, and when they did, they struggled to make loan repayments.** There is a risk of companies being pushed to both scale up quicker than they can, and to raise commercial finance which they do not have sufficient revenues to cover. Commercial debt repayment caused real challenges for the ESPs, although for investors BGFZ was perceived as a positive presence as the grant RBF funding increased the likelihood their investee would be able to repay the commercial loans.

**Companies have very limited cash reserves and resilience to external shocks.** When the COVID-19 pandemic hit, companies faced a rapid escalation in supply chain costs and a reduction in PAYGo

payments from customers. ESPs with thin capitalisation and not yet achieving year-on-year profitability are highly vulnerable to such shocks.

**It is highly likely that the ESPs would not have survived without the BGFZ grant.** Continued availability of RBF funding, including an increase in funding and revision of sales targets in response to COVID-19, have helped companies maintain service provision and sustain impacts for end users.

**The OGTF still relies on technical assistance and financial support.** Despite the success noted in Section 4.3, the OGTF fell away when there was not a strong driving impetus from the BGFZ implementing team. It still requires a similar level of commitment to continue to be effective.

**The data and market information systems (EDISON) continues to need substantial investment.** Implementation and operationalisation of EDISON has proved costlier than initially anticipated, and the operationalization of the EDISON-inspired Prospect platform continues to need funding, now repositioned as an open-source tool available for other stakeholders to use and adapt. As a visionary approach it may go on to achieve sustainability, but has not done so during BGFZ.

**This low sustainability reflects the challenging environment for energy access programmes in developing countries.** While in 2016 there was high optimism about the potential for rapid growth of off-grid solar and a belief this could be substantially fuelled by private sector finance, sector-wide this is much less the case writing in 2024. Furthermore, universal access to electricity in developed countries includes considerable cross-subsidisation of the hardest to reach (higher cost to supply) and typically offers preferential tariffs to disadvantaged customer groups. It is highly likely that energy access in rural regions of a high-poverty country such as Zambia needs a mix of short-term catalytic results-based-finance (which may be able to scale back over time), and longer-term subsidisation to bridge high cost-to-serve and low ability-to-pay.

## 5. Conclusions

### Strengths

**BGFZ was highly relevant to the market context and coherent with other programmes.** It played a key role in supporting Zambia's energy access objectives, and is a cornerstone of Sida's Power Africa project.

**Overall BGFZ achieved its objectives in terms of impact and co-financing.** The ESPs exceeded the target to reach one million people, and the co-finance ratio of 4:1. A major driver of this success was catalysing the entry of Fenix International to roll out their established product offering and business model from Uganda.

**BGFZ was highly determinant in the realisation of these outcomes.** The ESPs would not have achieved their scale up, or would have risked ceasing to operate, without the size and flexibility of the support provided by BGFZ.

**The OGTF was highly successful in coordinating policy reform.** It filled a clear need in coordinating policy and regulatory reform by engaging political decision makers, and provided a valuable platform for cooperating partners to stay informed and coordinate their interventions.

**Programme management was both effective and efficient.** The close working relationship with the four ESPs allowed for adaptive management with BGFZ responding rapidly to companies' needs, and supporting through a pragmatic approach to end of year assessments and grant disbursements based on helping companies make progress towards their business plan objectives. BGFZ as a whole was good value for money and the programme management was in line with what would be expected for early-stage market development initiatives.

### Weaknesses

**Success was highly variable across the portfolio, and driven by just one of the four ESPs.** The other three fell substantially short of their targets. While this speaks to the importance of taking a portfolio approach, it also points to the risks; without Fenix International the success of BGFZ would have been much weaker.

**None of the four ESPs supported by BGFZ were locally owned – so BGFZ may have missed local some local skills and knowledge.** The reverse auction and co-financing requirements resulted in relatively more mature companies with access to international financing networks being selected, with no Zambian-owned businesses selected. To achieve universal electrification it is likely that an ecosystem of different providers with different focuses will be needed, and local companies may need a different type of support to enable their participation.

**The data system proved complex and is yet to fully bear fruits.** The idea behind EDISON was, and continues to be, recognised as visionary and potentially highly valuable. It is continuing its development with further funding in the form of Prospect, is open-source and available as a public good well beyond BGFZ. However, within BGFZ it did not achieve the objectives and delivered limited value beyond for internal programme management.

**The outcomes achieved remain fragile and will need continued grant support.** None of the three BGFZ pillars has reached sustainability, nor a clear path to sustainability yet. This is not surprising given the market context, but does mean that for the four ESPs to maintain their service to existing customers acquired, and to scale up further, will likely require substantial further grant support.

## 6. Lessons Learned

### Building strong linkages between programme management and partners

**Close working relationships with grantees and flexible programme management are a key driver of success.** Building a close working relationship with the companies is essential especially in nascent market contexts. This enables context-appropriate funding and advisory work which can adapt swiftly to support the needs of the recipient companies.

**Developing strong implementing partners is important to ensure resilience of success.** Ensuring that ownership of processes and successes is transferred as much as possible beyond the programme implementing team to local stakeholders would help ensure longevity of outcomes, and eventually reduce the need for ongoing grant and TA support.

**Technical assistance and advisory can take time to deliver concrete solutions – and may be more effective when demand-led.** Advisory work can provide internal challenge for young companies – which may be valuable in itself. To drive concrete change in business operations however, technical assistance is more likely to be successful if it is in response to a clearly stated demand from the enterprise, and if the TA provider can offer embedded support that helps the company implement operational improvements.

### Market development and programme design

**Sustainable development of nascent off-grid markets takes patience and long-term commitment.** Grant funding is essential to catalyse entry and scale up in nascent markets, and more is likely to be needed both to maintain and extend these outcomes. Off-grid ventures are thinly capitalised with low profit-margins, and are highly vulnerable to external shocks, with limited options for (re)financing, needing long-term and patient capital, and ongoing grant support.

**The soft RBF approach is appropriate for early-stage market development, while the PAYGo business model needs grants of a sufficient size with regular disbursements.** An initial upfront payment accompanied by regular annual disbursements is extremely important for companies using the PAYGo business model to manage cashflow. The grant needs to be large enough to be catalytic, and provide the basis for companies to (try to) scale up their operations. The soft RBF approach with disbursements based on a holistic assessment of the businesses is appropriate for nascent markets and the high uncertainty facing grant recipients. A hard RBF would not suit this context and would risk pushing companies to try to scale too quickly.

**The absence of binding targets risks creating perverse incentives.** The downside of a soft RBF is that companies may chase grant funding without taking the commitments to scale up seriously, seeing this as 'free' impact finance. That is fine if the objective is to work hand-in-hand with companies to maximise impact, but if the intention is to help companies raise commercial finance and become commercially viable, risks creating dependency on grant funding.

**Targeting beneficiaries through RBF is a good way to maximise impact and ensure additionality.** Requiring companies to seek a majority of customers in rural and peri-urban areas results in customers being served who would otherwise not have been reached. This can also help raise finance from other impact investors.

**Targeting must be proportional to the ESP's core business and supports commercialisation.** If ESPs deviate (too) much from their main business model and are obliged to target harder to reach, and lower ability to pay customer segments in order to receive grant funding, this risks jeopardising their commercial viability and their PAYGo portfolio quality. This trade-off between seeking to

maximise impact, while also trying to leverage private sector finance and commercially viable companies, is the heart of challenge for off-grid financing programmes.

**The reverse auction is theoretically appealing but has practical constraints – the jury is out on whether this is the best fit for early-stage markets.** It is not clear that ESPs are able to accurately assess their subsidy need, in which case a reverse auction cannot be effective in one of its main rationales, of revealing information. Companies in the sector are not making huge profits, so the risk of over-paying and providing windfall gains to companies is not a major concern. The reverse auction process can be complex for companies, especially when they are competing not only on price but also on product quality and specification and the types of customers they will serve.

**There may be reasons why companies may over- or under-bid in the auction process.** Where the RBF targets are not perceived as binding, companies may bid higher than needed on the basis the more grant they can get the better. On the other hand, some companies told us they may underbid on the basis that any grant is better than no grant, but would then be less likely to serve customers they would not have served without the auction, reducing additionality and impact.

### Co-financing and commercialisation

**Co-financing is a complicated objective – there can be too much of a good thing.** Companies cycling from grant to grant or refinancing short-term loans can make them less attractive to commercial financiers. What matters more is the type of finance – with a need for committed and patient equity investors who are prepared to help early-stage companies through hard times.

**Insisting on credible plans for, or commitments to co-financing, may exclude less mature local companies which can play an important role in the private sector ecosystem.** As co-finance is more easily available for relatively mature companies and for foreign-owned ESPs with international networks, requesting high co-financing commitments may make it hard for locally owned companies to apply and compete in their bids. This is a double-edged sword, as credible co-financing also makes it more likely companies will be able to professionalise and commercialise.

**Raising commercial finance too quickly poses risks.** Young companies can find it challenging to take on debt from commercial financiers who will expect and insist on repayment. This can cause real challenges and risk the survival of companies.

**At the same time, over-leveraging grant co-funding can also present problems.** Companies layering grant on grant are at risk of becoming long-term dependent on subsidies. High levels of other grants in the ESPs also dilutes value for money (cost-effectiveness), as there are multiple grants funding the same outcomes.

**When it comes to the PAYGo business model, customer payments are not resilient to incomes shocks.** The idea that once you have acquired a customer they will keep paying – even if they highly value their product – does not reflect the reality of poor households. Incomes shocks – for example to farmers as a result of drought, or as a result of Covid-19 – are likely to negatively affect repayments. Paying for their off-grid solar product is not the top priority and will come after other priorities such as fertiliser, education, health. While evening lighting is a nice advantage it is not essential – time can be reorganised around daylight hours.

## 7. Recommendations for Future Programmes

- 1. Stay close to the grantees and show pragmatism.** The major success driver for BGFZ was the depth of relationship with the companies accompanied by a pragmatic approach to the RBF to support a holistic and sustainable approach to developing the young businesses.
- 2. Take a portfolio approach and have a high tolerance for failure.** While three companies fell short of their targets, one succeeded, and drove success across the whole portfolio. Supporting a diverse range of companies is essential to trialling different technologies and business models and learning what works best for the local market needs. This means some will fail, and that is a natural part of market development. There may also be a need to support both smaller and larger companies, who may be better suited to serving different customer segments and to adjusting to meet local needs building on local knowledge.
- 3. Take it slow and steady when it comes to raising co-finance.** In particular when it comes to commercial finance, there are major risks from taking on too much too quickly before companies have strong and resilient cashflows. Only start insisting on raising substantial co-finance once ESPs have reached a certain scale and stability with revenues stabilising and operational costs well managed and coming down.
- 4. Focus on establishing a viable commercial market which can provide a launchpad to target subsidies to boost impact.** Commercially sustainable companies are essential to deliver long-run impact. However, in the short-term there is a tension between serving harder to reach and lower revenue generating customers. RBF needs to strike the balance between catalytic grants that can be phased out, versus providing long-term committed grants to subsidise a customer base that is not commercially viable. The initial focus should be on customers that are able to pay to build a core commercial market, after which subsidies can help bridge the affordability gap for those unable to pay commercial prices because of poverty, or because they are far away and costs are prohibitively high.
- 5. Have clear and credible commitment on red-lines and holding ESPs accountable.** To avoid a risk that companies engage in chasing grants, companies must face a binding constraint in the terms of the grant support – even if pragmatic – with credible consequences if they do not meet milestones. This is very hard to do in an impact-oriented sector where customers suffer if companies fail, but without a credible commitment of non-disbursement, there is a risk that grant funding is seen as free money.
- 6. Find solutions to local currency needs to support PAYGo cashflows.** PAYGo companies with upfront costs and financing in hard currency but revenues in local currency face a major risk of currency depreciation. Insuring against such risks (hedging) or offering local currency facilities should be explored.
- 7. Dedicate resources to help overcome gender barriers in the workforce.** Targets can play part of the solution, but someone will need to foot the bill if there are higher costs associated with for example increasing the share of female sales agents. Either companies will have to pass on these higher costs to customers – risking reducing impact including for women beneficiaries – or a partner will need to cover these costs with grant support.

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# Annex 1 – Evaluation Terms of Reference

NEFCO



## Terms of Reference

10 August 2023

### End of Programme Evaluation of the Beyond the Grid Fund for Zambia

#### 1. Context

The Beyond the Grid Fund for Zambia (BGFZ) was co-designed by the Renewable Energy and Energy Efficiency Partnership (REEEP) and Sweden to kick-start the market for affordable, reliable, and clean energy services provided by the private sector. While in many other Sub-Saharan African countries in 2016, the private sector was already playing a significant role in energy access provision, Zambian off-grid markets remained nascent with only a handful of players piloting PAYG business models and struggling to secure finance to grow their business. Zambia's policy environment was not yet incentivising the growth of the sector. Although a number of energy sector initiatives were being planned and funded, the efforts lacked strategic coordination and dialogue between market stakeholders.

BGFZ was designed as a holistic programme that would address these key market challenges and support building the basis for a longer-term sustainable market-based growth of the sector. The overall aim of BGFZ was to incentivise and facilitate private sector participation in the Zambian off-grid markets in order to increase basic energy access, improve livelihoods and catalyse economic activity in rural and peri-urban areas of Zambia. There was also a need to increase effectiveness, appropriateness of the offer to private sector as well as minimise the level of market distortion of publicly funded energy initiatives.

The main expected outcomes of BGFZ were:

- Increased access to modern renewable energy with a target of reaching one million Zambians with basic access to modern energy services.
- Reduced dependence on fossil fuels and avoided greenhouse gas emissions through a shift to renewable energy sources in Zambia.
- A growing confidence with banks and funds to extend debt and equity to off-grid business ventures with an expectation that Swedish funding would have a catalytic effect in leveraging additional finance. BGFZ set a leverage target of 1:4.
- Technology and knowledge transfers that develop the energy sector of the country.
- Increased coordination of market-supporting efforts for the development of the off-grid energy sector in Zambia.

#### 1.1 Approach

Using an innovative financing<sup>27</sup> and risk-sharing approach, so called Social Impact Procurement, the Beyond the Grid Fund for Zambia (BGFZ) awarded funding contracts to four companies with energy service business models demonstrating potential for serving the rural and peri-urban market at scale. Awarded companies were also provided with technical assistance to support their business development and secure finance. In addition, BGFZ worked closely with the Zambian government, the renewable energy industry and other development cooperation partners in its efforts to build a market for off-grid

<sup>27</sup> BGFZ's successor, Beyond the Grid Fund for Africa (BGFA) utilises results-based financing.

energy services. To support effective and accurate monitoring and verification of end-users being served and to support evidence-based decisions an automated data capture and analysis platform was developed as part of the programme. The BGFZ approach was composed of three pillars:

1. **Financial incentives.** The backbone of BGFZ was to use public procurement principles, offering incentives to companies for the rollout and scale up of clean energy services in Zambian markets (which otherwise would have been too risky) as well as accelerate the path to offering energy services at scale. Rather than procuring a distinct physical asset or service, the BGFZ set focus on the social impact of the scale and quality of service that the companies could provide for Zambian consumers. Rather than buying energy services on behalf of customers, the BGFZ aimed to reduce the risk and bridge the path to financial viability in serving the Zambian market and accelerate market uptake of off-grid energy services.

Further, the focus was set on delivery at portfolio level and consideration to different capacities and maturity of the companies and related effectiveness in achieving social impact. To this end, the firms' ability to serve the markets (scale, quality of service as well as maturity of the business model and operations) was measured against the company's public financing requirement from BGFZ (reverse auction); through a key metric of the competitive procurement approach: so called Value for Money (VfM) coefficient. In addition to the financial incentives offered, the contracted companies were provided with technical assistance to develop their businesses and secure finance.

2. **Platform for Market Change (Off Grid Energy Task Force (OGTF)).** BGFZ engaged with a range of stakeholders to improve local market conditions through a combination of capacity building and technical assistance to local energy authorities, general stakeholder outreach and market intelligence development. In Zambia, this work was formalised under BGFZ as a national Off-Grid Energy Task Force, established by the Office of the Vice President; and embedded in and led by the Ministry of Energy with REEEP providing support to the OGTF secretariat. This Task Force has facilitated, among other things, the implementation of a VAT exemption for LED lights, the drafting of a new national mini-grid policy and the initiation of discussions to improve the affordability of off-grid energy solutions.
3. **Market Information and Analytics.** BGFZ generated market intelligence, including data on customer ability to pay. This was captured with near real-time data on deployment of energy service subscriptions. The data was gathered and analysed through a custom-built Energy Data and Intelligence System for Off-Grid Networks (EDISON), connected to the selected energy service provider companies' internal systems and provide live information on energy service subscriptions sold, payments, product upgrades, among other data points.

The intended benefits of having access to such data were verification of connections, ability to ensure sustainability of provided energy services (enforcing related programme criteria on continued and affordable service attributed to regular customer payments), transparent communication of programme results to general public, disburdening reporting efforts for supported companies through automated generation of KPIs to support analysis and decision making of programme managers as well as capturing of knowledge and learning to help to de-risk future investments in off-grid energy markets and guide policymaking.

## 1.2 Results

Beyond the Grid Fund for Zambia reached its access goal in September 2021, when 194,724 Energy Service Subscriptions<sup>28</sup> had been rolled out benefitting 1,012,565 Zambians, 53% of whom live in rural areas.

Of the customers surveyed in an impact study in 2021, 85% of customers received first time access, 96% experienced an improvement in quality of life, with 83% reporting their lives have been "very much

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<sup>28</sup> Energy service subscriptions (connections) made by end-customers entering into a contract with an ESP for the provision of energy services

improved". In total, USD 49 million in co-financing with 21 new third-party financiers was mobilised. Sweden's BGFZ funding has been slightly more than 100 MSEK (approximately USD 11 million), hence the leverage target of 1:4 was overshoot and resulted in a leverage of about 1:5. In addition, 1,860 jobs have been created (428 employees and 1,432 commission-based). 9% of customers used their energy access for income generating activities.

BGFZ also facilitated the establishment and implementation of the Off-Grid Energy Task Force and built capacity of the OGTF Secretariat in sector coordination, captured, analysed and leveraged data on rural and peri-urban customers in Zambia for programme management and future programme development as well as for public dissemination of programme results, engagement with financiers, government stakeholders and cooperation partners. BGFZ also enabled Rural Electrification Authority to pilot EDISON in their own activities.

### 1.3 Previous evaluations and analysis

**Customer impacts.** In 2018, an assessment of the early socio-economic impact of BGFZ and review of the carbon accounting methodology used under BGFZ was completed by an external consultant, the Centre for Energy, Environment and Engineering Zambia (CEEEZ). The assessment was based on 164 household interviews in three provinces. In 2021, 60 Decibels was commissioned to conduct an independent verification of the BGFZ.<sup>29</sup> The team completed over 600 phone surveys with randomly selected customers of four participating Energy Service Providers (ESP) across Zambia. In addition, for 12% of the total sample, 60 Decibels commissioned in-person surveys through a partner. The objective was to verify the Energy Service Subscriptions (ESS) offered by the providers under the fund and to capture customer insights, including profiles, feedback, impact, satisfaction, and experience.

**Evaluation of MRV aspect of BGFZ and EDISON.** In 2021, Oxford Policy Management Limited was commissioned to carry out an independent assessment of the monitoring, reporting and verification framework being used by the BGFZ programme. It was also asked to assess the likelihood that the ESPs supported under BGFZ will continue to serve target populations after the BGFZ programme is completed and provide some commentary on the positive and negative developmental impacts of the programme. In addition to externally commissioned evaluations, the programme has been reported on by REEEP and later Nefco in semi-annual reports and internal annual Sida conclusions on performance assessments.

**Oxfam Case Study.** In 2021, Oxfam published a case study of the Beyond the Grid Fund for Zambia as part of the Oxfam's *Inspiring Better Futures* series which studied examples of initiatives that have achieved impact at scale by successfully addressing underlying structural causes.<sup>30</sup>

**Paper on Impact of BGFZ's institutional support to the off-grid energy sector in Zambia.** NIRAS is currently preparing a report in collaboration with REEEP on the processes underlying the creation of impact of enhancing dialogue and coordination in the off-grid energy sector in Zambia through the establishment and implementation of the country's OGTF.

**Awards:** 2019 Ashden Award for Innovative Finance, 2019 UN Global Climate Action Award and 2021 Energy Globe Award.

## 2. Purpose of the Assignment

This independent evaluation aims to be a supplement to previous analysis on BGFZ. It is intended to help Sida and REEEP (as the co-designers and implementers of the pilot programme), and Nefco and contributing donors to the BGFA programme (that builds on the experience of the BGFZ pilot), to understand which elements have been key in contributing to BGFZ outcomes, to what degree they have been successful (and can be continued or replicated) and which elements may need to be adapted or avoided.

The aim is to understand:

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<sup>29</sup> [https://www.nefco.int/wp-content/uploads/2021/11/BGFZ-Verification-and-customers-insight\\_November-2021.pdf](https://www.nefco.int/wp-content/uploads/2021/11/BGFZ-Verification-and-customers-insight_November-2021.pdf)

<sup>30</sup> <https://oxfamlibrary.openrepository.com/bitstream/handle/10546/621117/cs-beyond-the-grid-fund-zambia-060121-en.pdf;jsessionid=B2ADB04A01B0C04ACD9D32C92DB1D294?sequence=1>

- The value addition of the competitive approach to delivering impact outcomes (based on reverse auction, Value for Money approach) in relation to impacts achieved, cost effectiveness, speed of delivery and reduction of subsidies over time. The approach should also be compared with more traditional approaches to support energy access and to generate development outcomes.
- The level of success of BGFZ in adapting to changing market conditions (in relation to structure of contractual parameters including related trade-offs between flexibility and simplicity allowing for less consideration to context)
- Recommendations for improved implementation

The objectives of the evaluation are:

1. To provide a holistic evaluation of the BGFZ and assess the effects and the appropriateness of the BGFZ programme's components:
  - a. financial incentives
  - b. technical assistance for business development and securing finance
  - c. support to the establishment of and facilitation of administration of an off-grid task force established by the Office of the Vice President and hosted by the Ministry of Energy, and
  - d. the EDISON automated MRV system and related data<sup>31</sup>
2. To assess the key programme impact (including impact of energy access provided to climb the energy ladder, longevity of the energy service provision, co-benefits, success in incentivising private sector involvement and leveraging of funds)
3. To assess the level of success in incentivising private sector involvement in the off-grid energy sector, including but not limited to the BGFZ supported companies; whether and how the contracted energy service providers have been able to scale and mature their businesses, what role BGFZ has played in this and to what extent they have or are on their way towards reaching sustainable operations
4. To assess key impacts achieved through use of BGFZ data in relation to different market stakeholders; recommendations for key areas where the programme can leverage data more effectively towards programme objectives
5. To assess the effectiveness and efficiency of programme delivery including an analysis of the ratio of administration costs to outcomes generated using a method proposed in the Inception Report
6. To assess the relevance and impact of the BGFZ programme against policy objectives of the Zambian Government and Sida's development cooperation
7. To assess if and how the operations of the Rural Electrification Authority (REA) have been impacted by the BGFZ programme
8. To assess the achievements, effectiveness and relevance of the Off-Grid Energy Task Force in relation to set OGTF ToR and workplans (priority action items).
9. To assess what lessons can be drawn from the Zambia experience for other markets i.e. programme design, methodological approach and replicability, with regard to the impact, procurement approach, data monitoring, analysis and dissemination as well as establishment and operations of an off-grid task force.

### 3. Scope of Work

The evaluation should at a minimum include:

- Review of the initial market scoping materials and Theory of Change
- Review of BGFZ company contracts (incl. any amendments) and logic of monitoring as well as overall programme design in relation to other off-grid programmes in the market and their results as well as other relevant parameters
- Review of the ToR of the Off-Grid Energy Taskforce and other institutional design and founding documentation

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<sup>31</sup> Documentation to be made available.

- Review of existing agreements, reporting, data and indicators from REEEP, Nefco and Sida as well as evaluations and analysis carried out during the programme implementation
- Analysis of key indicators on co-benefits on job creation and gender impact
- Review of prior analysis conducted on level and nature of private sector activity of energy service providers and financiers in Zambia, mapping of current level and nature of private sector activity
- Interviews with the four contracted energy service providers
- Interviews with at least 10 members of the off-grid task force representing the government, private sector and development cooperation partners
- Interviews with financiers of the four supported energy service providers, financiers of other energy service providers in the market as well as financiers in the off-grid space that have not yet invested in companies in the Zambian market
- Interviews with programme representatives with other off-grid programmes in Zambia
- Interviews with trade associations such as GOGLA and AMDA etc
- Interviews with representatives from Nefco, REEEP and Sida (including current and prior staff and long-term consultants involved in programme design and implementation in Vienna, the Embassy of Sweden in Lusaka as well as Stockholm)
- Provision should be made within the budget for one mission to Zambia.

#### 4. Qualifications of the Consultant

The Assignment should be carried out by the Consultant and its dedicated in-house or assigned experts or sub-contractors with profound knowledge of the energy sector in Africa, with due experience from similar programme evaluations. One expert shall be nominated as the Team Leader. The evaluation team shall ensure solid experience and knowledge in the following fields:

- Programme evaluations and assessment of social impacts in the energy sector including aspects of private sector, finance and policy; ideally in the off-grid energy sector
- Relevant sectoral experience, including experience from Sub-Saharan Africa
- Data analysis
- Other technical experience and knowledge relevant to the evaluation.

#### 5. Deliverables

During the course of the Assignment, the Consultant shall deliver the following reports:

- An Inception Report by 5 October 2023. approach, methodology and timeline to carry out the Assignment
- Draft Report by the end of December 2023.

The results of the evaluation should be described in a report outlining the Consultant's assessment and responses to the above questions. The report should be initially submitted in

draft for Sida , REEEP's Nefco's and a donors' comments. The Consultant will receive comments to the draft report within three weeks after the receipt of the draft report and prepare a final report by mid-February 2024.

The report should include a publishable public summary.

Allowance should be made for up to two presentations to Sida, REEEP, Nefco and/or donors (remote, online) of up to two hours.

#### 6. Timing

The work is intended to commence in early September 2023 and with a draft report to be completed by end of December 2023, and a final report by mid-February 2024.

## Annex 2 – Evaluation Methodology

### A2.1 Brief overview of approach

Several evaluation approaches and principles were followed for this evaluation:

- Theory-based evaluation
- Use of the OECD DAC criteria
- Qualitative contribution pathways based on the ToC which allowed us to test the BGFZ logic.
- Quantitative attribution based on share of finance provided.
- Gender-sensitive evaluation design

### A2.2 Full list of EQs and scores by sub-EQ

During the inception phase we defined 13 core EQs and 44 sub-EQs, organized under the OECD criteria: relevance, effectiveness, efficiency, impact, coherence and sustainability. Table 4 presents the scores that we have allocated to each sub-question, and the scoring criteria is explained further in section A2.3 below.

Table 4 EQs and sub-EQs and scores on a 0-3 scale

EQ	Sub-EQ		Score
<b>Relevance</b>			
1	1.1	Was the program designed to address clear "market failures" at beginning?	3
	1.2	Were there external circumstances - e.g. policy, regulation, market conditions, which required the program to change? If so, was the program able to maintain relevant given the changing conditions?	2
2	2.1	To what extent did BGFZ contribute to / complement policy objectives of the Zambian Government?	2
	2.2	To what extent did the BGFZ programme align and complement policy objectives of Sida's development cooperation ?	3
	2.3	To what extent were gender outcomes build into programme design? Was the program set up to support achieving those gender outcomes?	2
3	3.1	Were the financial incentives appropriately designed to address a clear market failure / local financing conditions?	3
	3.2	Was the technical assistance designed to appropriately support for business development and securing finance?	2
	3.3	How well did the establishment of the OGTF respond to barriers to market development?	3
	3.4	To what extent did the EDISON automated MRV system and related data respond to the data needs of the programme management and ESPs?	2
<b>Coherence</b>			
4	4.1	How well coordinated was BGFZ with other national government / development partner energy access programmes taking place in Zambia over the same period?	3

EQ	Sub-EQ		Score
	4.2	Is there any risk of duplication / significant overlap in expected contributions with other energy access programmes?	3
	4.3	Are there any synergies and interlinkages with other programmes by Sida?	3
<b>Effectiveness</b>			
<b>5</b>	5.1	Did the program as a whole achieve its objectives? How effective was the programme delivery? What changes could have made it more effective?	2
	5.2	To what extent did the underlying assumptions of BGFZ TOC hold throughout implementation? If not, why not and what impact did this have on programme success?	2
	5.3	To what extent did BGFZ successfully address the barriers to market development identified in the programme TOC?	3
<b>6</b>	6.1	Did the ESPs successfully scale up sales volumes as intended?	2
	6.2	Did the ESPs successfully scale up sales tiers as intended?	1
	6.3	Did the ESPs successfully raise as much (or more) co-finance as intended	3
	6.4	Did the ESPs raise finance from commercial sources, and in particular from local banks?	2
	6.5	In which ways did the TA influence the behaviour or actions of the ESP, if at all?	1
	6.6	To what extent did the Off-Grid Energy Task Force fulfil its role/objectives? What behavioural, organisational, or systemic changes were achieved in host country governments or in their policy context, as a result of the OGTF ?	3
	6.7	How well was BGFZ data used in relation to different market stakeholders?	1
<b>7</b>	7.1	How determinant was the BGFZ grant funding RBF and any technical assistance provided in achieving this scale up in sales volumes / mobilisation of co-finance	3
	7.2	How determinant was the OGTF in delivering policy change / improved coordination between actors	2
	7.3	What value add did the EDISON platform provide that would not have been available from other information sources?	0
<b>8</b>	8.1	To what extent, and how have the operations of the Rural Electrification Authority (REA) have been impacted by the BGFZ programme?	1
	8.2	To what extent did the BGFZ programme impacts contribute to policy objectives of the Zambian Government?	2
	8.3	To what extent did the BGFZ programme impacts contribute to policy objectives of Sida's development cooperation?	3
<b>Efficiency</b>			
<b>9</b>	9.1	Do the programme administration and implementation costs appear to represent value for money compared to comparable programmes?	2
	9.2	Was the program implemented speedily and without major delays?	3
<b>10</b>	10.1	How cost effective were the BGFZ grants provided in terms of scaling up the recipient ESPs	2
	10.2	How effective was the competitive outcome-based approach (reverse auction, VfM approach) in terms of outcomes achieved and \$-per-outcome. How does this approach compared with more traditional approaches to support energy access and to generate development outcomes?	2

EQ	Sub-EQ		Score
	10.3	How cost-effective was the provision of TA?	Not scored
	10.4	How cost-effective was the establishment and operationalisation of the OGTF?	Not scored
	10.5	How cost-effective was the implementation of EDISON?	0
<b>Impact</b>			
<b>11</b>	11.1	What was the economic, social impact, and environmental impact of energy access provided?	3
	11.2	Did it allow households to climb the energy ladder?	1
	11.3	How do outcomes vary across people of different genders and marginalised groups? To what extent have outcomes reduced inequalities or otherwise improved their situation?	2
<b>Sustainability</b>			
<b>12</b>	12.1	To what extent will the contracted ESPs be able to continue their activities / scale up since the BGFZ ended? (i.e. continued operations or further expansion, without further need for subsidies)	1
	12.2	To what extent will the OGTF continue to operate, without continued support from BGFZ?	1
	12.3	To what extent will the data platform and analytics (EDISON) be taken on and implemented / used by others, if relevant	0
<b>13</b>	13.1	Is the programme design and methodological approach replicable in other markets?	n/a
	13.2	What were the key lessons learned / shortcomings in the BGFZ design and/or implementation?	n/a
	13.3	What were the key drivers of success in the BGFZ design and/or implementation?	n/a

Source: Greencroft Economics

## A2.3 Scoring criteria by sub-EQ

**Each sub-Evaluation Question is scored on a four-point scale between zero and three.** Whole numbers only are given. Zero represents a ‘low’ score, while three represents a ‘high’ score. The scores for each sub-EQ are then averaged (unweighted) to give the overall scores for each EQ which are presented in Section 4 of the main report.

**When reading this section, the interpretation of each score should be approached with caution.** The scoring criteria are by their nature subjective, and have been developed to provide a reasonable reflection of performance against the programme theory of change. A lower score does not necessarily represent “poor” performance. It may also reflect: (1) a sub-EQ with criteria that make it more challenging to achieve the higher end of scoring; for example questions around programme effectiveness, efficiency, and sustainability would have been by their nature hard to achieve perfectly, as they depend on the evolution of complex dynamics in a nascent market for energy access in Zambia. Whereas the relevance and coherence of the programme were to a large extent within the control of the BGFZ programme team, and may therefore have been expected to be able to perform relatively well on these metrics.

**Table 5 Scoring criteria by sub-EQ**

Sub-EQ	Scoring 0-3			
	0	1	2	3
1.1	No barriers / market failures identified	Some but not all market failures identified	Market failures identified but link to TOC unclear	Clear market failures identified and link to TOC clear
1.2	External risks not identified before and not updated during implementation	Some risks identified prior, limited updating during implementation and limited risk mitigation implemented	External risks identified, some pose continued risk to success, and the programme has sought to identify risks as they evolved	All external risks identified and strategy in place to manage, including as circumstances emerged
2.1	Not aligned to Zambian Govt priorities	No contradiction, but no intentional alignment	Aligned but not co-designed	Co-designed and GoZ lead in programme design and delivery
2.2	Not aligned to Sida priorities	Individual standalone project - fits Sida objectives but no synergies	Has some synergies with Sida strategy	Fits as part of broader Sida strategy and key contributor
2.3	Gender blind: No gender consideration	Gender aware:	Gender sensitive	Gender mainstreamed
3.1	Not appropriate or already available	Some link to market needs, but weak link / alternatives already available	Reflects market needs - some similar products / services available	Tailored to reflect market needs - no similar product / service available
3.2	Not appropriate or already available	Some link to companies' needs given market context, but weak link / alternatives already available	Reflects companies' needs given market context - some similar products / services available	Tailored to reflect companies' needs given market context - no similar product / service available
3.3	Not appropriate or already available	Some link to market needs, but weak link / alternatives already available	Reflects market needs - some similar products / services available	Tailored to reflect market needs - no similar product / service available
3.4	Not appropriate or already available	Some link to market needs, but weak link / alternatives already available	Reflects market needs - some similar products / services available	Tailored to reflect market needs - no similar product / service available
4.1	No coordination	Limited coordination	Moderate coordination	Highly coordinated
4.2	High risk of duplication	Moderate risk of duplication	Low risk of duplication	No or very low risk of duplication
4.3	No immediate synergies	Limited synergies	Some synergies	High synergies

Scoring 0-3				
Sub-EQ	0	1	2	3
5.1	Fell short on most/all objectives due to ineffective delivery/lack of adaptation	Achieved some objectives	Achieved most objectives	Achieved objectives effectively-programme adapted as necessary
5.2	Many assumptions did not hold, with major detriment to successful outcomes	Some assumptions did not hold with moderate detriment to successful outcomes	Some assumptions did not hold, with minor detriment to successful outcomes	All or almost all assumptions held, with no or almost no detriment to successful outcomes
5.3	Market barriers / risks still stand today with no change as a result of BGFZ	Most market barriers still relevant today, and continue to constrain market development	Some market barriers still relevant, but several successfully addressed by BGFZ	Most or all market barriers identified have been successfully addressed
6.1	All grantees fell significantly short of active users targets	Overall, fell short of target but at least one ESP met targets	Overall, met target, but only half or fewer ESPs met target	Overall met target and most ESPs met targets
6.2	Significant majority of systems sold at low end of tier targets	Some deployment of higher tier systems, but still far short of targets	Deployment of higher tier systems below target, but close	Overall exceeded targets for higher tiers / productive use
6.3	All grantees fell significantly short of co-finance targets	Overall, fell short of target but at least one ESP met targets	Overall, met target, but only half or fewer ESPs met target	Overall met target and most ESPs met targets
6.4	Limited commercial capital raised by all ESPs	At least one investee succeeds in ESP commercial debt raise and in significant equity raise	Half or more of investees accessing significant volumes of commercial finance	Most ESPs leveraging significant private capital, and local banks making loans / investments
6.5	No or very limited changes identified from ESPs as a result of TA	Some examples provided by ESPs of how TA influenced business operations	Most ESPs report high value of TA and can point to specific examples of how influenced business operations	Clear changes implemented by ESPs with identifiable impact on business
6.6	No major policy changes etc. identified / acted on	Policy / regulatory / market barriers etc. identified, limited progress on actions to resolve	Policy / regulatory / market barriers etc. identified, some progress on actions to resolve	Policy / regulatory / market barriers etc. identified, substantial progress on actions to resolve including new policies / regulations introduced
6.7	Limited to no use of BGFZ data	Some use by limited number of market stakeholders	ESPs and other users accessing and using data to inform some (identifiable) decisions	High degree of transparency with data routinely used by stakeholders to inform decisions

Scoring 0-3				
Sub-EQ	0	1	2	3
7.2	Scale up likely to have occurred without BGFZ grants and TA	Scale up would have happened anyway, BGFZ grants and TA helped speed up slightly	Scale up catalysed by BGFZ but with major contributions from other sources - BGFZ grants and TA highly important contribution alongside others	Scale up highly unlikely to have occurred at this scale / pace without BGFZ grants and TA
7.3	OGTF played no or very limited role in securing policy / regulatory reforms, and/or in helping private sector raise finance	OGTF helped coordinate actions and offered a forum to identify barriers and discuss priorities, and/or some minor support in helping private sector raise finance	OGTF identified some barriers, and played a key role in coordination / engagement to approve policies and regulations, and/or made a contribution to helping private sector raise finance	OGTF played a lead role in identifying, coordinating, and implementing policy reforms, and in helping private sector raise finance
8.1	EDISON played limited role in informing decisions beyond programme management	EDISON provided limited data back to the ESPs only, who as a result made decisions based on this data	EDISON provided data for ESPs, cooperation partners, and/or GoZ, who used the data to inform some key decisions	EDISON provided data widely available which private sector, cooperation partners and/or GoZ, and used regularly to inform decisions
8.2	No or limited impact on REA	Some small impacts on operations, but not transformational	REA major beneficiary / participant in BGFZ and can point to areas of improved capacity	REA has made clear and identifiable changes as a result of participation / benefitting from BGFZ
8.3	No or limited impact on government policy objectives / institutional capacity	Some impact on government objectives and on institutional capacity	Moderate impact on government objectives and on institutional capacity	Major impact on government objectives and institutional capacity with clear and specific examples
9.1	Significant higher costs to manage the program compared to other programmes in the market in comparable sectors and countries	Slightly higher costs to manage the program compared to other programmes in the market in comparable sectors and countries	Costs to manage the program are in line with other programmes in the market in comparable sectors and countries	Lower costs to manage the program compared to other programmes in the market in comparable sectors and countries
9.2	Major delays in e.g. disbursements, response to TA opportunities	Some delays in e.g. disbursements, response to TA opportunities	Minor delays in e.g. disbursements, response to TA opportunities	Almost no delays in e.g. disbursements, response to TA opportunities

	Scoring 0-3			
Sub-EQ	0	1	2	3
10.1	Very poor cost-efficiency taking into account other sources of funding and relative to comparable benchmarks	Poor cost-efficiency taking into account other sources of funding and relative to comparable benchmarks	Good cost-efficiency taking into account other sources of funding and relative to comparable benchmarks	High cost-efficiency taking into account other sources of funding and relative to comparable benchmarks
10.2	Substantially worse compared to alternative approaches (e.g. defined incentive RBF, direct procurement)	Slightly worse compared to alternative approaches (e.g. defined incentive RBF, direct procurement)	In line with alternative approaches (e.g. defined incentive RBF, direct procurement)	Better compared to alternative approaches (e.g. defined incentive RBF, direct procurement)
10.3	insufficient information - not assessed	insufficient information - not assessed	insufficient information - not assessed	insufficient information - not assessed
10.4	insufficient information - not assessed	insufficient information - not assessed	insufficient information - not assessed	insufficient information - not assessed
10.5	Significantly higher costs than expected and than comparable data programs	Slightly higher costs than comparable data systems	Costs broadly comparable to comparable data systems	Costs lower than comparable data systems
11.1	No evidence of impact observed/ attributed to the energy access provided	Some limited evidence of impact observed/ attributed to the energy access provided (at least one example of social, environmental or economic impact)	Multiple examples of social, environmental OR economic impact observed/attributed to the energy access provided	Multiple examples of evidence (from more than one source) of sustained social, economic AND environmental impact observed/ attributed to the energy access provided
11.2	No difference to households	Limited change at household level (25% households climbed the energy ladder?)	Less than half the households climbed energy ladder	More than half of households climbed up the energy ladder due to BGFZ (or something about the consistency of change at household level?)
11.3	BGFZ outcomes have had a negative effect/ exacerbated inequalities	BGFZ outcomes have had no effect on reducing inequalities	BGFZ outcomes have had some effect on reducing inequalities	BGFZ outcomes have significantly reduced inequalities, with clear examples of improvements to marginalised or vulnerable groups
12.1	ESPs wholly reliant on grants, with no progress towards commercial sustainability. Need ongoing grants	ESPs have scaled up and can access other sources of finance, but remain heavily reliant on grants	ESPs have scaled up and successfully financing through an increasing share of commercial capital - will be able to	ESPs now viable and can raise commercial finance - will be able to maintain current operations and scale

Scoring 0-3				
Sub-EQ	0	1	2	3
	both to serve existing customers and to scale up further		continue to serve customers with no further grants	up further without a need for further grant support
12.2	OGTF will need the same level of grant support to continue to operate in future	OGTF has been embedded and has strong buy-in, but will need ongoing grant support and technical assistance to operate	OGTF embedded with political buy-in, operational without significant further grant support, some financing / TA to enhance functions	OGTF proof of concept established and will be operational without any further support, convened and with budget allocation from GoZ
12.3	Data systems need significant extra funding to achieve their initial objectives and to support continued / further use	Data systems need substantial funding for continued use	Data systems mostly operational without need for further funding	Data systems working and need no or very little budget to continue to be used by ESPs / suitable for use by others

Source: Greencroft Economics

## A2.4 Financial attribution analysis

**To provide an estimate of the importance of BGFZ's funding as part of the overall financing mix received by the four ESPs, we attribute outcomes based on the BGFZ share of overall funding.**

For each year in which energy service users are connected and using their product, we "attribute" the total number of users to each of the financiers on the basis of the share of overall capitalisation of each ESP. As a simplified example, if an ESP had \$10m of finance on its books, of which \$1m from BGFZ, BGFZ would be attributed 10% of the outcomes delivered in that year.

**The rationale for this analysis is to avoid double-counting of outcomes by financiers.** The ESPs which BGFZ supported between 2016 and 2022 also received funding and financing from a range of other sources. Each of those financiers and funders may also want to claim the impact delivered by the ESPs, which poses a methodological challenge if all financiers then claim the same outcomes generated.

**The pitfall of this analysis is that it does not account for different types of funding and finance, and it may mix results where some finance is used for only some parts of the business.** The same "weight" is applied to all types of finance, whether it is grant, equity, or debt, and regardless of the time at which it entered the business. It is of course plausible that some types of finance have been more catalytic than others, but no adjustments have been made to attempt to reflect this. Secondly, the BGFZ RBF funding was used only for deployment of qualifying systems in qualifying regions, which may not capture all of the ESP recipients' activities. In our meetings with the ESPs they did not make a difference between the use of the BGFZ funding from any other sales that did not benefit from the BGFZ grants.

**The steps undertaken for the attribution analysis were as follows:**

- **Step 1:** collate data per ESP on active service users by year and by tier.
- **Step 2:** collate data on net financing status (debt, equity, grant) by year.
- **Step 3:** calculate the BGFZ share of total capital relevant for each year of active service users, including the following adjustments:
  - Apply BGFZ finance in the year disbursed and (cumulatively) for subsequent years, as this funding stays in the business.
  - Apply any new equity and debt entering the business only from the *following* year onwards, to reflect that this financing was not "committed" and so can only be used after it has been raised.
  - Calculate the BGFZ relative share of "capitalisation" of the company for each year of sales.
- **Step 4:** multiply the active service users in each year by the BGFZ share of capitalisation in Step 3, and aggregate over the full period of BGFZ,
- **Step 5:** estimate the BGFZ attributed VfM coefficient as the BGFZ attributed sales from Step 4, divided by total BGFZ disbursements.

## A2.5 Impact metrics

**The impact estimates are based on a combination of BGFZ impact assessments and reporting, and GOGLA standardised impact metrics.** The standardised impact metrics have been in use since 2015, and provide a consistent and comparable reporting standard across the industry. We have adjusted the standardised impact metrics to reflect the context of the Zambian ESPs:

- **Step 1:** collate data per ESP on active service users each year at the tier level.
- **Step 2:** apply GOGLA standardised impact metrics for East Africa.<sup>32</sup> The impact metrics are available for three regions: West Africa, East Africa, and South Asia. We use East Africa as the nearest comparator for Zambia, but make several adjustments.
- **Step 3:** since BGFZ reports on active energy service subscriptions, we do not make any of the adjustments used in the standardised impact metrics for operational systems or systems within their asset life.
- **Step 4:** we make a number of assumptions to match product types sold by BGFZ investees to the standardised impact metric tier categories. Noting that for Standard Microgrid they are not a standalone solar home system provider, we nonetheless apply the standardised impact metrics and given the small weight of SMG in people connected by BGFZ, this would only have a small impact.
- **Step 5:** adjust parameters to reflect Zambia context:
  - Household size set to 5.2, instead of 5.5. We note that at the beginning of the programme an assumption of a household size of 6.0 was used, but this was revised down to 5.2 as the programme went through implementation. We also however note that the 60 DB surveys found a larger household size – reported as 6.0 in its overall impact report.
  - Discount for users purchasing a second SHS. Drawing on the 60 Decibels research, we adjust the number of first-time users down to 83% of the households, with the remaining 17% already having prior access to an off-grid energy device.
  - On income generating activities, we adjust down the standardised impact metrics such that just 9% of households use their product for income-generating activities – following 60 Decibels survey findings.
  - For additional income generated by those undertaking income generating activities, we also adjust down so as to be conservative, converting the standardised impact metrics by taking the ratio of Kenyan GNI : Zambian GNI, to reflect that the absolute income uplifts reported would likely be lower in Zambia.
  - Kerosene use: only 1% of people used kerosene before, so kerosene replacement ratio down from 1 kerosene lantern replaced to 0.01. This affects CO2 emissions avoided estimates.
- **Step 4:** Aggregate up to ESP total impact.
- **Step 5:** We also calculate, but do not report here, the impact that could be “attributed” to BGFZ’s capital, based on the financial attribution approach described in A2.4 above.

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<sup>32</sup> GOGLA (2020) “Standardised Impact Metrics for the Off-Grid Solar Energy Sector”, [Link](#)

## Annex 3 – Documentation Consulted

In total 242 confidential BGFZ programme files were received and reviewed as part of this evaluation, which can be broadly categorised as follows:

- **BGFZ design:** 15 documents relate to market scoping and pre-programme design of BGFZ and iterations around the results framework, theory of change, and programme management structure.
- **Contracting:** 47 documents relate to contracting, and to COVID-19 response plans and reports.
- **Regular reporting:** 127 documents cover ongoing progress reporting and annual reviews for the four ESPs, which supported programme management and disbursement decisions.
- **The off-grid task force:** 8 files set out the terms of reference, composition, and some meeting notes from the OGTF.
- **Impact assessments and evaluations:** 12 files provided socioeconomic impact assessments carried out by 60 Decibels and by CEEZ during the period of implementation of BGFZ, an independent evaluation of the EDISON data and MRV systems carried out in 2021, an internal end of programme evaluation carried out by REEEP in December 2022, and a case study on the success factors of the OGTF carried out by Niras in early 2024.
- **Follow up and clarifications:** In response to a follow up data request, 11 additional files were provided covering specific questions around budget allocations, monitoring and evaluation and results, and the co-financing raised. A further 22 files were provided to help answer questions around ESP financial reporting.

## Annex 4 – Stakeholder Consultations

Table 6 List of key informant interviews

#	Type	Organization	Respondent(s)
1	BGFZ funders / implementers	REEEP	Peter Storey, Merja Lakso"
2	BGFZ funders / implementers	NIRAS	Jeroen van der Linden, Ben Hagan
3	BGFZ funders / implementers	NEFCO	Kari Hämekoski
4	BGFZ funders / implementers	PROSPECT, GIZ	Victoire Cowley-Gottlieb, John Tkacik
5	BGFZ funders / implementers	Sida	Anders Arvidson
6	BGFZ funders / implementers	Embassy of Sweden Lusaka (1)	Ulf Ekdahl
7	BGFZ funders / implementers	Embassy of Sweden Lusaka (2)	Magdalena Svensson
8	Private sector – BGFZ grantee	Vitalite	John Fay
9	Private sector – BGFZ grantee	Engie Energy Access	Helen Zulu (and team)
10	Private sector – BGFZ grantee	ECS (Supamoto)	Marion Peterson;
11	Private sector – other Zambian ESPs	d.light Design	Mate Kafungwe
12	Private sector – other Zambian ESPs	WidEnergy Africa	Liliane Munezero Ndabaneze
13	Private sector – other Zambian ESPs	Solar Aid / Sunny Money	Karla Kanyanga, Fred Mwale
14	Private sector – other Zambian ESPs	SIAZ	Matanda Mwewa
15	Private sector – other Zambian ESPs	Solar Village Solutions	Peter Legat
16	Private sector – other Zambian ESPs	d.light Design	Karl Skare
17	Development Partner	FCDO ACE-TAF	Doreen Bwalya
18	Development Partner	USAID (A2C)	Lloyd Archer, Catherine Picard, Litongo Kaywala
19	Development Partner	USAID (BEP)	Shupi Mweene
20	Development Partner	Embassy of Sweden Lusaka	Ulf Ekdahl
21	Development Partner	Sida	Magdalena Svensson
22	Financier	EDFI ElectrFi	Quentin de Hoe, Quentin Antoine
23	Financier	Trine	Christoffer Falssen
24	Financier	SIMA	Arivazhagan G D
25	Financier	Lendahand	Koen The; Daniel van Maanen; Anshul Jindal
26	Financier	DIFFER	Tom Erichsen
27	Financier	SNV	Martijn Veen
28	Financier	Doen Foundation	Maaïke Broekhuis, Jitske Harms
29	Other	Oxford Policy Management	Simon Trace
30	Other	GOGLA	Collin Gumbu, Oliver Reynolds

Source: Greencroft Economics

## About Greencroft Economics

Greencroft Economics is a boutique economic consultancy, founded in June 2019, to advise public and private sector clients on sustainable development in emerging economies.

[www.greencrofteconomics.com](http://www.greencrofteconomics.com)