MAPPING THE OFF-GRID SOLAR MARKET IN ZAMBIA

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Source: Signify Foundation

AAVISHKAAR GROUP

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Abbreviations

ACE	Africa Clean Energy Programme
AfDB	African Development Bank
BD	Business Development
BGFZ	Beyond the Grid Fund for Zambia
BNEF	Bloomberg New Energy Finance
DFID	Department for International Development
ESP	Energy Service Providers
ERB	Energy Regulation Board
ESAP	Electricity Services Access Project
ESMAP	Energy Sector Management Assistance Programne
FAO	Food and Agriculture Organization
GRZ/Govt.	Government of the Republic of Zambia
GSM	Global System for Mobile Communications

HH	Household
SE4ALL	Sustainable Energy for All
SIDA	Swedish International Development Cooperation Agency
SHS	Solar Home Systems
SHG	Self Help Group
SPL	Solar Portable Light
SLS	Solar Lighting System
SREP-IP	Scaling up Renewable Energy Programme for Low Income Countries – Investment Plan
JSAID	United States Agency for International Development
WIDEN	Women's Initiative for Delivering Clean Energy to Africa
WTP	Willingness to Pay
ZABS	Zambia Bureau of Standards
ZESCO	Zambia Electricity Supply Corporation



MARKET OVERVIEW



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Market potential: ~58% of the households in Zambia have no access to electricity, suggesting a potential opportunity to promote Off-Grid Solar (OGS) solutions



• Over half the households using OGS have solar lanterns, typically using it for lighting and phone charging

- The share of households (HHs) using solar home system (SHS) or solar lighting system (SLS) is fairly small
- Solar has gained importance recently, with 91% HHs having obtained their first solar device within the past five years, and 79.2% in the last 3 years

- Sizeable penetration of OGS is observed in Southern, North Western and Northern provinces of Zambia
- Rural Zambia has a higher concentration of OGS devices with 87.2% rural HHs who have access using it as their primary source of energy
- Off-grid access is most common among households in the lower quintiles of expenditure

Sources: Beyond Connections: Zambia Energy Access Diagnostic Report Based on the Multi-Tier Framework, World Bank, 2019 (Link); Stand-Alone Solar Businesses in Zambia, RECP, May 2018 (Link)

Market potential: Market opportunity for off-grid solutions is estimated at ~\$234 Mn* per annum



Sources: **Zambia SEforAll Action Agenda, Ministry of Energy, GIZ, June 2019; GET.Invest Market Insights-Zambia: Solar PV and Hydro Minigrids, GIZ, June 2019 (Link); Stand-Alone Solar Businesses in Zambia, RECP, May 2018 (Link) *Zambia Electrification Geospatial Model, Power Africa, USAID, 2018

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200 HHs) till 2030





Market Penetration (Stand-Alone Solar Systems): With increased funding for electrification, OGS sales volume grew by 132% between July-Dec'18, with the total value at \$10.28 Mn (Jan-Dec'18)

SALES VOLUME AND VALUE OF STAND-ALONE SOLAR SYSTEMS INCREASED SIGNIFICANTLY IN 2018 WITH RESPECT TO 2017





- Total installed capacity of off-grid devices from Jan-Dec '18 from PAYGO was 1.37 MW
- Total sales volume for **OGS appliances** (TVs, fans, solar water pumps, refrigerators) **from July 2018-2019 was 8,952**
- There are also atleast **two larger stand-alone captive PV systems** one of 86 kWp at the AKTC demonstration farm and training centre and another system of at least 120 kWp capacity at the off-grid Chitokoloki Mission Station in Zambia

Volume of products sold in thousand

93% OF TOTAL VALUE AND 82% OF TOTAL VOLUME OF OFF-GRID SOLUTIONS SOLD WAS ATTRIBUTED TO PAYGO MODELS IN H2 2018



- Sales through PAYGO jumped by 141% from 30,081 units in H1 2018 to 72,595 units in the second half
- 47% of the population expressed lower preference for cash purchases, reflecting potential interest in PAYGO models (RECP, 2018)
- Companies deploying PAYGO attracted 91% of total investment in OGS market globally, between 2016 and 2018

Sources: Global Off-Grid Solar Market Report Semi-Annual Sales and Impact Data, GOGLA - H1 2016 (Link), H2 2016 (Link), H1 2017 (Link), H2 2017 (Link), H1 2018 (Link), H2 2018 (Link), H1 2019 (Link); Stand-Alone Solar Businesses in Zambia, RECP, May 2018 (Link)

Market Penetration (Minigrids): Solar PV minigrids make only a small contribution to rural electrification in Zambia, compared to hydro and diesel minigrids

By the end of 2017, 5 solar PV minigrids (4 private and 1 public run by a cooperative) were operational and 2 public solar PV minigrids were under construction in Zambia (ranging from 10 KW to 300 KW)

- Most minigrids are concentrated in RGCs as they are densely populated with an average offgrid site of 110 connections
- ENGIE, a private developer, inaugurated its first PowerCorner (minigrid) in 2019 providing electricity access to 378 households

SOLAR PV MINIGRIDS (END OF 2017)

Owner (# minigrids)	Site	Size kW	Beneficiaries				
Kafita Cooperative Society (1)	Mpanta	60	450 HHs, 1 school, 1 health centre, a market, churches and fish refrigerat depots				
Muhanya Solar (1)	Sinda	30	60 HHs and 5 businesses; Provides SHS to peripheral customers				
Standard MicroGrid (3)	Multiple	10,10, 24 respectively	N.A.				
REA (1)	Kafue National Park	200	Targeting 570 HHs, public institution and businesses				
REA (1)	Kasoma Lunga Island	300	Targeting 1,600 HHs, public institu and businesses				
Note: For more details	s refer to Annexure (Slide 54	4)	Operational	Under construction			

REGIONAL FOCUS



Existing and planned minigrids in Zambia

Sources: GET.Invest Market Insights-Zambia: Solar PV and Hydro Minigrids, GIZ, June 2019 (Link); ENGIE inaugurates first minigrid in Zambia and accelerates its electrification efforts in Africa, ENGIE, April 2019 (Link)

Products: Off-grid solutions, particularly solar lanterns, are most popular in Zambia, followed by rechargeable batteries and SHS



DISTRIBUTION OF OGS HHS BASED ON MULTI-TIER FRAMEWORK



- Solar Portable Lights (~\$6 to \$56): Solar photovoltaic (PV) panel (<3 W), internal battery, and a single lantern
- **Pico- and Small-SHS (~\$70 to \$200):** PV panel rated at less than 30 W, an internal battery, and associated plug and play accessories (e.g. LED lights, radio, mobile phone chargers)
- Medium (30-200 W) and large (> 200W) SHSs (~\$300+): One or multiple PV panel(s), an external battery, charge controller, associated appliances, and in some cases inverters

According to World Bank's Multi-Tier Framework (MTF) Energy Access Household Survey:

- 56% of OGS HHs fall in Tier 0 because of the limited capacity of their devices (less than 3W per day)
- **One-third** HHs in Tier 1 can power very low load appliances such as lighting and phone charging
- Majority of the OGS HHs can use electricity for 4 16 hours

Sources: Beyond Connections: Zambia Energy Access Diagnostic Report Based on the Multi-Tier Framework, World Bank, 2019 (Link); Global Off-Grid Solar Market Report Semi-Annual Sales and Impact Data, GOGLA, July-December 2018 (Link)

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Products: Product landscape is wide-ranged & divided, with price driven by quality, warranty, PAYGO options and after sales service



*List of products and prices is Indicative

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Products (Productive use technologies): A few companies are incorporating productive use solar products in their offering such as solar water heaters, water pumps, fans, fridges etc.



Sources: Fenix International (Link); Sunny Money (Link); Mangoo Marketplace (Link)



SUPPLIER MARKET TRENDS

2.1 Supplier landscape
2.2 Distribution models
2.3 Financing models
2.4 Value proposition by select suppliers
2.5 Barriers to Scale

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Supplier* landscape: The OGS value chain comprises of developers (manufacturers); distributors (assemblers, wholesalers, retailers) and last mile distribution agents



*They are a total of 101 licensed solar undertakings registered with the Energy Regulation Board Zambia as at Oct 2018



Distribution models: Most common distribution models involve distribution through conventional dealer networks and institutional partnerships with local retailers or NGOs

Microfranchise Model

The company offers franchising packages (such as financing, training, marketing support etc.) to microentrepreneurs who wish to become formalized retailers of exclusive company products

Rental-leasing Model

The solar company franchises to microentrepreneurs who set up solar charging kiosks. The micro-entrepreneurs either (1) rent products to consumers on an hourly/daily basis or (2) sell systems without a power source, offering a fixed fee for charging





Institutional Partnerships

The company partners with an institution (e.g., NGO, MFI, rural bank, assemblers, with links to a large potential customer base) to market its products to its customer base/members and/or to leverage its assembling & aftersales support services

Distributor-Dealer

The company sells through established networks of generalist or specialist distributors, leveraging the traditional consumer durables supply chain. Products are retailed in a basket of consumer durables. A distribution hierarchy of at least two levels (distributor and dealer/retailer) is maintained





Proprietary Channels

Products move through a proprietary distribution channel from manufacturer to in-house storage/ assembling facilities to a salaried/ contracted salesforce, which delivers them to customers directly



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Distribution models: Businesses in Zambia are exploring a variety of last mile distribution channels such as local retailers, NGOs and Mobile Network Operator (MNO) retail outlets





Financing models: PAYGO is being widely used in Zambia for higher cost OGS devices like SHS and SLS with mobile charging

Business model	Benefits	Compani	es on PAYGO) platforms		
PAYGO is a financing platform for off-grid energy systems with high up-front capital costs. An IT system underlies the platform, allowing automated payments and system monitoring/activation	 Ability to provide longer duration and big High consumer confidence in product d Improved operational efficiency of supp between financial and technology provid Reduced cost of payment collection (ind 	sunny C. greenlight money grant		fenix intl		
	PAYGO BUSINESS MODEL	ATTRIBUTES				
Payment Platform	Customer Relationships	System Size	Connecti	vity	Partners	nip Strategy
 Full connectivity model – M2M and mobile money Prepaid credit agent-based model (off- network) – requires manual input of unique code (e.g. Muhanya Solar Limited, Vitalite, Fenix international) Mobile airtime as prepaid credit USSD models Partial PAYGO models: agents accept cash and activate products via cable, bluetooth or manual SMS code 	 Lease to own: Transfer of asset ownership to user after limited payment period. Payment via licensed platform (e.g. Vitalite, Kazang Solar) Energy service: Co. provides electric service rather than financing. Service comes from a company-owned solar system B2B players: Hardware/software support for energy service and payment logistics. (e.g. Lumeter) 	 PAYGO solar products can be divided by system size, which dictates the service level that each provides HH products: Solar lanterns, SLS, SHS Community level shared minigrids 	 Systems fully onli including money a real time connecti energy s Systems intermitt connecto 	that are ne, mobile nd remote, ions with the ystem that are ently ed	 Partners be made distribut paymen hardwar service s other co aspects 	ships could e on tion, t portals, re/software support, or re business

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Financing models: The lifetime value of a customer through PAYGO models is much higher than it is with Cash based or Cash + PAYGO payment mechanisms



- Players are increasingly focusing on the lifetime value they can derive from a consumer as consumers migrate from basic products to products with higher functionality
- PAYGO models offer the highest lifetime customer value, as is reflected by the increasing adoption of PAYGO models by most suppliers in the market



Financing models: Franchise/dealership model is often used for extending end-user financing

DESCRIPTION

One Stop Shop Model	In this model, the same organization provides the products and finance. This happens when a finance provider decides to offer energy products, or when an energy enterprise decides to offer finance. (e.g. Greenlight Planet, SunTech)	greenlight [®]	(25) Lines SUNTECH APPROPRIATE TECHNOLOGY L	T D.
FI Partners With Energy Enterprise	In this case, an energy enterprise enters into a partnership with a local financial institution to sell OGS products. This model typically involves a financial institution (FI) providing credit to an end-user and managing the monitoring and repayment processes, while the energy company provides the energy product, installation, service and maintenance			
Umbrella Partnership Model	The energy enterprise enters into a partnership arrangement with an "apex institution" that manages a network of local FIs (e.g. a union of credit cooperatives, credit unions, or other village-based FIs). The apex institution lends money to the local finance providers, who lend to an end-user and manage the monitoring and repayment processes. The energy enterprise provides the product, installation, service and maintenance			
Franchise/ Dealership Model	The energy enterprise provides credit to dealers and/or franchises to allow them to sell to clients on an instalment basis. This particular model is common for relatively inexpensive products — usually those that cost under \$50. (e.g. Greenlight Planet, Azuri, Fenix International, Vitalite)	fenix intl		VITÂLITE
Brokering Model	A third-party organization is paid by the finance provider and the energy enterprise to market energy products and assess customers' suitability for financing. They bring viable customers forward to buy energy products. The broker may also be involved with loan payment collection, after-sales service, and technical upkeep			

Value proposition offered by select suppliers

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Product O	ffering	Financing And Distribution
	 Distributes Azuri's leading product, Azuri QUAD which includes 10 W solar PV panel, 6500 mAh Li-ion battery with Azuri Home Smart battery management technology, control box with keypad, 4 LEDs lamps, radio, mobile phone charger, flashlight, two wall switches, and cabling Priced at ~\$207 for direct cash sale The solar products have a 2-year warranty along with after-sales customer support 	 Sale of products through agents (responsible for marketing, installation and payment collection) and Kazang retail outlets or kiosks PAYGO Model of ~\$8.7 down payment, and ~\$4 (weekly) or ~\$16 (4-weekly) installments for 80 weeks Sold ~5,000 SHS units by 2018
enix intl Note: Fenix has been acquired by ENGIE	 Offers 5 SHS bundles; flagship SHS includes 10W solar panel, 22 W battery, 2 LED lights and a phone charging cable. Priced at ~\$14 down payment and ~\$0.15 per day for 36 months High end SHS: TV kit sold for \$80 down payment and \$0.88 per day for 24 months All systems come with 3-year warranty and service 	 Customers can buy these products through commission-based agents and managers operating from 90 MTN outlets Fenix has its own PAYGO platform ReadyPay, to purchase SHS over 24-36 months via micro-installments paid over MTN mobile money (offnetwork) ReadyPay Solar Power System had reached over 150,000 people in offgrid Zambian HHs by September 2018

Source: Reaching Scale in Access to Energy. Lessons from Practitioners, Hystra Hybrid Strategy Consulting, May 2017 (Link); Zambia Stand Alone Solar Businesses: Case Study Kazang Solar PAYGO SHS, Get.Invest, 2019 (Link);

Value proposition offered by select suppliers

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Product O	ffering	Financing And Distribution
VITÂLITE	 Primary product PSHS 7500 6 W lighting, radio, and phone charging package - basic off-grid solution; down payment of ~ \$18 and \$0.33 per day for one year Other products include 20 W at \$371 and 50 W at \$536 SHS systems, improved cookstoves, and solar water pumps The solar products are fully warrantied for four years 	 Several channels of distribution are used including small businesses (e.g. local grocer, hardware shops), commissioned-agents, distributors and retail outlets/hubs operated by Vitalite Financing through own PAYGO model (97.8%) and cash and carry sales (2.2%) Three partners – Lumeter (back end energy payment solution), AirTel Money (mobile money), Fosera (SHS manufacturer)
greenlight [*]	 Offers 5 lanterns and 2 SHS (6-12W, 3 lights, and phone charging); exploring DC radios & TVs Flagship product is Sun King Pro series, a \$35 lantern equipped with 1-2 USB phone charging ports and detachable solar panel Products have a 5-year battery life, 2-year warranty, can provide 36 hrs of lighting per charge and are Lighting Global certified 	 Customers may buy directly or from its partners, either in cash, on credit, or with PAYGO Partnered with ECS in Zambia for an innovative PAYGO bundle of SHS, cooked stove and fuel pellets Financing options can be costly for smaller products such as Home SHS which is retailed at \$80 in cash, but amounts to \$125 with a 9-month PAYGO contract

Value proposition offered by select suppliers

Product O	ffering	Financing And Distribution
sunny >@ money	 They do not manufacture their own products but are distributors for 6 products for lighting and charging This ranges from \$10 for a single lamp (4 hr lighting capacity per day) to \$87 for SHS (6-watt solar panel, three lamps and USB ports enabling dual mobile phone charging) 	 Most common sale point is school campaigns. There is some distribution through existing businesses in city centres or small rural retail outlets The staff members perform after sales visits and delivery of products to students or shops Payment system is mostly cash based
	 Microgrids that involve smart metering, PAYGO, distributed storage, and interconnections (500 m radius) This includes basic in-home wiring, lights, switches, and power outlets. Customers can add any widely available AC appliance 	 ~\$30 maximum connection fee PowerGen offers fully prepaid model to its clients, paid via mobile money. Larger payments lead to lower effective unit rates

Source: Reaching Scale in Access to Energy. Lessons from Practitioners, Hystra Hybrid Strategy Consulting, May 2017 (Link); Zambia Stand Alone Solar Businesses: Case Study Kazang Solar PAYGO SHS, Get.Invest, 2019 (Link);



Barriers to Scale: Poor implementation of the regulatory/institutional framework for OGS and high upfront costs of RE projects are the main barriers to scale for suppliers in Zambia (1/2)

Barriers		Initiatives
Regulatory Barriers	 Weak implementation of the existing institutional/policy framework due to capacity constraints Lack of standardized Power Purchase Agreements Absence of a transparent and competitive procurement framework Highly subsidized electricity tariff rates by ZESCO make private sector investment in electricity sector financially unviable Unclear regulations on VAT for solar product leads to inconsistency with a rate of 16% 	 GRZ commits to implement a cost-reflective electricity tariff regime to enable private sector investments, as per the Seventh National Development Plan As a part of the Increased Access to Electricity and Renewable Energy Production (IAEREP) project, GRZ has drafted a regulatory framework for minigrids. This entails licensing approaches based on capacity, treatment of security tenure and regulatory treatment of grid encroachment (e.g.: full tariff exemption and light-handed licensing for capacity 0-100kW, while full licensing is required for capacity >1MW). As per the Customs and Excise Act, solar equipment (panel, battery, inverter, etc.) is exempted from customs duty and VAT
Lack Of Information/ Data On RE	 Limited availability of information on RE landscape and market data 	 World Bank prepared a solar and wind atlas mapping the potential resources in Zambia Power Africa designed the Zambia Geospatial Model that states the least cost technology mix for provision of electricity

Sources: Zambia SEforAll Action Agenda, GIZ, June 2019; Regulation for Universal Access to Energy in Zambia, Cristian Lanfranconi, July 2018 (Link); Scaling-up Renewable Energy Program: Investment Plan for Zambia, MoE, April 2019 (Link); Action Document for Contribution to the African Investment Facility: ElectriFI – Zambia window, EC, 2017 (Link)



Barriers to Scale: Poor implementation of the regulatory/institutional framework for OGS and high upfront costs of RE projects are the main barriers to scale for suppliers in Zambia (1/2)

Barriers

Poor Access To Enterprise Finance For RE Projects

- Weak implementation of the existing institutional/ policy framework due to capacity constraints
- Lack of standardized Power Purchase Agreements
- Absence of a transparent and competitive procurement framework
- Highly subsidized electricity tariff rates by ZESCO make private sector investment in electricity sector financially unviable
- Unclear regulations on VAT for solar product leads to inconsistency with a rate of 16%

Initiatives

- GRZ commits to implement a cost-reflective electricity tariff regime to enable private sector investments, as per the Seventh National Development Plan
- As a part of the Increased Access to Electricity and Renewable Energy Production (IAEREP) project, GRZ has drafted a regulatory framework for minigrids. This entails licensing approaches based on capacity, treatment of security tenure and regulatory treatment of grid encroachment (e.g.: full tariff exemption and light-handed licensing for capacity 0-100kW, while full licensing is required for capacity >1MW)
- As per the Customs and Excise Act, **solar equipment** (panel, battery, inverter, etc.) is **exempted from customs duty and VAT**

Sources: Zambia SEforAll Action Agenda, GIZ, June 2019; Regulation for Universal Access to Energy in Zambia, Cristian Lanfranconi, July 2018 (Link); Scaling-up Renewable Energy Program: Investment Plan for Zambia, MoE, April 2019 (Link); Action Document for Contribution to the African Investment Facility: ElectriFI – Zambia window, EC, 2017 (Link)



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3.1 Affordability3.2 Demand Barriers

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Affordability: Willingness to pay (WTP) for a SHS is low due to limited purchasing power of HHs. However, ability to pay (ATP) can be boosted through PAYGO models with installment periods of 6 to 12 months.



Prices for SHS Systems including full/discounted rates (%) in USD*



Access to electricity by expenditure quintile

WILLINGNESS TO PAY

- According to the MTF Energy Access Household Survey, more than 50% rural customers maybe unwilling to pay for SHS even with payment plan options
- WTP improves with provision of a flexible payment plan: At current price, only 8.9% HHs are willing to pay upfront for a high capacity SHS and 8.5% HHs for a small capacity SHS. The WTP improves to 21.8% and 15.2% HHs for high and low capacity SHS with flexible payment plans of 6,12 and 24 months. The WTP increases significantly with discounted prices
- More than 65% of female-headed households surveyed were not willing to pay for an SHS at any cost

*Note: Full price $\,$ @100% and discounted prices @ 33% and 66% for SHS $\,$

ABILITY TO PAY

- The estimated ATP for electricity for rural HHs is ~\$7 per month (GET.Invest)
- The current expenditure of off-grid HHs on lighting alone is ~\$9 per month (BNEF)
- Off-grid solutions are the most common among HHs in the lower quintiles of expenditure (Q1 5.4% HHs and Q2 6.8% HHs)
- The average total expenditure of rural and urban HHs without a grid connection is **~\$100.3 and ~\$158.9 respectively per month**

Source: Beyond Connections: Zambia Energy Access Diagnostic Report Based on the Multi-Tier Framework, World Bank, 2019 (Link); GET.Invest Market Insights-Zambia: Solar PV and Hydro Minigrids, GIZ, June 2019 (Link); Off-grid Solar Market Trends Report, BNEF, 2016 (Link)

Affordability: PAYGO models can significantly improve consumer's ability to pay

ZAMBIA SCORES LOW ON WTP AND ATP FOR OFF-GRID SOLAR DEVICES, DUE TO AFFORDABILITY CONSTRAINTS

Market Attractiveness Index, IFC

	Demand Score			Supply Score				Enabling Environment Score		
Country	Market Size	Ability to Pay	Willingness to Pay	Access to Finance	Operational Considerations	Market Penetration	Human Capital	ICT	Legal and regulatory	Trade and Commerce
Angola										
Cameroon										
Congo Dem Rep.										
Cote d'Ivoire										
Ethiopia										
Guinea										
Kenya										
Madagascar										
Malawi										
Mozambique										
Niger										
Nigeria										
Senegal										
Sierra Leone										
Tanzania										
Togo										
Uganda										
Zambia										
Zimbabwe										

- PAYGO models are expected to provide customers especially in the rural area with a more affordable option for off-grid modern (solar) lighting systems
- Small size of the off-grid market and poor affordability among end-users makes the Zambian market less attractive for investors
- Limited penetration of mobile money usage requires OGS solution providers to invest in increasing consumer awareness of digital finance, explore non-mobile money enabled PAYGO models, or consider a dual strategy



Demand Barriers: Low affordability and consumer awareness hamper demand for OGS devices in Zambia

Demand Barriers		Initiatives
Low Consumer Awareness	 Limited awareness of potential benefits of using RE based technology Lack on information on availability of OGS 	 Many solar companies are distributing OGS appliances through campaigns in community centres and schools (e.g. SunnyMoney) The Global Energy Feed-in Tariff (GETFiT) programme mandates developers to partner with University of Zambia (UNZA) Solar Centre of Excellence for student workshops on development and implementation of RE projects
Poor Purchasing Power And Limited Access To Consumer Financing	 Initial connection cost and cost of wiring is a deterrent for poor HHs to access electricity Poor usage of digital financial services (20%) limits use of innovating consumer financing models for OGS such as PAYGO Access to mobile money is hindered by poor infrastructure - sparsely distributed HHs, lack of electricity and limited road access 	 Some of the solar companies are providing OGS solutions on a lease-to-own models on a PAYGO basis with micro-installments over payment periods of 6,12 or 24 months World Bank Electricity Services Access Project's (ESAP's) Last Mile Project, provides a \$2 Mn credit line loan facility for off-grid solutions to companies importing/ selling solar equipment, developers of minigrids, and end-users of solar equipment
Poor Quality Standards	 Lack of guidance on quality of OGS products by the Energy Regulation Boards leads to import and sale of low-quality products and services Scattered network of distribution chains results in difficulty to access warranties and after-sales service undermining consumer protection 	 Development partners such as World Bank, USAID, and AfDB are enforcing stringent compliances for solar manufactures who are accessing enterprise finance, to ensure good quality products

Sources: Zambia SEforAll Action Agenda, GIZ, June 2019; Regulation for Universal Access to Energy in Zambia, Cristian Lanfranconi, July 2018 (Link); Scaling-up Renewable Energy Program: Investment Plan for Zambia, MoE, April 2019 (Link)



ENABLING ECOSYSTEM

Source: Signify Foundation

4.1 Government4.2 Development partners4.3 Financiers4.4 Association and others

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Government: SREP-IP* supports GRZ to pilot innovative business models to increase access to electricity and other services for 4.8 Mn people including 850,000 HHs in grid and off-grid areas by 2030

Programmes	Mandate	Off-Grid Solar Targets				
Zambia Sustainable Energy for All (SEforALL) Action Agenda (2019-30)	Provides a roadmap for achieving and financing the energy efficiency and electrification target. It comprises on-grid generation, grid extension and densification, energy and off-grid electrification	By 2030	20% of Rural HHs to be served by off-grid RE (minigrid and stand-alone systems)			
7th National Development Plan (2017-21)	Provides a comprehensive strategy to create an economy for sustained growth and socio- economic transformation. It establishes targets for energy sector such as improving electricity access and supply and implementing RE based projects	By 2021	 15% Rural HHs access elecricity through off-grid solutions 6 off-grid projects** implemented in rural areas 			
Scaling Up Renewable Energy Programme in Low Income Countries – Investment Plan (SREP-IP) for Zambia, 2019	Provides a strategy to attain universal access to clean, reliable and affordable energy at the lowest total economic, financial, social and environmental cost consistent with national development goals by 2030	By 2030	Estimated emission reduction of 38,000 GgCO2eq. (Greenhouse Gas Carbon Dioxide Equivalent), 47% less than business as usual scenario			

Sources: Zambia SEforAll Action Agenda, GIZ, June 2019; Regulation for Universal Access to Energy in Zambia, Cristian Lanfranconi, July 2018 (Link); **7th National Development Implementation Plan, GRZ, 2018 (Link); * Scaling-up Renewable Energy Program: Investment Plan, MoE, April 2019 (Link)

Government: Institutional Framework



Source: Power Sector Reform and Regulation in Africa, 2013 (Link); GET.Invest Market Insights-Zambia: Solar PV and Hydro Minigrids, GIZ, June 2019 (Link)



Government and Quasi-Government: Several ministries and agencies are dedicated towards advancing access to energy through OGS solutions

Institutions	Mandate
Ministry of Energy (MoE)	 Develop and manage energy resources in a sustainable manner
	 Formulate/implement energy policies and regulations and undertake monitoring of policies
Energy Regulation Board	 Regulate the electricity, petroleum, renewable energy and other energy sources
(ERB)	 Set tariffs and issue licenses to operators including utilities and independent power producers
	 Enforce regulations with regard to imports of solar components
	 Promote new grid connections with a focus on low income households
Rural Electrification Authority	• Develop off-grid systems in rural areas and conduct all public activities regarding rural electrification
(REA)	• Manage the rural electrification fund, development and implementation of the rural electrification master plan, and promotion of the use of available energy sources in rural areas
	 Design and offer on a competitive basis smart subsidies for capital costs on projects
	 Share knowledge, experiences and technical information on on-going off-grid systems



Government and Quasi-Government: Several ministries and agencies are dedicated towards advancing access to energy through OGS solutions

Institutions	Mandate
Office for Promoting Private Power Investment (OPPPI)	 Promote private sector funding in the development of energy projects Undertake feasibility studies for projects & facilitate negotiations to execute agreements on behalf of GRZ
Zambia Electricity Supply Corporation (ZESCO)	 Operate off-grid RE projects as well as manage and maintain the national grid Offer technical support for generation, transmission and distribution
Zambia Bureau of Standards (ZABS)	 Responsible for standards formulation, quality control and assurance, quality inspections, and removal of technical barriers for trade (under the Ministry of Commerce, Trade and Industry) Provides ZABS certification for product quality of imports (including solar equipment)
The Energy Sector Advisory Group Committee under MoE	 Contains representatives from government ministries and authorities, development agencies, and commercial enterprises in energy and allied sectors Supports GRZ on designing energy policies by ensuring inclusion of opinions of all stakeholders



Government: The Rural Electrification Act (REA), Rural Electrification Master Plan and Renewable Energy Feed-in-Tariff (REFiT) Strategy are the key government policies guiding the country's off-grid market

Policy /Programme/Plan	Actions
The Energy Regulations Act, 1995 (amended 2003)	 Established the Energy Regulation Board (ERB), its functions and powers, rules and procedures for licensing of undertakings related to production of energy and handling of certain fuels/energy services
Rural Electrification Act, 2003	• Established the Rural Electrification Authority (REA) and equipped it with a Rural Electrification Fund
Zambia Grid Code, 2006	 Facilitates open and non-discriminatory access to the transmission system
	 Aims to enhance efficiency and more rapid electrification
National Energy Policy (Revised 2008)	 Liberalized the electricity sector by opening all market segments to private operators
	 Laid the foundation for new key institutions: Energy Regulation Board of Zambia (ERB) and Office for Promotion of Private Power Investments
Rural Electrification Master Plan (REMP), 2008	• Formulated the Master Plan for rural electrification up to the year 2030 and for enabling technology transfer to counterparts so that they can continue updating and implementing the Master plan by themselves
Renewable Energy Feed-in-Tariff Strategy, 2017	 Aims to increase the national generation output through private sector investments in RE technologies who contribute to increased grid capacity through the development of small and medium scale projects of up to 20MW
	 Its objective is to allow for alternative ownership and management models and provide an opportunity to empower local entrepreneurs and communities
National Climate Change Policy, 2017	 Implements programmes diversifying the energy mix to RE technologies
Seventh National Development 2017 -	 Adjusts electricity tariffs (maintaining the life-line tariff to protect poorer HHs) to attract private investment
2021	 Reviews the regulatory and legal framework of the energy sector

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Development Partners: Programmes being implemented in Zambia to develop the OGS market, are extensively contributing to BD support, technical assistance, policy enablement and market intelligence

Programme	Consumer awareness	Policy enabling	Access	to finance	Transaction advisory	BD support and TA*	Quality assurance	Market intelligence	Funding (Mn USD)
			Consumer	Enterprise					
BGFZ						•			20
IAEREP	٠					•	•		44
ESAP				•		•			5.9
Power Africa				•		•			
SE4AII				•	•	•	•	•	18.8**
ACE				•		•		•	81***
Scaling solar				•		•	•	•	94
RE Resource Mapping		•						•	3.6
GET.Invest		•	•	•	•	•		•	
SREP				•		•	•	•	10
GETFIT				•	•	•	•		
REFF					•	•	•		152.5
Exchange Rate: 1 EUR = 1.0	International inance Corporation	gíz		GREEN	**Covers Africa an income as on Dec ***Covers 14 Afric	nd Asia (donor 2018) an countries	Program	mes covering minigri	ds



Development Partners: SIDA is supporting GRZ through a \$20 Mn 'Beyond the Grid Fund' for private OGS enterprises. These Energy Service Providers (ESPs) have further raised \$35 Mn through other sources

Implementing agency	Programme	Intervention areas	Results	Donors/ Partners	Funding
REEEP . (Renewable Energy and Energy Efficiency Partnership)	Beyond The Grid Fund For Zambia (BGFZ) (2017 - 21)	BGFZ is a results based social impact procurement fund that aims to close the "viability gap", on a per-connection basis, incentivizing scaling up in areas that would otherwise be unviable markets for companies BGFZ aims to bring modern energy services to 1 Mn Zambians (167,000 HHs) by 2021	 780,000+ beneficiaries reached 369,521 kg of CO₂ mitigated annually 150,000+ Energy service subscriptions sold \$35 Mn co-funding leveraged by ESPs supported by BGFZ Contracted four private companies (Fenix, Vitalite, Emerging Cooking Solutions, Standard Microgrid) to implement projects on SHSs, SPLs, and improved cook stoves, and install minigrids for improving energy access 	 Nordic Environment Finance Corporation (NEFCO) manages the fund SIDA Sweden Sverige USAID's Power Africa 	\$20 Mn
KFW	Global Energy Feed-in Tariff (GETFiT) programme	 Fulfill GRZ Renewable Energy Feed-In Tariff (REFiT) strategy by: Procuring and supporting Independent Power Producer solar PV projects up to 20 MW Institutional capacity building Enabling regulatory policy 	 Awarded six solar PV projects with combined capacity of 120MW The awardees have to implement components of local capacity building on RE project development and implementation by partnering with University of Zambia (UNZA) Solar Centre of Excellence 	 German Cooperation MoE ERB ZESCO OPPPI AfDB Africa Trade Insurance 	

Source: Beyond the Grid Fund for Zambia (Link); Zambia SEforAll Action Agenda, Ministry of Energy, GIZ, June 2019; Scaling-up Renewable Energy Program: Investment Plan, MoE, April 2019 (Link); Beyond the Grid Fund for Zambia: Press Release (Link); Global Energy Feed-in Tariff Programme (Link); Zambia: Get FiT announces \$4c/kWh tariff (Link)



Development Partners: SIDA is supporting GRZ through a \$20 Mn 'Beyond the Grid Fund' for private OGS enterprises. These Energy Service Providers (ESPs) have further raised \$35 Mn through other sources

Implementing agency	Programme	Intervention areas	Results	Donors/ Partners	Funding
	Power Africa	 Policy support through embedded advisors, donor coordination, and the South Africa Energy Programme Technical assistance and financing support for the Scaling Solar Project and off-grid initiatives Development Credit Authority guarantee to strengthen distribution network Access to enterprise finance Market intelligence 	 Financially closed transactions include: Ngonye – Scaling Solar Zambia Round 1 (Solar 28 MW) Bangweulu – Scaling Solar Zambia Round 1 (Solar – 47.5 MW) Assisted ERB to develop multi-year tariff framework procedures, rules and regulations Developed a Renewable Energy Feed-in-Tariff (REFIT) strategy to enable private sector investment in RE sector (tariff structure, procurement, licences etc.) Provided \$2 Mn financial support to Scaling Solar 	 United States Government World Bank Group African Development Bank African Trade Insurance Agency European Union DFID 140 private companies 	
UN DP	Solar4Health Project	 Provides solar energy to Zambia's clinics and hospitals Provides energy to off-grid rural health facilities and back-up solutions to on-grid district hospitals as an alternative to expensive and polluting diesel generators 	 Installed solar PV systems of capacity 1,100 kWh across 19 health facilities in Zambia 	Innovation NorwayGovt. of Zambia	\$0.7 Mn

Source: Beyond the Grid Fund for Zambia (Link); Zambia SEforAll Action Agenda, Ministry of Energy, GIZ, June 2019; Scaling-up Renewable Energy Program: Investment Plan, MoE, April 2019 (Link); Beyond the Grid Fund for Zambia: Press Release (Link); Global Energy Feed-in Tariff Programme (Link); Zambia: Get FiT announces \$4c/kWh tariff (Link)



Development Partners: The World Bank is supporting ZESCO and REA through a \$5.9 Mn fund for increasing access to electricity in rural areas through off-grid solutions

Implementing agency	Programme	Intervention areas	Results	Donors/ Partners	Funding
(REA)	The Electricity Services Access Programme (ESAP) (2017 - 22)	 Implement an Off-Grid Electrification Smart Subsidy Programme with partial grant subsidies for private sector-led minigrids that may be complemented with stand-alone solar systems Provide a \$2 Mn credit line loan facility for off-grid solutions to companies importing/selling solar equipment, developers of minigrids, and end-users of solar equipment Create an enabling ecosystem for off-grid solar and minigrid – design frameworks and policies 	 Develop an off-grid implementation and operational plan Prepare the National electrification strategy (NES) - systematic approach of providing electricity through grid and off-grid roll out Train 25 people in sector policy and technical aspects Provide electricity to 114,400 people (grid and off-grid) 	 World Bank Development Bank of Zambia Zambia Electricity Supply Company (ZESCO) MoE SIDA AfDB 	\$5.90 Mn (for off-grid electricty expansion) Total funding stands at \$26.5Mn



Development Partners: AfDB and DFID are facilitating establishment of Green MiniGrids (GMGs). DFID's ACE programme is also assisting in the market development of SHS systems

Implementing agency	Programme	Intervention areas	Results	Donors/ Partners	Funding
The development of	Sustainable Energy For All (SE4all) (2016-19)	 Market Intelligence on off-grid solar solutions development Business development services Policy enablement for achieving energy targets Development of financing mechanisms to HHs and developers Technical standardization and quality control of off-grid solutions 	 Developed the Draft Action Agenda in 2018, framework for achieving SE4All objectives and monitoring process Developed the draft Investment prospectus (key activities, investment opportunities etc.) to operationalize the Action Agenda 	• Partnership between the AfDB, the African Union Commission, the NEPAD Planning and Coordination Agency and UNDP	\$18.8 Mn (Donor income as on Dec 2018)
DFFID Department for International Development	Africa Clean Energy Programme (ACE) (2016 - 22)	 Technical assistance to improve the enabling environment for a market-based approach for private sector delivery of SHS Enable enterprise finance Test innovative approaches to stimulating private sector investment and market development 	 Conducted studies to examine the impact of different fiscal incentives to accelerate the development of household solar markets in Zambia \$7 Mn invested in 10 solar companies in 4 countries including Zambia Developed Energy Africa Compact for Zambia aimed at improving policies and regulations that facilitate a market based approach to HH solar energy 	 DFID , UK Partners Africa Enterprise Challenge Fund Ltd. IFC USAID Power Africa DAI 	\$81 Mn (14 African countries)



Development Partners: EU supports GRZ through the Euro 40 Mn IAEREP programme. EU is also set to launch a EUR 30 Mn facility providing up to 50% grant to eligible off-grid private investors under IAEREP

Implementing agency	Programme	Intervention areas	Results	Donors/ Partners	Funding
(Ministry of Energy, Zambia)	Increased Access To Electricity And Renewable Energy Production (IAEREP) Project (2016 - 22)	 Enhance policy, legal and regulatory environment Capacity building on RE production Feasibility studies and demonstration projects to develop gender inclusive renewable energy initiatives Awareness generation 	 Developed a draft minigrid regulatory framework with the Energy Regulation Board (ERB) in Oct 2018. This entails different licensing approaches based on capacity of minigrid (0-100 KW, 100KW – 1 MW and >1 MW); options on treatment of security of tenure, and regulatory treatment of grid encroachment 	• European Union	\$44 Mn
ESSME bery Beter Hangement Asserter Progen	Renewable Energy Resource Mapping Project (2016 - 18)	 Mapping of solar and wind resource potential in Zambia 	• Solar and Wind Atlas	 The Ministry of Energy and Water Development Zambia Electricity Supply Company (ZESCO) Rural Electrification Authority (REA) 	\$3.6 Mn

Source: Zambia SEforAll Action Agenda, Ministry of Energy, GIZ, June 2019; Scaling Up Renewable Energy: Investment Plan for Zambia, MoE, 2019 (Link); Energy Sector Report 2018, Energy Regulation Board (Link); Summary of Approved Regulatory Framework for Minigrids in Zambia, ERB, 2018 (Link)

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Development Partners: The World Bank and IFC have supported GRZ to implement two solar PV plants in Zambia as part of the Scaling Solar programme

Implementing agency	Programme	Intervention areas	Results	Donors/ Partners	Funding
<image/> <image/>	Scaling Solar (2017)	 Provides business development support and assistance in tendering process for enabling private sector engagement in solar Supports GRZ to procure solar power at low cost through auctions Provides financing for solar power projects 	 Zambia's Industrial Development Corporation (IDC) signed an agreement with IFC in 2017 to develop 500 MW of clean, renewable energy through two to four projects Facilitated the first solar public private partnership in Zambia: Bangweulu project by NEON S.A.S./First Solar - 54 MW solar plant operational since Mar 2019 (\$60 Mn) A 34MW Ngonye solar plant by ENEL Green Power, operational since Apr 2019 (\$34 Mn) >27,000 homes have been supplied with electricity through Bangweulu 	 REEP Zambia's Industrial Development Corporation (IDC) Funding support - Ministry of Foreign Affairs of the Netherlands Ministry of Foreign Affairs of Denmark USAID's Power Africa Infrastructure Development Collaboration Partnership Fund (DevCo) European Investment Bank (EIB) IFC-Canada Climate Change Programme Overseas Private Investment Corporation (OPIC) 	\$94 Mn (Investment by IFC, EIB, FC-Canada Climate Change Programme and OPIC)

Source: Zambia SEforAll Action Agenda, Ministry of Energy, GIZ, June 2019; Scaling-up Renewable Energy Program: Investment Plan, MoE, April 2019 (Link); Zambia driving Scaling Solar forward with second large-scale project completion, PV Tech, April 2019 (Link); Scaling Solar Zambia, World Bank Group (Link); ZAMBIA: Bangweulu's solar park (54 MW) recently delivered by Neoen and IDC, Afrik 21, Sep 2019 (Link); IFC and the Government of Canada Support Second Scaling Solar Project in Zambia, IFC, June 2018 (Link)

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Development Partners: The World Bank and IFC have supported GRZ to implement two solar PV plants in Zambia as part of the Scaling Solar programme

Implementing agency	Programme	Intervention areas	Results	Donors/ Partners	Funding
REEN CLIMATE	Renewable Energy Financing Framework (REFF) (2018-23)	 Provided \$100 Mn of senior debt and stand by loans to selected GETFiT projects Provided TA grants upto \$4 Mn to develop ecosystem and value chain for RE electrification, including (a) Policy advocacy for minigrid and off-grid; (b) Capacity building of commercial banks and institutional investors 	 Expected Impact: Deliver 100 MW of power through 4-6 small-scale solar PV IPPs and small hydro plants 3.99 MtCO₂ eq. emission reduction over project lifetime (25 years) Benefit 1.8% population indirectly from low-emission electricity coming on-grid 3 off-grid and minigrid projects financed by private investors 	 MoE REA ZESCO Ministry of Finance (MoF) 	\$152.5 Mn (\$52.5 Mn by GCF)
(Ministry of Energy, Zambia)	China-Zambia South-South Renewable Energy Technology Transfer Project (2014-18)	 Strengthen enabling environment for transfer and priority use of RE technology Remove market barriers to the adoption of renewable technologies for the rural poor in Zambia 	 University of Zambia (UNZA) Solar Energy Centre of Excellence was launched in 2018 to provide skills development, testing of equipment and physical demonstration of solar technologies based on the Chinese experience 	 UNDP DANIDA Chinese Ministry of Science and Technology 	\$2.9 Mn

Source: Zambia SEforAll Action Agenda, Ministry of Energy, GIZ, June 2019; Scaling Up Renewable Energy: Investment Plan for Zambia, MoE, 2019 (Link); Zambia Renewable Energy Financing Framework, Green Climate Fund (Link)

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Development Partners: GET.Invest is another platform that is mobilizing investment for OGS solutions in Zambia, and providing business development support to OGS enterprises

Implementing agency	Programme	Intervention areas	Results	Donors/ Partners	Funding
gíz	GET.Invest (2018-21)	 The programme aims to- Enable access to finance for project and business developers by providing advisory services through a finance catalyst team Provide market Insights studies to help entrepreneurs identify markets and opportunities Support industry associations, in organizing networking and information sharing events Help regulators implement regulatory processes for private investments to accelerate transactions and balance the risk for all parties 	 The programme is hosted on the multi-donor platform GET.pro (Global Energy Transformation Programme), implemented by GIZ. Some key interventions in Zambia include the following: Organization of the Zambia off-grid Investor Forum in 2018 Created a portal of 11 funds that are specifically providing investment for RE-based technology in Zambia, to enable private developers to apply for financing of projects Published market insight reports and case studies on stand-alone solar businesses and minigrids in Zambia 	 EU (DG DEVCO) Germany (BMZ) Austrian Development Cooperation Ministry of foreign affairs of the Netherland Sweden (Sida) 	



Development Partners: SREP aims to boost private sector led electrification through OGS solutions by providing \$10 Mn grants. It also aims to raise additional \$151.7 Mn from donors, DFIs and private sector

Implementing agency	Programme	Intervention areas	Results	Donors/ Partners	Funding
(Ministry of Energy, Zambia)	Scaling-up Renewable Energy Programme (SREP) for Low- Income Countries	 One of the components of SREP aims to improve energy access in rural and peri-urban areas by: Enhancing quality of power supply to support community productive uses Increasing private sector participation in off-grid and minigrid systems Providing partial grants and subsidies to support private sector-led electrification through RE minigrids and stand-alone solar systems 	 Develop the off-grid/minigrid systems to realize 70 MW of RE based electricity, expected to increase access to financing for at least 50,000 households Install solar PV minigrids and deploy SHS in rural areas Conduct an affordability study to examine the ATP of consumers in rural and remote areas 	Strategic Climate Fund, which operates under the Climate Investment Funds (CIF) Other Partners: • AFDB • IFC • WB • GRZ • EU • SIDA • KfW	\$10 Mn (Total \$161.7 Mn for off-grid and minigrid, including funds raised from other sources)



Financiers (Enterprise): Globally, off-grid access companies raised \$1.7 Bn since 2010, of which 80% (\$1.1 Bn) went to SHS providers (90% of whom used PAYGO models) and 80% was deployed in Africa

TOP 10 SHS RECIPIENTS BY DISCLOSED FINANCING TYPE, CUMULATIVE TO YEAR-END 2018



A few of these SHS market leaders such as Greenlight Planet , Azuri in partnership with Kazang Solar have presence in Zambia

- Country: Africa is an attractive market for investors absorbing 80% of total OGS funding globally. The customers of the top scaled companies in the OGS sector are concentrated in East Africa. Mobile money penetration and sensitization has helped attract 58% of disclosed capital to East Africa but market saturation is a risk
- Product segment and financing models: Companies deploying solar home systems (SHS), pay-as-you-go (PAYGO) business models have attracted 81% and 91% of investment, respectively
- Asset Class: Over 50% of total capital raised is debt, ~44% is equity and ~6% is grants
- Source of financing: 71% of energy access finance is sourced from private capital markets while 86% of investments are dollar-denominated, but local currency is on the rise

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Financiers (Enterprise): In 2018, the OGS energy sector attracted a total investment of \$352 Mn, 20% more than 2017, and highest since 2012. However, investment by local banks remained low.





Funding overview

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- East Africa was the largest recipient but there are signs of market saturation: While East Africa received the largest amount of investment (44% of total) in 2018, it received the lowest absolute amounts of investment since 2012. Companies and investors are seeing growth potential in West Africa which attracted 19% of investments.
- Highest debt funding of \$225 Mn since 2012: Specialised intermediary debt finance providers along with crowdfunding platforms and DFIs have contributed significant amounts of debt funding for inventory finance, working capital and financing of receivables.
- Concentration of transactions dipped slightly from 2017 levels: Top 10 fund recipients attracted 77% of the total funding compared to 85% in 2017 suggesting that more recipients now have access to capital.

Barriers to investment in OGS by local FIs in East Africa

Investments from local banks and MFIs is limited due to the following factors:

- Mid-sized banks: Inadequate data quality of OGS players, weak credit management systems and controls, default risk due to poor product quality and limited internal capacity of banks in OGS sector
- Regional banks: Limited data transparency, management related challenges, inability to meet disbursement criteria and mismatched interest of banks and other providers of guarantees/ credit lines
- MFIs: Competition from PAYGO businesses, high transaction cost of small sized loans for low cost SHS systems, low quality standards and limited internal capacity

Source: The Top 5 Investment Trends in the Off-Grid Solar Energy Sector, GOGLA, May 2019 (Link); Increasing Local Financial Institution Investment in the Off-grid Solar Sector, GOGLA, Sep 2018 (Link);

Financiers (Enterprise): Listed below are a few recent deals in OGS sector involving players who have operations in Zambia

Investor	Company	Asset class	Amount (USD)	Date	Sources Of Fund Deployment
InfraCo Africa	Standard Microgrid Initiatives	Convertible Loan Agreement	3.5 Mn	Jun 2019	Build six solar photovoltaic (PV) microgrids in rural and peri-urban areas and rapidly expanding its distributed power service by further deploying >100 units in Zambia
Marubeni Corporation	Azuri	Equity	26 Mn	Jun 2019	For its Africa clean energy initiative
EU Programme ElectriFi, TRINE	Azuri	Debt	20 Mn	Jan 2018	Provide end-user financing for its PAYGO products
Apis Partners	Greenlight Planet	Debt and equity	60 Mn	Dec 2017	Expand its solar-energy product lines, distribution networks, and financing capabilities in Africa and Asia
REACT Window of the Africa Enterprise Challenge Fund	KAZANG Solar	Grant	1.6 Mn	Aug 2018	Provide solar home lighting products to more than 7,000 off-grid customers in rural Zambia
TRINE	Vitalite	Debt	0.2 Mn	Dec 2018	Install 1,800 solar home systems for low-income communities in Zambia

Sources: Azuri Technologies \$26 Mn investment to accelerate Africa's Clean Energy Drive, June 2019 (Link); Greenlight Planet Raises \$60 Mn for Off-Grid Solar Financing Business, Dec 2017 (Link); InfraCo Africa commits \$35 Mn to Standard Microgrid to Expand Delivery of Off-grid Solar in Zambia (Link); Azuri set for growth with Innovative \$20 Mn Debt Financing (Link); Kazang Solar Bags \$1.6 Mn to Provide Off-Grid Solar Solutions in Zambia (Link); Solar for Local Businesses in Zambia, TRINE (Link); Kazang Solar Bags \$1.6 Mn to Provide Off-Grid Solar Solutions in Zambia (Link); Solar for Local Businesses in Zambia, TRINE (Link);

Financiers: Funding opportunities in Zambia

	Financiers	Overarching Goal	Funding Amount
፠ Sida	SIDA	 Supports the Beyond the Grid for Africa multi-year programme aimed to increase energy access, improve livelihoods and catalyze economic activity in rural and peri-urban areas 	\$35 Mn co-funding leveraged by ESPs for Zambia
Fecf	REACT Window of the Africa Enterprise Challenge Fund	 A Household solar challenge fund window focused on off-grid electrification solutions in Zambia, Zimbabwe, Malawi and Sierra Leone 	\$161 Mn invested over 6 years in 77 companies
EEP Africa	Energy and Environment Partnership Southern and East Africa (EEP S&EA)	 Challenge fund promotes renewable energy, energy efficiency, and clean technology investments in Southern and Eastern Africa. Jointly funded by the Ministry of Foreign Affairs of Finland, the Austrian Development Agency, and the UK's Department for International Development (DFID) 	€60 Mn for the region
	ElectriFi	 EU funded energy access impact investment facility, ElectriFi provides debt and equity financing for small scale private companies focusing on new or improved electricity connections as well as generation capacity from sustainable energy sources in emerging market 	€40 Mn dedicated to boosting Zambia renewable energy market
	11th European Development Fund (2014–2020)	 Support both public and private sector organizations active in Zambia's rural electrification sector by awarding 3-4 grants for off-grid solutions 	€244 Mn dedicated to energy
Global Distributors Collective	GDC Innovation Challenge	 For GDC members who have presence in 7 African countries including Zambia; sell products that contribute to SDG 7; and support energy access including off-grid lighting and energy efficient appliances 	Up to £30,000

Source: Beyond the Grid Fund Zambia (Link); Electrifi: Zambia Country Window (Link); 11th European Development Fund: National Indicative Programme (Link)



Associations: Represent private sector interests and advocate policy issues to government

Organization		Work In Zambia
G G LA	GOGLA (Global Off- Grid Lighting Association)	 GOGLA is the global association for the off-grid solar energy industry established in 2012, representing 150 members It supports members with the following services: Market intelligence, building an understanding of market opportunities and impact Knowledge-sharing and networking through events and communications Advocacy, for building enabling policy and investment Creating and promoting industry standards and guidelines
Zambia ZARENA Renewable Energy Agency	Zambia Renewable Energy Agency (ZARENA)	 Interest group for renewable energy stakeholders in Zambia Their objective is to promote and advocate the increased use of Renewable Energy by developing an effective network of members and stakeholders, emphasizing the need for quality and best practice throughout the sector
Alliance for Rural Electrification Shining a Light for Progress	Alliance for Rural Electrification	 An international business association that promotes a sustainable decentralized renewable energy industry, activating markets for affordable energy services, and creating local jobs and inclusive economies It supports members with the following services: business partnerships on existing business solutions via 'Market Intelligence & Business Services' (B2B and B2F networking events). Creating business enabling framework conditions Building for future innovations
	Zambia Solar Association	 Promotes solar energy in Zambia and advocate for a conducive enabling environment



Others: There are some research institutions and universities active in Zambia working to support the OGS market

Organization		Work In Zambia
C25 DURING SUNTECH APPROPRIATE TECHNOLOGY LTD.	Pumulani Renewable Energy Centre (Under Suntech Appropriate Technology Ltd.)	 Its mission is to be Zambia's main centre for education and training on renewable energy It provide hands-on and tailor-made courses for technicians and entrepreneurs through direct linkage with the private sector and by using trainers with full experience in production, installation and maintenance of solar installations
Ð	University of Zambia	• The university through its Energy and Environment Research Group (EERG) in the department of physics focuses on consultancy, capacity building and research in the energy and environment space
CEEEZ ICentre for Energy, Environment and Engineering Zambia Limited	Centre for Energy, Environment and Engineering Zambia (CEEEZ)	 Conducts studies, research and development, consultancy and training in the areas of energy, environment and engineering
BongoHive	Bongo Hive	• Provides capacity building mainly through start up and tech programmes, workshops and events



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Off-grid technologies in Zambia provide energy to Tier 0 to Tier 1 consumers. PV SHS and DC powered energy efficient appliances that provide access to Tier 3, 4, and 5 consumers are rarely available

Multi Tier Framework	TIER O	TIER 1	TIER 2	TIER 3	TIER 4	TIER 5
Appliances	Kerosene lamps Dry cell batteries	Task lighting, phone charging radio (e.g. solar lanterns , SLS)	Multipoint general lighting, TV, Computer, Printer, Fan (e.g. Entry level SHS)	Air cooler, refrigerator, freezer, food processor, water pump, rice cooker	Washing machine, iron, hair dryer, toaster, microwave	Air conditioner, space heater, vacuum cleaner, water heater, electric cookstove
Load Level		3-49 W	50-199 W	200-799 W	e.g. High capacity 800-1999 W	SHS and Minigrids 2000 W or more
			Inc	crease In Size (kV	V)	



Private operators: The off-grid product enablers in Zambia are commonly divided into developers, assemblers, wholesalers and last mile distribution agents (1/3)

Company Name		Products	Activities	Contact details
VITĂLITE	Vitalite Zambia Limited	 Solar Home Systems – lighting plus radio, TV Cooking products Agro-innovations 	Assembly of solar productsMaintenance and supply of solar products	contact@vitalitegroup.com
fenix intl	Fenix International	 Solar Home Systems – ReadyPay Power 	 Assembly/Manufacturing of solar products Wholesale distribution of solar products Training of local technicians and helping them become entrepreneurs 	press@fenixintl.com
	Azuri Technologies (distributed by Kazang Solar)	Solar Home SystemsAzuri Tv	 Wholesale distribution of solar products Solar centers - consumers are taught how to install and use products, and can access consumer credit and after-sales service and maintenance support PAYGO in partnership with Mobisol 	Simon Bransfield-Garth, CEO sbg@azuri-technologies.com
Muhanya Solan Limited Silent, Clean, Green Energy	Muhanya Solar	 Solar Home Systems Solar fridges and freezers Solar water pumping systems Solar water heaters Solar PV Microgrids. 	 Wholesale distribution of solar products 	sales@muhanyasolar.co.zm



Private operators: The off-grid product enablers in Zambia are commonly divided into developers, assemblers, wholesalers and last mile distribution agents (2/3)

Company Name		Products	Activities	Contact details
sunny È money [∞]	Solar Aid/Sunny Money	 Solar lights – SunKing brands among others 	 Wholesale distribution Last mile distribution – solar money agents Social enterprise owned by Solar Aid – UK based charity 	info.zambia@sunnymoney.org
	Total Awango	 Solar Lanterns 	 Distribution 	
KAZANG SOLAR	Kazang Solar	 Solar Home Systems – Azure 	Wholesale DistributorPAYGO model - Azuri	sales@kazang-zambia.com; choma@kazang-zambia.com
Sun king.	Greenlight Planet	 Sun King products – SHS and Solar Lamp kits 	Developer/ManufacturerWholesale Supplier	Anish Thakkar, Co-founder anish@greenlightplanet.com
f <mark>e</mark> sera	Forsera (distributed by vitalite)	Solar Home SystemsSolar Lighting	Developer/ManufacturerWholesale Supplier	



Private operators: The off-grid product enablers in Zambia are commonly divided into developers, assemblers, wholesalers and last mile distribution agents (3/3)

Company Name	2	Products	Activities	Contact details
(25) VANG OF SUNTECH APPROPRIATE TECHNOLOGY LTD.	SunTech Appropriate Technology Ltd	 Solar Lanterns Solar Home Systems d. light brand Solar water heating Solar cookers Solar Water Pumping Solar fridges Solar Street Lights 	 Manufacturer/Assembler Wholesale distribution After sales service/maintenance Training – Pumulani Renewable Energy Centre 	info@suntech-zambia.com
WidEnergy Africa Ltd Water block to Datwing Clean former	Widenergy Africa Ltd	 Solar lanterns – Little Sun Solar, Sunking products 	• Last mile distribution of clean energy solutions	info@widenergyafrica.com
	Sunray	Solar LightsSolar pumpsSolar panels	 Distribution and installation 	info@sunrayafrica.com
emų	Electric Maintenance Lusaka	 Solar Home Systems 	 Retail distribution Installation of SHS	hightec@eml-eis.com
SAROUP GROUP	Saro Agro Industrial	Solar GeysersSolar Pumps	 Distribution and Installation 	saro@saroagri.co.zm

Minigrids: Summary of public and private solar PV minigrid initiatives in Zambia (2017)

Owner	Site	Status (as on 2017)	Size KW	Connections	Other Details
Kafita Cooperative Society	Mpanta	Operational since 2013	60	450 households, 1 school, 1 health centre, a market, churches and fish refrigeration depots	
Muhanya Solar	Sinda	Operational since 2017	30	60 households and 5 businesses	Provides SHS to peripheral customers50 HHs and 2 institutional connections planned
Standard MicroGrid	Multiple	3 microgrids operational	10,10, 24	N/A	 Existing systems are containerized Partnership with Empowered by Light NGO Plans to build 150 microgrids across the country
REA	Chunga	Construction	200	Targeting 570 HHs, public institutions and businesses	Located in Kafua National Park
REA	Lunga	Construction	300	Targeting 1,600 HHs, public institutions and businesses	Located on Kasuma Lunga Island
Entiba Energy	Multiple	Planning	100	N/A	One pilot site under developmentHas identified 40 additional sites
Green Knowledge Institute	Luangwa	Planning		N/A	Located in Lundazi One pilot project solar PV/wind hybrid
ENGIE/Power Corner	Multiple	Scoping		N/A	One pilot site under assessment
Sigora Zambia	Kanja Area	Scoping		Targeting 215 HHs, 15 businesses, health centre, veterinary office, school	Located in Sioma District

Source: GET.Invest Market Insights-Zambia: Solar PV and Hydro Minigrids, GIZ, June 2019 (Link)

About The Organizations

(signify foundation

The Signify Foundation is dedicated to supporting underprivileged and underserved communities across the world by enabling access to light. When pursuing this mission, the Foundation expects to leverage Signify's expertise and knowledge to help develop and provide easily-accessible, sustainable lighting systems that have a meaningful impact on people's lives.

For more details please visit https://www.signify.com/global/our-company/signify-foundation



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