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Electrification



**Catalysing decentralised
renewable energy market
development for sustainable
electricity access in high
opportunity countries through
industry engagement and DRE
market & impact report**

NIGERIAN MARKET REPORT - MAY 2024

**THE EUROPEAN UNION GLOBAL TECHNICAL ASSISTANCE
FACILITY FOR SUSTAINABLE ENERGY**

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Abbreviations list

\$	United States Dollar	GOGLA	Global Off-Grid Lighting Association
ACE TAF	Africa Clean Energy Technical Assistance Facility	GW	GigaWatt
AECF	Africa Enterprise Challenge Fund	HETA	Health Electrification and Telecommunications Alliance
AFD	Agence Française de Développement	IDA	International Development Association
AfDB	African Development Bank Group	IEDN	Independent Electricity Distribution Networks
Africa REMI	Africa Renewable Energy Manufacturing Initiative	IPP	Independent Power Producer
AMP	Africa Mini-Grid Programme	JICA	Japan International Cooperation Agency
ARE	Alliance for Rural Electrification	KE	Key Expert
ATA	Agricultural Transformation Agenda	KMM	Key-Maker Model
ATASP-1	Agricultural Transformation Agenda Support Programme Phase I	kVA	Kilovolt-Ampere
BCG	Boston Consulting Group	LBS	Lagos Business School
BEIS	UK's Department for Business, Energy and Industrial Strategy	LPG	Liquefied Petroleum Gas
BMZ	German Federal Ministry for Economic Cooperation and Development	MAN	Manufacturers Association of Nigeria
C&I	Commercial and Industrial	MFI	Micro Finance Institutions
CAPEX	Capital Expenditures	MNO	Mobile Network Operator
CEFP	Clean Energy Funding Programme	MOU	Memorandum of Understanding
DARES	Distributed Access through Renewable Energy Scale-up	MSME	Micro, Small and Medium Enterprise
DART	Demand Aggregated Renewable Technology Facility	MTF	Multi-Tier Framework
DCC	Department for Climate Change	MW	MegaWatt
DFI	Development Finance Institution	MYTO	Multi-Year Tariff Order
DGIS	Directorate-General for International Cooperation	NACC	Nigerian Alliance for Clean Cookstoves
DISCOM	Electricity Distribution Company	NBS	Nigeria Bureau of Statistics
DRE	Decentralised Renewable Energy	NDC	Nationally Determined Contribution
DSOLS	De-Risking Sustain-able Off-Grid Lighting Solutions in Nigeria	NEEAP	National Energy Efficiency Action Plan
EAP	Energising Agriculture Programme	NEnP	National Energy Policy
ECN	Energy Commission of Nigeria	NEP	Nigeria Electrification Project
ECOWAS	Economic Community of West African States	NEPP	National Electric Power Policy
EEI	Energising Economies Initiative	NERC	Nigerian Electricity Regulatory Commission
EPC	Engineering Procurement Construction	NESP	Nigerian Energy Support Programme
EPSRA	Electricity Power Sector Reform Act	NESREA	National Environmental Standards and Regulations Enforcement Agency
ETP	Nigeria Energy Transition Plan	NFDP	The National Fadama Development Project
EU	European Union	NGN	Nigerian Nairas
FAO	Food and Agriculture Organization of the United Nations	NGO	Non-Governmental Organisation
FCDO	UK's Foreign, Commonwealth and Development Office	NIAF	Nigeria Infrastructure Advisory Facility
FCT	Federal Capital Territory	NIPC	Nigerian Investment Promotion Commission
FGN	Federal Government of Nigeria	NKE	Non-Key Expert
FMENV	Federal Ministry of Environment	NOMAP	Nigeria Off-Grid Market Acceleration Programme
FMP	Federal Ministry of Power	NPSF	Nigeria Power Sector Programme
FUTO	Federal University of Technology Owerri	NREAP	National Renewable Energy Action Plan
FX	Foreign Exchange	NREEEP	National Renewable Energy and Energy Efficiency Policy
GEAPP	Global Energy Alliance for People and Planet	NSIA	Nigeria Sovereign Investment Authority
GEF	Global Environment Facility	OAU	Obafemi Awolowo University
GMG	Green Mini Grids	Q&M	Operation and Maintenance
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	OSIC	One-Stop Investment Centre
		PACT	Partnering for Accelerated Climate Transitions
		PAYGO	Pay-As-You-Go
		PEBEC	Presidential Enabling Business Environment Council
		PIDG	Private Infrastructure Development Group

PPP	Public-Private Partnership
PSB	Payment Service Bank
PUE	Productive Uses of Energy
RBF	Results-Based Financing
REA	Rural Electrification Agency of Nigeria
REAN	Renewable Energy Association of Nigeria
REF	Rural Electrification Fund
REMP	Renewable Energy Master Plan
REPP	Renewable Energy Performance Platform
RESIP	Rural Electrification Strategy and Implementation Plan
RMI	Rocky Mountain Institute
ROGEAP	Regional Off-Grid Electricity Access project
SAS	Stand-Alone System
SEforALL	Sustainable Energy for All
SHP-DAIN	Small Hydro Power Development for Agro-industry Use
SHS	Solar Home Systems
SME	Small and Medium-sized Enterprise
SOGE	USAID's Scaling Off-grid Energy
SON	Standards Organisation of Nigeria
SPN	Solar Power Naija
SSPU	Stand-Alone Solar for Productive Use
SUNREF	Sustainable Use of Natural Resources
TAF	Technical Assistance Facility
TEA	Transforming Energy Access
TEI	Team Europe Initiative
UBA	United Bank for Africa
UDUSOK	Usmanu Danfodiyo University Nigeria
UEF	Universal Energy Facility
UK	United Kingdom
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation
UNIPORT	University of Port Harcourt
UNN	University of Nigeria Nsukka
USADF	United States African Development Foundation
USAID	United States Agency for International Development
USTDA	United States Trade and Development Agency
VAT	Value-Added Tax

1.

Executive summary

Nigeria leads the top 20 countries worldwide having the largest energy access deficits with the biggest unserved population of 88.5 million (59.5% access to electricity rate)¹. Despite government interventions over the years, electrification efforts have failed to bridge the access gap and keep pace with population growth.

In addition to the population without access to electricity, an estimated 22 million small backup diesel generators are installed in Nigeria with a capacity of 42 gigawatts - about eight times the installed peak generating capacity of the main grid. 78% of main grid customers in Nigeria report that the grid “works about half the time, occasionally, or never”.²

The Nigerian government stated that access to energy for all Nigerians is a top priority for the country, aiming to reach an access rate of 90% by 2030³.

One of the vectors for reaching that goal are decentralised renewable energy (DRE) solutions, driven by a Public-Private Partnership approach, as well as the development of a dynamic and thriving private sector.

The DRE sector in Nigeria has grown significantly over the past years. This growth has been primarily driven by concerted market development efforts and initiatives of international funding partner programmes that have improved the enabling environment for the sector. This includes a multitude of Team Europe initiatives.

On the demand side, Nigeria represents the largest market in terms of potential (over 88 million people without access to energy) alongside the Democratic Republic of Congo and Ethiopia, but with an important difference: Nigeria has advanced on policy and regulatory reform, addressing supply, finance, and demand barriers, funding projects and testing business models from pilot stages to commercial

viability, and building the capacity of the government and DRE companies. As a result, significant commercial investments have been made by industry, especially in the green mini-grid space in the country.

Overall, the estimated potential annual market opportunity to supply customers with DRE technologies, such as green mini-grids and solar home systems in Nigeria, is \$9.2 billion⁴.

Nevertheless, whilst the Nigerian DRE market has seen significant progress over the years, there are still several barriers, particularly financing, macroeconomic, and policy implementation barriers, that need to be effectively addressed.

This report assesses the supply side where a highly dynamic private sector has developed over the last years and the demand side where a large potential remains untapped. Regarding the enabling environment, many improvements have been achieved, including the institutional, policy and regulatory environment. On the other hand, access to finance for local companies remains a major issue, less in terms of programmes and initiatives and more related to credit from local finance institutions.

1 SEforALL (2023) Tracking SDG7: The Energy Progress Report. https://trackingsdg7.esmap.org/data/files/download-documents/sdg7-report2023-full_report.pdf

2 ESMAP (2024). Mini Grid Solutions for Underserved Customers: New Insights from Nigeria and India.

3 Nigeria SEforALL Action Agenda (2016). https://www.seforall.org/sites/default/files/NIGERIA_SE4ALL_ACTION_AGENDA_FINAL.pdf

4 Nigeria Rural Electrification Agency (2017). The Off-Grid Opportunity in Nigeria (Presentation). https://www.esmap.org/sites/default/files/Presentations/REA_Damilola-Off-Grid%20Opportunity_03122017_web.pdf

2.

Current situation of energy access

The Renewable Energy Master Plan (REMP) establishes the following rural electrification goal: to increase access to electricity to 75% by 2020 and then to 90% by 2030 and achieve at least 10% of renewables in the energy mix by 2025. Increasing electricity access rates requires both expansion of the grid, and deployment of decentralised renewable energy (DRE) such as solar home systems (SHS), green mini-grids (GMG), and renewable energy solutions for commercial and industrial (C&I) uses.

Despite government interventions over the years, electrification efforts have struggled to keep pace with population growth. Even if the current grid generation capacity reaches 13 GigaWatts (GW), technical, political, and financial issues pose challenges across the grid value chain and constrain utilisation.

The electricity deficit has resulted in the high use of petrol- and diesel-powered generators, with the Nigerian diesel genset market estimated to be worth \$445.1 million in 2021⁵. About ~42GW of electricity is provided through small gensets only (0-4 Kilovolt-Amperes (kVA))⁶, 10 times more than the grid does. 22 million households and small businesses spend an estimated \$12 billion each year buying and operating these small gensets⁷. As of 2017, it was estimated that 86% of companies in Nigeria own or share a generator covering 48% of their electricity needs⁸. Those that cannot afford generators, particularly in rural communities, resort to using kerosene lamps, torchlights, candles, and firewood for basic energy services such as lighting. The deficiencies in the supply of power, combined with the size of the existing self-generating market and high cost of diesel/ petrol self-generating options, mean that Nigeria has a high potential to develop its DRE sector.

In the cooking sector, only 11% of the population has access to clean cooking⁹. Cooking is predominantly done using wood (80% in rural areas)¹⁰.

According to the Nigeria Bureau of Statistics (NBS) 2020 report, 68.3% of all Nigerian households use solid biomass for cooking in Nigeria, 10.5% use Liquefied Petroleum Gas (LPG), 19.8% use kerosene, and only 1% use electricity for cooking. Energy stacking is the norm. Most families have more than one stove type and use a variety of fuels regularly.

The clean cooking sector represents 22% of the country's commitment to reducing emissions according to the Nigeria Energy Transition Plan (ETP), together with four other key sectors (power, oil and gas, transport and industry), with the overall commitment to be carbon neutral by 2060. However, clean cooking adoption in Nigeria has been slow. The transition to cleaner fuels is not a linear process and stacking should be used as a coping mechanism to improve resilience.

5 Prescient and Strategic Intelligence (2021). Nigeria Diesel Genset Market. <https://www.psmarketresearch.com/market-analysis/nigeria-diesel-genset-market>

6 Dalberg (2019). A2EI - Putting an End to Nigeria's Generator Crisis: The Path Forward.

7 Ibid.

8 Punch (2017, December 28). Heavy use of generators puts Nigeria's climate plans in jeopardy. <https://punchng.com/heavy-use-of-generators-puts-nigerias-climate-plans-in-jeopardy/>

9 World Bank (2023). Unlocking Clean Cooking Pathways – A Practitioner's Keys to Progress. <https://documents1.worldbank.org/curated/en/099095503072317708/pdf/P1742320fcb6a8051083c008061576a2156.pdf>

10 CCA (2021). Nigeria Consumer Segmentation. <https://cleancooking.org/wp-content/uploads/2021/08/Nigeria-Consumer-Segmentation-Fraym-for-Clean-Cooking-Alliance.pdf>

In terms of energy access, the current situation is summarized in the table below:

Table 1: Overview of energy access status

59.5%	Electricity access rate
17%	Clean-cooking access rate
89.2%	Electricity access rate (urban)
26.3%	Electricity access rate (rural)
218	Population (total in millions)
2040	Target year for universal electricity access
88.5	Population (in millions) without access to electricity
181	Population (in millions) without access to clean cooking
80%	Target for clean cooking by 2030
2.930	Number of alive stand-alone solutions (in millions)
113	Fully operational mini-grids
10%	Target for mini-grid electrification
5%	Target for stand-alone electrification

Nigeria’s electrification efforts have so far focused on SHS, GMGs, and C&I renewable energy systems. These methods have been used in particular to meet the energy needs of remote communities at distances over 10km from the grid, underserved areas with unreliable grid access, households, and businesses.

The establishment of GMG and SHS solutions in remote areas which are unserved and underserved are expected to improve electricity supply. These are also expected to improve the opportunities for investment in the manufacturing and supply of electrical equipment, promoting local content and economic development.

The Federal Ministry of Power and the Rural Electrification Agency of Nigeria (REA) have been key stakeholders in the implementation of projects focused on renewable energy mini-grid development, SHS deployment, C&I clean energy systems, and geospatial planning.

The table below provides a summary of the evolution of the electricity access sector focusing on four key aspects: companies, products, financing, and policy and regulation. There is a clear change since 2018 due to development of mobile money, new supportive regulation and the launch of certain programmes (mainly related to green mini-grids).

Table 2: Timeline of progress regarding DRE electrification initiatives in Nigeria¹²

	Pre 2018	2018 - 2023
Companies	<ul style="list-style-type: none"> Relatively nascent DRE sector with ~45 companies. Characterised by new SHS market entrants and indigenous developers with local market knowledge. 	<ul style="list-style-type: none"> Burgeoning sector with 100+ DRE introducing new business models such as Pay-As-You-Go (PAYGO) and Productive Uses of Energy (PUEs). Companies ranging from seed stage to established brands with market presence in multiple geographies. Several programmes for mini-grids have sustained the private sector to scale from early stage to more sustainable businesses.
Products	<ul style="list-style-type: none"> SHS market dominated by Pico systems and entry-level SHS systems sold outright or through a PAYGO model. Isolated green mini-grids (below 100kW) introduced by pioneer developers. 	<ul style="list-style-type: none"> Addition of larger SHS systems and productive use appliances targeted at small and medium-sized enterprises (SMEs). Increased optimisation of mini-grid customer mix to include productive use of customers and support daytime loads.
Financing	<ul style="list-style-type: none"> International SHS companies supported by corporate level fundraising. Mini-grid developers predominantly financed by grants and developer equity. Financing on project-by-project basis. 	<ul style="list-style-type: none"> Transition from grant funding towards private debt and equity funding. Introduction of innovative financing approaches that show potential for financing at scale. Major investments in mini-grid portfolios with commercial capital.
Policy & Regulatory	<ul style="list-style-type: none"> Clear requirements for licensing, permitting, registration, tariff setting, interconnection and grid arrival established for mini-grids. 	<ul style="list-style-type: none"> Regulatory environment continues to attract DRE investors. Centralised approach through REA as one-stop shop on electrification in the country. Offset by slightly worsened macro-economic environment.

11 World Bank Data (2021).

12 USAID Power Africa Nigeria Power Sector (NPSP) (2022). Presentation at the Off-Grid Donor Meeting.

2.1 THE NIGERIAN MINI-GRID MARKET

The Nigerian mini-grid sector is fast growing, with most operators established in the past five to eight years. There has been a lot of interest in the sector, which has grown significantly from just 11 mini-grids¹³ (mainly pilot demonstration projects) and ~5 mini-grid developers in 2015¹⁴ to ~113 mini-grids with a total installed capacity of ~12MW and 171,635 connections across 135 communities¹⁵. Nowadays, more than 15 mini-grid developers are active in the mini-grid market. This growth has been encouraged by the development of the Nigerian Mini-Grid Regulation (from 2016 and updated in 2023) which provides the regulatory framework for investment and deployment of mini-grids in the country, and by the Nigeria Electrification Project (NEP) which has catalysed commercial investment in mini-grids across the country.

Other government initiatives, such as the Rural Electrification Fund (REF) and the Solar Power Naija (SPN) programme, a COVID-19-response initiative of the government, have further encouraged investment in mini-grids.

The Mini-Grid-Regulation is the overarching document governing the development of mini-grids with plant capacity of up to 1MW in Nigeria. The regulation oversees all aspects of mini-grid development, with mini-grids defined by the regulation as “any electricity supply system with its own power generation capacity, supplying electricity to more than one customer and which can operate in isolation from or be connected to a distribution licensee’s network”.

Regarding costs, they have increasingly become competitive over the last years, compared to alternatives like diesel and petrol generators, and projects are moving away from grant funding to commercial investment. Current mini-grids are showing greater availability, reliability, and customer value compared to alternatives in most rural areas.

Electricity distribution companies (DISCOMs) are open and willing to work with mini-grid developers, which represents a change compared to the sector’s inception years when

mini-grids were considered to be threats by distribution companies.

Tariff rates vary and tariffs are developed in agreement with the host community. Current cost-reflective mini-grid tariffs are typically near N200/kWh (\$0.43/kWh), which is less expensive than the cost of running a small diesel or petrol genset. Although this cost reflects the small scale and risk of a nascent market, mini-grid tariffs are expected to continue falling as the sector grows and as demand matures¹⁶.

Most existing commercial mini-grids use a public private partnership (PPP) operator business model funded through a mix of debt, equity, and grant funding. The most common debt-to-equity ratio is around 70:30, with an additional variable grant component. Commercial debt is obtained primarily through concessional loans and impact investment, with some developers also exploring crowdfunding. Mini-grid developers report 15%–20% of expected returns on successful projects¹⁷.

It is important to note that most of the progress and investment in the mini-grid sector is related to off-grid mini-grids. However, there is an increasing interest in the deployment of interconnected mini-grids for grid connected and unserved/underserved areas, and also as a mean of grid decarbonisation. The latter is not limited to mini-grids but also captive and embedded power systems above the capacity thresholds of mini-grids. There is an ongoing review of the Mini-Grid Regulation by the government and sector stakeholders to update the regulation, including a proposed increase in the capacity threshold to 5MW.

13 Nine solar photovoltaic + batteries, one biogas, and two hybrid solar PV-diesel systems.

14 ESMAP (2017). Mini Grids in Nigeria – A Case Study of a Promising Market. <https://documents1.worldbank.org/curated/en/352561512394263590/pdf/ESM-dNigeriaMiniGridsCaseStudyConfEd-PUBLIC.pdf>

15 Nigeria SEforALL tool (2023). Mini-grids. <https://nigeriase4all.gov.ng/mini-grids>. Includes mini-grids deployed under the NEP, REF 1, REA Capital Projects, GIZ NESP, FMP, NESP1 and USADF as verified by the GIZNESP programme.

16 NESG, NIRER, RMI (2018). Mini-Grid Investment Report. https://rmi.org/wp-content/uploads/2018/08/RMI_Nigeria_MiniGrid_Investment_Report_2018.pdf

17 Nigerian Economic Summit Group, Nigerian Renewable Energy Roundtable & Rocky Mountain Institute (2018). Mini-grid Investment Report – Scaling the Nigerian Market.

Table 3: Number of mini-grids installed by programme¹⁸

Number of mini-grids by registered programme:	
67	NEP
28	REA Fund & Projects
3	Federal Ministry of Power Projects
7	EU-BMZ (Nigeria Energy Support Programme-NESP).
1	United States African Development Foundation (USADF)
7	Infracredit Clean Energy Funding Programme (CEFP)

Business models and financing schemes for mini-grids can be organised according to the following categories:

Table 4: Types of schemes used for mini-grids¹⁹

SCHEME	DESCRIPTION	ENGINEERING, PROCUREMENT AND CONSTRUCTION (EPC) & OPERATION AND MAINTENANCE (O&M)	OWNERSHIP	DESCRIPTION
Public	Government budget allocations	Government financed, construction and operation by shortlisted mini-grid developers	Government	Funded through government annual budgetary allocations for electrification projects. Federal (through the REF under the REA) and state governments announce calls for proposals, and successful operator/bidders implement projects.
Private	Private sector funded	Private sector financed, construction and operation by shortlisted mini-grid developers	Private	Financed by private organisations such as donors, non-governmental organisations (NGOs), and development finance institutions (DFIs), typically as pilot projects or community social projects.
Public-Private	Build – Own - Operate	Donor/DFI funded through grants and technical assistance, construction and operation by shortlisted mini-grid developers	Government	Donor/DFI provides technical assistance in form of equipment and technical know-how, as well as grant funding to the government through eligible mini-grid operators who construct and operate the mini-grid. The government typically provides support through land provision and tax incentives. Examples include European Union (EU) and German funded NESP, implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).
		Funded through a mix of government grant subsidies and private sector investment, construction and operation by qualified mini-grid developers	Private	Government initiatives such as the NEP funded through the World Bank and the African Development Bank (AfDB), and the SPN Programme funded through the Central Bank of Nigeria, through performance-based grants and minimum subsidy tenders. A blend of government grant subsidies and private sector investment from eligible mini-grid developers.

2.2 THE NIGERIAN STAND-ALONE SYSTEMS MARKET

Over the past 10 years, the Stand-Alone Systems (SAS) sector has developed from a largely grant funded market to a fully private sector led and commercially viable market with an influx of foreign and local SAS companies. Business models have also developed from a predominantly cash based model to the adoption and growth of PAYGO.

Large SAS companies in Nigeria have adapted their market approaches through partnerships with stakeholders such as telecom companies (for instance, Lumos in early 2020

reviewed its revenue-sharing model under their partnership with telecommunications company MTN Group Limited), and the utilisation of mobile payment agent companies in rural communities for collection and as sales representatives.

Growth in the sector has been catalysed by the support of donor and development partners.

According to a report by the Global Off-Grid Lighting Association (GOGLA)²⁰, Nigeria accounted for over 50% of

18 The Nigeria SEforALL Platform. <https://nigeriase4all.gov.ng/>

19 EU TAF Mini-Grid Schemes.

20 GOGLA (2022). Off-Grid Solar Market Trends Report 2022: State of the Sector. <https://www.gogla.org/reports/off-grid-solar-market-trends-report-2022/>

SAS sales in West Africa. SHS technologies dominate the SAS sub-sector.

In terms of number of systems, and according to the GOGLA report²¹, there are:

- 951,000 cash sales of lighting products between 2019 – 2022;
- 1,333,000 PAYGO sales of lighting products between 2019 – 2022.

REA also has 315,128 and 19,000 SHS deployed through the NEP and REF initiatives utilising the Results-Based Finance (RBF) business model²².

While both PAYGO and cash sales are increasing, payments in Nigeria are predominantly cash-based, with consumers taking full ownership of the product. PAYGO and the utilisation of mobile payment agents is expected to dominate payments in the medium to long-term. Business models, such as the lease to own and perpetual leasing (power-as-a-service) models for larger SAS systems, are increasingly adopted in the sector.

However, the PAYGO model has increasingly been adopted by consumers because of the benefit of increasing affordability by spreading out payments over longer periods (over a year)

than cash credit (typically three-six months). However, this is largely based on a lease-to-own model where the consumer owns the product eventually, rather than a perpetual lease model. While the market is predominantly cash based, the PAYGO model has increased significantly over the years and is almost on par with cash sales.²³

There is a \$2 billion potential annual market opportunity for SHS in Nigeria. According to an Africa Clean Energy Technical Assistance Facility (ACE TAF) report²⁴, “investors deployed an estimated \$227 million of investment into SAS companies between 2015 and 2020. Development partners and government programmes were the major financiers, contributing 54% of investment within the period. Debt finance was the main instrument, accounting for ~54% of total inflows, primarily to larger international companies. It only accounted for 18% of the deal count because of larger ticket sizes such as the Development Finance Corporation’s \$35 million debt investment into Lumos in 2020”.

There has been a growth in demand for SAS resulting from a multiplicity of factors including declining electricity provision, rising fuel costs for alternative electricity supply such as petrol generators and kerosene for lighting, and improved supply and consumer understanding of SAS.

2.3 EVOLUTION OF THE PRODUCTIVE USE OF ENERGY (PUE) MARKET

For the millions of Nigerians living without electricity access or with poor grid supply, the goal of electrification is to improve their quality of life through the benefits of energy access and to improve their income and livelihoods through the use of electricity in powering productive and income-generating activities. Over the years, sector focus has increasingly moved towards catalysing PUEs. Key factors driving this trend include:

1. Increased deployment and investment in DRE solutions, especially mini-grids and the role of productive use in increasing consumer income and affordability of DRE solutions, as well as the viability of DRE solutions, especially mini-grids;
2. Government focus on driving rural economic activities, especially in agriculture, through energy access. There is a growing need for energy access initiatives to focus on economic activities via productive use and local manufacturing.

21 Ibid.

22 Based on presentations by REA.

23 GOGLA (2022). Off-Grid Solar Market Trends Report 2022: State of the Sector. <https://www.gogla.org/reports/off-grid-solar-market-trends-report-2022/>

24 ACE TAF (2021). Nigeria SAS Investment Map.

Productive use interventions have and are largely focused on mini-grids but also include SAS solutions. Early PUE efforts include initiatives by the EU-German Federal Ministry for Economic Cooperation and Development (BMZ) (NESP) to distribute PUE to mini-grid consumers for demand stimulation and to encourage the use of energy-efficient appliances for the benefit of the mini-grid. With most rural communities involved in agricultural activities, there is an increasing focus on the energy-agriculture nexus and the utilisation of PUE in improving the agriculture value chain. Initial concepts such as the Key-Maker Model (KMM)²⁵, developed by Inensus and piloted in Nigeria by the EU-BMZ (NESP), have been tested. Several energy access companies have also raised finance either through grants or commercial finance for PUE-initiatives, e.g., Sosai Renewable Energy, a woman-owned energy enterprise in northern Nigeria, which purchased solar-powered drying equipment to support women's cooperative businesses in Northern Nigeria.²⁶

While initial PUE efforts were unsuccessful because of their infancy, PUE interventions have now become mainstream and a key focus area for the sector with an increasing number of government and donor initiatives such as the Energising Agriculture Programme (EAP).

They also form a key component of DRE initiatives, especially for mini-grids such as the NEP. Interventions to improve the enabling environment and address bottlenecks are also being carried out - including appliance financing, innovative business models, and policy and regulatory initiatives. Financiers such as Infracredit, the Nigeria Sovereign Investment Authority (NSIA), GreenMax Capital, and others are increasingly incorporating PUE considerations in their financing instruments.

The most common PUE for agriculture is solar water pumps and solar-powered cold rooms for storage (predominantly stand-alone). For SMEs, these predominantly include solar refrigerators. Sectors benefiting from PUEs primarily include:

- **Agriculture:** Mainly for irrigation and storage. For processing, a United States Agency for International Development (USAID) study on value chain activities for 12 crops shows the highest potential for cassava grating, rice milling, and flour milling²⁷.
- **Telecom:** Mini-grid developers are exploring partnerships with telecom operators as anchor loads for their mini-grids.
- **Small service businesses:** Most PUE activities include shilling (refrigerators), and powering rural businesses such as vulcanising, tailoring, barbing, etc.

The deployment of PUE in Nigeria is still largely grant driven because of its infancy. Business models primarily include lease-to-own models, which include PAYGO solutions for individual customers, and cooperative models where bigger size and capital-intensive PUE are leased to rural cooperatives to own on lease.

Financing is predominantly grant-based on philanthropic entities and development partners such as the World Bank and Global Energy Alliance for People and Planet (GEAPP). PUE financing is typically incorporated into the financing structure for mini-grids. Market development organisations such as Nigeria Off-Grid Market Acceleration Programme (NOMAP), a Shell Foundation accelerator programme, are piloting local currency based commercial financing schemes for productive use to unlock and catalyse local financing for PUE.

2.4 EVOLUTION OF THE MARKET FOR SOCIAL INFRASTRUCTURE

There is not yet an attractive market for the private sector for social infrastructure DRE electrification in Nigeria, even if most of the energy solutions for social services such as healthcare and schools will be better served by either stan-

dalone solutions or mini-grid solutions.

Other solutions include solar powered technologies, such as solar streetlights and solar borehole solutions, which are

25 The KeyMaker Model (KMM) (https://greenminigrad.afdb.org/sites/default/files/kmm_fundamentals.pdf) is an approach to electrify rural areas while enabling rural manufacturing and successful trading of goods from deep rural areas of developing countries into competitive national and international markets. It aims to "reduce transport costs and increase product quality through local processing with mini-grid electricity, to achieve economies of scope between the mini-grid and product trade business to facilitate linkages between rural and urban centres, as well as to outperform metropolitan or international competitors".

26 USAID (2019). Improving Access to Electricity and Safe Appliances in Nigeria. <https://www.usadf.gov/story/238>

27 USAID NPSP (2020). Agricultural Productive Use Stimulation In Nigeria: Value Chain & Mini-Grid Feasibility Study. https://pdf.usaid.gov/pdf_docs/PA00WQX4.pdf

deployed primarily as community social programmes by the government, NGOs, religious bodies, and philanthropies.

The deployment of solar solutions for social infrastructure is still predominantly government-led both at the national and sub-national level, as well as through donor initiatives.

Efforts to develop business models for powering social infrastructure sustainably, especially schools and primary health centres, are being made mainly by donors, including the EU, Sustainable Energy for All (SEforALL), USAID Power Africa, the World Bank, and the Heinrich Boll Foundation.

The government - through the REA's Energising Education Initiative - is exploring the development of a private sector led model to power academic institutions and health facilities. However, it is expected to still be largely government funded in the coming years.

The Health Electrification and Telecommunications Alliance (HETA) is a new Power Africa initiative for health facility electrification and digital connectivity in sub-Saharan Africa catalysing public-private partnerships that increase access to reliable, renewable energy, digital and health care connections.

3. Market supply side

The DRE sector in Nigeria has significantly grown over the past ten years. This growth has been primarily driven by concerted market development efforts and initiatives of donor programmes that have improved the enabling environment for the sector.

This was also made possible by the government's commitment and support for the sector through the REA, especially from 2018.

Pre-2018, the sector was relatively nascent with ~45 companies and characterised by new SHS market entrants and indigenous mini-grid developers with local market knowledge. From 2018 until today, it has become a burgeoning sector with 100+ off-grid companies ranging from seed stage to established brands with market presence in multiple geographies.

The Renewable Energy Association of Nigeria (REAN) is an independent, non-profit industry association in Nigeria that was established in 2017 with the vision "to promote strategies that will improve the contribution of renewable energy up to 40% of the national energy mix by 2030"²⁸. It has a membership of 200+ renewable energy professionals, project developers, and practitioners that promotes the interest of the private sector in Nigeria's renewable energy sector.

Regarding SAS companies, most of them distribute, sell, operate and provide consumer financing with different channels to reach last mile distribution including Micro-Finance Institutions (MFIs), local retailer/distributor and Mobile Network Operators (MNOs) networks and different financing models like «lease to own» and «energy as a service».

The mini-grid private sector has developed over the last years due to supportive programmes, mainly driven by REA, such as the NEP. The market continues to evolve towards becoming increasingly commercially viable with initiatives such as PUE schemes/models implemented to further improve rural economies and stimulate demand.

Nigerian enterprises are primarily owner equity financed and source funds through grants (for which there is increased competition), equity, debt, and crowdfunding. Reasonably priced debt is difficult to obtain due to high collateral requirements and high interest rates, usually 25% to 35% from commercial banks. Long term equity and debt finance is required for DRE enterprises to fund projects, expansion, capital needs, operational costs and consumer lease financing. Additionally, currency fluctuations are a significant challenge for DRE companies, since funding from international investors and funding institutions are in United States dollars, while mini-grid customers pay their bills in local currency.²⁹

3.1 BARRIERS

Even if the supply side of the market is very active with many active companies, there are still several barriers that the private sector needs to overcome, such as:

- High presence and influx of poor-quality DRE products, especially in the SAS/SHS market.
- Low local manufacturing capacity – technologies manufactured mostly abroad, although an increasing number of cookstoves are either developed or assembled in-country. <10% of panels are produced in Africa (in Nigeria, Auxano and NASENIS are the main local manufacturers). There is a need to improve the ability to import efficiently (or manufacture locally) at sufficient scale and at a competitive cost.³⁰
- Lack of credible and easily accessible market data and intelligence.
- Payment collection constraints because of the absence of mobile money tools.
- Availability of skilled human resources (both technical and finance).

28 Renewable Energy Association of Nigeria (2023). <https://rean.org.ng/>

29 ACE TAF (2021). Stand-Alone Solar Investment Map – Nigeria. <https://ace-taf.org/wp-content/uploads/2021/03/Stand-Alone-Solar-Nigeria-Investment-Market-Map.pdf>

30 ACE TAF (2021). Assessment of Local Manufacturing of Off-Grid Solar in Sub-Saharan Africa. <https://ace-taf.org/wp-content/uploads/2021/04/Assessment-of-Local-Manufacturing-of-Off-Grid-Solar-in-Sub-Saharan-Africa-1.pdf>

- Lack of market intelligence online or publicly available, and it is difficult to get information from the companies themselves who are very strict with sharing data.
- Need to strengthen the capacities of the industry associations.
- Complex, ambiguous, and lengthy importation process.
- Foreign exchange risks due to currency fluctuations.

In comparison to the growth of off-grid electrification, clean cooking has also grown, but not at scale. Between 2015 and

today, the sector has seen an increase in the number of local and foreign clean cookstove enterprises in the country, and the government has made efforts to catalyse the market through initiatives such as the National Clean Cookstove Programme.

Finally, the market for e-cooking in Nigeria is still at an infancy stage with no major player. Clean cooking is largely focused on LPG and clean cook stoves.

3.2 CURRENT SECTOR SUPPORTIVE PROGRAMMES

Major programmes like the World Bank funded NEP, the EU-BMZ funded and GIZ implemented NESP, and the USAID Power Africa Nigeria Power Sector Programme (NPSP) and many other similar programmes and initiatives as the NESP (a detailed list is provided in the Annexes) have contributed to efforts aimed at stimulating electrification using renewable energy hybrid solutions and to promote energy efficiency through policy development, project financing and technical assistance.

NEP includes three key project funding components: a mini-grid Minimum Subsidy Tender, a mini-grid Performance Based Grants facility, and a SHS Output Based Fund. All three funding components are results-based. Funds are disbursed once the recipient has proven to have provided reliable electricity to its customers.³¹

The success of the NEP RBF in scaling of mini-grids has opened the way for other RBF facilities, which can be deployed as either supply or demand side, or a combination of both. There are also suggestions for milestone-based financing. Under NEP's RBF, companies need to raise 100% of the debt/equity upfront, construct the projects and then claim the grants three-months post-completion.

A Milestone Based Funding could be more favourable for companies, especially for the smaller companies in the sector. It gives the companies the option of either using the first disbursement as "equity" to access debt to complete projects, or it helps get projects underway immediately until a milestone is attained to trigger another disbursement till the end of the

project³². While there are limitations to this approach, innovative approaches could be developed. A good example will be the provision of construction financing facilities for mini-grids.

A new programme has been launched by the World Bank at the end of 2023 called "Distributed Access through Renewable Energy Scale-up" (DARES) aiming to provide over 17.5 million Nigerians with new or improved access to electricity through distributed renewable energy solutions.

According to GET.transform, "in 2020, the Central Bank of Nigeria also issued a framework for the implementation of a Solar Connection Facility to provide long-term low-interest credit facilities to enterprises in the solar value chain which have been pre-qualified by the NEP. This includes mini-grid developers who can receive term loans for civil works, project expansion, equipment purchases, etc. amounting to a maximum of 70% of the project cost. The tenor for such loans is set at seven years with up to a two-year moratorium, at 10% interest".³³

Regarding clean cooking, the United Kingdom (UK), United States, and the German Government have provided the most donor support, besides other development partners such as the EU, the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), and the Global Environment Facility (GEF).

[Annex 2](#) provides a summary of the support initiatives for mini-grids, SHS and PUE covering supply, demand, policy and regulation, and access to finance.

31 Odyssey (2021). Using Odyssey To Implement Big Data Solutions For One The Most Ambitious Off-Grid Rural Electrification Programs In History - Nigeria Electrification Project, <https://odysseenergy.com/wp-content/uploads/2021/11/Nigeria-Electrification-Project-Case-Study-v2.pdf>

32 Havenhill (2021). Financing Off-grid Electrification: A multi-instrument approach. <https://havenhillsynergy.com/tag/milestone-based-funding/>

33 GetTransform (2021). Success in Rural Electrification Regulatory Case Studies. https://www.get-transform.eu/wp-content/uploads/2021/08/Success-in-Rural-Electrification-Case-Study_Nigeria.pdf

4.

Market demand side

4.1 MARKET POTENTIAL

According to USAID, “Nigeria has the largest potential DRE electrification market in Africa. Due to the unreliable electricity supply from the national grid, Nigerians spend an estimated NGN 5 trillion (\$14 billion) annually on generation of power using small petrol or diesel generators that are both expensive and release harmful emissions into both the immediate and global environments. (...) The sector has significant potential for scale, particularly in the market for solar mini-grids. According to REA, the installation of 10,000 mini-grids of 100 kW each for 10 years would meet just 30% of the needed energy demand in Nigeria. REA also estimates that over 23 million households will be suitable for SHS solutions to meet their electrification needs by 2023. Increased investment from conventional debt and equity funders and an increased focus on interconnected mini-grids are two trends that define the off-grid market in recent years”³⁴.

Currently, the Nigerian mini-grid market is the largest proven and fastest growing market for private mini-grids in sub-Saharan Africa. REA estimates that at least \$3.6 billion is required for investment in the Nigerian mini-grid market annually.³⁵

The market potential for rural mini-grids is predominantly Multi-Tier Framework (MTF)³⁶ tier 2 (50W) and tier 3 (200W) customers who make up the larger portion of rural consumers with the ability to pay. 13.6 million Nigerian households will currently be best served through mini-grids based on tiers 2 and 3 profiles³⁷. A presentation by REA estimates this to be as high as 15.3 million.³⁸ Although current mini-grid tariffs are high relative to distribution

companies and the central grid, they fall within the ability and willingness of customers to pay for electricity within those tiers.

Currently, 88.5 million Nigerians lack access to electricity and can all be served through mini-grids and SAS based on various business models. The government plans for 15.4 million people (rural population) to be served by a mix of mini-grids and SHS by 2030.³⁹

The SEforALL Africa Hub report⁴⁰ also estimates that 6.2 million Nigerians (6% of the non-electrified population) are best served by SHS. A 2020 analysis by the Boston Consulting Group (BCG) breaks it down further on a household level based on ability-to-pay. The analysis estimates that out of ~17.4 million households without electricity access, ~1 million could afford monthly SHS PAYGO with no incremental spending on lighting, ~2.2 million could afford monthly SHS PAYGO with ~10% incremental spending of non-food budget, and ~14.2 million likely cannot afford monthly SHS PAYGO under any scenario.

34 USAID (2022, April). Power Africa – Nigeria Power Sector Program – Off-Grid Market Intelligence Report.

35 Managing Director of REA (2019). Presentation : Opportunities in the Off-Grid Sector in Nigeria.

36 MTF (2023). Electricity. <https://mtfenergyaccess.esmap.org/methodology/electricity>: “The MTF starts with the lowest level of access (Tier 1), referring to limited access to small quantities of electricity for a few hours per day, enabling the household to use electric lighting and phone charging.

37 SE4ALL Africa Hub & African Development Bank (2018). Mini-Grid Market Opportunity Assessment: Nigeria. https://greenminigrad.afdb.org/sites/default/files/minigrad_market_opportunity_assessment_nigeria_june_2018.pdf

38 Managing Director of REA (2019). Presentation: Opportunities in the Off-Grid Sector in Nigeria.

39 SE4ALL Africa Hub & African Development Bank (2018). Mini-Grid Market Opportunity Assessment: Nigeria. https://greenminigrad.afdb.org/sites/default/files/minigrad_market_opportunity_assessment_nigeria_june_2018.pdf

40 Ibid.

4.2 BARRIERS

On the demand side, the key barriers are:

- Macro-economic challenges such as rising inflation, higher costs of living, lower income, and rising unemployment which pose an increasing challenge to the consumer's ability to pay.
- Payment complexity due to low (~6%) mobile money penetration, especially in last mile rural areas, and Payment Service Banks's (PSBs⁴¹) inability to give loans. There is a need for a sufficient customer base of end-users willing and able to pay, especially through digital payment solutions and demand-side financing.
- Limited access to consumer finance, including for PUE.
- Low consumer awareness for renewable energy products and efficient appliances and machinery.
- High import tariff on products increasing product prices up to 40%.
- Poor association to other potential consumer sectors (i.e. agriculture).
- Limited awareness among C&I users about the benefits of DRE and how to finance and deploy them.

41 PSBs leverage mobile and digital channels to enhance financial inclusion and stimulate economic activities at the grassroots through the provision of financial services.

5.

Institutional, policy and regulatory framework

5.1 INSTITUTIONS

The institutions linked to decentralised energy solutions reflect the federal structure of Nigeria, as power is a concurrent responsibility shared between the federal and state governments.

The central institutions are analysed in this report.

Table 5: Key public institutions involved in energy access

S/N	INSTITUTION	DESCRIPTION
1	Federal Ministry of Power (FMP)	FMP is the policy-making arm of the Federal Government responsible for the provision of power in the country.
2	REA	REA is the implementing agency of the Federal Government of Nigeria (FGN) under the FMP tasked with the electrification of rural and unserved communities. REA is the focal government institution for DRE electrification in Nigeria.
3	Nigerian Electricity Regulatory Commission (NERC)	NERC is an independent body established by the Electric Power Sector Reform Act of 2005 to undertake technical and economic regulation of the Nigerian Electricity Supply Industry.
4	Energy Commission of Nigeria (ECN)	The ECN was established by Act No. 62 of 1979, as amended by Act No. 32 of 1988 and Act No. 19 of 1989, with the statutory mandate for the strategic planning and co-ordination of national policies in the field of energy in all its ramifications.
5	State ministries, departments, and agencies of power	State governments have several institutions with the mandate and responsibility of supervising and executing electrification projects for energy access. Most of the time, energy access is integrated into the State Ministries of Energy, Works and Housing, or/and Infrastructure.
6	DISCOMs	Electricity is distributed through the transmission of electric power from Transmission Company of Nigeria to the 11 existing DISCOMs primary substations, then to the secondary distribution system, and finally to the end consumers.
7	Nigeria Energy Transition Plan (ETP)	Public office in charge of Nigeria's ETP to achieve the 2060 net zero target whilst also meeting the nation's energy needs.

5.2 POLICY AND REGULATORY FRAMEWORK

The government has developed several policies, as well as regulatory and strategy documents to encourage investments in renewable energy and energy access, especially off-grid solutions for both electrification and clean cooking.

Key among them are the National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015), the National Renewable Energy Action Plan (2016), the Rural Electrification Strategy and Implementation Plan (RESIP) (2016), the Regulation for Mini-Grids (2016), and the SEforALL – Action Agenda (2016). More recently, the government passed the Electricity Act (2023), the Nigeria Climate Change Act (2021) and launched the Nigeria ETP (2022) to support its 2060 net-zero commitments, and Nationally Determined Contribution (NDC). The NDC's new

version incorporates provisions for clean cooking which were missing in the first version of the NDC. Efforts are also ongoing to develop a National Clean Cooking Policy and a National Bioenergy Action Plan.

The country has several laws, policies, strategies, and plans that support renewable energy deployment. The REMP - launched in 2011 - aimed at increasing the share of renewable energy in the country's energy mix by at least 13% by 2015, 23% by 2025, and 36% by 2030.

The NREEEP (2015) seeks to “drive the creation of market incentives for the deployment of efficient private-sector driven renewable electricity solutions, for remote and off-grid areas.” The National Electric Power Policy (NEPP)

(2001), the Electricity Power Sector Reform Act (EPSRA) (2005), the REMP (2012), the NREEEP (2015), the RESIP (2016), the NERC Mini-Grid Regulation (2016 and updated in 2023), the ETP (2022), the Nigerian Energy Masterplan (2022) all support plans to increase energy access in Nigeria and diversify the energy mix to include clean energy sources.

Most recently, the Electricity Act (2023), which replaces the EPSRA (2005) as the overarching law for the Nigerian Power sector, also promotes the generation of electricity from renewable energy sources. It also supports the development and utilisation of renewable energy solutions such as solar mini-grids by incentivising a simplified licensing and fees regime for issuance of licenses to renewable energy service companies for the provision of electricity to

consumers and from renewable energy sources specified under the Act.

While these efforts have earned the country the reputation of having one of the best policy and regulatory frameworks for energy access in sub-Saharan Africa, implementation challenges persist. This can be attributed to factors that include poor coordination between government institutions, conflict between policy documents, and – sometimes – a lack of political will to drive implementation.

A summary of key policy, regulatory and strategy documents on electrification, renewable energy and energy access is presented in Annex 1. It also includes energy access provisions in the agriculture and water sector policy documents.

The regulations have been reviewed as follows:

Table 6: Review of the policy and regulatory framework

S/N	PRE-CONDITIONS: ENERGY POLICY	ANALYSIS
1	A clear vision for the investment, management and operation of mini-grids and SAS in towns and villages (rural and peri-urban areas)	Clear vision and regulation outlined through the NREEEP, National Renewable Energy Action Plan, Rural Electrification Strategy and Implementation Plan, and the National Mini-Grid Regulation.
2	For isolated mini-grids, a legal and regulatory framework setting pricing principles and a pricing method reflecting actual costs and allowing an acceptable return for the investor	The legal and regulatory framework for tariff pricing is clear and effective, as established in the National Mini-Grid Regulation. The updated 2023 regulation includes the provision for a portfolio of sites.
3	A mechanism to support low-income consumers	There is no mechanism for the provision of demand-side subsidies for low-income households to afford clean energy access solutions.
4	A clear and stable institutional framework	Clear institutional framework but challenges for policy implementation remain.
PRE-CONDITIONS: ECONOMY, INVESTMENT AND TAX		ANALYSIS
5	Regulations defining the economic conditions to connect isolated mini-grids to the national grid	The National Mini-Grid Regulations clearly defines the economic conditions for connecting isolated mini-grids under Chapter V Section 19 Interconnection of the Distribution Licensee's Network to an Isolated Mini-Grid operated under a Permit and Re-integration of Interconnected Mini-Grid into a Distribution Licensee's Network.
6	Public financing and incentive mechanisms in place to facilitate the economic viability of investments for these business models	Public financing and incentive mechanisms are clearly provided for in the NREEEP – Sections 2.7 Renewable Energy Financing; 5.4 Renewable Energy and Energy Efficiency Incentives; and 5.7 Special Customs Clearance of Renewable Energy and Energy Efficiency Equipment. These are further described in the National Renewable Energy Action Plan and Rural Electrification Strategy and Implementation Plan. Public financing mechanisms - such as through the NEP and the SPN Programme - have also been set up and funded by the government up to \$550 million and NGN 250 billion, respectively. However, import duties still apply to solar components, ranging from 5 to 25%. Value-added tax (VAT) exemptions for select solar components are as provided in the 2021 VAT Exemption Order.
PRE-CONDITIONS: TECHNICAL STANDARDS, ENVIRONMENTAL AND CONSUMERS POLICY		ANALYSIS
7	Regulations with minimum technical rules, including connection of isolated mini-grids to the national grid and certification of installers	Chapter IV of the National Mini-Grid Regulations clearly defines minimum technical rules and certification requirements for installers. The NERC has also developed and approved standards, manuals, and codes that are binding for all Nigerian electricity services.

S/N	PRE-CONDITIONS: ENERGY POLICY	ANALYSIS
8	Regulation on consumers' protection, credit requirements for end users and waste management	Regulations for consumer protection primarily focus on e-waste and quality standards. Whilst quality standards for SAS have been developed and adopted and e-waste guidelines for SAS developed by National Environmental Standards and Regulations Enforcement Agency (NESREA) and Standards Organisation of Nigeria (SON) with support from the UK government through ACE TAF, gaps still exist regarding enforcement. There are no regulatory credit requirements for end users. Regulations on service for mini-grids are covered under the National Mini-Grid Regulations, Chapter IV.
PRE-CONDITIONS: LICENSING AND PERMITTING		ANALYSIS
9	Simplified procedures for obtaining licenses-permits for the operation of isolated mini-grids as well as the allocation of land	These procedures are clearly provided for and straightforward under Chapters III, Registration, Grant of Permit and Mandatory Conditions; IV Operation of the Mini-Grid; and V Commercial Arrangement of the National Mini-Grid Regulations. The updated regulation of 2023 establishes the case for interconnected mini-grids.
10	A clear definition of the scope of exclusivity	A clear definition of the scope of exclusivity is provided in the National Mini-Grid Regulations, Chapter VI Section 21 titled 'Exclusivity Period and Site Reservation for Project Development Purposes'. It covers the right given by a community to grant exclusive rights up to 12 months, the right of the developer to request an extension of the exclusive period, and the right of the distribution licensee and the community to grant an exclusive right to develop an interconnected mini-grid project until commissioning.
11	A legal and regulatory framework defining the principles and mechanisms for the transparent granting of land permits	There is no clear policy provision on permits for land allocation.

6.

Enabling environment

Over the past few years, the enabling environment and ease of doing business for the energy access sector has improved.

According to the United States Department of State, “the government [of Nigeria] has undertaken reforms to help improve the business environment, including by facilitating businesses to start-up their activities by allowing electronic stamping of registration documents, and making it easier to get construction permits, register property, obtain credit, and pay taxes. (...) Corruption is a serious obstacle to Nigeria’s economic growth and is often cited by domestic and foreign investors as a significant barrier to doing business”⁴². Nigeria ranked 150 out of 175 countries in Transparency International’s 2022 Corruption Perception Index, compared to its 2021 rank of 154⁴³.

The government provides tax incentives and customs duty exemptions for pioneer industries, including renewable energy.

“Domestic and foreign businesses frequently cite lack of access to foreign currency as a significant, if not the most significant, impediment to doing business”⁴⁴. Additionally, currency fluctuations are a major challenge for DRE companies active in Nigeria.

Nigeria’s power sector is a bottleneck to broad-based economic development and forces most businesses to generate a significant portion of their own electricity⁴⁵, so there is an opportunity for self-generation with renewables.

In addition, “security remains a concern to investors in Nigeria due to violent crime, kidnappings for ransom, and terrorism in certain parts of the country”⁴⁶.

Inflation rose in February 2022 and ended the year at 21.3%. Despite being an oil producer, Nigeria suffered from the increase in global oil prices occasioned by the war in Ukraine. The cost of the government’s gasoline subsidy increased by about 17% in 2022, while local diesel prices saw a nearly fourfold increase⁴⁷.

One initiative to improve the conditions of the private sector is the creation in 2016 of the Presidential Enabling Business Environment Council (PEBEC), to remove bureaucratic constraints to doing business in Nigeria, and make the country a progressively easier place to start and grow a business.

“PEBEC’s focus areas include: starting a business, cross-border and domestic movement of people and goods, obtaining credit and resolving insolvency, enforcing contracts, registering property, acquiring construction permits and electricity, and paying taxes”⁴⁸. PEBEC has six key indicators: infrastructure, transparency and accessibility of information, skills and labour, secure environment, regulatory environment, and economic opportunities.

PEBEC also ranks internally Nigerian States in terms of doing business metrics.

In addition, the One-Stop Investment Centre (OSIC) provides fast-tracked, efficient, and transparent services to investors. In 2021, it could register businesses electronically.

Since 1989, the Nigerian Investment Promotion Commission (NIPC) Act allows 100% foreign ownership of firms. Related to investments, the Industrial Development/Income Tax Relief Act provides incentives to pioneer industries deemed beneficial to Nigeria’s economic development and to labour-intensive industries. In order to promote local

42 United States Department of States (nd). 2023 Investment Climate Statements: Nigeria.

43 Transparency International (2022). Corruption Perception Index. <https://www.transparency.org/en/cpi/2022>

44 United States Department of States (nd). 2023 Investment Climate Statements: Nigeria.

45 Ibid.

46 Ibid.

47 Ibid.

48 Ibid.

production, the Africa Renewable Energy Manufacturing Initiative (Africa REMI) of SEforALL aims to catalyse the growth of green manufacturing industries in Africa to support low-carbon economic development.

Nigeria's skilled labour pool has declined over the past decade because of "inadequate educational systems, limited employment opportunities, and the migration of educated Nigerians to other countries, including the UK, the United States, Canada, and South Africa. The low employment capacity of Nigeria's formal sector means that almost three-quarters of all Nigerians work in the informal and agricultural sectors or are unemployed"⁴⁹.

However, the sector is also affected by general ease of doing business factors in the country.

49 Ibid.

7.

Access to finance

7.1 FINANCING MODELS

There are various financing models available for financing in the off-grid sector: individual, third-party, or blended financing. Most mini-grid developers and SAS providers rely on a mixture of these models to execute projects and expand their operations.

Individual financing. This model involves the developer raising the funds required for the project internally through the company's available cashflow. This is less common in the deployment of mini-grid systems because of the high capital cost but SAS providers may use internal cashflows to invest in a deployment of standalone systems depending on the size of a particular deployment round.

Third-party financing. Third-party financing is much more common for capital-intensive projects. This model involves the developers seeking funding from external sources. External funds may be as equity from an impact investor or DFIs, loans from banks, or grants from government agencies or multinational foundations.

Blended financing. This model is also suitable for large projects that involve significant capital. Blended financing involves the developer combining external financing with funds raised internally from the company's cashflows. This is common with grants where the developer has to raise a counterpart fund for the development. NEP adopts this model when it gives grants to developers with the provision that the developer has to provide a counterpart fund to carry out the development.

According to USAID, the off-grid clean energy market in Nigeria "remains largely driven by foreign investments in the forms of grants by donor agencies and equity or debt from impact funds and international private investors. According to the ACE TAF, the SHS sector attracted \$227 million within the last five years, with development partners

and government programmes accounting for 54% of the total investment inflow and other funding coming from later and early-stage investors, specialised debt providers, strategic corporates, crowdfunding, and commercial banks. In addition, the prominent instrument was debt financing accounting for 54% of total inflows, mixed instruments – a combination of either equity, grant, or debt - contributed 19%"⁵⁰.

The growth of the solar mini-grid sector has been driven largely by the success of business models supported by funding mechanisms, in particular RBF that has been a valuable instrument for donors and development partners to de-risk commercial investment and reward the engagement of companies offering solutions in hard-to-reach markets.

A "key feature of RBF is payment upon delivery, with financing contingent upon the success of the business or initiative. That means the companies that receive the financing are expected to take the full risk until results are achieved. (...) RBF payments are only made after the successful verification of energy access being delivered by participating companies. This makes RBF less distortionary than other incentive programmes, producing better results for a lower expected cost – while leveraging private sector investment and enhancing financial as well as impact returns"⁵¹.

RBF for energy access has developed in the country, building on efforts by development partners in piloting financing instruments for the off-grid sector. Key examples include GIZ's Mini-Grid Acceleration Scheme, which provided in-kind and performance-based grants of up to 70%, with developers providing 30% (10% equity and 20% debt)⁵². Other financing efforts include the Bank of Industry's efforts to match the availability of grants with commercial debt instruments through its NGN6 billion (\$13 million) Solar Energy Fund

50 USAID (2022, April). Power Africa – Nigeria Power Sector Program – Off-Grid Market Intelligence Report.

51 Next billion (2021, October 4). Optimizing Results-Based Financing for Off-Grid Energy: Why Localization Can Provide a Pathway to More Effective Investment.

52 GIZ (2015). Nigerian Energy Support Programme (NESP). <https://www.giz.de/en/downloads/giz2016-en-promoting-clean-energy-investments-in-nigeria.pdf>

which it provided at concessionary rates of 9%⁵³. Lessons and insights from these informed the creation of Nigeria's first RBF facility under the NEP, facilitated through an improved regulatory environment.

These investments have come as grants from government programmes and donor agencies such as the World Bank and AfDB funded NEP and the United States Trade and Development Agency (USTDA), equity from impact investors such as All On and Gaia Impact Fund, and debt funding from commercial banks, government programmes such as SPN, and crowdfunding platforms such as Bettervest and Trine⁵⁴.

Overall, grant financing represented only 7% of funding but accounted for 64% of the known transactions by deal count because of small ticket sizes ranging mostly from \$20,000- 520,000⁵⁵. These are mainly under government and donor funded initiatives that target low-income rural communities. Mixed instrument investments, a combination of either equity, grant, or debt, represented 19% (see Figure 1 below).

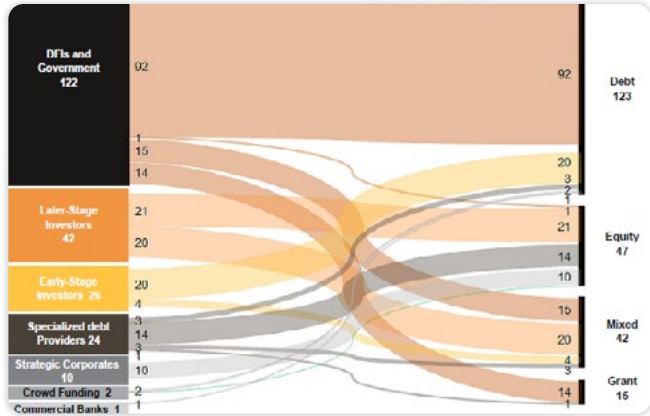


Figure 1: Sources of investment into the Nigerian SAS sector (2015 -2020) (United States dollars, millions)⁵⁶

According to ACE TAF, “international SAS companies have attracted more financing (93% of known inflows) because they have substantial traction, proven operating models, and capital raise experience. (...) Local SAS companies find

it comparatively hard to access capital from both international and local investors. (...) They are often not vertically integrated throughout the value chain, and they often sell more than one type of product. Most are yet to achieve comparable traction to that of international companies, and so they face challenges accessing financing to scale their operations, as shown by the number of deals in Figure 2”⁵⁷ below.

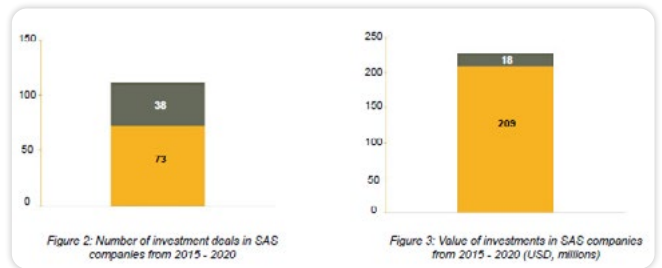


Figure 2: Number of investment deals in SAS companies from 2015 - 2020⁵⁸

Still according to ACE TAF, “within the SAS sector, SHS companies have attracted more investment compared to pico solar and PUE. Pico solar are too small and unable to generate sufficient revenues or profits needed to attract investment unless they operate on a high-volume, global scale. For PUE, (...) upfront, maintenance, and replacement costs are currently too high for end users [, thus discouraging investment.] Investor interest is increasing with new business models and technology, but most funding to date consists of grants”⁵⁹.

There is also an increased demand “for larger capacity SHS for economic and productive uses in shops, markets, and micro, small and medium enterprises (MSMEs), use cases that are making investment into these companies more attractive”⁶⁰ for investors and financiers.

According to USAID, commercial banks, “despite their initial reluctance to enter the off-grid market, have, in the last three years, begun to financially support companies and projects [in the off-grid sector]. Some examples of their support include Sterling Bank and Virtus Energy under

53 Bank of Industry (2022). Solar Energy Fund. <https://www.boi.ng/products/solar-energy-fund/>

54 ACE TAF (2021). Nigeria SAS Investment Map.

55 Ibid.

56 Ibid.

57 Ibid.

58 Ibid.

59 Ibid.

60 Ibid.

the Energising Economies Initiative (EEI) and First City Monument Bank and Darway Coast and A4&T under NEP, which has resulted in over NGN 500 million mobilized in the last two years alone. In addition, Chapel Hill Denham's Nigeria Infrastructure Debt Fund made a notable \$4.6 million investment in Havenhill in 2021.⁶¹

Commercial finance from local commercial banks is still limited, with high interest rates and collateral requirements. A few banks, such as Sterling Bank, are however progressive in financing the sector with technical assistance support from donors. Some microfinance banks, such as LAPO and Grooming, are also providing consumer financing for solar products and partnering with SAS companies to retail products. Foreign investors such as Breakthrough Energy Ventures, Chapel Hill Denham and local investors such as All On - among others - are also key investors in the sector.⁶²

Regarding mobile money, PAYGO is largely used by an increasing number of SAS companies for payments. In the absence of mobile money solutions, companies still use payment agents to facilitate payment collection. The Central Bank recently launched Payment Service Banks as an alternative to mobile money, enabling Telecom compa-

nies to engage in rural financial service provision.⁶³

Available blended finance instruments include RBF, concessional debts, commercial debts, equity, crowdfunding, green bonds, specialised debt instruments, and guarantees such as first-loss instruments (e.g. Engie Energy Access project finance agreement to build a \$60 million portfolio of mini-grids).⁶⁴

For more mature off-grid electrification segments, such as solar mini-grids and SHS, there is a need to shift from grants to sustainable, market-based investment, to finance working capital and accounts receivables. For lesser mature and under-developed segments such as clean cooking, PUE, and biogas, there is still a need for grants to catalyse and improve the viability of these sub-sectors.

There are missing financing instruments and guarantees: There is an increasing need for more equity investment in the sector to enable companies to scale, as well as construction finance at favourable rates. There is also a need for increased local currency financing and a hedging instrument to protect against Foreign Exchange (FX) risks, as most of the capital in the sector is from foreign financiers.

7.2 BARRIERS

- Major barriers to financing in the sector include:
- High cost of raising capital, especially from local financial institutions - high interest rate and collateral requirements;
- Challenges in raising foreign capital because of the depreciating value of the naira and foreign exchange accessibility barriers;
- High upfront capital: the purchase of off-grid solutions and limited consumer financing options;
- Financing instruments not designed to fit the market's particular needs for low interest patient finance;
- Rising inflation and declining macro-economic environment, including increasing inability of investors to repatriate funds because of shortage of foreign currency in the country;
- Currency fluctuations and foreign exchange risks (international funding partners usually finance in United States dollars, while customers pay in naira);
- Lack of credible and accessible market data and intelligence to support investment decisions.

61 USAID (2022, April). Power Africa – Nigeria Power Sector Program – Off-Grid Market Intelligence Report.

62 ACE TAF (2021). Nigeria SAS Investment Map.

63 Ibid.

64 Ibid.

8.

Annexes

8.1 ANNEX 1: OVERVIEW OF KEY ENERGY ACCESS POLICIES AND REGULATIONS

Table 7: Key power sector, renewable energy and off-grid sector policy and regulatory documents

DOCUMENT	DATE	DESCRIPTION	OWNER
Nigerian Electric Power Policy	2001	Sets out the establishment of an efficient electricity market in Nigeria and the privatization of the electricity industry through the transfer of ownership and management of the infrastructure and assets.	Federal Government of Nigeria (FGN)
Independent Electricity Distribution Networks (IEDN) Regulation	2012	For the operation of independent power distribution networks by individuals or groups other than the franchised Electricity Distribution Companies (DISCOMs).	Nigerian Electricity Regulatory Commission (NERC)
Regulation for Captive Power Generation	2012	Framework for captive generation of electricity (1 MW for consumption by the generator, and which is consumed by the generator itself, and not sold to a third-party).	NERC
Application for License Regulation	2012	Procedures to apply for and obtain licenses issued by NERC and their renewal, extension, suspension, cancellation, and withdrawal.	NERC
Embedded Generation Regulation	2012	Framework for embedded generation and distribution of electricity - the generation of electricity that is directly connected to and evacuated through a distribution system which is connected to a transmission network operated by a System Operations Licensee.	NERC
Multi-Year Tariff Order (MYTO)	2008 (updated 2021)	Establishes a 15-year tariff path for the wholesale and retail electricity industry, with minor and major reviews bi-annually and every five years, respectively. The aim of the original order (July 2008) is to ensure adequate recovery of investments in the generation, transmission, and distribution of electricity in Nigeria. The three building blocks for the determination of transmission and distribution tariffs are a market-based rate of return on capital invested, depreciation and efficient operating costs and overheads.	NERC
Technical Standards for Rural Electrification	2021	Harmonised technical standards (including designs and minimum specifications) that are required to implement the Rural Electrification Agency of Nigeria (REA) rural electrification schemes through grid extension, injection substations and solar mini-grids, solar home systems and solar streetlights.	REA
Renewable Energy Masterplan (REMP)	2005 (updated 2012)	Framework for integrating renewable energy into Nigeria's energy mix with at least 10% renewable energy by 2025.	FGN
Regulation on Renewable Energy Generation	2015	A regulation to stimulate investments in 2,000 MW of electricity from renewable energy sources by 2020.	NERC
National Renewable Energy and Energy Efficiency Policy (NREEEP)	2015	Sets the Nigerian government's blueprint to harness the country's renewable energy and energy efficiency resources increasingly in driving sustainable development across the country. Developed in line with the country's national energy policy, the NREEEP outlines the government's programmes and measures for deploying renewable energy and energy efficiency technologies and practices towards facilitating Nigeria's green transition.	FGN
National Renewable Energy Action Plan (NREAP) 2015 – 2030	2016	Sets out the implementation strategy for the NREEEP (2015) on renewable energy.	FGN
National Energy Efficiency Action Plan (NEEAP) 2015 – 2030	2016	Sets out the implementation strategy for the NREEEP (2015) on energy efficiency.	FGN
Strategy Plan for Nigerian Alliance for Clean Cookstoves	2015	Strategy for the implementation of activities of the Alliance.	NACC
Rural Electrification Strategy and Implementation Plan (RESIP)	2016	Provides the implementation framework and measures for driving rural electrification across the country by - on and off-grid energy solutions, including productive uses of energy.	REA
Mini-Grid Regulation	2016 (updated in 2023)	Overarching document governing the development of mini-grid electricity generation - with plant capacity put at anywhere between 0-100kW to 1MW in Nigeria.	NERC

DOCUMENT	DATE	DESCRIPTION	OWNER
Sustainable Energy for All (SEforALL) – Action Agenda	2016	Provides a simplified summary of Nigeria's action agenda for the SEforALL Initiative. It provides context to the action agenda, the legal foundation, the targets and measures in the policy document, the gaps, the incentives, the key provisions, the key stakeholders, as well as related regulatory and policy documents, as well as current implementation status.	FGN
Action Plans for Nigeria's Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC)	2017	Sectoral action plans for priority sectors: Agriculture; Power generation; Industrial energy efficiency; Oil and gas; and Transport.	Federal Ministry of Environment (FMENV) Department for Climate Change (DCC)
National Action Plan on Gender and Climate Change	2020	Provides the implementation framework and measures for gender mainstreaming in national climate change strategies and actions.	FMENV DCC
Nigeria Energy Compact	2021	Nigeria's flagship commitment is to electrify 25 million people across 5 million homes by 2023 using solar technologies and creating 250,000 jobs. Nigeria also commits to giving 30 million homes access to clean cooking and energising agriculture, textile production, cold storage, etc. using gas as a transition fuel.	FGN
Nigeria's NDC	2016 (updated 2021)	Nigeria's NDC shows its national commitment towards embracing sustainable development measures that limit the rate of global warming and the negative impacts of climate change. It shows the country's climate targets and measures to be adopted in actualising them.	FMENV DCC
National Climate Change Policy (2021 – 2030)	2012 (updated 2021)	Sectoral and cross-sectoral strategic policy statements and actions for the management of climate change within Nigeria's pursuit for climate resilient, sustainable development.	FMENV DCC
National Energy Policy (NEnP)	2003 (updated 2022)	Framework for sustainable energy development in Nigeria with the overall aim of providing clean, affordable, adequate, and reliable energy with the active participation of the private sector.	Energy Commission of Nigeria (ECN) / Federal Ministry of Science, Technology, and Innovation
National Energy Master Plan	2022	For coordinated energy sector development, including energy demand and supply, production, processing, research and development, training and human resources development, energy databank, fossil fuels, nuclear energy, renewable energy, environment, energy efficiency and conservation and international cooperation. It also specifies procedures for the implementation, monitoring and evaluation of the level of compliance with the objectives of the National Energy Policy.	ECN / Federal Ministry of Science, Technology, and Innovation
Nigeria Energy Transition Plan	2022	A home-grown, data-backed, multipronged strategy developed for the achievement of net-zero emissions in terms of the nation's energy consumption. The Nigeria Energy Transition Plan (ETP) sets out a timeline and framework for the attainment of emissions' reduction in five key sectors; Power, Cooking, Oil and Gas, Transport and Industry. Within the scope of the ETP, about 65% of Nigeria's emissions are affected.	FGN
Nigeria Electricity Act	2023	A core aim of the Act is to provide a holistic, integrated policy plan that recognizes all sources for the generation, transmission, and distribution of electricity, including the integration of renewable energy into Nigeria's energy mix.	FGN

8.2 ANNEX 2: SUPPORTING PROGRAMMES

Table 8: DFI/donor support programmes for mini-grids

S/N	PROGRAMME / INITIATIVE	DURATION	IMPACT	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
1	Africa Mini-Grid Programme (AMP)	2022 -2025	Supporting access to clean energy by increasing the financial viability and promoting scaled-up commercial investment in mini-grids in Nigeria. Launched in Q3 2022 and in the early stages of implementation. Also designed as a sister project to the Rural Electrification Agency's (REA) Energising Agriculture Programme (EAP) (see section on Productive Uses of Energy - PUE).	REA	Global Environment Facility (GEF) / UN Development Programme (UNDP)	Grants - \$5.91 million; Project development grants - \$3.10 million; and \$96.5 million co-financing
2	Clean Energy Funding Programme	2022	The Programme seeks to aggregate, de-risk and unlock domestic institutional investments to support eligible clean energy projects in Nigeria to contribute towards meeting the country's universal electrification goals. It is being supported by a £10 million climate blending facility from the United Kingdom (UK) government as concessional aid to Infracredit to reduce the risk for pension and insurance funds to invest in energy access projects, and support Nigeria's COP26 commitments. The £10 million will be blended to de-risk transactions and therefore mobilise domestic institutional investment from local pension funds, insurance firms and other local institutional investors. Its first project is the credit enhancement of Darway Coast Nigeria Limited's green debt issue, under a co-financing arrangement with the £10 million Climate Finance Blending Facility.	UKAid	InfraCredit	£10 million
3	Solar Power Naija (SPN)	2020 – 2023	The federal government's solar strategy for the electrification of 5 million households, serving about 25 million Nigerians, as part of its Economic Sustainability Plan with 250,000 jobs to be created.	REA	Central Bank of Nigeria	NGN350 billion (\$758 million)
4	Sustainable Use of Natural Resources (SUNREF)	2020 - 2023	SUNREF Nigeria seeks to improve access to energy through improved access to affordable finance for renewable energy and energy efficiency technologies that will improve lives, increase economic opportunities, and support various sectors, such as industry and agriculture. The project helps mitigate climate change, reduce carbon emissions, increase economic opportunities, improve employment and, ultimately, sustain development in Nigeria. It has provided a \$300,000 loan facility to fund the installation of a 350kW solar photovoltaic facility at the Lagos Business School (LBS).	Winrock in collaboration with the Manufacturers Association of Nigeria (MAN)	French Development Agency (Agence française de développement - AFD)	\$70 million credit line through Access Bank (50%) and United Bank for Africa (UBA) (50%); €9.5 million grant

S/N	PROGRAMME / INITIATIVE	DURATION	IMPACT	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
5	Mini-Grid Innovation Lab		<p>CrossBoundary's Mini-Grid Innovation Lab, part of CrossBoundary Group, is Africa's first research and development fund exclusively focused on testing new business model innovations for mini-grids, designed to close the gap on the 618 million Africans who do not have power. The Mini-Grid Innovation Lab works with developers across the continent to test innovations to make mini-grids a more reliable and commercially viable solution.</p> <p>CrossBoundary's Innovation Lab funded developers who deployed 326 income-generating machines on credit to customers across 25 sites in Nigeria, Kenya, and Tanzania. The aim was to test business models for Productive Uses of Energy (PUE) deployment in the countries.</p>	Cross-boundary	Rockefeller Foundation, UK Aid, Shell Foundation, P4G, DOEN Foundation	
6	Renewable Energy Performance Platform (REPP)		<p>REPP was established in 2015 to create and support the growth of sub-Saharan Africa's renewable energy sector. Its objective is to mobilise private sector development activity and investment in small to medium-sized projects in sub-Saharan Africa.</p> <p>REPP approach / products:</p> <ul style="list-style-type: none"> • Development assistance funding, technical and financial advisory; • Facilitating access to risk mitigation instruments and finance provided by REPP partners; • Gap financing (e.g. bridge construction finance); • Bottom-up policy / knowledge development. <p>Active projects in Nigeria:</p> <ul style="list-style-type: none"> • GVE Ltd – \$288,000K development capital for mini-grid of 2.72MW planned capacity with 0.43MW achieved; • PAS Solar Nigeria (BBOX) – \$2.24 million loan, \$1.6 million equity for solar home systems of 0.52MWp planned capacity with 0.3MWp achieved; • PowerGen - \$2.0 million equity for solar mini-grids of 19.9MW planned capacity with 3.67MWp achieved. 		UK's Department for Business, Energy and Industrial Strategy (BEIS)	\$200 million
7	Transforming Energy Access (TEA)		<p>TEA is a research and innovation platform supporting the technologies, business models and skills needed to enable an inclusive clean energy transition. Two initiatives are currently being implemented under TEA in the country:</p> <ul style="list-style-type: none"> • Reducing mini-grid capital expenditures (CAPEX) by 20% using subsidy parity; • Supporting research and postgraduate energy systems and technology training at e-universities - University of Nigeria Nsukka - UNN, University of Port Harcourt - UNIPORT, Usmanu Danfodiyo University Nigeria - UDUSOK, Federal University of Technology Owerri - FUTO, Obafemi Awolowo University -OAU. 		UK's Foreign Commonwealth and Development Office (UK FCDO)	

S/N	PROGRAMME / INITIATIVE	DURATION	IMPACT	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
8	Nigeria – UK Partnering for Accelerated Climate Transitions (PACT)	Rolling basis	<p>The UK PACT is a unique capacity-building programme through the UK's International Climate Finance, which works in partnership with countries with high emissions reduction potential to support them to implement and increase their ambitions for tackling climate change.</p> <p>UKPACT is currently supporting two projects in the country:</p> <ul style="list-style-type: none"> Developing Renewable Energy Embedded Generation with four pilots in four different DISCOMs locations (Lagos, Federal Capital Territory - FCT and Ibadan), implemented by the Rocky Mountain Institute (RMI); Electricity Supply Outage Reduction via smart sensors and interconnected mini-grids with a pilot in Kano State implemented by Nortech. 	Several	UK FCDO and UK BEIS	-
9	Nigeria Infrastructure Advisory Facility (NIAF)	2019 - 2023	<p>A technical assistance facility delivered on a mutual accountability basis between the UK and Nigerian government. The scope covers power, roads, and infrastructure finance. Its aim is to transform infrastructure planning, financing, and delivery and develop sustainable, inclusive infrastructure solutions that improve the quality of life of the most vulnerable Nigerians.</p> <p>On power, NIAF aims to support the transition to a sustainable market solution including sustainable off-grid renewable energy solutions with focus on mini-grids:</p> <ul style="list-style-type: none"> It carried out a review of existing mini-grids to determine factors that mitigate against commercial viability, and developed a framework for commercially sustainable mini-grids. Working with InfraCredit via the Private Infrastructure Development Group (PIDG) leveraging Green Bond for Universal Energy Access - \$15.6 million capital for six solar mini-grids deals across 32 States. 	Tetra Tech International Development	UK FCDO	£72.8 million
10	Demand Aggregated Renewable Technology (DART) Facility	2018 - ongoing	<p>The DART Programme combines demand pooling, aggregated procurement of solar equipment and access to affordable finance to unlock economies of scale for solar companies, achieve cost savings for end users, and speed up the growth of the renewable energy sector in Nigeria. It acts as an aggregated purchasing mechanism and equipment financing facility that supports the supply value chain for off-grid equipment in the country. It aims to:</p> <ul style="list-style-type: none"> Reduce component prices through aggregation mechanisms; Enable participation in industry initiatives, etc.; Improve payment terms / provide working capital to get projects off the ground faster; Reduce lead times; Streamline logistics (shipping, customs and clearance) and reduce costs; Improved warranty claims process. 	Odyssey	All On and Global Energy Alliance for People and Planet (GEAPP)	All On commitment of \$5 million + Rockefeller Foundation commitment of \$5 million

S/N	PROGRAMME / INITIATIVE	DURATION	IMPACT	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
11	Nigeria Electrification Project (NEP)	2018 - 2023	The NEP is an innovative initiative of the Federal Government of Nigeria (FGN), conceptualised to catalyse off-grid development in Nigeria, through the provision of grant funding to support the deployment of solar mini-grids, Solar Home Systems (SHS), and productive use appliances to rural communities. Over 4.7 million Nigerians have been electrified to date under the programme, including the deployment of over 67 mini-grids with over 28,000 connections.	REA	World Bank and the African Development Bank (AfDB)	\$550 million (World Bank - \$350 million; AfDB - \$200 million)
12	Nigeria Off-Grid Market Acceleration Programme (NOMAP)	2018 - Ongoing	NOMAP is a market building programme jointly supported by the Shell Foundation and USAID's Scaling Off-grid Energy (SOGE), to identify unaddressed off-grid energy market barriers and implement high impact initiatives to tackle them. It has implemented three key sector interventions, including a survey of over 150 communities, to inform off-grid companies on communities best suited for SHS and mini-grid solutions.	Roving Heights Limited	Shell Foundation, UK FCDO	-
13	Nigeria Power Sector Programme (PA-NPSP)	2018 - 2023	The signature initiative of Power Africa in Nigeria with a target to enable 10,000 MW of new and rehabilitated generation capacity and 3,000,000 connections by 2023. Building on Power Africa's priorities, PA-NPSP supports comprehensive power sector reform, a strengthened enabling environment, and increased private sector participation. PA NPSP has provided technical assistance and transactional support to the NEP and SPN programmes, as well as business development support to off-grid companies, including mini-grid developers.	Deloitte LLC	USAID Power Africa	\$109.2 million
14	Energising Economies Initiative (EEI)	2017 - Date	An FGN sponsored programme targeting Micro, Small and Medium Enterprises (MSMEs) for solar electrification. Achievements include: <ul style="list-style-type: none"> • 12,927 installed connections; • 86,909 SMEs connected; • 126,931,680 CO2 savings annually. 	REA	FGN	\$37 million
15	Rural Electrification Fund (REF)	2017 - 2023	The REF was established by the section 88 sub-section II of the Electric Power Sector Reform Act of 2005 to provide support for the development of the on and off-grid sectors for the power/energy sector by REA. Between 2020 and 2021, the REA launched the first call of the REF to deploy solar mini-grids and SHS systems to rural communities across the country. It is currently implementing the second REF call, and in April 2023, it started early bidding processes for the third REF call. Under REF calls 1 and 2, 18 mini-grids have been deployed and many more are under deployment.	REF	REA	Annual budget allocation from the Federal Government

S/N	PROGRAMME / INITIATIVE	DURATION	IMPACT	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
16	Nigeria Energy Support Programme (NESP)	2013 – Ongoing NESP I – 2013 – 2018; NESP II – 2017 - 2023	<p>Technical assistance programme to promote investments in renewable energy, energy efficiency and rural electrification in Nigeria. Provides advisory services to the Nigerian Government regarding energy policy and management. In the renewable energy and energy access sector NESP focuses primarily on mini-grids and has supported several initiatives including:</p> <p>Launched Energy Platform of Nigeria as a networking platform for stakeholders;</p> <p>Supported the establishment of the Department for Renewable Energy and Rural Power Access under the Federal Ministry of Power, Works, and Housing;</p> <p>Supported the development and adoption of the National Renewable Energy and Energy Efficiency Policy (NREEEP), the Rural Electrification Strategy and Implementation Plan (RESIP), the National Renewable Energy Action Plan (NREAP), National Energy Efficiency Action Plan (NEEAP), and the Sustainable Energy for All (SEforALL) Action Agenda/ Vision 30:30:30, and the Nigerian Mini-Grid Regulations;</p> <ul style="list-style-type: none"> • Together with the Renewable Energy and Energy Efficiency Project (REEEP), partnered with 10 Nigerian training institutions to support skills development for renewable energy and energy efficiency; • Deployed mini-grids in six rural communities across the country under NESP I; • Supporting the development and deployment of additional mini-grids across the country including interconnected mini-grid pilots; • Developed the One Stop Investment Platform with the NIPC - A digital platform which allows easy access to relevant information for investments in Renewable Energy and Energy Efficiency in Nigeria; • Developed the SEforALL geospatial tool to support government and private sector developers with data and energy access planning. <p>NESP is currently providing in-kind grants worth NGN4.2 billion (\$9.1 million) to eight local solar mini-grid developers under its Interconnected Mini-Grid Acceleration Scheme (IMAS) to enable the development of 23 interconnected mini-grids across 11 states.</p>	<p>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH</p> <p>In collaboration with the Federal Ministry of Power</p>	<p>European Union, German Federal Ministry for Economic Cooperation and Development (BMZ)</p>	€57.5 million in total (NESP I & II)
17	Distributed Access through Renewable Energy Scale-up (DARES)	2023-Ongoing	<p>The DARES project aims to provide over 17.5 million Nigerians with new or improved access to electricity through distributed renewable energy solutions. The DARES project will use innovative financing solutions to scale up private sector led clean electricity provision in Nigeria</p>	Rural Electrification Agency	International Development Association (IDA) and United States Agency for International Development (USAID), GIZ, SEforALL, and AfDB	\$750 million credit. \$1 billion expected private capital. Also, \$100 million from the GEAPP and \$200 million from the Japan International Cooperation Agency (JICA)

Table 9: DFI/Donor support programmes for stand-alone solar

S/N	PROGRAMME / INITIATIVE	DURATION	DESCRIPTION	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
1	De-Risking Sustainable Off-Grid Lighting Solutions in Nigeria (DSOLS)	2022 – 2027	<p>Designed to develop a private sector-led technology value chain for making off-grid renewable energy technologies, such as solar lanterns and solar home systems, available to base-of-pyramid rural households who would not be electrified at least until after 2025. The project rationale is underpinned by a novel approach to de-risk private sector investments in the market for rural Decentralised Renewable Energy (DRE) access. Objectives include:</p> <ul style="list-style-type: none"> Putting in place appropriate policies, programmes and regulations; Off-grid lighting providers are operating and have access to working capital and equipment; Good practices, lessons learned, market assessments, demand-supply surveys, delivery models and business models are documented to support replication and scaling-up. <p>It was launched in Q3 2022 and is at an early implementation stage.</p>	Rural Electrification Agency (REA)	Global Environment Facility (GEF) and the UN Development Programme (UNDP)	\$4.33 million grant; \$10.6 million co-financing
2	Universal Energy Facility (UEF)	2022 – 2023	<p>The Stand-Alone Solar for Productive Use (SSPU) programme of the UEF scales up electricity access to households, and small and medium enterprises (SMEs). The programme offers results-based grants to solar companies for verified end-user connections based on pre-determined standards. Launched in Q3 2022 in Nigeria, its objectives include:</p> <ul style="list-style-type: none"> Scale up electricity access for SMEs by supporting sustainable business models that address the challenge of making full upfront payments to purchase solar systems, which helps to ease the switching costs from polluting energy sources such as fuel generators. De-risk investments in solar companies by providing grant payments to enable solar companies to expand their operations to new market segments and serve as a blended finance mechanism to crowd in additional private capital. 	Sustainable Energy for All (SEforALL)	Multi-donor results-based finance (RBF) facility	\$10 million grant facility. Grant covers 40% capital expenditures (CAPEX) for each SSPU unit at a pre-determined amount (capped unit cost)
3	Regional Off-Grid Electricity Access project (ROGEAP)	2022 – unclear	<p>Aims to increase access to sustainable electricity for households, businesses, government hospitals, schools within communities across the 15 member countries of the Economic Community of West African States (ECOWAS) and four other African countries using stand-alone solar products and entirely based on a harmonised regional approach.</p>	ECOWAS and the West African Development Bank	World Bank, Clean Technology Fund and Netherlands Cooperation (DGIS)	\$338.7 million – Grant and Technical Assistance

S/N	PROGRAMME / INITIATIVE	DURATION	DESCRIPTION	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
4	Promotion of Private Investment in Renewable Energy in Nigeria	2020 – 2022	<p>Focused on increasing deployment of renewable energy, and private investment in sub-Sahara Africa with Nigeria as one of five major target countries among 12 sub-Sahara African countries. It aims to plan the Japan International Cooperation Agency's (JICA) strategy and identify future programmes to promote renewable energy Independent Power Producers (IPP) and mini-grid development in Sub-Sahara Africa. As part of its activities in Nigeria, the programme aims to enhance operational capacity of REA for effective implementation of off-grid projects. This will include the provision of advisory service or training to strengthen:</p> <ul style="list-style-type: none"> Capacity to collect data on geospatial information, electricity demand, etc.; Technical and financial capacity to evaluate proposals submitted by private sectors for the development of off-grid system; Capacity to enhance intersection of off-grid and other sectors such as agriculture and health to increase household income, upscale electricity demand, and expand access to public infrastructure services. <p>The programme has deployed three containerised solar systems in Abuja as demonstration projects.</p>	JICA	JICA	-
5	REACT Household Solar II	2018 – 2022	<p>A key component of the UK Foreign, Commonwealth and Development Office's (FCDO) Africa Clean Energy (ACE) Programme, it aims to increase access to clean, affordable energy for low-income people in Africa by promoting a market-based approach for private sector delivery of solar home system products and services in the target countries in sub-Saharan Africa. REACT Household Solar Round II supports companies in Ethiopia, Senegal, Nigeria, Ghana and Somalia. In Nigeria, it has provided grants to three local Solar Home Systems (SHS) companies – Sosai Renewables, Smarter Grid International, and Consistent Energy – to scale up SHS distribution across the country.</p>	Africa Enterprise Challenge Fund (AECF)	UK FCDO (formerly DFID)	£16 million – Grant and Technical Assistance
6	Demand Aggregated Renewable Technology (DART) Facility	2018 - Ongoing	<p>The DART Programme combines demand pooling, aggregated procurement of solar equipment and access to affordable finance to unlock economies of scale for solar companies, achieve cost savings for end users, and speed up the growth of the renewable energy sector in Nigeria. It acts as an aggregated purchasing mechanism and equipment financing facility that supports the supply value chain for off-grid equipment in the country. It aims to:</p> <ul style="list-style-type: none"> Reduce component prices through aggregation mechanisms; Enable participation in industry initiatives, etc.; Improve payment terms / provide working capital to get projects off the ground faster; Reduce lead times; Streamline logistics (shipping, customs and clearance) and reduce costs; Improved warranty claims process. 	Odyssey	All On and Global Energy Alliance for People and Planet (GEAPP)	All On Commitment of \$5 million + Rockefeller Foundation Commitment of \$5 million - Debt and Technical Assistance De
7	Nigeria Electrification Project (NEP)	2018 – 2023	<p>The NEP is an innovative initiative of the Federal Government of Nigeria (FGN), conceptualized to catalyse off-grid development in Nigeria through the provision of grant funding to support the deployment of solar mini-grids, SHS, and productive use appliances to rural communities. Over 4.7 million Nigerians have been electrified till date under the programme, including the deployment of over 1.2 million SHS.</p>	REA	World Bank and the African Development Bank (AfDB)	\$550 million (World Bank - \$350 million; AfDB - \$200 million) – Grant and Technical Assistance

S/N	PROGRAMME / INITIATIVE	DURATION	DESCRIPTION	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
8	Nigeria Off-Grid Market Acceleration Programme (NOMAP)	2018 - Date	<p>NOMAP is a market building programme jointly supported by the Shell Foundation and USAID's Scaling Off-Grid Energy (SOGE), to identify unaddressed off-grid energy market barriers and implement high impact initiatives to tackle them. It has implemented three key sector interventions, including:</p> <ul style="list-style-type: none"> Survey of over 150 communities to inform OGS companies on communities best suited for SHS and mini-grid solutions; Development of a Single Point of Integration (SPOI) to integrate SHS consumer payments with the infrastructure of payment agent platforms, financial institutions providing agent banking services, Payment Service Banks (PSB) and other rural finance providers to facilitate consumer payments for SHS. 	Roving Heights Limited	Shell Foundation, UK FCDO	-
9	Nigeria Power Sector Programme (PA-NPSP)	2018 - 2023	<p>The signature initiative of Power Africa in Nigeria with a target to enable 10,000 MW of new and rehabilitated generation capacity and 3,000,000 connections by 2023. Building on Power Africa's priorities, PA-NPSP supports comprehensive power sector reform, a strengthened enabling environment, and increased private sector. PA NPSP has developed several knowledge products for the SHS sector including 'Expansion Strategies for SHS companies in Nigeria'.</p>	Deloitte LLC	USAID Power Africa	\$109.2 million – Technical Assistance
10	Rural Electrification Fund (REF)	2017 - 2023	<p>The REF was established by virtue of the section 88 sub-section II of the Electric Power Sector Reform Act of 2005 to provide support for the development of the on and off-grid sectors for the power/energy sector by REA. Between 2020 and 2021, the REA launched the first call of the REF to deploy solar mini-grids and SHS systems to rural communities across the country. It is currently implementing the second REF call, and in April 2023, it started early bidding processes for the third REF call.</p> <p>Under REF call 1 (mini-grids and SHS), the Agency deployed 18,750 SHS.</p>	REF	REA	Annual budget allocation from the Federal Government

Table 10: DFI/donor support programmes for productive use

S/N	PROGRAMME / INITIATIVE	DURATION	IMPACT	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
1	Africa Mini-Grid Programme (AMP)	2022 -2025	Supporting access to clean energy by increasing the financial viability and promoting scaled-up commercial investment in mini-grids in Nigeria. Launched in Q3 2022 and in early stages of implementation. The AMP is also designed as a sister project to the Energising Agriculture Programme (EAP) to support mini-grid powered productive use activities in the energy-agriculture nexus.	Rural Electrification Agency (REA)	Global Environment Facility (GEF) / the UN Development Programme (UNDP)	Grant amount - \$5.91 million; Project development capital grants - \$3.10 million; Co-financing - \$96.5 million
2	Energising Agriculture Programme (EAP)	2022 - 2025	EAP aims to stimulate the productive use of mini-grid electricity in agriculture by enabling market-led deployment of appliances, breaking the silos and separating electrification and agricultural development programmes.	Rocky Mountain Institute (RMI) and REA	Global Energy Alliance for People and Plants (GEAPP)	\$5 million
3	Nigeria Electrification Project (NEP)	2018 - 2023	The NEP is an innovative initiative of the Federal Government of Nigeria (FGN), conceptualised to catalyse off-grid development in Nigeria through the provision of grant funding to support the deployment of solar mini-grids, Solar Home Systems (SHS), and productive use appliances to rural communities. The NEP has a Productive Uses of Energy (PUE) component which has deployed 16 PUE appliances to date.	REA	World Bank, and the African Development Bank (AfDB)	\$550 million (World Bank - \$350 million; AfDB - \$200 million)
4	Nigeria Energy Support Programme (NESP)	2013 – Ongoing NESP 1 – 2013 – 2018; NESP II – 2017 - 2023	NESP piloted early PUE initiatives through the KMM, an approach to electrify rural areas using mini-grids while enabling rural processing, manufacturing, and trading activities. It focuses on local processing with mini-grid electricity and enhancing a mini-grid company to expand from generating and offering one service – electricity – together with another complementary pre-processed good in two different markets. NESP's current mini-grid interventions also incorporate PUE in their implementation.	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH In collaboration with the Federal Ministry of Power	European Union (EU), German Federal Ministry for Economic Cooperation and Development (BMZ)	€57.5 million in total (NESP I & II)
5	Nigeria Infrastructure Advisory Facility (NIAF)	2019 - 2023	A technical assistance facility delivered on a mutual accountability basis between the UK and the Nigerian government. The scope covers power, roads, and infrastructure finance. Its objective is to transform infrastructure planning, financing, and delivery and develop sustainable, inclusive infrastructure solutions that improve the quality of life of the most vulnerable Nigerians. On power, NIAF aims to support the transition to a sustainable market solution including sustainable off-grid renewable energy solutions with focus on mini-grids. On PUE, it carried out a survey of the off-grid space to identify agricultural and manufacturing sites that can potentially serve as anchor customers for commercially sustainable mini-grids.	Tetra Tech International Development	UK Foreign, Commonwealth and Development Office (FCDO)	£72.8 million
6	Nigeria Off-Grid Market Acceleration Programme (NOMAP)	2018 - Ongoing	NOMAP is a market building programme jointly supported by the Shell Foundation and USAID's Scaling Off-grid Energy (SOGE), to identify unaddressed off-grid energy market barriers and implement high impact initiatives to tackle them. It has implemented three key sector interventions including a pilot to test the viability of a \$250,000 commercial finance vehicle for productive use appliances for mini-grids.	Roving Heights Limited	Shell Foundation, UK FCDO	-

S/N	PROGRAMME / INITIATIVE	DURATION	IMPACT	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
7	Nigeria Power Sector Programme (PA-NPSP)	2018 - 2023	The signature initiative of Power Africa in Nigeria with a target to enable 10,000 MW of new and rehabilitated generation capacity and 3,000,000 connections by 2023. Building on Power Africa's priorities, PA-NPSP supports comprehensive power sector reform, a strengthened enabling environment, and increased private sector. PA NPSP carried out a PUE agro value chain study to access opportunity to initiate and scale the productive use of energy from Nigerian mini-grids by electrifying three prevalent agricultural processing activities: rice milling, grain flour milling, and cassava grating. This informed the design and implementation of the EAP.	Deloitte LLC	USAID Power Africa	\$109.2 million
8	Financing Facility for Productive Use Appliances	2022	The facility will offer procurement subsidies, capacity building grants, consumer financing, and advisory support focused on credit systems development for productive use appliance distributors. It will lower appliance costs for end-users by discounting the price of bulk solar appliance procurements and providing financing for distributors to enable them to sell their products on credit. The facility will initially operate in Democratic Republic of Congo, Ethiopia, Kenya, Nigeria, Sierra Leone, and Uganda based on growth potential and market maturity.	CLASP and Nithio	GEAPP	\$6.5 million
9	LINKS	2019 - 2023	A programme funded by the UK Government to support the development of a vibrant and diversified economy in three key northern Nigerian states of Kano, Kaduna and Jigawa, acting as a powerful engine of northern economic growth. The programme focuses on the development of high potential pro-poor value chains, supporting them to become productive, competitive and attractive for investment at every level. LINKS is implementing a Climate Smart Agriculture Initiative which aims, amongst other factors, at transforming strategic value chains to improve resilience and reduce climate impact including the integration of solar powered equipment for agriculture (irrigation, land preparation, planting, harvesting, storage, initial processing).	Tetra Tech International Development	UK FCDO	£67.5 million (Closed down prematurely, actual expenditure is unclear)
10	Team Europe Initiative (TEI) Nigeria Green Economy		TEI aims to improve the competitive advantage of Nigeria's agriculture and energy sectors and consists of 60 projects to be completed by 2027. In line with the EU's Green Deal, its Green Economy Initiative will support the Nigerian government's efforts to diversify the economy by combining support to enhance access to renewable energy for productive uses and boosting the development of the agricultural sector.		EU	€1.3 billion
11	The National Fadama Development Project (NFDPP)		The NFDPP is an agriculture programme under the Federal Ministry of Agriculture and Rural Development, and in collaboration with The World Bank, designed to increase the incomes of the users of land and water resources sustainably. In July 2022, REA signed a Memorandum of Understanding (MoU) with the NFDPP to collaborate on several activities during the planning and implementation of electrification programmes targeted at agriculture, land and water resources, including collaboration on the EAP. It covers agro-energy initiatives, including the provision of decentralised solar pumps and/or centralised solar mini-grids to viable FADAMA irrigation schemes.		World Bank	

S/N	PROGRAMME / INITIATIVE	DURATION	IMPACT	IMPLEMENTING ORGANISATION	FUNDING ORGANISATION	FUNDING SIZE
12	Agricultural Transformation Agenda Support Programme Phase I (ATASP-1)		Funded by the African Development Fund under the AfDB, and implemented by the Ministry of Agriculture, ATASP-1 aims to support the Nigerian Federal Government in implementing its Agricultural Transformation Agenda (ATA) launched to attract private sector investment in agriculture, reduce post-harvest losses, add value to local agricultural produce, develop rural infrastructure and enhance access of farmers and other value chain actors to financial services and markets. The overall sector goal of the proposed programme is to contribute to employment generation and shared wealth creation along the commodity value chains, as well as food and nutrition security. Its specific aim is to increase, sustainably, the income of smallholder farmers and rural entrepreneurs that are engaged in the production, processing, storage and marketing of the selected commodity value chain.		AfDB	
13	USAID-Feed the Future Nigeria Agribusiness Investment Activity		The five-year USAID Feed the Future Nigeria Agribusiness Investment Activity aims to strengthen the enabling environment for agribusiness finance and investment. To achieve this goal, the Activity focuses on four interrelated components: improving the enabling environment for agricultural sector growth; broadening access to finance by mitigating the credit risks of agribusinesses; promoting and facilitating investment opportunities for agribusinesses to expand and scale up operations; and sustainably enhancing the performance of agribusiness micro, small, and medium enterprises (MSMEs).		USAID	\$15.7 million
14	Small Hydro Power Development for Agro-industry Use (SHP-DAIN) and Advancing Nigeria's Green Transition to Net Zero through Circular Economy Practices	2024-2027	Promoting of small hydropower development and circular economy approaches	United Nations Industrial Development Organisation (UNIDO)	EU	€9 million

Table 11: Policy and regulations – Current supportive programmes

S/N	DFI/DONOR	INITIATIVE	SCOPE	AMOUNT	IMPLEMENTATION TIMELINE
1	European Union (EU)/ German Federal Ministry for Economic Cooperation and Development (BMZ)/ Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	Nigeria Energy Support Programme	Technical Assistance (TA) programme to promote investments in renewable energy, energy efficiency and rural electrification in Nigeria.	€48 million	2013 - 2023
2	United Kingdom (UK)	Africa Clean Energy Technical Assistance Facility (ACE TAF)	Technical Assistance (TA) to government and private sector to catalyse a market-based approach for private sector delivery of quality stand-alone solar systems. Primary focus on policy and regulatory reform.	£15.5 million	2018 - 2022
3	UNDP GEF	De-risking Sustainable Off-Grid Lighting Solutions in Nigeria	De-risk private sector investments in the market for rural DRE access primarily solar lanterns and solar home systems.	\$4.33 million grant; \$10.6 million co-financing	2022 - 2027
4	World Bank, Clean Technology Fund and Netherlands Cooperation (DGIS)	Regional Off-Grid Electricity Access project (ROGEAP)	Increase access to sustainable electricity for households, businesses, government hospitals, schools within the 15 ECOWAS member countries and four other African countries using stand-alone solar products based on a harmonised regional approach.	\$338.7 million	NA
5	Global Environment Facility (GEF) / UN Development Programme (UNDP)	Africa Mini-Grid Programme (AMP)	Supporting access to clean energy by increasing the financial viability and promoting scaled-up commercial investment in mini- grids in Nigeria; Designed as a Child Project to implement the Energising Agriculture Programme (EAP).	Grant amount: \$5.91 million; Project development capital grants: \$3.10 million; Co-financing: \$96.5 million	2022 - 2027

Table 12: Access to finance – Current supportive programmes

S/N	DFI/DONOR	INITIATIVE	SCOPE	AMOUNT	IMPLEMENTATION TIMELINE
1	World Bank/ AfDB	Nigeria Electrification Project	The Nigeria Electrification Project provides grant funding to support the deployment of mini-grids, SHS, and productive use appliances to communities.	\$550 million combined (\$350 from the World Bank, \$200 from AfDB)	2013 - 2023
2	AFD	Sustainable Use of Natural Resources and Energy Finance (SUNREF)	SUNREF Nigeria seeks to improve access to energy through improved access to affordable finance for renewable energy and energy efficiency technologies to support various sectors such as industry and agriculture.	\$70 million credit line; €9.5 million grant	NA
3	United Nations Development Programme (UNDP) Global Environment Facility (GEF)	De-risking Sustainable Off-Grid Lighting Solutions in Nigeria	Designed to develop a private sector-led technology value chain for making solar lanterns and solar home systems, available to base-of-pyramid rural households. It employs a novel approach to de-risk private sector investments in the market for rural DRE access.	\$4.33 million grant; \$10.6 million co-financing	2022 - 2027
4	Sustainable Energy for All (SEforALL)	Universal Energy Facility	A Stand-Alone Solar for Productive Use (SSPU) programme that offers results-based grants to solar companies for verified end-user connections based on pre-determined standards.	NA	NA
5	Central Bank of Nigeria	Solar Power Naija (SPN)	The federal government's concessional debt facility for the electrification of 5 million households in the country.	NGN140 billion	2020 – 2023
6	All On	NA	Provides access to commercial energy products and services for under-served and un-served off-grid energy markets in Nigeria, with a special focus on the Niger Delta.	NA	NA
7	Sterling Bank	NA	Provides commercial debt facilities for renewable energy projects in the country.	NGN 10 billion	Continuous
8	UKAID	De-Risking Facility	The UK is providing up to £10 million of concessional aid alongside InfraCredit to reduce the risk for pension and insurance funds to invest in energy access projects, and support Nigeria's COP26 commitments. The £10 million will be blended to de-risk transactions and therefore mobilise domestic institutional investment from local pension funds, insurance firms and other local institutional investors.	£ 10 million	