

STAND-ALONE SOLAR INVESTMENT MAP

Nigeria

February 2021





Foreign, Commonwealth and Development Office (FCDO) Africa Clean Energy Technical Assistance Facility

© February 2021

Tetra Tech International Development

This report was co-authored by the Africa Clean Energy Technical Assistance Facility and Open Capital Advisors, in collaboration with the Rural Electrification Fund under the Rural Electrification Agency of Nigeria.

12 Usuma Street, Maitama, Abuja.
Nigeria

Prosperity House, Westlands Road,
P.O. Box 4320, 00100, Nairobi, Kenya.
Tel: +254 (0)20 271 0485

Cover page: photo courtesy: Russell Watkins/Department for International Development

Disclaimer

This report is provided on the basis that it is for the use of the Foreign, Commonwealth and Development Office (FCDO) only. Tetra Tech International Development Ltd will not be bound to discuss, explain or reply to queries raised by any agency other than the intended recipients of this report. Tetra Tech International Development Ltd disclaims all liability to any third party who may place reliance on this report and therefore does not assume responsibility for any loss or damage suffered by any such third party in reliance thereon.



CONTENTS

Abbreviations	iv
Executive summary	v
1. Introduction	1
2. Investments overview	2
2.1 Investor types	4
2.2 Investment per type of SAS company	5
2.3 Investments in women-led businesses	6
2.4 Impact of Covid-19 pandemic	7
2.5 SAS sector financing need	8
3. Barriers to investment	9
3.1 Supply-side barriers to investment	9
3.2 Demand-side barriers to investment	10
3.3 Regulatory/policy barriers to investment	10
4. Existing initiatives to encourage investment	11
5. Recommendations to accelerate investment	14
6. Conclusion	18
Appendix	19

List of Figures

Figure ES 1: Sources of investment into the Nigerian SAS sector (2015 -2020) (USD, millions)	v
Figure 1: Sources of investment into the Nigerian SAS sector (2015 -2020) (USD, millions)	2
Figure 3: Value of investments in SAS companies from 2015 - 2020 (USD, millions)	5
Figure 2: Number of investment deals in SAS companies from 2015 - 2020	5
Figure 4: SAS financing need at different stages of growth and operating models	8
Figure 5: Estimated financing gap in the SAS sector (USD, millions)	8

List of Case Boxes

Case box 1: Green financing driving increased uptake of solar PV technologies	4
Case box 2: Raising capital as a PUE company	6
Case box 3: Gender equality and social inclusion in off-grid energy investments	7
Case box 4: A State-level view of investment for off-grid in Nigeria	13
Case box 5: Receivables securitization structure overview in off-grid solar	15
Case box 6: Strategies to improve investment readiness	16





ABBREVIATIONS

Abbreviation	Definition
AFC	Africa Finance Corporation
AFDB	African Development Bank
BoI	Bank of Industry
CBN	Central Bank of Nigeria
CTIAF	CleanTech Incubation and Acceleration Foundation
DFC	Development Finance Corporation
DFI	Development Finance Institution
EEP	Energizing Education Program
EU	European Union
FCDO	Foreign Commonwealth and Development Office (formerly DFID)
FIRS	Federal Inland Revenue Services
GESI	Gender and Social Inclusion
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GSMA	Global System for Mobile Communications Association
IFC	International Finance Corporation
MDA	Ministries, Departments, and Agencies
NASENI	National Agency for Science and Engineering Infrastructure
NCIC	Nigeria Climate Innovation Center
NED	Nigerian Energy Database
NEP	Nigeria Electrification Project
NESP	Nigerian Energy Support Programme
NIPC	Nigerian Investment Promotion Commission
OBF	Output-Based Fund
OCA	Open Capital Advisors
PAYG	Pay-As-You-Go
PUE	Productive use of energy
PSB	Payment Service Bank
REA	Rural Electrification Agency
REAN	Renewable Energy Association of Nigeria
REF	Rural Electrification Fund
RMI	Rocky Mountain Institute
SAS	Stand-alone solar
SHS	Solar home systems
USADF	United States African Development Foundation
USAID	United States Agency for International Development
VAT	Value Added Tax
WHT	Withholding Tax

EXECUTIVE SUMMARY

The standalone solar (SAS) sector in Nigeria has grown significantly, with increasing private sector traction. As of 2019, ~1.8M SAS products—including solar home system, pico solar, and productive use products powered by standalone solar—were currently in use in the market. Further, it is estimated that over 23 million households in Nigeria will be suitable for SAS solutions to meet electrification needs by 2023.¹ At least 61 SAS companies have set up operations in the country to address the demand for energy solutions, including international companies that have ongoing operations in other parts of the continent and many local companies with substantial market knowledge.² Though currently in its infancy, the sector overall has a USD 9.2 billion annual revenue potential.³

To meet the significant market need, the sector has attracted ~USD 227 million from a wide range of investors. Currently, about 20 million households in Nigeria lack access to power, and many households with a connection also rely on diesel and gasoline back-up given poor power quality of the grid.⁴ As a result, the SAS sector stepped in to close the gap, with strong investor backing. Development Finance Institutions (DFIs), development partners, and governments programs contributed most investment, up to 54 percent of the total investment inflows. Early-stage impact firms, specialized debt investors, and strategic corporates also invested heavily, largely in international SAS companies with proven traction. Commercial bank investment

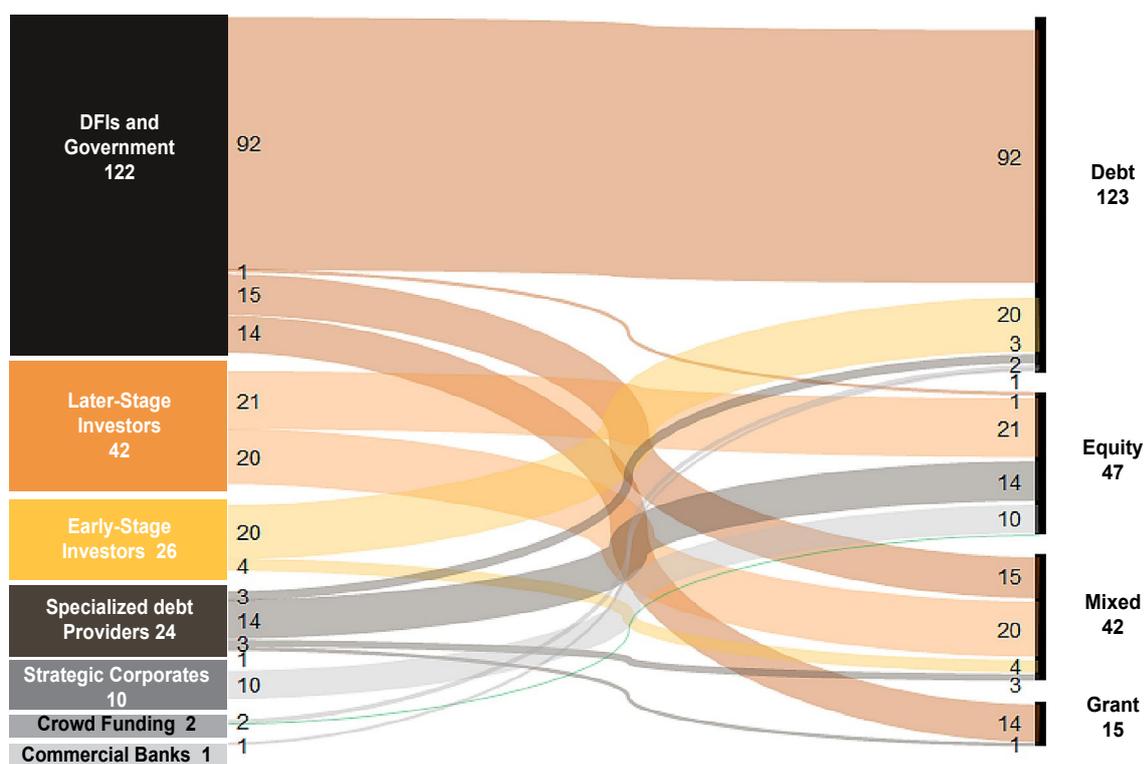


Figure ES 1: Sources of investment into the Nigerian SAS sector (2015 -2020) (USD, millions)

Source: OCA consultations, press releases, company websites, and other secondary sources; Sustainable Energy for All (2020), State of the global mini-grids market report.

1. Lighting Global (2020), Off-Grid Solar Market Trends Report. World Bank (2019), Off-Grid Solar Market Assessment and Private Sector Support Facility Design
2. here are 57 SAS companies that are REAN members and 4 additional. Additional companies identified through primary and secondary research.
3. REA (2019), Opportunities in the Off-Grid Sector in Nigeria: Focus on the Nigeria Electrification Project (NEP)
4. USAID Power Africa (2020),

remains elusive because many companies are still small and unable to service commercial rate financing. Hard currency dominates investment, as companies struggle to access affordable local currency financing.⁵

International SAS companies captured 93 percent of the investment inflows from 2015-2020, demonstrating the imbalance in capital flows to these companies compared to local businesses.

International companies have more substantial traction, proven operating models, and capital raise experience compared to their counterparts, due in part to previous investor backing as many of them scaled in other markets with patient capital. Though local SAS companies strongly understand the local context, they struggle to raise capital as many have not achieved comparative levels of traction.

Historically, solar home system companies have received more investor focus compared to pico solar and productive use (PUE) companies. Investors observe that pico solar companies are often too small and unable to yield satisfactory investment returns. The PUE sub-sector is new and yet to generate sufficient traction to attract significant investment, though investors are actively looking to invest in the segment. Comparatively, the demand for SHS products is high and growing, resulting in expansion of international companies into Nigeria and increased opportunities for existing SHS providers.

Despite the traction and investment into the sector, the funding gap remains large and companies continue to cite limited access to financing as a major setback. The estimated funding gap for the SAS sector is USD 1.5 billion over the next five years.⁶ Given the sector in Nigeria is nascent compared to other countries on the continent, SAS companies—specifically local companies—need patient capital to prove commercial viability and achieve bankable operating traction so that they can raise growth capital. The international companies with significant local presence also require growth capital in the form of debt to scale operations.

This paper explores the barriers that have and continue to limit investment into the SAS sector. Complex business models, an unstable macro-economic environment, and limited understanding of SAS company operations have stifled investment to

date by creating capital supply gaps. On the demand side, many SAS companies are not able to raise or absorb external capital given their current scale of operations, their internal capabilities, and unattractive financing options. Lastly, limited or poor implementation of supportive government policy has failed to provide sector actors with the confidence needed to enter the market.

In recent years various interventions have targeted sector growth, but stakeholders need to redouble efforts. Development partners and government have bolstered the enabling environment through market awareness programs, technical assistance to financiers and SAS companies, policy reforms, and even subsidies to encourage market scale-up. Nonetheless, the SAS sector requires further investment to scale SAS businesses to meet the national electrification targets in pursuit of universal electrification. There are several routes to improving capital flows to the SAS sector, including:

- **Investors can adopt financing structures that are more suitable for SAS companies.** Local SAS companies still need patient financing in the form of equity and concessionary capital to attain the necessary internal capabilities and traction to deliver market rate returns for later stage investors. They also need smaller tranches of financing given the companies' ability to absorb financing; affordable debt in small tranches could help them develop a strong credit history. On the other hand, larger international SAS companies require more debt financing to scale up operations as opposed to equity financing.
- **Increasing sector data and technical assistance to local financiers can bridge the information gap to increase investor confidence in making investments.** Some investors, particularly local investors, lack a proper understanding of the SAS sector to make informed investment decisions. Databases and platforms such as REA's Nigerian Energy Database, ACE TAF's Energy Access Explorer, and the RE Investment database by GIZ NESP and NIPC could provide more information on viable SAS market opportunities. Other platforms, such as Nithio, could provide investors with relevant customer information that can support financing instruments such as receivables-backed financing.

5. OCA Consultation and analysis

6. ECREEE (2019), *Regional Off-Grid Electrification Project: Off-Grid Solar Market Assessment and Private Sector Support Facility Design*; NPC (2018), *Nigeria Demographic and Health Survey 2018*; OCA Consultation and Analysis



Further, technical assistance to financiers could increase knowledge of the risks and opportunities in the sector, while also identifying and structuring facilities tailored to the SAS sector.

- **Technical support to SAS companies can ensure that companies are capable of absorbing capital.**

Most investors observed that many SAS companies, mainly local companies, are not investment ready. Technical assistance can help these companies streamline some of their core operations including distribution strategy, treasury management, financial management, financial evaluation, and risk management. Further, third parties can provide companies with direct investment readiness support to prepare businesses to raise capital. Though ad-hoc technical assistance is needed, it is also necessary that these companies build internal capacity and develop adequate governance structures to raise and manage external financing.

- **Further improvements to the enabling environment and more licensing for the Payment Service Banks (PSB) financing platform can increase the**

- **attractiveness of Nigeria's off-grid energy markets and encourage scaling of businesses.**

Removal of VAT on all solar components could reduce overall product costs and increase uptake of SAS products. Additionally, import duty exemptions, simplified importation processes, and tax holidays could also foster the growth of investments and uptake of SAS. Increasing payment service banks would make it easier for customers to make payments to SAS companies, and as a result increase distribution of SAS products to remote populations. As a result, SAS companies would realize increased income and stable cash flows that will in turn improve the businesses' investment proposition.

The scale-up and success of the SAS sector is crucial to achieving Nigeria's 5 Million Solar Connections Project by 2023, and electrification goal of 100 percent by 2040. Coordinated stakeholder efforts compared to siloed interventions are required to catalyze investments into the sector to realize full market potential. The recommendations in this report can help accelerate investments through tactful involvement of both public and private investors, and the ecosystem at large.



Photo credit: Power Africa



1. INTRODUCTION

The government of Nigeria currently targets 100 percent electrification rate by 2040, and off-grid energy will play a vital role. The electrification rate currently stands at 45 percent, with higher access in urban areas (55 percent) compared to rural areas (36 percent).⁷ While the country has an energy generating capacity of 12,522 MW, 20 million households remain without energy access.⁸ Extending on-grid connections will continue, but it will be timely and costly, particularly for rural and sparse populations. Off-grid energy, however, presents a viable alternative, and standalone systems are particularly well suited to reach the hardest to reach customers.

The SAS sector is nascent and fast-growing, and stakeholders have committed to its rapid expansion. The Nigerian government looks to add 5 million new solar connections through solar home system and mini-grids by 2023 under the 2020 Economic Sustainability Plan, reaching 25 million people.⁹ This builds on a young and growing sector, comprised of international companies that have established traction in other markets—for example BBOX, Lumos, Zola Electric, d.light, Azuri, and Oolu—and often smaller but established local companies such as Sosai Renewables, Arnergy, Blue Camel, Consistent Energy, and ColdHubs, among others. Combined, these companies have an annual revenue potential of USD 1.2 billion, presenting opportunities for both private and public investments.¹⁰

To achieve the government’s goals, stakeholders must execute a rapid roll-out and provide strategic support to existing SAS companies. Many companies in the sector are yet to achieve substantial scale-up of their businesses, and many—in particular local companies—cite limited access to the right financing as the primary setback to growth. Given the capital-intensive nature of this sector, companies will require substantial investment to prove commercial viability, scale operations, and support the country’s electrification efforts.

The need for more investment and the current lack of investment data created the impetus for this report. Throughout this work, the research team conducted a comprehensive literature review to gain a detailed understanding of the investment landscape, the key stakeholders, and the regulatory environment for stand-alone solar in Nigeria. The team then conducted interviews with over 20 senior industry stakeholders to validate the findings, gather additional data, and align on recommendations needed to accelerate investment. Throughout the process, the research team aimed to answer the following questions:

1. What has been the nature of investment in SAS to date?
2. What are the main barriers to investment into SAS to date?
3. What are the highest potential interventions to accelerate SAS growth in Nigeria?

The report outlines the current investor landscape, barriers to investment, and interventions required to catalyze both public and private investment into the sector to accelerate market growth. While the off-grid sector is comprised of both mini-grids and standalone solar (SAS) companies, this report will only focus on the SAS sector, including pico solar products, solar home systems (SHS), small standalone productive use systems, and larger standalone systems that are not considered for commercial and industrial purposes. The report aims to inform investors of the investment opportunity for SAS in Nigeria; companies of potential investors in the market; and policymakers, development partners, and supporting organizations of interventions required to catalyze investment and market growth in the sector.



The Nigerian government looks to add 5 million new solar connections through solar home systems and mini-grids by 2023 under the 2020 Economic Sustainability Plan, reaching 25 million people.

7. USAID Power Africa (2020), *Nigeria Energy Sector Overview*,

8. USAID Power Africa (2020), *Nigeria Energy Sector Overview*,

9. Government of Nigeria (2020), *Nigeria Economic Sustainability Plan*

10. REA (2019), *Opportunities in the Off-Grid Sector in Nigeria: Focus on the Nigeria Electrification Project (NEP)*

2. INVESTMENTS OVERVIEW

Investors deployed an estimated USD 227 million of investment into SAS companies from 2015-2020.¹¹ Development partners and government programs were the main financiers, contributing 54 percent of investment within the period. Debt finance was the main instrument, accounting for ~54 percent of total inflows, primarily to larger international companies. It only accounted for 18 percent of the deal count due to larger ticket sizes such as Development Finance Corporation's USD 35M debt investment into Lumos

in 2020. On the other hand, grant financing comprises only 7 percent of funding but accounts for 64 percent of the known transactions by deal count due to small ticket sizes ranging mostly from USD 20K-520K.¹² Mixed instrument investments, a combination of either equity, grant, or debt comprised 19 percent. Figure 2 below provides an overview of the SAS inflows, and the remainder of this section explains in more detail these trends.

2.1 Investor types

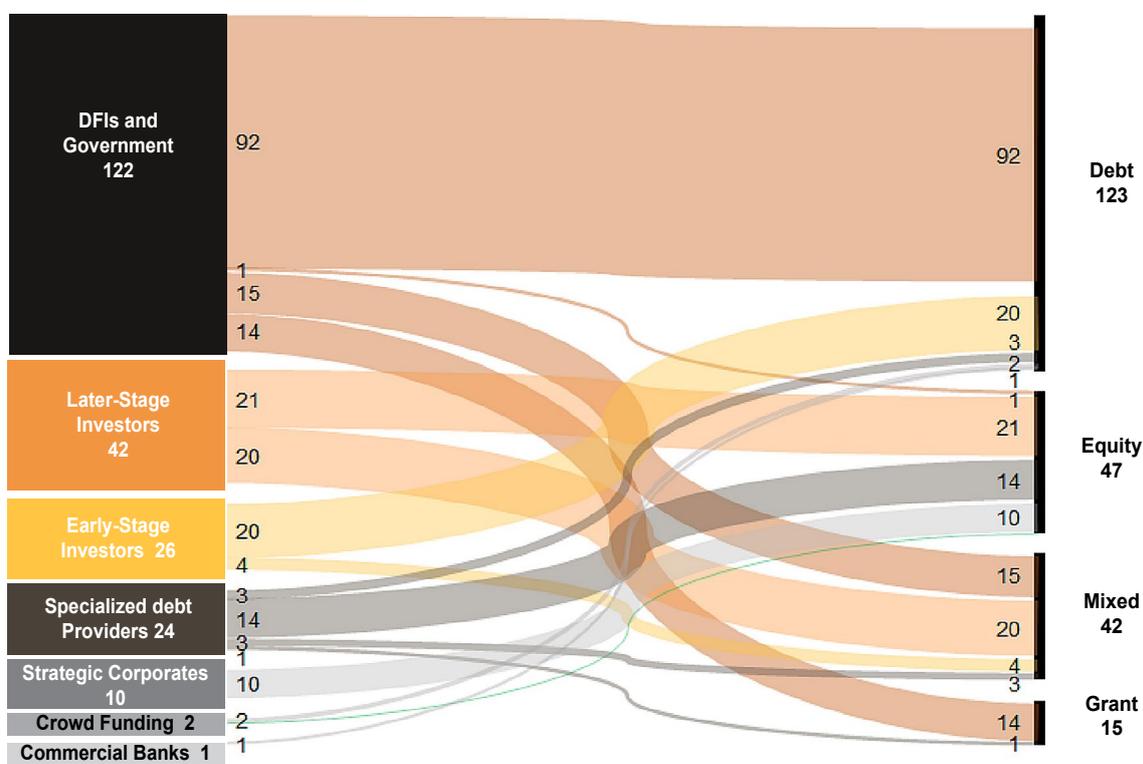


Figure 1: Sources of investment into the Nigerian SAS sector (2015 -2020) (USD, millions)

Source: OCA consultations, press releases, company websites, and other secondary sources; Sustainable Energy for All (2020), State of the global mini-grids market report

11. OCA Consultation and analysis. Based on data accessible online from investment databases such as crunch base, company websites, investor websites, and news publications.
 12. d.light (2016), d.light Raises Over \$22 Million to Expand PAYG Business into New Off-Grid Solar Markets

DFIs, development partners, and government programs are the primary contributors of funding to the SAS sector. DFIs include Development Finance Corporation (DFC), Swedfund, AfDB, and Proparco while development partners include FCDO (formerly DFID), World Bank, GSMA, EU, USAID, Power Africa, and USADF. The government of Nigeria has driven growth of the SAS sector by rolling out donor-backed initiatives such as the Rural Electrification Fund (REF) and the Nigeria Electrification Project (NEP). The ~USD 60M Output Based Fund (OBF) of the NEP is focused solely on the provision of grants to SHS providers, signing on six providers in 2019, among them A4&T Integrated Services Limited, ASOLAR Systems Nigeria Limited, Txtlight Power Solutions Limited (Lumos Nigeria), Greenlight Planet, Smarter Grid International, and Solar Energy by d.light Limited.¹³ Through these government programs and development partner programs such as FCDO's Solar Nigeria, this category disbursed ~USD 123M directly to SAS companies, comprising 76 percent debt, 12 percent mixed financing, 11 percent grants, and 1 percent equity.¹⁴

Early-stage investors have provided patient and catalytic capital to scale the sector. Early-stage investors, including impact funds such as All On and GAIA Impact Fund have deployed ~USD 26M to the sector, deploying 55 percent in equity, 10 percent in quasi-equity, and the remainder in debt and grants, while also deploying much-needed technical assistance to the sector. Through investments such as All On's ~USD 1.5M quasi-equity investment into Auxano Solar to fund assembly plant expansion and Breakthrough Energy Venture's ~USD 9M Series A equity investment into Arnergy in 2019, these investors have bolstered sector growth by focusing on indigenous companies.

Strategic corporates and later stage investors have focused exclusively on international companies, recognizing the strategic and financial importance of these companies in their portfolios. Strategic corporates have invested exclusively through equity in landmark deals such as the ~USD 50M Mitsubishi Corporation-led equity investment in BBOXX in 2019, an example of the preference for larger ticket sizes

for many corporates.¹⁵ Later-stage investors have deployed ~USD 42M, comprising 51 percent equity and the remainder in quasi equity. Examples include Helios Investment Partners' total investment of ~USD 65M in Zola Electric between 2016 and 2018, as well as African Infrastructure Investment Managers' (AIIM) ~USD 31M equity investment into BBOXX. Commercial investors are attracted to companies with proven business models, traction, and commercial viability before investing.¹⁶

Similarly, specialized debt providers have also focused almost exclusively on international companies. Investors such as SunFunder and responsAbility have deployed mainly debt (81 percent of investment), with the remainder deployed in quasi equity. For example, Sunfunder provided over ~USD 20M to d.light between 2016 and 2019 with the latter's ~USD 18M 2019 investment deployed as quasi equity.

Given limited options, crowdfunding has offered an alternative avenue to finance local SAS company operations. Crowdfunding platforms such as Bettervest and TRINE have provided ~USD 2M in debt, in hard currencies such as EUR and USD respectively. Sosai Renewable Energies Company, a local SAS company has raised over ~USD 530K from Bettervest in two equal tranches, to fund the purchase of 500 SHS systems, 200 LED lamps, 500 televisions and 500 fans. The crowdfunding investors offered interest rates of 7.5-8.5 percent over a tenure of 4 years, with high interest in the company's projects driving investor fulfillment of the first ~EUR 112K tranche in only 89 days.

Local financial institutions and commercial banks have so far contributed little to financing the sector. Commercial banks have typically deployed debt in international firms exclusively, as seen with Standard Chartered Bank's ~USD 5M investment in Azuri in 2017. Local financial institutions have cited a high sector risk profile as the main reason behind their limited involvement. However, some local firms have managed to raise financing from local financial institutions, and some banks are increasing their involvement with renewable energy, for example Sterling Bank's Energizing Economies Initiative (EEI).¹⁷

13. Afrik21 (2020) NIGERIA: REA grants Renewvia for mini-grids in rural areas

14. OCA Consultation and analysis

15. These large international firms would raise at the parent company level and trickle down to the country-level subsidiaries, making it difficult to estimate amounts allocated to Nigeria-specific operations.

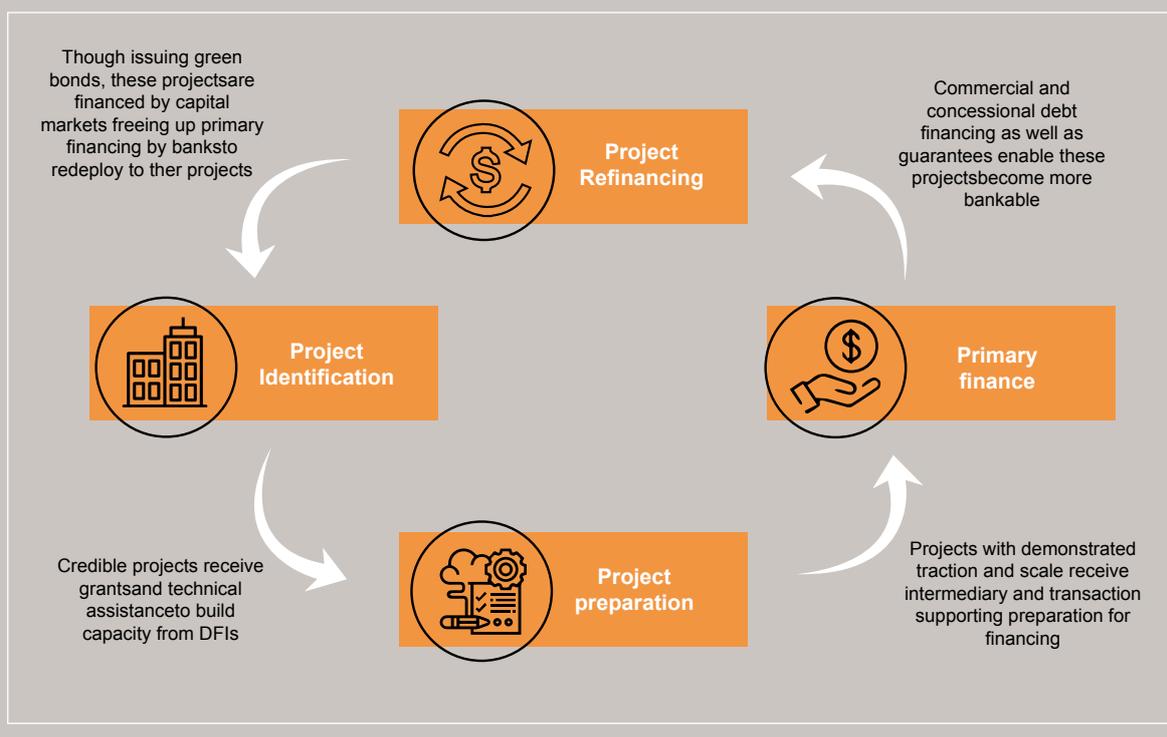
16. These large international firms would raise at the parent company level and trickle down to the country-level subsidiaries, making it difficult to estimate amounts allocated to Nigeria-specific operations.

17. Sterling Bank (2019), Funding Renewable Energy in Nigeria

Case Box I: Green financing driving increased uptake of solar PV technologies

Nigeria's efforts to improve food security, energy access, and unemployment led to the development of the country's 2030 Nationally Determined Contribution (NDC) targets to deliver sustainable economic growth and mitigate the effects of climate change across sectors. Given the energy sector's ~33 percent contribution to GHG emissions, increasing solar PV uptake is necessary. Green financing as an option to accelerate uptake has made significant inroads, Nigeria becoming the first African nation to issue sovereign green bonds in 2017 of ~N 11B (~USD 29M), followed by the first corporate issue to finance sustainable development in Africa by Access Bank in 2019, for N 15B (~USD 39M).

Green financing often leverages blended finance to combine financial instruments from commercial capital sources such as institutional investors with de-risking and catalytic instruments from concessional capital sources including development partners. In Nigeria grants and debt from REF, AfDB, and Bol have been blended with catalytic instruments such as the ~USD 75M NSIA-backed InfraCredit infrastructure credit guarantee and InfraCredit's first-loss taking and securitization models to de-risk investments. Nonetheless, limited involvement from local financial institutions stifles access to green financing, despite some early examples like Access Bank's corporate green bond issuance. Green financing could catalyze SAS sector growth by financing projects which would subsequently be refinanced through capital markets as shown below.



Source: UNDP: Nigeria and the Paris Agreement; Climate Change and Green Financing Training, 2020; InfraCredit; Sustainable Finance Initiative: Case Study: Access Bank Green Bond

2.2 Investment per type of SAS company

International SAS companies have attracted more financing (93 percent of known inflows) because they have substantial traction, proven operating models, and capital raise experience. The nine international SAS companies in Nigeria have relatively high traction in other markets like East Africa or Asia.¹⁸ These companies are mostly vertically integrated, with

significant traction despite their complex business models. They historically raised capital from international investors, which allowed them to prove their traction, and trickled-down investments from parent companies into local subsidiaries. In a few other instances, they have raised local currency investment directly for subsidiaries or received grant funding as Lumos did through the Nigeria Electrification Project (NEP)

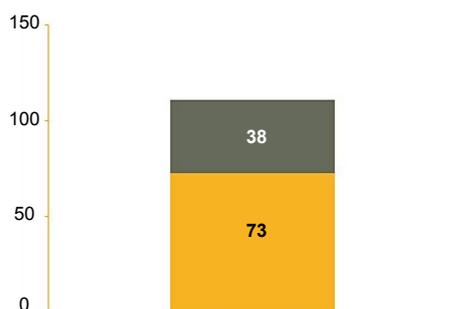


Figure 2: Number of investment deals in SAS companies from 2015 - 2020

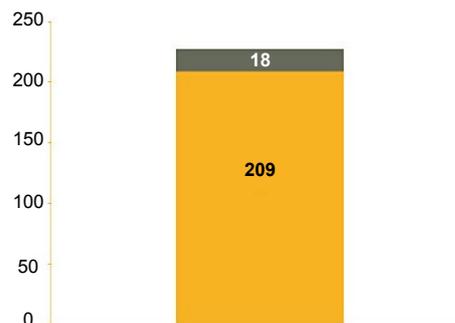


Figure 3: Value of investments in SAS companies from 2015 - 2020 (USD, millions)

Source: OCA analysis of data from consultations, press releases, company websites, and other secondary sources; Sustainable Energy for All (2020), State of the global mini-grids market report.

Local SAS companies find it comparatively hard to access capital from both international and local investors. Out of the known ~52 local SAS companies, three are assemblers and distributors, while the remaining are importers, distributors, and retailers.¹⁹ 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. Programs such as Rural Electrification Fund (REF) and Nigeria Electrification Project (NEP) by REA, World Bank, and AfDB aim to identify credible local SAS companies to provide capital to, although only 8 out of 32 NEP approved suppliers are SAS companies and most are predominantly international.²⁰ Also, specialized investors such as All On have emerged that invest substantially in local companies such as Auxano, ColdHubs, and Creeds Energy.²¹

Within the SAS sector, SHS companies have attracted more investment compared to pico solar and productive use equipment (PUE). Investors note that companies focusing exclusively on 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, investors observe that upfront, maintenance, and replacement costs are currently too high for end users; investor interest is increasing with new business models and technology, but most funding to date is comprised of grants. On the other hand, demand for SHS solutions remains high driven by an unavailable or highly unreliable grid, in addition to high demand for SHS-powered domestic appliances such as televisions. Furthermore, there is increased demand for larger capacity SHS for economic and productive uses in shops, markets, and MSMEs, use cases that are making investment into these companies more attractive.²²

18. AECF (2019), Country specific implementation framework for REACT Household solar program in Nigeria; OCA analysis and database of companies

19. AECF (2019), Country specific implementation framework for REACT Household solar program in Nigeria

20. REA (2020), Nigeria SHS Programmes and Donor Sector Coordination Workshop – Day 1

21. All on

22. OCA Consultation and analysis

Case Box II: Raising capital as a PUE company

Early grant and equity financing have been vital to the PUE sector's success to date, as availability of financing for PUE companies differs greatly from that of other SAS segments. ColdHubs provides a great example from Nigeria. The company is a local firm that produces modular solar-powered walk-in cold rooms for off-grid storage and preservation of perishable goods. They charge their customers, mainly farmers to date, on a pay-as-you-store basis. The company has had initial success raising equity, grant funding, and prize money. A history of its investments is as follows:

- **2018:** ColdHubs secured an undisclosed amount in grant funding from Microsoft's AirBand Grant Fund in 2018.
- **2018:** ColdHubs secured an undisclosed amount of financing from All On to deploy to cold hubs for fish storage in Ibeno and Ibaka
- **2019:** ColdHubs was awarded GBP 75K from emerging 1st in the UK aid-funded, Global LEAP Awards Off-Grid Cold Chain Challenge.
- **2020:** ColdHubs was awarded USD 100K in the Global Maker Challenge under the Mohammed bin Rashid Initiative for Global Prosperity.

With these funds, the company has rolled out several pilot sites (almost 30), allowing the company to monitor these sites and gather critical information to build out their business case.

More patient capital is required to continue the segment's growth trajectory. Consistent Energy is another PUE company that sells solar energy solutions to small businesses, schools, and offices on a PAYG basis for productive use. Besides the owner's equity, Consistent Energy has raised financing from local banks—USD 100K local currency revolving loan at 25 percent interest and a 150 percent collateral requirement—and secured some grants. Companies at this stage in this segment need upwards of USD 1M in debt and equity to scale operations, but local banks and grants cannot fully meet this need. Understandably, investors are hesitant to invest in PUE businesses without significant traction, but larger debt or equity investments are needed, particularly for companies providing larger systems. The market opportunity for PUE is significant and commercially viable businesses exist. ACE TAF is conducting assessments for productive use across three agricultural value chains to inform the government and investors of more opportunities that exist within PUE.

Source: OCA consultations and company websites

2.3 Investments in women-led businesses

Gender and Social Inclusion (GESI) investments have been limited due to low levels of investable SAS companies. Women's involvement in the energy space in Nigeria is historically low primarily due to culture and perception, but new business models have encouraged participation of women. A few companies have demonstrated traction and investment readiness through well-articulated business plans, strong corporate governance structures, and legal and financial compliance to raise investment. Sosai Renewables, for example, founded and led by Habiba Ali has raised ~USD 600K through Bettervest and as a winner of the USADF/All On Energy Challenge in 2019. Creeds Energy, owned by Hannah Kabir, was also a winner of the USADF/All On Energy Challenge in 2019 and raised grant financing from FCDO's Solar Nigeria. Investors have expressed willingness to invest in SAS companies

that are women-led but want to see more investable businesses.²³

The sector continues to leverage women across the value chain, either through capacity building or direct distribution. Solar Sisters for example, provides capacity building to women entrepreneurs to distribute different solar products. ColdHubs employs women to manage each of their cold rooms by handling cash collections, reporting, and cashflow management, ultimately empowering them and their families. Auxano Solar employs more women in its core solar panel assembly business as women are perceived to be more careful and patient in learning the assembly process.²⁴ To catalyze women's involvement in the sector, REA's Energizing Education Program (EEP) and the Female STEM Students Internship Program has enrolled over 180 female STEM students to help with operating and maintaining solar hybrid plants.²⁵ As more women gain

23. OCA Consultation and analysis

24. OCA Consultation and analysis

25. Energizing Educational Institutions: The BUK Off-grid Solar Hybrid Initiative – Leadership

participation in the sector, there is higher likelihood of women-led involvement at the management level, hopefully leading to more investments into women-led businesses in the future. International SAS companies

such as Lumos and Azuri and are already setting precedents for women in leading roles for their Nigeria or West Africa operations.

Case Box III: Gender equality and social inclusion in off-grid energy investments

Groups such as women and youth are often overlooked as a potential recipient for investment, not just in the off-grid energy sector but largely across sectors that receive equity financing. Given their position in the SAS value chain, women-led businesses are often too small to absorb capital and do not have adequate structures in place to attract investors. Nevertheless, several women-led businesses have proven that they can raise and repay debt. With the right support to develop internal capacity and traction, these businesses can be prime investment candidates. A few examples of initiatives in Sub-Saharan Africa that target these groups include:

- Rise Tide Africa, a group of women angel investors that invest between USD 50K and USD 100K in women-led businesses,
- Greenhouse lab, a three-month accelerator program that also invests between USD 50K and USD 100K in women-led start-ups and early-stage businesses,
- The African Women Innovation and Entrepreneurship Forum (Awief), an economic empowerment organization that provided grants worth USD 5,000 to women innovation and entrepreneurship, and
- US African Development Foundation (USADF) that provided technical support and seed investment up to USD 250K in community enterprises including off-grid energy and youth-led enterprises.

These initiatives are available for companies in Nigeria, and their promotion or the creation of Nigeria-specific programs could potentially result in greater access to funding for women- or youth-led businesses. Though most stakeholders did not signal out a gender disparity, instead focusing on the need for bankable investments in the sector, such interventions could encourage diversity in off-grid energy company management.

Source: Venture Burn (2020), OCA consultations and analysis

2.4 Impact of Covid-19 Pandemic

The Covid-19 pandemic has exacerbated the gaps in capital available for off-grid energy companies. Some investors have withheld their capital until there is more certainty. For example, the REACT Household Solar Round 2 program by AECF was postponed.²⁶ SAS companies report postponed conversations with investors as investors assumed the pandemic will impact investment return potential.²⁷ Other investors shored up existing portfolio companies, ensuring these companies can deal with the prolonged economic impact on end users.

The government and investors have, however, set up interventions to mitigate the impact of Covid-19 on the SAS sector. The Central Bank of Nigeria has established a 150 billion Naira solar intervention fund that will provide long-term low-interest credit facilities to the NEP pre-qualified SAS companies in support

of the federal government's plan to roll out 5 million solar connections under the Covid-19 Economic Sustainability plan. The facility will be administered through select commercial banks at concessionary rates of 9 percent interest—lowered to 5 percent due to Covid-19—with a 2-year moratorium on principal, and a maximum tenor of 10 years, not exceeding ~USD 1.3M per company. The goal of the economic recovery plan is to provide energy access to 25M people and create 250K jobs.²⁸ The Bank of Industry also announced some interventions for businesses to mitigate the impact of Covid-19 including a 2 percent decrease in interest rates for one year starting April 2020 and a 3-month moratorium on principal repayments with an option to extend to 12 months.²⁹ All On set up a USD 500,000 Covid-19 relief fund to support solar powered solutions to health centers.³⁰ The NEP funded by World Bank and AfDB had also set up a Covid-19 fund to support SAS companies within its portfolio.

26. OCA Consultation and analysis

27. OCA Consultation and analysis

28. Central Bank of Nigeria (2020), Framework for implementation of the solar connection facility

29. Latifat Opoola (2020), Nigeria: COVID-19 - Bank of Industry Lists Key Interventions for Enterprises,

30. USAID (2020), Nigeria Power Sector Program Off-grid Stakeholder meeting presentation

2.5 SAS sector financing need

The SAS sector is capital intensive and while most companies attest to needing local currency financing, financing needs are unique to a company's operating model and stage of development. Several international SAS companies such as BBOXX Nigeria are relatively new in the market and have lined up equity financing to establish their Nigerian operations. However, a company like Lumos has significant traction in Nigeria

and has raised debt financing to fuel its growth. Local and smaller SAS companies still need patient capital in the forms of grant and equity to establish strong governance structures, prove commercial viability, and achieve scale to prove bankability. They could also use more short-term debt financing for working capital. Figure 5 illustrates the typical financing need for SAS companies based on operating traction and operating models.

	Seed stage	Growth stage		Expansion stage	Scale-up
Business focus	Proof of concept and commercial viability			Commercial scale up	
Ideal investors	Self-funding	Donors, foundations, and crowdfunding	Early-stage investors	Late-stage investors	Commercial investors
Financial instruments	Grants	Equity		Debt	Instruments deemed necessary for scale-up
Cash need (PAYG)	USD 0.5 – 2m	USD 15- 35m		USD 35 – 65m	USD 15- 50m
Cash need (cash sales)	USD 7- 15m	USD 4-10m		USD 3-10m	

Figure 4: SAS financing need at different stages of growth and operating models

Source: Gogla (2018), *Providing Energy Access through Off-Grid Solar: Guidance for Governments*

Notwithstanding the investment flows, interventions to date, and a USD 1.2B market opportunity, the financing gap in the SAS sub-sector stands at USD 1.5 billion for the next five years, indicating limitations to accessing financing.³¹ SAS companies have demonstrated ability to

scale but access to financing and the ability of companies to absorb capital is a primary limitation. Despite the availability of multiple local and regional funds, poor awareness of funds also limits access to finance.³² The next section outlines some of the barriers to investment for the sector.

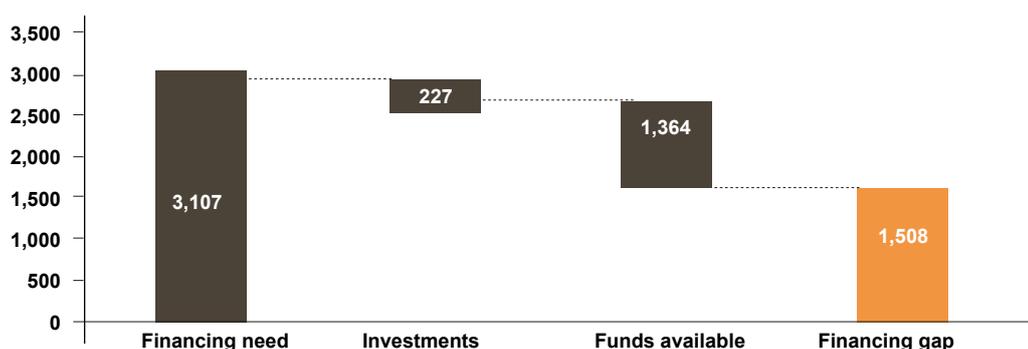


Figure 5: Estimated financing gap in the SAS sector (USD, millions)

Source: OCA consultations, press releases, company websites, and other secondary sources; *Sustainable Energy for All (2020), State of the global mini-grids market report.*

31. NIPC (2020), *Nigerian Renewable Energy Investment Opportunities: Africa Investment Summit*; REA (2019), *Opportunities in the Off-Grid Sector in Nigeria: Focus on the Nigeria Electrification Project (NEP)*

32. REAN (2020), *Assessing the Accessibility of Government Social Intervention Funds for Renewable Energy Sector*

3. BARRIERS TO INVESTMENT

3.1 Supply-side barriers to investment

Investor perception that the SAS business model is high risk has negatively influenced investment to date. Demand for SAS goods is still elastic in many markets, especially in the rural areas with readily available substitutes such as battery-powered torches or other energy products. Consumers are aware that SAS products are relatively expensive, and many historically did not trust solar technologies due to sub-standard products on the market though overall perception is improving over time due to consumer awareness programs and increased SAS company sales of high-quality systems.³³ Several SAS suppliers have resorted to Pay-As-You-Go (PAYG) to address affordability issues, where the credit risk for off-grid populations is high, especially in low-income areas.³⁴ Other SAS companies also work with local cooperatives and credit groups to facilitate payment and consumer financing.³⁵ Investors, however, perceive social objectives such as electrifying rural areas as unprofitable, thereby withholding lending to SAS companies.³⁶

The unstable macroeconomic environment in Nigeria has also increased the risk profile of investments into the country, deterring hard currency investment. Since 2016, the Naira has widely fluctuated because of international oil price volatility. The recent drop in oil prices in the first quarter of 2020 resulted in reduced access to hard currency in Nigeria and decreased the value of the Naira against the dollar.³⁷ The CBN has tried to regulate the demand for hard currency to stabilize the Naira value, resulting in a shortage of hard currency in Nigeria.³⁸ Therefore, businesses borrowing in hard currency but receiving revenue in local currency are unable to acquire sufficient hard currency from regulated forex providers to make repayments, and black market forex operators often have higher exchange rates. International investors, therefore, often withhold hard

currency financing to safeguard investments from forex losses and SAS companies are also unwilling to take hard currency loans because they are risky and costly.³⁹

Some investors also have limited understanding of the SAS market and companies' financing needs. Many commercial investors have limited exposure to the sector and are unaware of its sector-specific risks. While the market potential for SAS products is clear, consumer data for many areas remains scarce.⁴⁰ Non-bank commercial debt investors typically price their financial instruments at >USD 250K ticket sizes with a >9 percent interest and look for an internal rate of return of about 10 percent with a five-to-ten-year turnaround, plus collateral requirements to secure investments.⁴¹ Many SAS companies, with the exception of some international companies, are often unable to absorb such large volumes of capital at market rate financing terms.

Other investors are discouraged to enter the market given uncompetitive financing terms offered by development partners. To generate a sufficient pipeline, investors as well as government and related Ministries, Departments, and Agencies (MDAs), have offered competitive lending terms. Some investors have provided concessional rates at the maximum CBN rate less 300 basis points, and denominated lending rates at the London Inter-Bank Offered Rate (LIBOR) plus 400 basis points. However, funds from the Bank of Industry (BoI) are priced between 5-8 percent, outpricing these investors and squeezing them out of the market despite the potential for faster fund deployment with commercial investors.⁴² While facilities such as the BoI offer financing terms palatable to SAS companies, they are often difficult to access due to complex requirements and processes, further straining SAS access to capital and resulting in SAS companies pursuing funds elsewhere.

33. Shell Foundation (2018), *Nigerian Off-Grid Market Acceleration Program: Mapping the Market*

34. Acumen and OCA (2019), *Roadmap to Exits in Off-Grid Energy*

35. OCA Consultation and analysis

36. OCA consultation and analysis

37. Council on Foreign Relations (2020), *Amid Oil Price Collapse, Nigeria Is Running out of Foreign Exchange*,

38. Tope Alake and Alonso Soto (2020), *Nigeria Naira Remains Under Strain After Devaluation*,

39. OCA Consultations and analysis

40. Shell Foundation (2018), *Nigerian Off-Grid Market Acceleration Program: Mapping the Market*

41. OCA Consultation and analysis

42. AECF (2019), *Country specific implementation framework for REACT Household solar program in Nigeria; OCA Consultation and analysis*

3.2 Demand-side barriers to investment

Despite substantial grant financing, many SAS companies are not ready to raise or absorb external capital given their current scale of operations. Smaller SAS companies have shown limited ability to evaluate investment needs and prepare for a capital raise process. Further, the financing needs for many of the smaller companies are often below the minimum “ticket size” requirements for investors present in the market (tens or low hundreds of thousands in dollars versus millions). Consequently, smaller local SAS companies have raised little financing from institutional investors and are often put off in seeking foreign investment due to the long process of accessing financing.⁴³

Limited availability of local financing and forex hedging options further limits access to capital. Hard currency financing accounts for 93 percent of capital deployed in the off-grid energy sector in Nigeria since 2018.⁴⁴ SAS companies have limited forex hedging options, increasing forex risk exposure as a result of the predominance of hard currency in the market. Local financing, however, remains out of reach due to unfavorable interest rates and predominantly short-tenured loans.⁴⁵ As a result, demand for the current investment opportunities among Nigerian SAS companies is limited.

3.3 Regulatory/policy barriers to investment

Historically, limited or poor implementation of SAS-specific regulation has failed to provide sector actors with the confidence necessary to enter the market. In 2017, the World Bank classified Nigeria in the bottom 26 countries in its Regulatory Indicators for Sustainable Energy (RISE), a slight improvement from the bottom 10 in 2016. The ranking illuminates the role of policies and regulations in driving investments for achieving universal electrification and calls for interventions that create an attractive policy environment and corresponding stability.⁴⁶ Low implementation of sector reforms historically prevented regulations from taking root in Nigeria, though in recent years the Government has shown more significant intent through the activities of REA and other government bodies.⁴⁷

Unfavorable fiscal policy for solar components increases product prices, reducing affordability and hence market penetration. Currently, batteries and inverters attract over 20 percent in import duties with an additional 7.5 percent in Value Added Tax (VAT). While there are several tax incentives for off-grid energy actors, the incentive mostly applies to infrastructural investments as opposed to SAS products. Therefore, SAS companies do not often benefit from these tax breaks.

Further, current consumer payment platforms from financiers are not easily accessible to rural communities, due in part historically to regulation. Up until 2018, Nigeria’s Regulatory Framework for Mobile Payment Services (2009) excluded mobile network operators from providing mobile financial services, despite Nigeria’s relatively high mobile phone penetration rate of ~87 percent.⁴⁸ This in part slowed the growth of PAYG companies to reach last-mile consumers. The Payment Service Banks are potentially an alternative to mobile money solutions that could increase access to remittance and non-credit services to last mile distributors.



Hard currency financing accounts for **93% of capital deployed** in the off-grid energy sector in Nigeria since 2018. SAS companies have limited forex hedging options, increasing forex risk exposure as a result of the predominance of hard currency in the market.

43. Insights from conversation with Chibuikem Agbaegbu Country manager, Nigeria, ACE TAF

44. REA (2019), *Opportunities in the Off-Grid Sector in Nigeria: Focus on the Nigeria Electrification Project (NEP)*

45. Shell Foundation (2018), *Nigerian Off-Grid Market Acceleration Program: Mapping the Market*

46. World Bank (2016), *Regulatory Indicators for Sustainable Energy: A Global Scorecard for Policy Makers, RISE*,

47. SE4All (2016), *Action Agenda*

48. Shell Foundation (2018), *Nigerian Off-Grid Market Acceleration Program: Mapping the Market*; Jumia (2019),

4. EXISTING INITIATIVES TO ENCOURAGE INVESTMENT

Stakeholders have deployed large amounts of technical assistance to build capacity for both investors and companies.⁴⁹ REA, through its REF and NEP, has allocated ~USD 44 million specifically to technical assistance for SAS and mini-grid providers.⁵⁰ Development partners including FCDO, USAID NPSP, and IFC have provided technical support to local financial institutions to understand the emerging solar market and unlock local financing in Nigeria.⁵¹ Innovation hubs like All On's work in conjunction with partners like the Nigeria Climate Innovation Center (NCIC) and the Clean Tech Incubation and Acceleration Foundation (CTIAF) have developed SAS company capacity and bankability through the provision of incubation and growth acceleration support.⁵¹ Though these have catalyzed initial growth, more TA is still need to close the gap between companies and investors.

Stakeholder coordination has spurred greater collaboration in the SAS sector. REA, in addition to USAID NPSP and All On, convenes development partners, donors, investors, and other sector stakeholders through its quarterly Off-grid Investors/ Donors Coordination Meeting that provides a platform to discuss key activities and identify potential collaborations.⁵³ In addition, the Renewable Energy Association of Nigeria (REAN) represents and advocates for private SAS companies. Donors and other partners such as ACE TAF are providing technical assistance to bolster REAN's capacity in lobbying for the private sector, while also leveraging the association to support companies.⁵⁴ More collaboration is critical to eliminate duplicated efforts and increase stakeholder engagement in pursuit of a sound enabling environment, for example

more streamlined importation processes and reduced tariffs, both critical to catalyzing sector growth.⁵⁵

Development partners and the FGN have also spearheaded several initiatives to encourage investment into the sector. Development partners such as AFD have extended lines of credit to local commercial and development banks, among them Access Bank and United Bank of Africa (UBA), to spur local financing and reduce the dependence on hard currency financing, thereby reducing exposure of companies to foreign exchange risks.⁵⁶ Guarantees such as USAID's Development Credit Authority for EcoBank attempted to reduce collateral and credit history requirements, but limited improvement in tenures and interest rates have resulted in limited utilization.⁵⁷ Development partners and some investors have also spurred innovation and scale-up with grants such as FCDO's Solar Nigeria, World Bank's Nigeria Climate Innovation Center (NCIC), and the Off-Grid Energy Challenge by All On and USADF. They also back initiatives alongside the FGN through REA and Bol that availed ~USD 150 million to SAS companies.⁵⁸

The FGN has also enacted several policies and regulations to encourage growth in the off-grid energy sector. Nigeria has taken critical steps, beginning in 2005 with the enactment of the Electricity Sector Power Reform Act (ESPRA) to unbundle the state's monopoly on electricity and catalyze sector investments, also resulting in the creation of REA to oversee and implement the FGN's commitment to rural electrification.⁵⁹ Since then, eight critical energy policy documents have made an impact on off-grid energy, as stakeholders can continue to focus on active

49. *Insights from conversation with Chibuikem Agbaegbu Country manager, Nigeria, ACE TAF*

50. *World Bank (2007), Operation Manual for Rural Electrification Fund; REA (2020), Nigeria SHS Programmes and Donor Sector Coordination Workshop – Day 1*

51. *ESI Africa (2016), Nigeria: IFC partners with FCDO to accelerate solar power*

52. *Business Day Nigeria (2020), Increasing Nigeria's energy access and bridging gaps*

53. *Power for All (2018), Campaign Updates*

54. *Africa Clean Energy Update*

55. *REA (2020), Nigeria SHS Programmes and Donor Sector Coordination Workshop – Day 2*

56. *SUNREF (2018), AFD supports the Nigerian banking sector with SUNREF*

57. *USAID/Power Africa, Renewable Energy and Energy Efficiency Project 2014-2018; REAN (2020), Assessing the Accessibility of Government Social Intervention Funds for Renewable Energy Sector*

58. *Guardian Nigeria (2015), Bol, UNDP to stake \$4.8m on renewable energy projects in Nigeria; REA (2020), REA Disburses Capital Grant for Solar Home Systems (SHS)*

59. *GOGA (2018), Technical Notes: Quality Matters*

implementation.⁶⁰ Government organizations including Federal Ministry of Power, REA, Nigerian Electricity Regulatory Commission (NERC), Central Bank of Nigeria, and Nigeria Investment Promotion Commission (NIPC) have driven major reforms through the creation of policy documents that outline the government's objectives, strategies, and targets for renewable energy. These policies, regulations, and organizations provide the necessary bedrock against which the Nigeria's off-grid energy sector can grow but commitment to implementation will dictate their effectiveness. Part of ACE TAF's technical assistance approach is to support the government at a federal and state level to improve policies and implement them in order to catalyze investment into the sector.

There are also several investment policies currently in place to encourage foreign investment into the sector.⁶¹ The Federal Inland Revenue Services (FIRS) provides foreign investors with a 100 percent withholding tax (WHT) exemption on loans to local companies, provided these loans are for a period of at least 7 years, with a 2-year moratorium. Further, under a minimum tax exemption, local companies are exempt from minimum tax payments, assuming that a minimum of 25 percent of equity is foreign. Finally, the NIPC Act provides that foreign investors into local companies are guaranteed "unconditional transferability of funds through an authorized dealer in a freely convertible currency" including dividends or profits, and remittances of proceeds, net of tax.⁶² Additionally, the NIPC pioneer status incentive provides eligible companies a tax holiday on income tax for up to five years.⁶³

Current moves toward quality standards for SAS products will help to safeguard consumer interests by limiting low-quality products. In Nigeria, non-quality verified (QV) solar products have accounted for ~70 percent of product sales, largely in part due to their affordability, up to four times cheaper than QV products.⁶⁴ The introduction of the Standards Organization of Nigeria (SON) quality standards under the SON Conformity Assessment Program (SONCAP)

ensures minimum product standard conformity.⁶⁵ The SON has adopted the International Electrotechnical Commission (IEC) standards for SAS through support from IFC and ACE TAF, and is setting up a testing lab for market quality checks and surveillance with the aim of implementing the standards and issuing product certifications.⁶⁶ In addition to ensuring customer safety, quality standards improve trust needed to grow SAS product adoption.

Consumer financing mechanisms have been piloted to increase affordability of SAS products. PAYG has increased affordability and uptake of SAS products, with over 53 percent of customers surveyed selecting products based on mode of payment offered.⁶⁷ In Nigeria, stakeholders have overcome the limitations on consumer financing imposed by the CBN with innovative mechanisms. Lumos, for example, partnered with Global System for Mobile Communications Association (GSMA) and MTN Nigeria, to pilot the use of airtime credit to provide PAYG services.⁶⁸ Programs such as Power Africa's Beyond the Grid (BTG) and IFC's Lighting Nigeria have worked with MFIs to provide credit for SAS products to last-mile consumers. Lighting Nigeria has collaborated with 14 MFIs, disbursing ~100K loans for a total value of ~USD 3.4M while BTG and AfDB partnered with LAPO, Nigeria's largest MFI, to reach its ~90 percent female client base.⁶⁹ While these initiatives have increased affordability and ability to serve vulnerable populations, limited geographic reach of MFIs limits traction.

Finally, the CBN recently released the Revised Payment Service Bank (PSB) Regulation that permits licensed promoters to provide small scale non-credit services in rural areas. The PSBs will accept deposits from customers and small businesses, execute payments, issue debit cards, and provide financial advisory services. Consumers in remote areas can leverage these services to make payments for SAS products and services delivered. Eligible promoters include bank agents, telcos, retail chains, postal services, mobile money operators, and fintech companies subject

60. GOGLA (2018), *Technical Notes: Quality Matters*

61. GOGLA (2018), *Technical Notes: Quality Matters*

62. GOGLA (2018), *Technical Notes: Quality Matters*

63. GOGLA (2018), *Technical Notes: Quality Matters*

64. GOGLA (2018), *Technical Notes: Quality Matters*

65. ACE TAF (2020), *Importation Guide for Solar PV Products and Technologies in Nigeria*

66. REA (2020), *Nigeria SHS Programmes and Donor Sector Coordination Workshop – Day 2, OCA consultation and analysis*

67. Acumen (2017), *An Evidence Review: How affordable is off-grid energy access in Africa?*

68. GSMA (2016), *Mobile for Development Utilities Lumos: Pay-as-you-go solar in Nigeria with MTN*

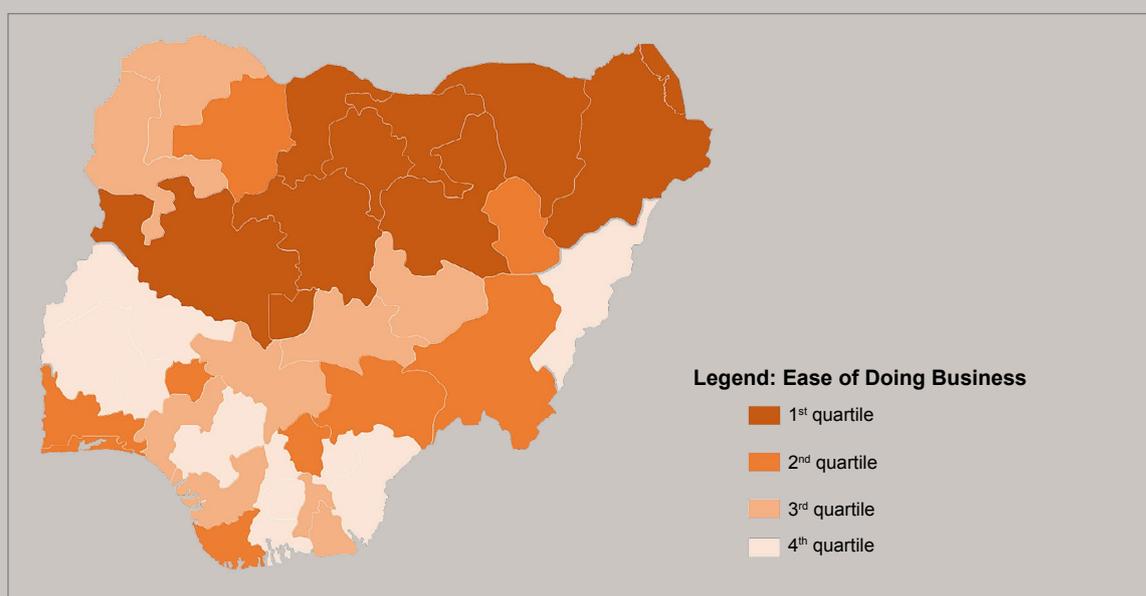
69. *Lighting Africa (2019), Nigeria: A program designed to impact 6 million people; AfDB (2015), AfDB Group signs loan agreement with Nigeria's LAPO Microfinance Bank*

to approval of the CBN.⁷⁰ The regulation has significant potential to increase financial inclusion in rural areas, but there are only 3 PSB providers licensed to date, due to the high minimum capital required to be granted a license (~USD 130 M).⁷¹ More promoters need to be licensed to realize further reach and higher financial inclusion. Adequate access to the PSB services can facilitate efficient consumer payment of SAS solutions.

ACE TAF has been in the forefront providing support to different stakeholders to catalyze sector growth. Their interventions cover enabling environment factors, knowledge management, and stakeholder coordination. Under enabling environment, ACE TAF supports

government stakeholders in improving and implementing policies that are favorable to the SAS sector, such as the custom duty policies that have historically limited the sector's growth potential. ACE is also facilitating several market studies and supporting the development of databases that will increase the overall sector transparency for informed decision making by different stakeholders in the value chain. While providing support to the different stakeholders, ACE also coordinates the stakeholders to facilitate interaction, communication, and mutually beneficial outcomes for stakeholders. A detailed overview of ACE TAF's activities are listed in Table 1.

Case Box IV: A State-level view of investment for off-grid in Nigeria



Many interventions occur at the national level, but to achieve universal access it is vital to consider differences across States to ensure that businesses can expand and reach last-mile customers throughout the entire country. Northern Nigeria has lower electrification rates than other geopolitical zones, ranging from ~53 percent in Kaduna to 18 percent in Yobe. They also rank favourably in the Ease of Doing Business Index, as seen with Jigawa being the 3rd best for doing business as an SME state in Nigeria. Of course, socio-political instability in some of these states is also a key consideration. While ranking of the ease of doing business in the West, South, East states may be low, they on average have higher SAS adoption rates.

Sector stakeholders have started to promote investment at the state level. For example, NIPC's Book of States evaluates all 36 states and the Federal Capital territory for different investment opportunities across sectors. For SAS-specific interventions, ACE TAF is offering support to state governments to improve the enabling environment for off-grid solar and drive electrification goals at the state level through its "State-Level Stand-Alone Solar Market Support."

Source: NIPC (2020), *Book of States*; Uduak Akpan, (2015) *Technology Options for Increasing Electricity Access in Areas with Low Electricity Access Rate in Nigeria*; OCA Analysis

70. Central Bank of Nigeria (2020), *Guidelines for licensing and regulation of payment service banks in Nigeria*

71. EFINA (2020), *Payment Service Banks (PSBs) in Nigeria: Landscape Assessment and Key Learnings from India to Implement Optimal Payment Service Banks*

5. RECOMMENDATIONS TO ACCELERATE INVESTMENT

Building from the base of current sector interventions, stakeholders should streamline pathways for financing and accelerating sector growth. The SAS market is earmarked to play a substantial role in achieving universal electrification in Nigeria, estimated to provide Tier 2 access to over 88 million people by 2030.⁷² Compared to this goal, the sector has achieved relatively limited traction, though interventions and investments have spurred significant early sector development. This section outlines potential interventions that can accelerate investment and increase energy access.

5.1 Supply-side interventions

Financing structures tailored to SAS business models in Nigeria are needed to increase transactions, and small local SAS companies still require early-stage equity to prove their operating models and set up proper team structures capable of attracting investment. Early-stage investors have historically made equity investments of USD 2-9M into local SAS companies and USD 15 – 25M into international SAS companies.⁷³ Examples include the USD 8M equity investment into GoSolar Africa from SME Funds Capital, Anergy's USD 9M Series A investment from Breakthrough Energy Ventures in partnership with All On Energy, ElectriFI, and Norfund, and ColdHubs' ~USD 280K investment from Factor[e].⁷⁴ With better knowledge of how to scale SAS businesses, companies can more likely achieve successful exits. An example of a successful exit in the form of secondary sale was Blue Haven Initiative's acquisition of Acumen's shares in M-KOPA. Other exit strategies observed in the market include share buybacks, mergers, and acquisitions.⁷⁵

Concessionary capital can cushion the working capital needs for SAS companies by limiting commercial rate repayment obligations. Currently, local currency financing charges 20-25 percent interest rates, and hard currency financing charges 15 percent including collateral requirements of up to 150 percent of the borrowed amounts, which is too costly for small SAS

companies.⁷⁶ Concessionary debt in both hard and local currency, for example using lower interest rates, innovative securitization structures such as debentures on assets, guarantees, or receivable-backed financing, can allow companies to develop a track record of repayment while encouraging streamlined operations and improved governance structures. Local banks can provide this by leveraging lower cost funds provided by the Central Bank of Nigeria to provide local currency loans at lower interest rates.

Concessional financing from development partners and DFIs can also mitigate investment risks for more commercial investments in the form of blended finance. Blended finance can combine concessional and commercial capital to provide debt, equity, or risk-sharing to SAS company investments. Here, high-risk and impact-focused investors take on more risk through mechanisms such as first-loss layers in junior tranches or guarantee mechanisms, while risk-averse investors such as commercial lenders take on reduced risk. By crowding in commercial lenders, impact-focused investors catalyze commercial investment into the SAS sector.⁷⁷ Blended finance can provide more concessionary or "patient" capital that eases SAS companies away from dependence on grant capital while increasing private sector investment, visibility, and comfort in investing in the sector.

Medium to large SAS companies typically seek larger tranches of capital at more commercial rates given their traction and financial robustness. The specific financing structures and terms suitable for large SAS companies varies depending on their current and projected cash flow performance, their leverage, and shareholders' willingness to raise more equity. Nonetheless, financing instruments such as mezzanine debt, for example All On's investment into Sosai Renewable Energies Company, can provide flexible payment terms to allow businesses to access growth capital while at the same time providing lucrative returns to investors.⁷⁸

72. María Yetano Roche et al (2019), *Achieving Sustainable Development Goals in Nigeria's power sector: assessment of transition pathways*

73. OCA analysis of data from consultations, press releases, company websites, and other secondary sources; *Sustainable Energy for All (2020)*.

74. Crunchbase, REA (2020),

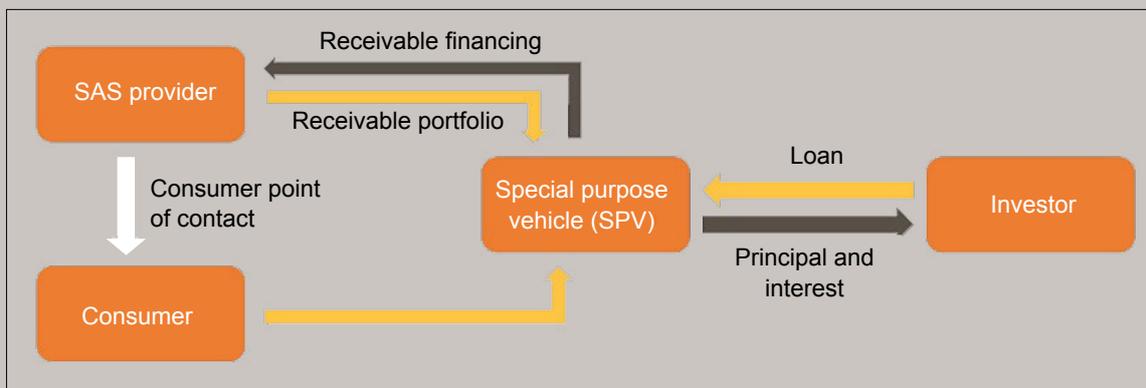
75. Acumen and OCA (2019), *Roadmap to Exits in Off-Grid Energy*

76. OCA Consultation and analysis

77. REA (2019), *Rural Electrification Agency Programmes and Initiatives*

78. OCA Consultations and analysis

Case Box V: Receivables securitization structure overview in off-grid solar



Though the SAS sector in Nigeria is currently nascent, companies will need to attract more scalable forms of finance to reach the country's electrification goals. Some larger PAYG SHS companies are attempting to use their receivables balances to raise financing through securitization. Under securitization, the SAS provider pools customer receivables to create assets that are subsequently pledged to a Special Purpose Vehicle with oversight from the SPV trustee.

The SPV requires underwriting and ongoing management. An underwriter performs risk assessments and due diligence to determine eligibility of loans and price debt tranches, based on the credit quality of the pooled receivables—historic and projected default or repayment rates. Once completed, the asset-backed security is created, usually in two tranches: senior and subordinated debt tranches. An SPV trustee markets and sells the instruments to a pool of investors ranging from commercial investors, DFIs, and other retail investors. DFIs could invest in the subordinate tranche, providing a first-loss credit enhancement to the security.

The securitization process can be complex and costly, and therefore more applicable to medium to large sized SAS companies. Smaller companies can, however, employ factoring. Under factoring, the SAS companies would sell their receivables at a discount to a third party and receive upfront cash, much like securitization. The discount rate would be informed by the riskiness of the receivables. In Nigeria, this form of financing would help larger companies to continue their scale-up while improving their liquidity position, as seen outside of Nigeria.

Source: GOGLA (2020), *Market Trends Report*; Global Innovation Lab: *Solar Securitization for Rwanda*; CGAP (2018), *Strange Beasts: Making Sense of PAYG Solar Business Models*

To crowd in this needed equity and debt investment, SAS companies still require grant or other concessional funding from development partners.

Various grant schemes can help companies—those with new business models or ones overlooked in previous rounds—demonstrate traction. Results-based financing links payment to the completion of specified performance measures or outputs, such as number of connections, allowing funders to steer sector growth, for example by targeting certain products or geographies. Examples include NEP's USD 60M SHS output-based fund that has deployed USD 1M to support ~86,272 SHS system installations covering around 20 percent of the of the retail costs to the grantees.⁷⁹ Alternatively, match grant funding can serve as another form of grant finance,

requiring companies to contribute capital at predefined proportions with the investor, thereby sharing in the risk and encouraging streamlined operations. Some funders such as AECF have assessed the applicability of this financing option and estimated that a ratio of 1:1 would be ideal for smaller SAS companies compared to 2:1 for medium-sized companies.⁸⁰

Guarantees or first-loss facilities are currently lacking despite their potential value in catalyzing investments into SAS companies.

Development partners could set up guarantees to incentivize commercial investment into the SAS sector. Guarantees would allow SAS companies to take up commercial debt financing against the facility, therefore hedging

79. Donor Coordinator meeting (10 November 2020), 5M solar connection programme

80. AECF (2019), *Country specific implementation framework for REACT Household solar program in Nigeria*

the commercial investors against the risk of loss. One example is a forex-based guarantee to hedge commercial investors against forex losses in hard currency investment. USAID has historically provided a similar facility in the form of a partial credit guarantee to Ecobank through the USAID Development Credit Authority.⁸¹

Increased data and sector transparency are also required to bridge the information gap and increase investor confidence in making investments. The Rural Electrification Agency (REA) is developing the Nigerian Energy Database (NED) to house energy statistics and promote increased sector transparency. The NED will capture consumer energy access data and market potential to help companies identify high-value markets and subsequently attract investments.⁸² Similarly, ACE TAF is developing the Energy Access Explorer platform that analyzes spatial data sets on energy supply and demand and produces graphical representations of energy access maps to improve energy access planning. Initiatives such as these can help companies identify viable market opportunities, and as a result attract investors willing to support

their growth. Additionally, data from sources such as Nithio, an AI-driven data provider that uses geospatial customer profiling, can provide investors with relevant information to provide receivables-backed financing.⁸³ Greater collaboration across sector actors will increase transparency around the financial performance of SAS companies, financing needs for SAS companies, optimal investment terms, and key performance indicators needed for investment decision-making.

5.2 Demand-side interventions

It is also necessary to improve the ability of companies to prepare to raise and absorb capital. A common complaint of financiers is that companies in the sector, local companies especially, are not investment ready.⁸⁴ Tailored TA can ensure that companies are investor ready, for example supporting them to streamline their operating models, treasury management functions, develop financial evaluation skills, improve credit management, and prepare investor materials. New TA models are evolving to provide more direct support to businesses that can ultimately give investors more confidence.

Case Box VI: Strategies to improve investment readiness

It is important for SAS companies to build the internal capacity to raise and manage external capital beyond technical assistance. The companies should focus on five overall areas including:

1. Financial management and evaluation

- ◆ Perform audits and maintain clean and accurate records of historical financial performance, financial position (assets and liabilities), and cash position.
- ◆ Monitor, record, and evaluate key financial and operational performance indicators such as profitability, cost optimization, and product efficiency metrics, among others.

2. Operations management and optimization

- ◆ Monitor and manage operational efficiency such as duration and cost of customer acquisition, inventory balance and turnover, and sales/distribution, among others.
- ◆ Actively manage customer credit risks and receivables collections.
- ◆ Measure overall impact of operating activities such as improvement in electricity access, customer satisfaction, and number of women impacted, among others.

3. Capital raising

- ◆ Prepare investor material including a business plan, investor teaser, and financial model.
- ◆ Define the financing need, optimal financing structure (equity, debt, grant, or quasi equity), and timeline for investment.
- ◆ Shortlist and reach out to best fit investors to introduce and discuss the investment opportunity.
- ◆ Be prepared to address critical questions from investors and to negotiate on key financing terms.

81. World Bank (2019), *Off-Grid Solar Market Assessment and Private Sector Support Facility Design*; REAN (2020), *Assessing the Accessibility of Government Social Intervention Funds for Renewable Energy Sector*

82. REA (2019), *Rural Electrification Agency Programmes and Initiatives*

83. Nithio

84. REAN (2020), *Assessing the Accessibility of Government Social Intervention Funds for Renewable Energy Sector*

Case Box VI: Strategies to improve investment readiness (continued)

4. Risk management

- ◆ Establish a clear governance structure with a competent management team that can inspire confidence from investors.
- ◆ Establish checks and balances in the use of capital raised to achieve stated investment plans.
- ◆ Create monitoring and evaluation functions to align overall financial and operational performance with investor expectations.

5. Business planning and marketing

- ◆ Articulate the business' market share, target market, value proposition of products and services, and competitive advantage.
- ◆ Ascertain the quality of products and services including the reliability and sustainability of the supply chain.

While development partners have historically provided technical assistance, SAS companies are keen on working with private investors that are also interested in their business development. Investors could supplement their investments with technical assistance support to ensure the companies can absorb and efficiently manage the capital raised. All On's hub is an example of technical assistance facility that builds a pipeline of investable businesses that they have eventually invested in, while AECF also couples technical assistance with financing.

Programs tailored to local companies that further bridge the gap between them and international companies can support the long-term sustainability of the sector. Local companies know the Nigerian context well and are capable of developing bottom-up solutions for the market, but often lack the same resources as international companies. Beyond improving their investment readiness, as above, programs can target local companies to increase linkages with investors, or couple concessional capital with TA to allow local companies to scale to the point where they can then raise further capital from commercial investors.⁸⁵

5.3 Policy and regulatory interventions

Fiscal policy reviews aimed at increasing the affordability of SAS products and the scale potential of SAS are required to drive further investments. Removal of VAT and import duties on solar components is a key proposal to reduce overall product costs and increase SAS product uptake. Case studies of price sensitivity in Kenya identified a 32 percent increase in household uptake of solar products due to a price

reduction from USD 7 to USD 3.⁸⁶ In Nigeria, such an intervention could be achieved through a gazette notice by the Minister of Finance, exempting certain items from VAT or import duties. ACE TAF's cost-benefit analysis on the socio-economic impact of import tariff exemptions for solar products and its Importation Guide can be leveraged to inform the government on optimal custom duty revisions.

Import duty exemptions and tax holidays could also foster the growth of investments and uptake of SAS.

These fiscal policies would incentivize firms that are engaged in the importation, provision or manufacture of machinery, equipment, and parts for use in clean energy generation. Exemptions would reduce product costs thereby improving product affordability effectively creating a larger base of potential customers.⁸⁷ These interventions are covered in more detail in reports such as Strategic Fiscal Incentives to Unlock the Off-Grid Clean Energy Sector in Nigeria: Opportunities and Recommendations by All On.

More licensing for the PSB financing platform is required to facilitate consumer PAYG remittances.

To ensure a wider reach of financial inclusion, the CBN would need to license more promoters to provide payment services. While PSBs would not extend credit to consumers to purchase SAS solutions, they would make it easier for consumers to make payments once the solutions are purchased. Increases in repayment efficiency could ensure that SAS companies are generating sufficient operating cash flows to cover working capital needs. Nonetheless, more consumer financing platforms are still needed to mitigate affordability constraints for the SAS products.

85. All On ; AECF

86. GOGLA (2018), *Providing Energy Access through Off-Grid Solar: Guidance for Governments*

87. All On (2019), *Strategic Fiscal Incentives to Unlock the Off-Grid Clean Energy Sector in Nigeria: Opportunities and Recommendations*

6. CONCLUSION

The SAS sector is an essential component of Nigeria's goal of 100 percent electrification by 2040. Despite increased commercial activity and investor focus in recent years, the USD 1.2 billion revenue potential remains largely untapped as access to affordable and suitable financing remains elusive for many companies. Coordinated and strategic investment, technical assistance, and regulatory implementation are required to catalyze the investment needed by the sector.

Development partners and government have been integral in creating an enabling environment for the SAS sector's financing and growth. Their activities, ranging from consumer awareness, technical assistance to financiers, technical assistance to companies, policy reform, and subsidies have opened markets to begin scale-up. Continued support in these areas is essential as the sector grows. Investors still require tactical support through guarantees and forex hedging facilities before deploying capital, while they can invest alongside subsidy and consumer awareness programs.

Ultimately, the right type of financing can unlock the potential for SAS companies to meet the current market opportunity. Small local SAS companies still require early-stage equity to prove their operating models and set up proper team structures capable of attracting investment. Medium-sized SAS companies need larger tranches of financing to scale their operations and can absorb more commercial rate terms. Flexible financing structures such as mezzanine debt can allow

medium-sized companies to scale their operations while providing lucrative returns to investors without straining their profit and cash position. Concessionary capital and blended finance can crowd in commercial investments by providing the financing needed to set up proper operating structures, cushioning working capital needs by absorbing some of the costs of capital to SAS companies, and absorbing investment risks such as revenue volatility and forex fluctuation.

SAS companies are keen to work with investors that can support them in their growth efforts. Early-stage and commercial impact investors should aim to understand the local market structure and provide the right capital structures for the sector, in coordination with finance from DFIs. In the meantime, the government can play a key role in increasing the attractiveness of the sector through fiscal incentives and concessionary capital arrangements with local financiers. Nonetheless, it is essential that SAS companies are also willing to work within the constructs of available capital sources and build internal capacity to raise and absorb external financing.

The recommendations outlined in this report have the potential to catalyze investments into the sector. Coordinated implementation by public and private investors, SAS companies, the government, and donors is required for successful implementation. If SAS companies can access the right financing and technical support for their operations, they can unlock the tremendous SAS market potential in Nigeria.



ACE TAF PARTNERS INCLUDE:



STRATEGIC PARTNER



Tetra Tech International Development

12 Usuma Street, Maitama, Abuja.
Nigeria

Fourth Floor, Prosperity House, Westlands Road
PO Box 19084 - 00100 | Nairobi, Kenya.