

How is COVID-19 Pandemic Affecting Electricity Access in Africa? Evidence from Nigeria

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Abstract

The COVID-19 pandemic has triggered a twin health and economic shocks globally. It has also highlighted the critical role of electricity to livelihoods as more people work from home while practicing social distancing. Yet, in developing countries like Nigeria millions of people lack access to electricity, with adverse implications for decent livelihoods and sustainable development in the post-pandemic period. This article examines the effects of COVID-19 pandemic on the Nigerian offgrid renewable energy sector, with particular emphasis on broader implications for achieving the objectives of providing affordable, reliable and clean energy for all (SDG7). It is shown that COVID-19 pandemic has led to supply chain disruptions, declining demand, and falling investments in the Nigerian off-grid renewable energy sector, with adverse implications for energy access goal. Policy recommendations are provided to help bolster the sector to contribute not only to alleviating energy poverty but also to create green jobs and facilitate sustainable recovery in the future.

1. Introduction

The coronavirus (COVID-19) pandemic brought a dreadful start to the decade. Although the COVID-19 outbreak originated in Wuhan, central China, it has since spread to almost every country, causing over 870, 000 deaths, and infecting over twenty seven million people globally as of September 4, 2020². Moreover, the pandemic has triggered an unprecedented economic crisis as shown by the collapse of stock markets, slump in air travels, and major disruptions to global production and supply chain. The International Monetary Fund (IMF) projected that the global economy would contract sharply by -3% in 2020, with recovery expected in 2021³. Meanwhile, governments have responded with unprecedented stimulus packages worth over \$9 trillion in order to limit the economic impacts of the pandemic⁴.

The pandemic has significantly disrupted the energy sector. According to the International Energy Agency (IEA), oil demand plunged by over 30% as industries shut down and travels are restricted due to strict lockdown measures imposed across the world. As a result, oil prices dropped below \$30, a fall of almost 50% between January and April 2020, thanks to both slowing global economy and an initial lack of coordination among major oil-producing

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² Max Roser, Hannah Ritchie and Esteban Ortiz-Ospina (2020). Coronavirus Disease (COVID-19) – Statistics and Research". Retrieved from: <https://ourworldindata.org/coronavirus> [Accessed April 14, 2020]

³ International Monetary Fund (2020). World Economic Outlook, April 2020. <https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020>

⁴ Goergieva, Kristalina (2020). Confronting the Crisis: Priorities for the Global Economy. <https://www.imf.org/en/News/Articles/2020/04/07/sp040920-SMs2020-Curtain-Raiser> [Accessed April 13, 2020]

countries over production cuts⁵. Meanwhile, faltering global economic growth has prevented a sharp increase in the oil prices even as countries have begun gradually reopening from lockdown.

Furthermore, the pandemic may slow the global energy transition. Analysts forecast disruptions in the global supply chain of both solar and wind technologies due to the lockdowns in China and other major economies. The Bloomberg New Energy Finance downgraded its 2020 global solar demand forecast from 143 to 108 gigawatts and noted that wind energy faces “considerable downside risks”⁶. However, others have claimed that low oil prices also present opportunities for governments to slash fossil fuel subsidies and strengthen carbon taxes in order to provide a level playing field for renewables to compete effectively. According to Fatih Birol, the Executive Secretary of the IEA, governments should “seize the opportunity” and put “clean energy at the heart of the stimulus plans to counter the coronavirus crisis”⁷. Indeed, the European Union has made investments in clean technologies as a crucial element of its stimulus package and pledged to steer the bloc’s economy towards a green recovery in the post-pandemic period.

While a lot has been written on the effects of the COVID-19 outbreak on energy markets, little is known about how the pandemic is disrupting the decentralized clean energy sector in sub-Saharan Africa (SSA), where around 600 million people lack access to electricity. During lockdowns, access to reliable and clean electricity is extremely important not only for households’ wellbeing but also for powering healthcare centers at the forefront of responding to the pandemic⁸. In recent years, the use of off-grid solar solutions has become widespread across SSA and has been especially touted as a crucial vehicle for achieving reliable, affordable and clean energy access for all (SDG7). Between 2019 and 2022, the off-grid solar is estimated to provide access to clean energy services for over 740 million people, mainly in SSA⁹. More broadly, access to clean energy is instrumental to achieving to other Sustainable Development Goals (SDGs) such as zero poverty, good health and wellbeing, and climate action.

This article provides a preliminary analysis of the mechanisms through which the COVID-19 pandemic is impacting the off-grid solar sector in Nigeria and sub-Saharan Africa at large. Nigeria is an appropriate case study not only because it has the largest number of poor people globally, but also because about 80 million people lack access to electricity, while over half of the population suffer from unreliable electricity services. Needless to say, lockdown measures during the pandemic have compounded energy poverty challenges across the country, thereby

⁵ International Energy Agency. (2020). The global oil industry is experiencing a shock like no other in its history (2020). Put Clean Energy at the Heart of Stimulus Plans to Counter the Coronavirus Crisis. <https://www.iea.org/commentaries/put-clean-energy-at-the-heart-of-stimulus-plans-to-counter-the-coronavirus-crisis> [Accessed April 10, 2020]

⁶ Bloomberg New Energy Finance (2020). How Virus Outbreak May Change Solar Manufacturing <https://about.bnef.com/blog/how-virus-outbreak-may-change-solar-manufacturing-qa/> [Accessed April 12, 2020]

⁷ Birol, Fatih (2020). Put Clean Energy at the Heart of Stimulus Plans to Counter the Coronavirus Crisis. <https://www.iea.org/commentaries/put-clean-energy-at-the-heart-of-stimulus-plans-to-counter-the-coronavirus-crisis> [Accessed April 10, 2020]

⁸ Ogunbiyi, Damilola (2020). Here's why energy security is a vital tool in tackling a pandemic. <https://www.weforum.org/agenda/2020/04/pandemic-energy-access-coronavirus/> [Accessed April 8, 2020]

⁹ GOGLA (2019). Investing in the solar off-grid sector: What you need to know. Utrecht, Netherlands.

throwing millions into abject poverty. Yet, the pandemic has impacted the decentralized renewable energy sector, which is at the forefront of expanding access to clean energy particularly in remote communities. Three channels of impacts have been identified across the clean energy landscape: supply chain disruptions, demand shocks, and shrinking investments. In addition, both private and public responses to support clean energy access have been examined, with emphasis on policy innovations, financial assistance and multi-stakeholder partnerships.

Following this introduction, section 2 summarizes the situation of COVID-19 in Nigeria and its impacts on the Nigerian economy. Section 3 highlights data and methods, while section 4 provides analysis on the impact of the pandemic on the off-grid renewable energy sector in Nigeria. Section 5 provides conclusions and policy recommendations.

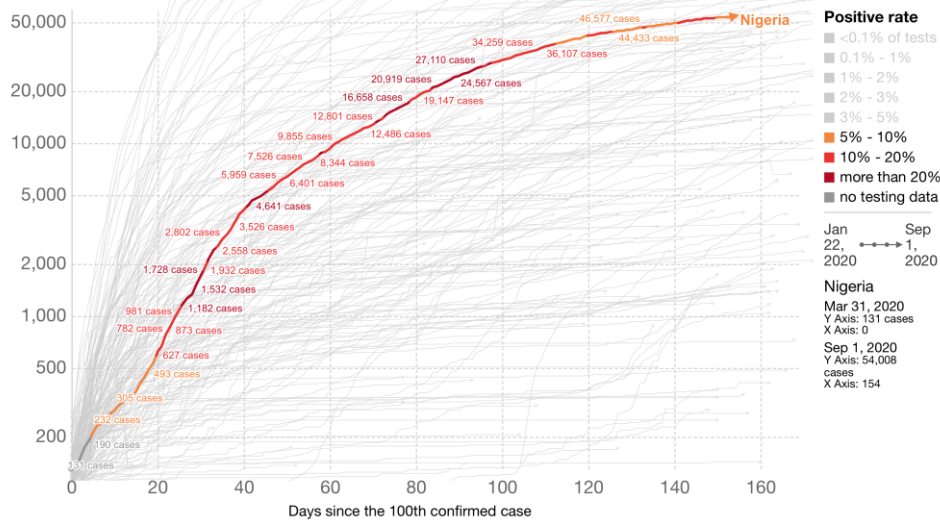
2. Brief background on COVID-19 pandemic in Nigeria

Like other sub-Saharan African countries, the health impact of the pandemic is relatively low in Nigeria compared to other countries such as the United States, United Kingdom, Brazil, and India. However, given weak health systems, crowded housing conditions, widespread poverty, as well as uncertainty over the future spread of the virus, the implications of the COVID-19 outbreak could be far-reaching in the country. As of September 1st, Nigeria has just over 54,000 confirmed cases of COVID-19, 11,000 active cases, 1,013 deaths, according to statistics from the Nigeria Center for Disease Control (NCDC). However, the number of new infections has been rapidly rising as shown in figure 1 below. Indeed, some experts have even argued that actual cases are much higher than the official figures due to low test capacity and unrecorded cases in remote communities. Since April 2020, the Nigerian government has taken several measures through the Presidential Taskforce on COVID-19. Initially, strict lockdowns were imposed in Abuja, the capital, and two other states – Lagos and Ogun –, where cases have been quite high. In addition, moderate restrictions were introduced in several other states, such as bans on gatherings and interstate travels, to curb the spread of the virus. Schools and airports have been shut across the country since April, although domestic flights have since resumed in July.

Figure 1: Total and daily confirmed cases of COVID-19 cases in Nigeria (Jan 22 – Sep 1 2020)

Cumulative confirmed COVID-19 cases

The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.



Source: European CDC – Situation Update Worldwide – Last updated 1 September, 10:04 (London time), Official data collated by Our World in Data
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Given that crude oil accounts for over 80% of public revenues and export earnings, the Nigerian economy has been hit hard by the pandemic. Plummeting oil prices have brought an enormous fiscal strain on the government, forcing it to cut projected expenditures in the 2020 fiscal budget. Between January and April 2020, Nigeria’s foreign reserve has declined by \$4 billion, the largest drop in several years, while the Nigerian Naira (₦) lost about 30% of its value as the Central Bank of Nigeria (CBN) struggled to prevent a precipitous devaluation of the currency¹⁰. Currently, the official exchange between US dollar is ₦380 compared to about ₦306 in January 2020. Nigerian economy has dipped into a recession, with growth rate of –6% in the second quarter of 2020, according to the latest report of the National Bureau of Statistics. With an unprecedented recession on the horizon in Nigeria, lower economic activity and heightened risks present significant challenges for the sustainability of the off-grid solar sector, ultimately reversing progress towards achieving universal access to electricity across the country. The Nigerian government has launched the COVID-19 Fiscal Stimulus and the Economic Sustainability Plan in order to boost income of citizens and support businesses, thereby helping to facilitate economic growth¹¹. Yet, this would be largely financed through the borrowing of \$6.9 billion from multilateral agencies including African Development Bank, World Bank and IMF due to limited fiscal space, which has worsened due to low oil prices. Similarly, the Central Bank of Nigeria (CBN) has introduced a monetary stimulus package in order to encourage banks to extend concessional loans to small and medium scale enterprises, thereby boosting confidence in the economy.

3. Data and method

¹⁰ Stears Data (2020). The Impact of COVID-19 on the Nigerian Economy. Lagos, Nigeria.

¹¹ Ministry of Finance (2020) <https://statehouse.gov.ng/wp-content/uploads/2020/04/HMFBNP-Final-Press-Statement-on-Responding-to-the-COVID-19-06.04.2020-v.7.docx-1.pdf>

The study uses qualitative research method to achieve the research objectives through a combination of online survey, structured interviews, as well as extensive review of available documents and publications from the websites and database of government departments such as the Rural Electrification Agency (REA), development organizations, as well as renewable energy companies and associations such as the Global Offgrid Lighting Association (GOGLA). Specifically, an online survey was administered to members of the Renewable Energy Association of Nigeria (REAN), a national body of solar home systems (SHS) companies and mini-grid developers in Nigeria, to understand their experiences over the past few months and to examine the channels through which renewable businesses have been disrupted by the pandemic, and to assess of the long-term effects for business sustainability and energy access. Twenty solar companies participated in the survey. In addition, in-depth semi-structured interviews were conducted with executives of five off-grid renewable energy companies to gain deeper insights into the extent to which the COVID-19 has impacted the clean energy sector in Nigeria and the broader implications for the goal of achieving affordable, clean and reliable electricity in the country. Moreover, online interviews lasting were conducted with five renewable energy experts working in energy consultancy, development agency, and the government in Nigeria. Interviews took place between April and June 2020 and each lasted at least 30 minutes.

4. The impact of COVID-19 pandemic on Nigeria's off-grid renewable sector

Electricity access remains a perennial challenge in Nigeria, where 77 million Nigerians lack access to electricity. Gas-fired power plants constitute 80% of electricity generation, while hydro-dams accounts for nearly all of the remaining 20%. Nigeria's non-hydro renewable energy resources have remained largely unexploited, with solar and wind energy accounting for less than 1% of electricity generation in 2017. Meanwhile, the country has high solar insolation levels, especially in northern Nigeria, vast landmass and strong wind speeds suitable for generating electricity using both solar panels and wind turbines. A recent article published in *Climate Policy* shows that standalone solar and hybrid mini-grids could provide modern energy access to over 88 million Nigerians by 2030¹², helping to avoid \$14 billion annual spending on diesel generator sets. However, achieving this requires increased investments into the off-grid solar sector, well-planned integration of distributed solutions into the energy infrastructure, and favorable policies.

While it may be early to assess the full effects of COVID-19 pandemic on the off-grid clean energy sector in Nigeria, findings from this research provide valuable preliminary evidence on the nature of the disruptions facing the sector and the implications for clean energy access in

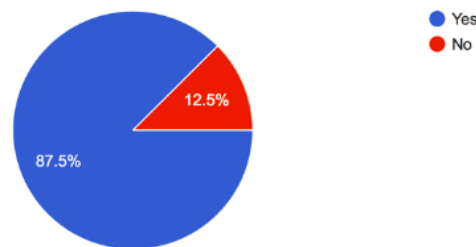
¹²María Yetano Roche, Hans Verolme, Chibuike Agbaegbu, Taylor Binnington, Manfred Fischedick & Emmanuel Olukayode Oladipo (2019) Achieving Sustainable Development Goals in Nigeria's power sector: assessment of transition pathways, *Climate Policy*, DOI: [10.1080/14693062.2019.1661818](https://doi.org/10.1080/14693062.2019.1661818)

the country. The effects of the pandemic on the off-grid market are categorized under four themes: supply disruptions, demand shocks, shrinking investments, and slow energy access.

Supply disruptions

The immediate impact of the pandemic has been from the supply side of the decentralized sector. Due to lack of domestic capacity to produce clean energy technologies, the Nigerian off-grid businesses rely on the importation of solar components from China, Europe, and the U.S. Therefore, as production has plunged in these countries due to lockdowns over the past several months, the supply chain of clean technologies in Nigeria has been significantly disrupted. The implication is that businesses without a stockpile of equipment were left with little scope for business continuity due to the difficulty to procure new inventory.

Have you experienced delays in procuring solar components during this pandemic period?



The survey results indicate that about 88% of solar off-grid operators have experienced delays while trying to import solar components (such as panels, batteries, etc.) since the outbreak of the pandemic about six months ago. This has resulted in a shortage of solar products that would worsen unless supply disruptions are minimized across the value chain and countries adopt a coordinated response to ensure global trade continues smoothly. The majority of the respondents also expect more delays in the second half 2020 as global trade is teetering from uncertainties amidst stranded shipments in China and other countries.

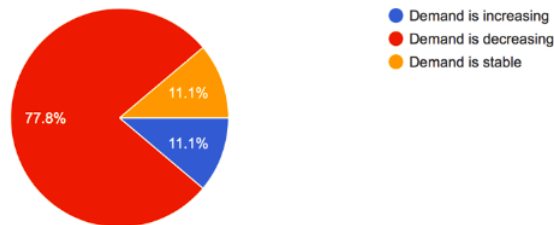
Another major challenge to the supply chain comes from a shortage of workforce during the pandemic. The off-grid sector is labor intensive involving extensive collaboration among networks of solar installers, technicians, sales agents, and distributors. Due to safety reasons and travel restrictions, most off-grid businesses have halted operations, at least for a few weeks, because of limited manpower across the industry. Additionally, many foreign stakeholders have either remained stuck abroad or repatriated to their home countries over the course of the pandemic, thereby halting some operations, technical expertise, among others. Majority of foreigners working in the off-grid sector in Nigeria come from countries with high cases of COVID-19 such as U.S. France, Germany, and India.

Demand shocks

The impact of the pandemic on the demand side of the Nigerian off-grid energy market is mixed but generally indicates a downward trajectory. Around 78% of renewable energy companies reported decreasing electricity demand from clients over the past months, with

adverse implications for cash flow, business continuity and financial resilience of off-grid enterprises.

How is the demand for your off-grid solar services changing as more people stay at home?



Falling demand can be traced to specific factors facing customers. On the commercial side, micro, small and medium enterprises (MSMEs) that use roof-top solar PV are closed, thus, their energy use is minimal. More broadly, MSMEs in Nigeria have been hard hit by the pandemic due to low sales, time restrictions and disruptions to supply chains. Moreover, lack of adequate physical and digital infrastructure for efficient home deliveries has made it hard for businesses to operate remotely during the lockdown, thereby virtually halting economic activities. On the household side, declining demand is attributed to negative income shocks affecting millions of people, including clean energy subscribers, due to job losses and restrictions on day-to-day activities. The ongoing recession has unfortunately exacerbated the poverty across the country. Given that most clients are in the lower- or middle-income class, they face a financial trade-off between buying essential goods (such as food) and meeting other needs (such as solar power); obviously, customers are more likely to prioritize the former. As one respondent put it, “in the context of [poverty] where people are struggling to survive, energy is not going to be a top priority”. Moreover, travel restrictions make it harder for PAYGO¹³ customers to reach sales agents to buy subscription cards for unlocking their solar solutions.

Shrinking investments

Nigeria has one of the world’s largest off-grid markets with the potential to generate \$8 billion in annual revenues¹⁴. However, investment into Nigeria’s off-grid clean energy sector has been limited due to poor regulatory and policy frameworks, and lack of diversified financing instruments¹⁵. Volatile and scarce foreign exchange has also been a perennial barrier to foreign investors interested in venturing into the Nigerian clean energy sector. Nonetheless, respondents pointed that the COVID-19 pandemic is likely to shrink the already limited private

¹³ Pay-as-you-go (PAYGO) model is one in which customers pay pre-paid instalments weekly or monthly to use solar power mostly enabled by digital technology.

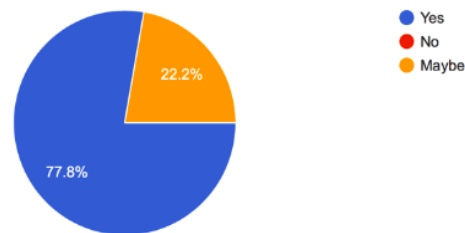
¹⁴ Rocky Mountain Institute (2018). Minigrad Investment Report: Scaling the Nigerian Market. The NESG: Abuja, Nigeria.

¹⁵ Isah, Abdulrasheed, A Tale of Two Countries: Financing Renewable Energy in Nigeria and Brazil (April 24, 2019). USAEE Working Paper No. 19-400. Available at <http://dx.doi.org/10.2139/ssrn.3377029>

investments in the off-grid sector by delaying ongoing projects and deterring new capital investments.

It was found that the pandemic threatens the financial sustainability of off-grid businesses. About 78% of the respondent reported that they anticipate experiencing financial difficulties over the next 3 months or so. Specifically, three factors compound financial risks in the sector. First, supply chain disruptions will limit sales growth over the next several months. Second, falling demand due to financial troubles facing customers is likely to cause liquidity shortfall in the off-grid market. Third, strict travel measures make it difficult to run businesses smoothly and complete ongoing projects. For instance, a respondent, who heads an energy consultancy firm in Lagos, reported that a visit to a mini-grid project site in Southwest Nigeria has been indefinitely postponed due to travel restrictions, thereby putting the project on hold. These factors have the potential to grind the sector to a halt.

Do you anticipate that your business will experience financial difficulties in the next 3 months and above?



Moreover, the pandemic has led to postponements and cancellations of planned conferences and indabas which traditionally connect off-grid enterprises with potential investors. About 67% of respondents know of a business event that has been canceled due to the pandemic. This is expected to reduce new investments and financial deal-making opportunities in the sector. Although digital technologies are increasingly used to facilitate communications and networking among different stakeholders in the industry, the pandemic would significantly reduce new physical investments due to the need for site inspections, solar installations, maintenance, among others.

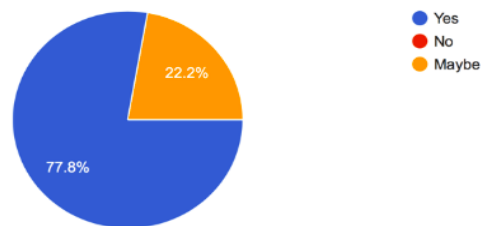
Slow energy access

Energy access is central to human development and lies at the heart of achieving other SDGs such as zero poverty (SDG1), health and wellbeing (SDG3), economic growth (SDG8), and women empowerment (SDG5)¹⁶. Yet, energy access is not immune to the impacts of the ongoing COVID-19 pandemic. While it is premature to make a definitive claim, it is generally believed that the pandemic would slow progress towards achieving the SDG7 in Nigeria, with devastating consequences for millions of people without electricity. However, this depends on the length of the lockdown in Nigeria as well as the extent to which global trade in clean technologies is impacted by the pandemic. Almost 78% of respondents believed that the pandemic would slow progress towards universal electrification in country. Besides, some

¹⁶ Akinkugbe-Filani, Rolake (2020). 5 things you should know about COVID-19 and energy access. <https://medium.com/@rolakeakinkugbe/5-things-you-should-know-about-covid-19-and-the-global-energy-access-debate-fe5ce3b9ae3d>

argued that the pandemic would only have temporary effects, lasting not more than a year, on the off-grid businesses without having long-term crippling impacts due to the sheer size of the Nigerian off-grid sector. Either way, the pandemic underscores the need for a coordinated response from the government and development partners in order to expand access to electricity and improve livelihoods of the poor.

Do you think that the pandemic would slow progress towards SDG7 in Nigeria?



Furthermore, assessing the effects of the pandemic on energy access would require observing how it affects the operations of the Rural Electrification Agency (REA), Nigeria’s government department responsible for expanding access to electricity in remote communities, mainly using off-grid solar, as well projects run by development agencies such as the Solar Nigeria Program and Power Africa. A staff of the REA said that the agency is only operating “skeletal services” involving limited managerial activities. For several months, project monitoring and evaluation have been canceled which would obviously delay the disbursement of grants to mini-grid developers. Although the REA released a statement that it would facilitate the disbursement of grants to mini-grid developers during the pandemic period, there has yet to be any payment and it remains unclear whether the agency can operate efficiently remotely. Nonetheless, the REA has collaborated with the private companies to establish minigrids in health facilities and COVID-19 isolation centers in Abuja, Ogun, Kano and Lagos. Despite this quick policy innovation and rapid response in powering the health centers, the pandemic would be detrimental to plugging the huge electricity access gap in Nigeria as many rural electrification projects have been halted or cancelled.

5. Conclusions and recommendations

In addition to its enormous health and economic impacts, the COVID-19 pandemic is taking its toll on the off-grid clean energy sector in Nigeria and Africa at large. This article showed that the pandemic has led to supply chain disruptions, declining demand, falling investments and reduced energy access in the Nigerian off-grid renewable energy sector. Given the bleak economic outlook of the country, the off-grid solar industry is likely to trail behind even if the economy fully reopens in the nearest future. Yet, lack of stable grid electricity during lockdown and the recent surge in fuel prices in Nigeria could also spur demand for off-grid solar, especially among the middle class, thereby positively contributing to the expansion of the clean sector in the country. More broadly, the pandemic may derail progress towards achieving the SDG7 in Nigeria in the nearest future.

Notwithstanding, the clean energy sector is essential for rapid economic recovery in the post-COVID period and would positively contribute to sustainable development by improving living standards of the poor while boosting national productivity. Therefore, concerted actions and multi-stakeholder collaboration are needed to stimulate the sector. This can be achieved in the following ways outlined below.

Off-grid energy companies should prioritize the continued provision of power to communities as long as it is feasible, even in the event of non-payment by some customers. This will ensure that reliable and affordable energy access is available to support economic activity, sustain livelihoods and limit the economic damage on vulnerable customers during this difficult time. Similarly, poor clients should be given the option to pay at a later date or preferably, the government should subsidize their bills in order to reduce their electricity bills, which can be quite high and unaffordable. The off-grid industry should also leverage technological solutions to sustain efficient operations without putting their workforce at risk of the virus. These would require deployment of energy technologies such as smart meters, big data and artificial intelligence to financial management, technical monitoring and operations. The widespread use of mobile money in the off-grid solar industry can help

Financial institutions can support the off-grid sector through the provision of long-term finance. As Nigerian banks often do not lend to off-grid businesses, this is the right time for them to extend vital loans to help the sector to thrive financially. Banks could also extend maturities of existing loans without additional interest payments. For instance, the decision of All On¹⁷, an off-grid clean energy impact investment company seeded by Shell Nigeria, to suspend interest payments on all its loans to solar companies in Nigeria throughout Q2 2020 is highly commendable and should be followed by other investors. Similarly, multilateral agencies like the World Bank need to provide more grants and relief funds specifically targeting decentralized renewable energy companies, making them part and parcel of responding to the pandemic and recovery plans in poor African countries.

The government's first line of support is to facilitate the clearance of clean energy products at the ports and to allow their easy transportation nationwide to minimize supply chain disruptions. This is crucial because solar companies often complain about long queues and customs delays as major logistical challenges. The government could also support solar companies by lifting import taxes on clean energy technologies, extending concessional loans and emergency grants, and ensuring favorable policies and regulatory frameworks. Although it is encouraging that the Nigerian government is collaborating with the off-grid energy industry to deploy solar to power in COVID-19 response facilities, potential isolation centers, and other healthcare centers, this needs to be complemented with policies that remove business barriers and create enabling environment for investors willing to invest in Nigeria's clean energy industry. Given that less than 28% of health facilities in sub-Saharan Africa have reliable electricity, electrifying hospitals is an innovative strategy that would not only help in ensuring constant power in health centers but also stimulate demand in the off-grid industry, helping companies to remain afloat. More broadly, the government should recognize energy

¹⁷ Isaac, Nyaogu (2020). Nigerian Impact Investor All On Announces Moratorium on Loan Interest payments. Business Day April 15, 2020. <https://businessday.ng/exclusives/article/nigerian-impact-investor-all-on-announces-moratorium-on-loan-interest-payment/>

access as an essential service during the pandemic and facilitate strategic operations of off-grid solar companies especially in rural areas. Lastly, the government should encourage domestic production of clean energy technologies in order to mitigate against future supply chain disruptions and create green jobs in the decentralized renewable energy sector.