

# **Can Market Mechanisms Facilitate Energy Access for People Living in Extreme Poverty?**

Part 1: Understanding the Relationship Between Energy Access and Extreme Poverty

## **Appendix 7.2d**

**Energy Access among People Living in Extreme Poverty in Nigeria with a Focus on Fragile-and-Conflict-Affected Areas**

## 1. Introduction

This review is one of a series of six,<sup>1</sup> looking at energy access for people living in extreme poverty in specific country contexts.<sup>2</sup> It has been carried out as part of a wider study entitled ‘Can Market Mechanisms Facilitate Energy Access for People Living in Extreme Poverty?’ under the Transforming Energy Access programme. Nigeria was chosen for review because of the large number of people living in the country in extreme poverty who are without access to energy. The review focuses on north-western Nigeria, where the MTF energy access diagnostic survey was carried out in 2017.

Each of the reviews also looks at issues around energy access for a specific demographic group who experience differential levels of extreme poverty or lack of energy access; have distinctive energy needs; and/or face distinct barriers to achieving energy access. This review looks specifically at extreme poverty and energy access among people living in fragile -and- conflict-affected areas. This group was chosen as the focus in Nigeria because of the significant number of people living in such contexts and availability of relevant information.

Some of the key findings from the research include:

- **People living in extreme poverty in northwest Nigeria had lower levels of electricity and clean cooking energy access** than the rest of the population. Access was also found to be significantly lower in the northwest region than the country as a whole in 2017.<sup>3</sup>
- **Conflict has influenced energy access in Nigeria as well as creating additional energy needs, barriers and factors hampering mechanisms’ reach** and capacity to enable people living in extreme poverty to access energy. Data limitations, however, make it difficult to establish the extent of conflict’s impact.
- **While upfront and ongoing costs are significant factors preventing people living in extreme poverty from accessing electricity**, the importance of factors beyond affordability suggest that market mechanisms may be less effective in enabling grid electricity access in Nigeria. However, given their impact on willingness to pay among people living in extreme poverty, **mechanisms may be more effective in enabling off-grid electricity access.**
- **Evidence suggests that willingness to pay for cleaner cooking in Nigeria is relatively high** compared to other countries reviewed, suggesting that market mechanisms to improve clean cooking access may have greater reach than in other contexts.

Information on the methodology used; definitions of terms and acronyms; and the sources referenced can be found in the report ‘Part 1: Understanding the Relationship Between Energy Access and Extreme Poverty’.

## 2. Country context

Nigeria is the most populous country in Africa with a total population of 225 million in 2023 (BBC, 2023). The country is a multi-ethnic and culturally diverse federation of 36 autonomous states and the Federal Capital Territory (World Bank, 2023a).

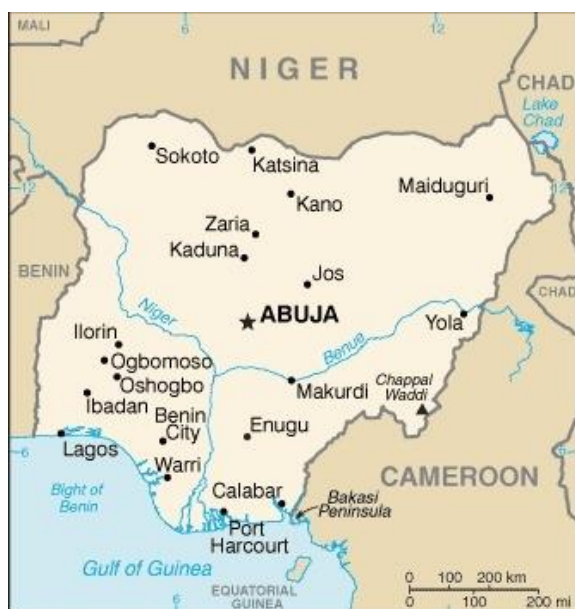


Figure 1: Map of Nigeria (Source: CIA, 2023)

General Elections to elect a new President, Federal and State Legislators and Governors were held in February and March 2023. Bola Tinubu of the ruling All Progressives Congress (APC), won the February 2023 presidential elections (BBC, 2023).

Since 2011, Nigeria's internal security has been shaped by the war against Boko Haram and other terrorist groups in the northeast in addition to frequent banditry and kidnappings in the north-west and parts of the southwest (World Bank, 2023a). The southeast continues to witness unrest resulting from separatist agitations linked to opposition to the national government and the region's oil and gas industry.

Nigeria's economy is projected to grow by an average of 2.9% per year between 2023 and 2025, only slightly above the estimated population growth rate of 2.4%. Growth will likely be driven by services, trade, and manufacturing. It is threatened by low oil production, scarcity of foreign exchange and local currency and challenges related to domestic policies (ibid).

## 3. Extreme poverty

Nigeria's extreme poverty rate was 30.9% (60.5 million people) in 2018 (the last year survey data was collected) (World Bank, 2023b).

Nigeria experienced limited poverty reduction in the years leading up to the COVID-19 pandemic (World Bank, 2023b). Recent shocks including the Ukraine War and its impacts on global commodity markets, the depreciation of the Nigerian currency (naira) and flooding threaten to hold back future poverty reduction by keeping inflation high for fuel and food items. Climatic shocks, such as floods and droughts, are particularly harmful because they threaten rain-fed agricultural and pastoral activities. Poor households have also been disproportionately impacted by the Nigerian Government's policy of demonetisation (ibid).

We estimate, based on regional changes in extreme poverty between 2016 and 2019,<sup>4</sup> that extreme poverty is ~29.3% in 2023. This equates to 65.5 million people, the largest single population living in extreme poverty in sub-Saharan Africa and the Indo-Pacific.<sup>5</sup>

Extreme poverty remains concentrated in northern and rural areas (World Bank, 2023b). The national poverty rate for the North Central, North East, and North West zones was 57.9% in 2018/19, compared with 20.3% for the South East, South, and South West zones. The rate in Sokoto (87.7%) was almost 20 times that in Lagos (4.5%) (World Bank, 2022b).

Young people and those with lower levels of education were more likely to live in poor households in Nigeria (World Bank, 2022b). Between 20 and 44 (when most likely to have children), women were more likely to be living in poverty than men of the same age. Divorced, separated or widowed women were also more likely to be in poverty than men with the same status (ibid). Households reliant on agriculture were also more likely to be living in poverty. This reflects broader findings that the majority of people living in poverty are employed but unable to lift themselves out of poverty due to insufficient earnings and that economic growth has had little poverty reduction impact (ibid).

#### **4. Poverty and conflict**

Fatal conflict events have become more frequent and widespread across Nigeria over the past two decades, especially in the country's north where the rate of extreme poverty is also highest. This corresponds with the onset of the Boko Haram insurgency in the northeast in 2009, the rise of criminal gangs and banditry in the northwest and growing political violence and vigilante groups in the south (World Bank, 2022b).

Conflict events appear to be related to seasonal pressure on resources suggesting strong interlinkages between poverty, conflict and climatic disasters (although cultural and political factors are also important) (World Bank, 2022b). For example, among Nigeria's Fulani community, whose livelihoods depend primarily on agriculture (especially pastoralism), fatal conflict events appear to be more prevalent in the lean season when water is less available for animal forage or rain-fed crops. Conflict has disrupted agricultural production by impeding access to markets and inputs; fields for planting and harvesting; and water sources needed by livestock herders (ibid). Conflict is thus a significant barrier to poverty reduction.

Poverty is also a contributing factor in conflict in the Niger Delta Region (McDowell, 2020). Specifically, failure to use revenue from the oil and gas industry to alleviate poor living conditions has led to multiple militant insurgencies and attacks on energy infrastructure (ibid). Interlinkages between poverty, conflict and energy access are discussed in section 6.

#### **5. Energy access**

##### **Background**

Nigeria has a total installed electricity generation capacity of 16,384 MW (USAID, 2023). This includes natural gas (11,972 MW), hydro (2,062 MW), wind (10 MW), solar (7 MW), with the remaining 2,333 MW coming from diesel and HFO and other sources (ibid). The national grid is characterised by high unreliability with around 222 full or partial losses of power having occurred nationwide over the past 20 years (Climate Scorecard, 2023).

Nigeria is an attractive market for off-grid solar companies given its relatively high number of unelectrified households (GOGLA, 2021). The country is responsible for the majority of sales of off-grid solar products in West Africa including energy kits (lanterns, multi-light systems, and solar home systems) and appliances. Growth in the sale of off-grid solar products between 2021 and 2022 has been attributed to a large untapped potential market and increasing diesel prices where generators are often used as a back-up to a weak grid. PAYGo has also played an important role with sales volumes more than doubling since 2019 and now exceeding cash sales (GOGLA, 2022). Challenges to market development include limited access to foreign exchange and local currency working capital for off-grid companies; counterfeit and low-quality products, especially pico-solar lights; high taxes and

administrative challenges affecting the import of solar products; and high inflation driven by rising food, diesel and gas prices and supply chain disruptions (GOGAL, 2021).

### **Key policies and programmes**

The Nigerian Government aims to achieve 90% electricity access by 2030 and universal access by 2040 with a primary focus on rural areas home to the majority of the population (GOGLA, 2021). By 2030, the Government also aims to provide 48% of the population with clean cooking (LPG) and 13% with improved cookstoves (Climate Scorecard, 2023).

### **Key energy policies include:**

**The Rural Electrification Strategy and Implementation Plan (RESIP) (2016)** aims to connect 513,000 new rural household each year from 2020 to 2040 (GOGLA, 2021). The Rural Electrification Agency (REA) aims to achieve universal rural electrification through both grid extension and off-grid approaches including Solar Home Systems and mini grids supported by greater use of both subsidies and the private sector (ibid).

**The Nigeria National Renewable Energy Action Plan (2015-2030)** aims to reach 5,545MW of installed off-grid renewable energy capacity by 2030 with a specific focus on expanding Stand Alone Solar (ibid).

**Nigeria's Nationally Determined Contribution (NDC)** aims to provide 48% of households (26.8 million) with LPG and 13% of households (7.3 million) using improved cookstoves by 2030 (Climate Scorecard, 2022).

**The National Clean Cooking Committee** was launched in May 2022 to develop a national policy on clean cooking (Nigerian Alliance for Clean Cookstoves, 2022).

### **Sector support programmes include:**

- **The Nigeria Electrification Programme (NEP):** a government-led programme that seeks to provide electricity access through mini-grids and standalone off-grid solutions through the private sector and a Results-Based Financing scheme (GOGLA, 2021).
- **Solar Power Naija initiative (2020):** launched by REA to stimulate local involvement in the off-grid solar value chain and local manufacturing and assembly.
- **Nigeria Off-grid Market Acceleration Programme (NOMAP):** supported by FCDO and the Shell Foundation to identify unaddressed off-grid energy market barriers and implement initiatives to tackle them.
- **Regional Off-Grid Electrification Project (ROGEP):** aims to enhance electricity access in West Africa and the Sahel through Stand Alone Solar systems.
- **Africa Clean Energy Technical Assistance Facility (ACE-TAF):** an FCDO funded programme that aims to catalyse a market-based approach for private sector delivery of renewable-based electrifications, with a focus on standalone systems.
- **Power Africa- Nigeria Power Sector Programme (PA-NPSP):** aims to create 10,000 MW of new generation and 3 million new connections through power sector reform and increased private sector investment (ibid).

### **Energy access levels**

As of 2021, 60% of people in Nigeria had access to electricity while 17% had access to clean cooking (IEA et al, 2023). Electricity access had increased slightly from 54% in 2017, while access to clean cooking energy had nearly doubled from 8.7% (ESMAP, 2023). Only 26% of rural residents have electricity access, compared to 89% in urban areas, and only 5% of rural households have clean cooking access, compared to 33% of urban residents (IEA et al, 2023).

The Multi-Tier Framework (MTF) energy access diagnostic survey carried out in 2017 in northwest Nigeria found that 39.3% of households had access to electricity, and 3.7% had access to clean cookstoves while 2.4% were using clean fuels (Luzi et al, 2020).<sup>6</sup> These lower energy access levels presumably reflect relatively high rates of poverty, and rural nature, of the north-west region compared with the country as a whole.<sup>7</sup>

From the MTF survey data, 31% of people living in extreme poverty in the survey area had a grid connection, compared to 43% of the rest of the population (World Bank, 2023c) – see Fig 2. Only 1% of people living in extreme poverty, and 2% of the rest of the population, were using off-grid solutions as their main electricity source (though perhaps 5 times this number were using off-grid products, mainly generators, for back-up). The majority of people living in extreme poverty relied on dry-cell batteries, while 6% had no electricity at all. Overall, we estimate that 71% of people living in extreme poverty had no effective modern electricity access (ie did not MTF tier 1 or higher access), compared with 58% of higher earners.<sup>8</sup>

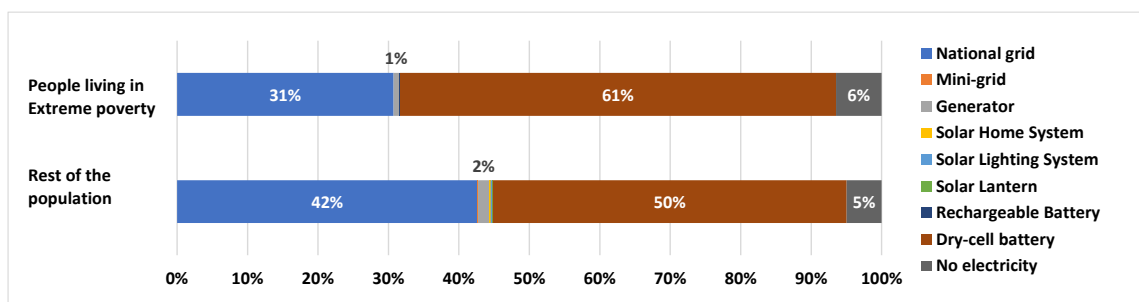


Figure 2: Electricity access by technology (based on data from World Bank, 2023c)

Only about 1% of people living in extreme poverty in northwest Nigeria, compared with ~5% of the rest of the population, were using stoves burning clean fuels (primarily LPG) for cooking when the survey was carried out (see Fig 3). About 85% were cooking with wood and a further 5% used other biomass fuel, while 4% used charcoal and the same percentage kerosene. Another 2% of people in extreme poverty relied on burning garbage to cook.

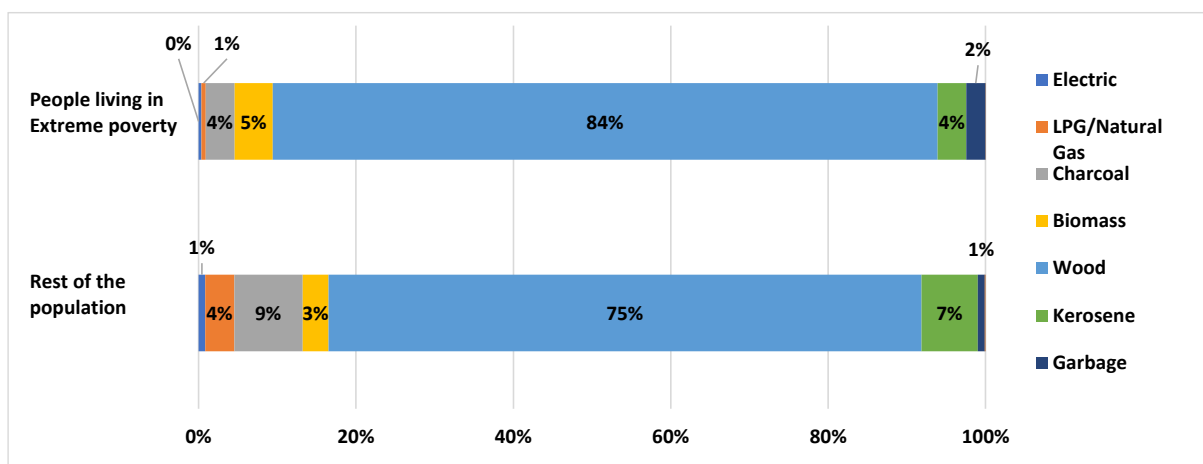


Figure 3: Cooking by fuel type (based on data from World Bank, 2023c)

People living in extreme poverty in northwest Nigeria thus had significantly lower levels of energy access than the rest of the population in the same region. In addition, access in the region more generally appears to have been significantly lower than in the country as a whole at the time of the survey (in line with higher regional poverty levels). There is insufficient

data from Nigeria to estimate current levels of electricity or clean cooking access among people living in extreme poverty in the country.

### **Energy access in fragile and conflict affected areas**

Limited energy access data at state level means that it is not possible to compare variations in energy access between conflict-and-non-conflict- affected parts of Nigeria. Regionally specific data on electricity and clean cooking access is only available for northwest Nigeria covering the states of Kano, Jigawa, Kaduna, Kebbi, Sokoto, Zamfara and Katsina (Luzi et al, 2020). These states, especially Katsina, Zamfara and Kano, have experienced an increase in fatal conflict events over the past 20 years and especially between 2015 and 2020. Specific energy access data is not available for other areas of Nigeria especially affected by conflict including the Northeast and the Niger Delta Region, or areas less affected such as the west and east (Luzi et al, 2020). In the Northeast, a lack of data potentially reflects difficulties conducting energy access research in conflict situations.

Generally, the north of Nigeria is reported to have lower levels of energy access than the south (Luzi et al, 2020). Although both are affected by conflict, this is attributed to higher poverty rates, lower grid coverage and lower population density making grid extension more costly (ibid). Although factors related to conflict and fragility have hindered energy access for Nigeria as a whole and in specific states (see section 5), studies do not discuss the extent to which conflict is a main cause of regional differences in energy access (Londoño, 2018; McDowell, 2020). In addition, a lack of detailed analysis means that it is not possible to establish to what extent conflict influences energy access relative to other factors both within specific states and between regions.

## **6. Energy needs of people living in extreme poverty**

Energy needs among those in extreme poverty in Nigeria appear to be similar to those among extreme poor in the other five countries reviewed, and fall under household, productive and communal requirements (Oyedepo, 2012).<sup>9</sup>

As part of the MTF energy access diagnostic survey carried out in 2017 (Luzi et al, 2020) the relatively small number of people who had off-grid solar products were asked if there were any electrical appliances, they did not have that they would like to have. Only about 20% of people living in extreme poverty asked this question replied “yes”, compared with about 50% among the rest of the population.<sup>10</sup>

### **Energy needs in fragile-and-conflict-affected areas**

Conflict and fragility have created additional energy needs less acute in other countries.

Nigeria’s internally displaced population stood at 3.3 million at the end of 2022 (the third highest in Sub-Saharan Africa) (UNHCR, 2023). UNHCR (2020) estimated that 91% of internal displacement in 2020 was attributed to conflict with over 74% of IDPs in Borno State in the north. As extreme poverty is mostly concentrated in Nigeria’s northern states (World Bank, 2023b), it is likely that most internally displaced people also live in extreme poverty. IDPs are split fairly evenly between refugee camps (47%) and host communities (53%) (UNHCR, 2020). Therefore, there is a need for energy access to power peacekeeping and humanitarian operations as well as to meet the household, productive and communal needs of IDPs themselves (whether in the wider population or in formal refugee camps where energy access has been underprioritized historically).

Energy access is also needed to improve living standards and reduce incentives for conflict in regions prone to conflict. Uneven development, linked to unequal distribution of oil revenue, is a key contributor to oil theft and attacks on oil production in Nigeria (BBC, 2016). For instance, oil theft or ‘bunkering’ in the Niger Delta Region originally grew out of poor economic conditions and protest against the limited benefit that people received from oil production (ibid). Development strategies in conflict affected areas providing energy access for productive activities, such as powering agricultural equipment or small-to-medium sized enterprises, have the potential to improve living standards, thereby reducing hostility. For instance, McDowell (2020) reports that an amnesty programme providing education and employment opportunities (in which energy services can play a key role) helped to end hostilities in the Niger Delta (although conflict resumed after the programme was ended).

## 7. Affordability, willingness to pay and other barriers

Those living in extreme poverty in Nigeria face many barriers to energy access common to other countries. Low access to electricity is attributed to poor grid coverage; poor quality infrastructure with frequent leakages in transmission and distribution and power outages (affecting the 31% of those in extreme poverty with grid connections); a lack of maintenance and repair services; energy theft and vandalism; and low incentives, especially among private distributors, to extent grid infrastructure to remote and hard to reach areas (Londoño, 2018; Oyedepo, 2012; Climate Scorecard, 2023). These challenges are compounded by severe mismanagement of the energy sector and lack of investment (Londoño, 2018).

As part of the MTF energy access diagnostic survey in 2017, people in northwest Nigeria were asked about their willingness to pay for energy access (World Bank, 2023c). Some people living in extreme poverty were willing to pay upfront for each of a solar home system or improved cookstove (see Fig. 4).<sup>11</sup> However, willingness to pay upfront was lower among people living in extreme poverty than among the rest of the population.

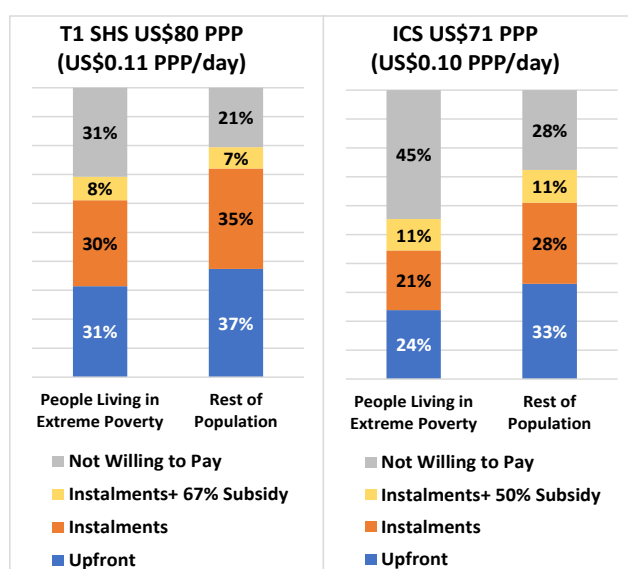


Figure 4: Willingness to pay for solar home system or improved cookstove (based on data from World Bank, 2023c)

The option to payment in instalments significantly increased willingness to pay for energy access among people living in extreme poverty, though it continued to lag behind the rest of

the population. Subsidizing costs further increased willingness to pay among both people living in extreme poverty and the rest of the population. However, but a significant proportion (30% - 45%) of people living in extreme poverty remained unwilling to pay, particularly for improved cookstoves even on these terms, indicating that further steps would be needed if these people are not to be left behind.

Some people living in extreme poverty who had no connection had applied and were waiting to be connected (see Fig 5). Distance from the grid made connection unavailable for 45% of people living in extreme poverty who were not connected. Upfront cost was the barrier to connection for the largest single percentage (14%) of remaining people living in extreme poverty, and ongoing costs prevented a further 13% from connecting (suggesting that spreading costs over time may not be sufficient to encourage many to connect).

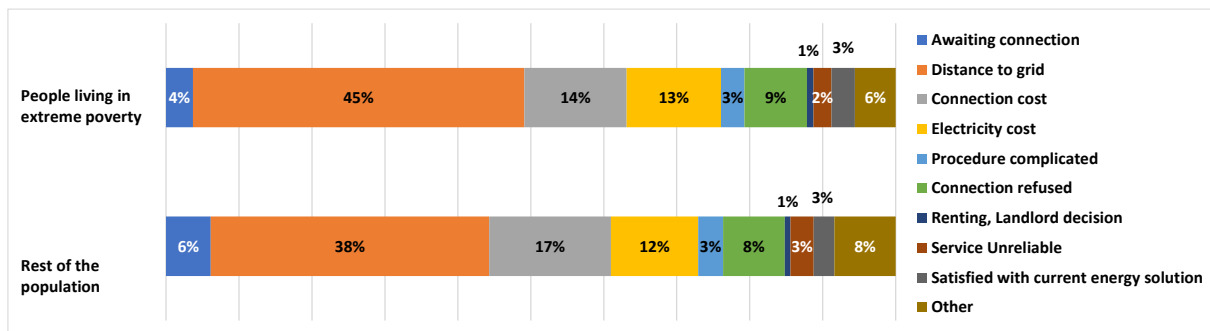


Figure 5: Barriers to grid connection (based on data from World Bank, 2023c)

The vast majority of people living in extreme poverty who were unwilling to pay for a solar home system or an improved cookstove also said they could not afford the cost (see Fig 6).

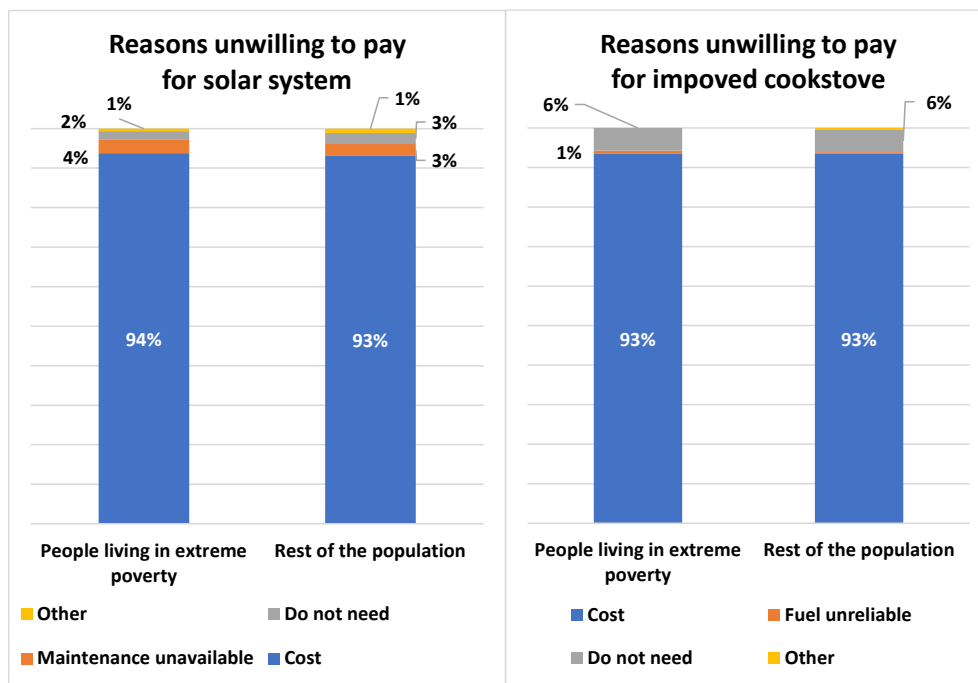


Figure 6: Reasons for unwillingness to pay for a solar home system and improved cookstove (based on data from World Bank, 2023c)

Apart from distance from the grid and cost of connection, a total of 13% of people living in extreme poverty said their connection requests had been refused, or that the complexity of

the application procedure or their reliance on their landlord for connection prevented them connecting (see Fig 5).

About 5% of people living in extreme poverty said they hadn't connected because the grid supply was unreliable. A similar percentage (~4%) were not willing to pay for a solar home system because maintenance services were unavailable, and ~1% were unwilling to pay for an improved cookstove because fuel supplies were unreliable (see Fig 6).

A small but notable percentage of people living in extreme poverty said that faults made their grid connection inoperable or identified incompetence, corruption or inaction of the government or other authorities as the reason they had no connection.

Only about 3% those living in extreme poverty without a grid connection, and 2% of those unwilling to pay for a SHS, said they did not need electricity. A slightly higher 6% were unwilling to pay for an improved cookstove because they did not need one.

### **Barriers to energy access in fragile and conflict affected areas**

Conflict and fragility have directly and indirectly affected access to energy in Nigeria.

Politically motivated attacks on Nigeria's energy infrastructure are common in the south where oil and gas production and processing are concentrated. Attacks on gas pipelines by the Niger Delta Avengers in opposition to environmental damage in the region have disrupted energy access in grid covered areas as natural gas is the main source of grid electricity (oil is prioritised for foreign export) (Owolabe, 2016). In addition, attacks on both oil and gas infrastructure have had a less direct impact by reducing revenues that could be reinvested in grid upgrades or expansion as well as expanding off-grid solutions (ibid). In contrast, conflict with Boko Haram in the north is less likely to have directly impacted energy access as the group primarily targets western cultural and education influences (McDowell, 2020). However, the group has attacked humanitarian agencies for their real or perceived cooperation with the government (CORE, 2020). Therefore, government actors, NGOs and private companies working to provide off-grid energy access in the north (as well as other areas) may face similar risks, hindering their ability to extent energy access.

Although Nigeria as a whole is considered an attractive market for off-grid companies given its high number of unelectrified households (GOGLA, 2021), willingness to invest and operate in areas of heightened conflict such as the northwest are likely lower than in more stable areas due to heightened risks and additional costs. These include physical risks (injury or loss of life as a result of attacks), especially if companies or organisations are perceived to be operating in support of the government, as well as financial risks including that grid or off-grid technologies may become damaged or stranded if areas are controlled by militant groups (Logan et al, 2021). Other factors such as higher repair and maintenance costs and security measures may also reduce the attractiveness of investing in these areas (ibid).

Security risks in fragile and conflict affected parts of Nigeria are likely to reduce the willingness of potential customers to travel to off-grid markets. For example, CORE (2020) reports that Boko Haram's attacks on civilians and government forces in Borno State have reduced people's ability to access humanitarian operations. They are also likely to make local markets where energy products and services are sold (and routes to markets) unsafe, deterring potential customers from travelling to such locations to purchase energy products.

Corruption, another characteristic of fragility, limits the availability of finance to invest in expanding energy access in Nigeria. Corruption is widespread within the Nigerian National Petroleum Corporation (NNPC), includes the looting of oil directly and of revenue generated

by the oil and gas industry (the main source of government revenue) (McDowell, 2020). Disruption and corruption in the domestic oil and gas industry means that, despite being a major global exporter, Nigeria has to import oil to meet domestic demand (BBC, 2016). Therefore, payments on foreign oil imports also limit the state's capacity to invest in economic development, including expanding energy access.

McDowell (2020) argues that poor conditions in conflict affected areas in the south are maintained by a lack investment, driving further opposition and disruption to the oil and gas industry. Therefore, to tackle and reduce incentives for conflict, investment and reforms are needed to improve energy access and to enable more even development across the country.

## **8. Factors limiting market mechanism reach**

Market mechanisms are intended to overcome affordability and potentially other barriers to energy access. However, certain factors may affect the capacity of those in extreme poverty to take up mechanism support (i.e. mechanism's reach to these groups).

### **Experience with financial support in general**

People's experience with financial support is likely to influence willingness or ability to use market mechanisms for energy access. Some 45% of adult, but only 33% in the poorest 40% of the Nigerian population had an account with a formal financial institution in 2021 (World Bank, 2023d). For the population as a whole, account ownership was lower in rural areas (34% of adults) compared to urban areas (54%). The World Bank's Findex Database shows that barriers to account ownership include distance to financial institutions (affecting 20% of survey respondents); financial services being too expensive (17%); having insufficient funds (38%); lack of necessary documentation (18%); lack of trust in financial institutions (10%); religious reasons (4%); or because a family member already has an account (9%) (ibid).<sup>12</sup> Those living in extreme poverty are likely to be more affected by key barriers to financial inclusion affecting the whole population including high cost of financial services and having insufficient funds to open accounts. Limited experience with financial support mechanisms in general may limit willingness or ability to use market mechanisms for energy access.

### **Levels of general and financial literacy**

General and financial literacy are likely to affect the extent to which people in extreme poverty can understand and derive benefit from market mechanisms. Nigeria's national literacy rate is 59.6% of the adult population, as of 2023, compared to a global average of 86.9% (wisevoter, 2023). Financial literacy is also low at 26% of the adult population in 2014 (S&P, 2014).<sup>13</sup> Barriers to formal education are likely to affect those in extreme poverty to a greater extent than the wider population (Global Citizen, 2020). This suggests that additional measures to improve people's understanding of how market mechanisms work are required to ensure that benefits are obtained.

### **Experience borrowing from financial institutions**

Experience borrowing from formal financial institutions may affect people's willingness to engage with market mechanisms providing access to energy products via credit. The World Bank (2023d) reports that only 5% of adults in the poorest 40% of the population had borrowed money from either a formal financial institution or using a mobile money account in 2021. A much higher proportion (46%) had borrowed money from family or friends (ibid). Limited engagement with financial institutions, either saving or borrowing with them, will mean that people are less likely to have credit histories or records of regular savings,

potentially hindering the implementation of business models involving repayments. It may also create reluctance to engage with mechanisms where borrowing is involved.

### **PAYGo infrastructure**

PAYGo mechanisms typically involve payment via mobile credit (by sending a text message) (IRENA, 2020). Therefore, the reach of this mechanism is primarily dependent on mobile phone ownership and network coverage. Mobile money account ownership may also influence the ease in which customers can engage with this mechanism (ibid). Conditions for PAYGo uptake are mixed in Nigeria. Around 93% of the population were covered by at least a 2G network in 2019 (mAccess, 2023) and 73% of adults owned a mobile phone in 2021 (World Bank, 2023d). However, only 3% of adults in the poorest 40% of the population had a mobile money account (World Bank, 2023d). For the whole adult population, mobile money account ownership was lower in rural areas (4% of adults) than in urban areas (12%) (ibid). This suggests a more challenging environment to increase uptake of PAYGo for people living in extreme poverty, especially those in rural areas.

### **Market mechanism reach in conflict affected areas**

Willingness to engage with market mechanisms is potentially lower in fragile and conflict affected areas of Nigeria due to high risk aversion. Evidence from Nigeria supports a global trend of reduced use of formal financial services in conflict affected areas and increased use of informal networks (Posso, 2023). This is likely because formal financial institutions, including banks, are perceived as targets for attack or more likely to be controlled by terrorist groups if local governments collapse (ibid). Therefore, if market mechanisms are perceived as vulnerable to physical attack or control by militant groups (if utilising financial institutions), this may reduce willingness to engage by those in extreme poverty.

Security risks in northeast Nigeria are likely to reduce people's willingness to travel to market mechanism providers. Attacks by Boko Haram in Borno reduced people's ability to access humanitarian operations (CORE, 2020) and are also likely to make local markets where energy products and services are sold (and routes to markets) unsafe, deterring both market mechanism providers and potential customers from entering. Market mechanism providers may also be at heightened risk of attack if their activities have real or perceived links to government operations. Ability to travel is also restricted by Nigeria's military who have placed restrictions on humanitarian and civilian travel in northern states (ibid). Similar restrictions are likely to apply to market mechanism providers.

## **9. Key findings and conclusions**

- Though Nigeria's extreme poverty rate, at an estimated ~29%, is below the sub-Saharan Africa regional average (34.9%), because of its large population it includes the single **largest number (66 million) people living in extreme poverty in sub-Saharan Africa and the Indo-Pacific.**
- **People living in extreme poverty in northwest Nigeria had lower levels of electricity and clean cooking energy access** than the rest of the population in 2017. Access was also found to be significantly lower in the northwest region than the country as a whole.<sup>14</sup>
- **There is evidence that conflict has influenced energy access for Nigeria** as a whole and in specific states, but a lack of regionally specific data and detailed

analysis of this nexus means that it is not possible to compare variations in energy access between conflict-and-non-conflict- affected areas or establish conflict's influence on energy access relative to other factors.

- **Conflict and fragility have created additional energy needs in Nigeria** including for energy to power peacekeeping and humanitarian operations and meet the energy needs of internally displaced people. Energy access also has the potential to reduce incentives for conflict by alleviating key drivers such as poverty and poor living standards.
- **Both upfront and ongoing costs are significant factors preventing people living in extreme poverty from accessing grid electricity.** However, the importance given to factors beyond affordability indicate that **market mechanisms alone may be less effective in enabling grid electricity access in the Nigerian context.**
- **Payment in instalments and reduced prices substantially increased willingness to pay for energy access among people living in extreme poverty,** indicating that market mechanisms have the potential to enable people living in extreme poverty in Nigeria to access off-grid energy.
- **Only a small number of people living in extreme poverty said they did not need an improved cookstove,** possibly indicating relatively high awareness of the benefits of cleaner cooking and hence that market mechanisms which make clean cooking more affordable may have greater reach than in other contexts.
- **Those living in extreme poverty in Nigeria, especially in rural areas, are more affected by factors likely to limit market mechanism reach** than the wider population. Targeted support to improve awareness and understanding and to address other potential barriers to uptake are needed if market mechanisms are to reach them.
- **Conflict and fragility create both additional barriers to energy access and additional challenges to market mechanism reach in Nigeria.** Barriers include disruption to the grid system; customers' inability to travel; companies' reluctance to invest; and higher costs. Furthermore, the Government's ability to extend access is hindered by reduced oil revenues. Heightened safety concerns and risk aversion may similarly lower willingness to engage with market mechanisms which involve credit or require travel. Thus, market mechanisms' capacity to enable people living in extreme poverty to access energy may be restricted in Nigeria.

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## 11. Endnotes

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<sup>1</sup> The other reviews in this series are of Ethiopia, Kenya, Nepal, Rwanda and Zambia

<sup>2</sup> Defined by the World Bank as those living on less than US\$2.15 per day at 2017 purchasing power parity (PPP) <https://www.worldbank.org/en/news/factsheet/2022/05/02/fact-sheet-an-adjustment-to-global-poverty-lines>

<sup>3</sup> There is insufficient data to estimate current levels of access among extremely poor people in Nigeria as a whole.

<sup>4</sup> See Methodology section for description of how this estimate has been derived.

<sup>5</sup> Poverty rates estimated for Nigeria using the updated US\$2.15 per person per day poverty line based on 2017 PPP data differ from those using the previous US\$1.93 per person per day poverty line based on 2011 PPP data. World Bank reports that further analysis is needed to understand this (World Bank, 2022b, 2022c).

<sup>6</sup> Kano, Jigawa, Kaduna, Kebbi, Sokoto, Zamfara and Katsina states

<sup>7</sup> Rates of poverty at the national poverty line for these states in 2018/19 were Sokoto (87.7%); Kano (55.1%); Jigawa (87%); Kaduna (43.5%); Kebbi (50.2%); Zamfara (74%); and Katsina (56.4), compared to 40.1% for Nigeria as a whole (World Bank, 2022)

<sup>8</sup> We estimate, from figures in the Nigeria – Northwest Geopolitical Zone Beyond Connections Energy Access Diagnostic Report (Luzi et al, 2020) that 6% of grid connections and 23.8% of off-grid solutions in Nigeria did not achieve tier 1 electricity access.

<sup>9</sup> Other countries reviewed are Ethiopia, Kenya, Nepal, Rwanda and Zambia

<sup>10</sup> As noted, the number of people asked this question was small, so caution must be exercised in drawing any conclusions from the responses. Information on what appliances people wanted was not available.

<sup>11</sup> It is recognized that responses given regarding willingness-to-pay cannot be taken entirely at face value, and so percentages of people saying they would be willing to pay at a particular price point may not be entirely realistic. However broad inferences may be drawn from the overall pattern of responses.

<sup>12</sup> The World Bank surveyed approximately 1,000 people in each of more than 160 countries included in the Findex Database, using a randomly selected, nationally representative sampling method.

<sup>13</sup> S&P's Global Financial Literacy Survey measured the concept in terms of understanding of four key elements of financial decision making: risk diversification, inflation, numeracy and compound interest. A person was considered financially literate if they could answer 3 out of 4 questions related to these topics correctly.

<sup>14</sup> There is insufficient data to estimate current levels of access among extremely poor people in Nigeria as a whole.