

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

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

Appendix 7.2b

Energy Access among People Living in Extreme Poverty in Kenya with a Focus on People with Disabilities

1. Introduction

This review is one of a series of six,¹ looking at energy access for people living in extreme poverty in a specific country context.² 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. Kenya was chosen for review because of the availability of data on energy and poverty in Kenya, and its role as a leader in mobile money and off-grid energy market development in sub-Saharan Africa.

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 with disabilities. This group was chosen as the focus in Kenya because of the importance of issues around social exclusion for energy access among people with disabilities and the breadth and quality of information available for Kenya.

Some of the key findings from the research include:

- **People living in extreme poverty in Kenya have significantly lower levels of energy access than the rest of the population.** We estimate that some 4.9 million people living in extreme poverty have no effective access to electricity and ~ 12.7 million have no access to clean energy for cooking.
- **Cost is the main reported obstacle to all forms of energy access by people living in extreme poverty in Kenya. The option to pay in instalments increases their willingness to pay,** bringing it broadly in line with the rest of the population. However, mechanisms which just spread costs over time will not reach all.
- **Between 13% and 50% (depending on the technology) of people living in extreme poverty remain unwilling to pay for energy, even in instalments and with subsidies, and a significant percentage see an improved cookstove as unnecessary.** More detailed understanding of their reasons is needed to guide market mechanism design.
- **People with disabilities in Kenya have lower levels of access to energy than people without disabilities and face significant additional barriers to access.** driven by social exclusion; lack of access to information and power to make or influence household decisions.

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

Kenya is a multi-party presidential republic (with the president being both head of state and head of government). Since 2010, a range of matters (including energy access policies) have been devolved to its 47 counties (CIA, 2023).



Figure 1: Map of Kenya (CIA, 2023)

Kenya's population of 54 million (World Bank, 2023a) is concentrated in the west along the shore of Lake Victoria, to the southeast along the Indian Ocean coast and in its capital Nairobi. Around 29% of the population lives in urban areas (World Bank, 2023b). Population growth since the mid-20th century has been dramatic, and as of 2020 almost 40% were aged under 15 (CIA, 2023).

Kenya's economy is the third largest in sub-Saharan Africa with a GDP of \$113bn (\$2,099 per capita or \$5,764 per capita in purchasing power parity terms) in 2022 (World Bank 2023c; World Bank 2023d; World Bank 2023e).

The Covid-19 pandemic and drought have impacted economic growth since 2020. Rains resumed in the first half of 2023, but Kenya remains vulnerable to weather-related shocks, intercommunal tensions and, as a net importer of fuel, wheat, and fertilizer, to the global price impacts of the Ukraine War (World Bank 2023f).

3. Extreme poverty

Kenya's extreme poverty rate was 29.4% (14.1 million people) in 2015 (the last year survey data was collected) (World Bank, 2023g). This represents a decline from 2005 when poverty stood at 36.7% of the population. The severity of poverty also declined with the poverty gap at the extreme poverty level falling from 12.9% in 2005 to 8.6% in 2015 (ibid).

Poverty reduced in Kenya between 2005/06 and 2015/16, with the majority of this decline occurring in rural areas. Poverty remains heavily concentrated in north and north-east Kenya, which lags behind the rest of the country. Indicators of multi-dimensional poverty, including food security, educational attainment and access to water and sanitation services, also remain poor in these areas (ibid).

Simulations based on the relationship between GDP growth and poverty reduction suggest that the incidence of extreme poverty rose slightly from 27.3% in 2019 to 27.7% in 2020, largely due to the economic impacts of COVID-19 (World Bank, 2023g). Additional challenges including the drought and fuel and food price increases due to the Ukraine War are likely to have increased poverty since 2020 (ibid). The latest projections are that Kenya's extreme poverty rate fell by 1.17% between 2019 and 2023 (Hadad et al, 2023), bringing it to 26.1% in 2023: 14.4 million people (a slight increase in absolute terms since 2015).³

4. Poverty among people with disabilities

Estimates of the number of people with disabilities in Kenya vary widely. According to the 2019 census, 2.2% (0.9 million) of Kenyans live with some form of disability - 1.9% of men and 2.5% of women. More live in rural areas than urban areas and the highest disability rates were in central, eastern and western parts of Kenya (Development Initiatives, 2020). However, the Disabilities Data Report 2023 estimates that 12.7% of adults in Kenya have some form of functional difficulty (Hanass-Hancock et al, 2023), implying that ~7 million Kenyans live with a disability.⁴

Evidence of links between disability and poverty in Kenya is strong. People with functional difficulties are more likely to work than people with no difficulty but are also more likely to do informal work. The proportion of youth who are economically inactive is also significantly higher among people with disabilities (Hanass-Hancock et al, 2023). A 2021 study found that 63% of households which included a person with a disability had an income of less than Ksh 2000 per month, compared with 57% of other households (Hunt et al, 2021). A 2011 study found that 67% of people with disabilities in Kenya were multi-dimensionally poor, compared with 52% of the rest of the population, while 50% of people in households with a working-age adult member with a disability were living below the extreme poverty line compared with 38% of households which did not include members with disabilities (Mitra et al, 2011). Current multi-dimensional poverty rates among people with functional difficulties are 38.2%, compared with 35.3% for people with no difficulty (Hanass-Hancock et al, 2023). Assuming that extreme poverty rates have moved in line with multi-dimensional poverty, this implies that 28.5% (2 million) people with disabilities in Kenya are living in extreme poverty.⁵

In addition to higher poverty levels, people with disabilities and their households incur additional direct costs (for healthcare, assistive devices, transportation etc) as well as indirect costs (through un-and-underemployment and lower salaries) both for individuals themselves and among family members, which are not adequately covered by support available to them (Banks, et al, 2021; Muraya, 2022).

5. Energy access

Background

Kenya has a total installed electricity generation capacity of 2,819 MW (USAID, 2023). This includes hydro (826 MW), geothermal (828 MW), thermal (MSD & GT) (749 MW), wind (331 MW), solar (51 MW) and biomass (28 MW). The country is well-endowed with renewable energy with total solar energy generation potential estimated to be around 15,000 MW (Rapid Transition Alliance, 2022). Wind potential is also significant with the government aiming to generate 2,036 MW of wind power by 2030 (ibid).

Kenya is the most mature off-grid solar market in Africa (GOGLA, 2021). Market growth has been underpinned by Kenya's political stability, economic growth, ease of doing business, consumer awareness campaigns and a supportive policy environment. Widespread use of mobile money has also helped to generate sales through the PAYGo business model. Off-grid solar sales have been concentrated in more densely populated and wealthier counties meaning that markets are less developed in poorer and remote areas. The COVID-19

pandemic and the temporary reintroduction of VAT caused a slight decline in overall sales volumes. A quick recovery was enabled partly by the government's recognition of energy as an essential service allowing companies and mini-grid operators to continue operations. Ensuring a consistent tax regime for companies, including VAT and import duty for solar appliances, is a key challenge for the off-grid market going forward (ibid).

Key policies and programmes

The Kenyan Government initially aimed to achieve universal electricity access by 2030 (GOGLA, 2021). However, in 2013 the target year was revised to 2022 and this is reflected in guiding policies. More recently, the government has re-instated a target of reaching universal access to electricity by 2030 and clean cooking by 2028 (KCSPOG, 2022).

Key energy policies include:

The Kenya National Electrification Strategy (KNES) (2018-2022): KNES outlines the means by which universal access to all households and businesses will be achieved (IEA, 2023). It prioritises both grid expansion and off-grid solutions, as well as increased private sector involvement in providing energy access in rural or remote parts of the country.

Energy Act No. 1 (2019): The Energy Act was adopted to promote the generation of renewable energy in Kenya (FAO, 2020). The act mandates development of plans to expand energy access using renewable energy. National and county governments are also required to facilitate the acquisition of land for energy infrastructure development (ibid).

Sector support programmes include:

- **The Kenya Off-Grid Solar Project (KOSAP) (2017-2023)** is the main support programme aimed at extending the off-grid market into underserved counties through results-based financing (RBF) and local currency working capital (GOGLA, 2021).
- **The KawiSafi Ventures Technical Assistance Facility (KSV TAF) (2020-2025)** addresses market failures in the off-grid sector in Kenya and Rwanda through activities such as consumer protection, gender inclusion and knowledge creation.
- **The Africa Enterprise Challenge Fund (AECF) (2021-2023)** supports private companies that promote the use of renewable energy. Funded by the SIDA, it has a dedicated RBF facility of US\$4 million to incentivize energy companies to accelerate energy access, especially among unserved and underserved low-income households.
- **Energising Development (EnDev)** aims to facilitate access to off-grid electricity in rural areas by establishing and strengthening sustainable and commercially viable supply and distribution models for pico-PV products (ibid).
- **The Last Mile Connectivity Project (2014-2024)** is funded by the African Development Bank and implemented by the Kenya Power and Lighting Corporation (KPLC), aims to reach around 1.2 million people through construction of low voltage distribution lines and connection of residential and commercial customers (AfDB, 2023)

Energy access levels

As of 2021, 77% of people in Kenya had access to electricity while 24% had access to clean cooking (IEA et al, 2023). This is a significant increase from 2016 when access to electricity was 53% and access to clean cooking was 12% (ESMAP, 2023). Both electricity and clean cooking energy access remain geographically uneven. Electricity access among urban

residents was 98% in 2021, compared to 68% of rural residents (IEA et al, 2023). Similarly, 51% of urban residents, but only 8% of people in rural areas, had clean cooking energy (ibid).

When people were asked, as part of the World Bank’s (2023h) Multi-Tier Framework energy access diagnostic survey carried out in 2016, what access they had to energy, only 15% of people living in extreme poverty had a grid connection, compared to 45% of the rest of the population (see Fig. 2).⁶ Levels of off-grid access in rural areas were very similar between people living in extreme poverty and the rest of the population. In urban areas, however, 17% of people living in extreme poverty, compared with 10% of the rest of the population, relied on off-grid solutions. We estimate that 67% of people living in extreme poverty had no effective modern electricity access (i.e. did not have MTF tier 1 or higher access), compared with 41% of higher earners.⁷

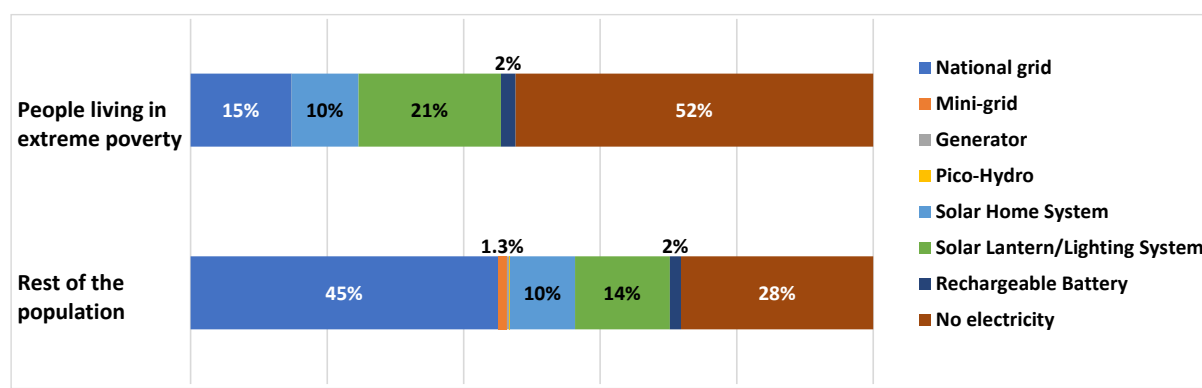


Figure 2 Electricity access by technology (based on data from World Bank, 2023h)

Based on the 77% general level of electricity access in 2021 reported through the SDG7 tracking process (IEA et al, 2023), and if it is assumed that the ratio between lack of access among people living in extreme poverty and the whole population remains as estimated from the MTF survey data (i.e. 67%:47%), the percentage of people living in extreme poverty in Kenya who lack electricity access can be estimated at 34%, 4.9 million people.

Less than 2% of people living in extreme poverty, compared with 20% of the rest of the population were using clean cooking energy when the MTF survey was carried out (see Fig. 3). About 84% of people living in extreme poverty, compared with 52% of the rest of the population, were cooking with wood or sawdust. Some 12% of people living in extreme poverty cooked with charcoal and 2% with kerosene (compared with 19% of the rest of the population who used charcoal and 10% who used kerosene).

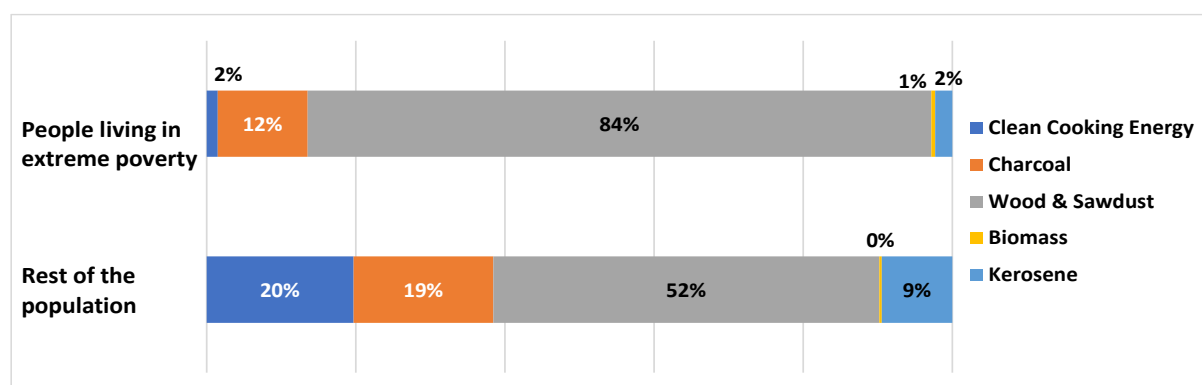


Figure 3: Cooking by fuel used (based on data from World Bank, 2023h)

Based on the 24% national level of clean cooking energy access in 2021, reported through the SDG7 tracking process (ibid), and assuming that the ratio between lack of access among people living in extreme poverty and among the whole population remains as estimated from the MTF survey data (i.e. 98.5% vs 85%), it can be estimated that 87% of people living in extreme poverty in Kenya, 12.5 million people, lack access to clean energy for cooking.

Energy access levels among people with disabilities

The 2016 MTF survey included a question on whether any of the household members had a disability.⁸ Households above the extreme poverty line which include people with disabilities had very similar rates of electricity access to equivalent households which do not include anyone with a disability. However, households in extreme poverty with a member with a disability had significantly lower rates of access (19% vs 33%) than households in extreme poverty without anyone with a disability. No households living in extreme poverty which included someone with a disability used clean fuels, compared with 2% of households living in extreme poverty which did not include anyone with a disability. Households which included people with disabilities among the rest of the population reported higher levels of use of clean fuels than other households.

The Disability Data Report 2023 found an average 5 percentage point differential in electricity access between people with and without disabilities (Hanass-Hancock et al, 2023). This is partly driven by a higher prevalence of disability in rural areas, where levels of access are lower. Similarly, 14% of people with a disability, compared to 23% of people with no functional difficulty, were found to be using clean fuel. If these differentials (5% and 9% respectively) are applied to the most recent access levels from SDG 7 progress reporting, it would imply that 28% of people with disabilities (ie 2 million people) are without access to electricity, and 85% (5.9 million) are without access to clean cooking energy. If it is also assumed that the ratios between the percentages of those living in extreme poverty, and the rest of the population, without access are the same among people living with disabilities as among the wider population, this would imply that 41% (0.8 million) of people with disabilities living in extreme poverty are without electricity and 97% (1.9 million) without clean cooking energy.^{9,10}

6. Energy needs of people living in extreme poverty

There is limited evidence to indicate the extent to which the energy needs of those living in extreme poverty correspond with, or differ from, those of the wider population in Kenya. When Practical Action, as part of its research for the Poor People's Energy Outlook 2016, asked people in poor rural communities in Kenya about their energy needs, household energy (for cooking and electricity for lighting cooking and communication at tier 2.5-3) was their highest priority, followed by energy for community services and productive uses. These energy needs did not appear to vary with level of poverty.¹¹

As part of the 2016 MTF survey (World Bank, 2023c), people in Kenya were asked about electrical appliances they would like to be able to use. Most people living in extreme poverty, more than among the rest of the population, wanted televisions or radios (see Fig. 4). Some people living in extreme poverty, but fewer than among the rest of the population, also wanted electricity for refrigerators, mobile phone charging, computers, tablets or fans. The

overall level of additional requirements was similar between people living in extreme poverty and the rest of the population.

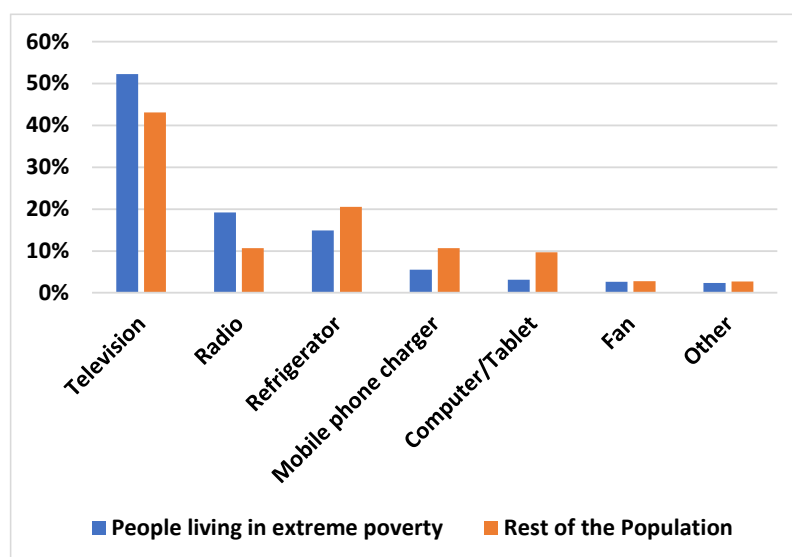


Figure 4 Additional appliances wanted (based on data from World Bank, 2023h)

However, when fewer people living above the extreme poverty line said they wanted televisions and radios, it may be because they already had them. We also do not know whether people did not have appliances they wanted because their energy supply could not support them, or because they could not afford the appliances themselves.

Energy needs among people with disabilities

Little attention has been given to the energy needs of people with disabilities in Kenya – for instance, the review of Kenya’s implementation of the Sustainable Development Goals, as they relate to people with disabilities, carried out by the Kenya Union of the Blind in 2019-20 did not look at progress towards universal energy access under SDG7 (KUB, 2020). Among those asked as part of the MTF survey, households including people with disabilities identified refrigerators, radios and computers/tablets as priorities.¹²

7. Affordability, willingness to pay and other barriers

People in Kenya were asked, as part of the MTF energy access diagnostic survey carried out in 2016, 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 grid connection, solar home system or improved cookstove (see Fig. 5).¹³ However, willingness to pay upfront was lower among people living in extreme poverty than among the rest of the population.

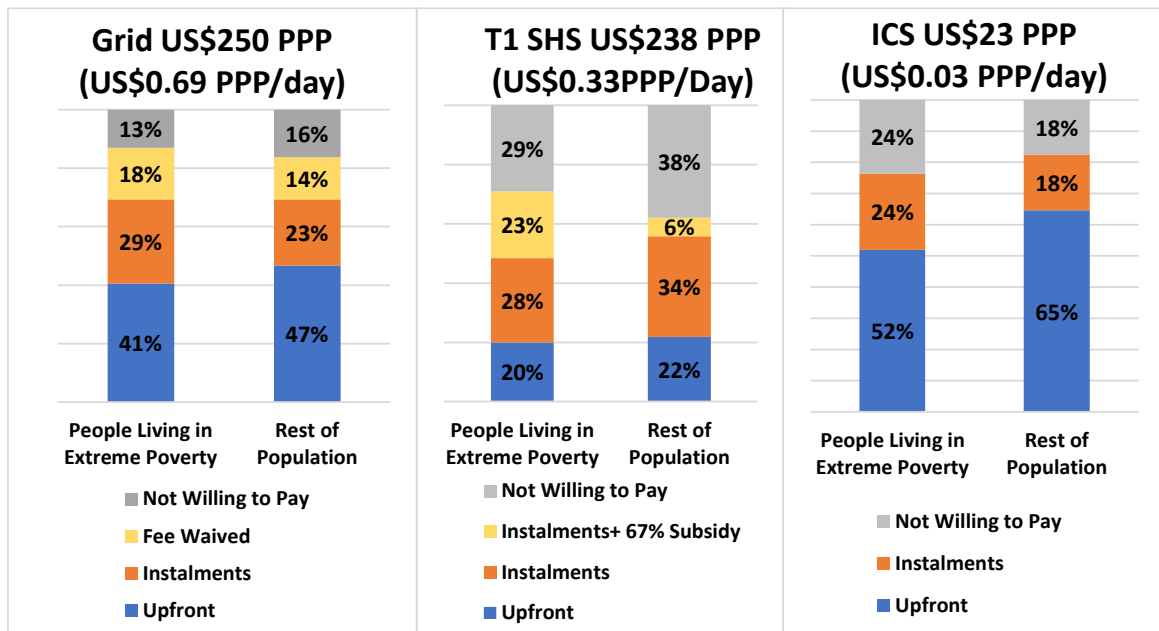


Figure 5: Willingness to pay for grid connection, solar home system or improved cookstove (based on data from World Bank, 2023h)

The option to pay in instalments significantly increased willingness to pay for energy access among both people living in extreme poverty and those on higher incomes. It brought willingness to pay among those living in extreme poverty closer to, but not quite in line with, willingness to pay among people living above the extreme poverty line. Waiving the fee for grid connection and subsidizing the cost of a solar home system further increased percentages of people willing to pay, and actually brought willingness to pay among people living in extreme poverty above that among the rest of the population. However, some people living in extreme poverty (13% - 29%) remained unwilling to pay even on these terms.

A number of people living in extreme poverty who had no grid connection had applied for one and were just waiting to be connected (see Fig. 6).

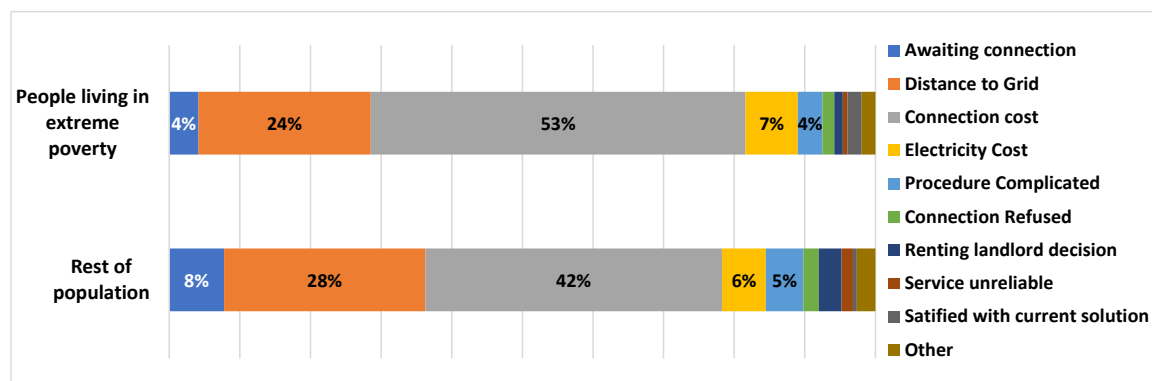


Figure 6: Barriers to grid connection (based on data from World Bank, 2023h)

A significant minority (24%) could not connect to the grid simply because of distance. Cost was, however, the main barrier to connection for the majority of people living in extreme poverty, and ongoing electricity costs prevented a further ~7% from connecting.

The majority of those living in extreme poverty who were unwilling to pay for a grid connection, a solar home system or improved cookstove also said it was because of the cost. A far smaller percentage (6-7%) saw ongoing costs as an issue (see Fig. 7).

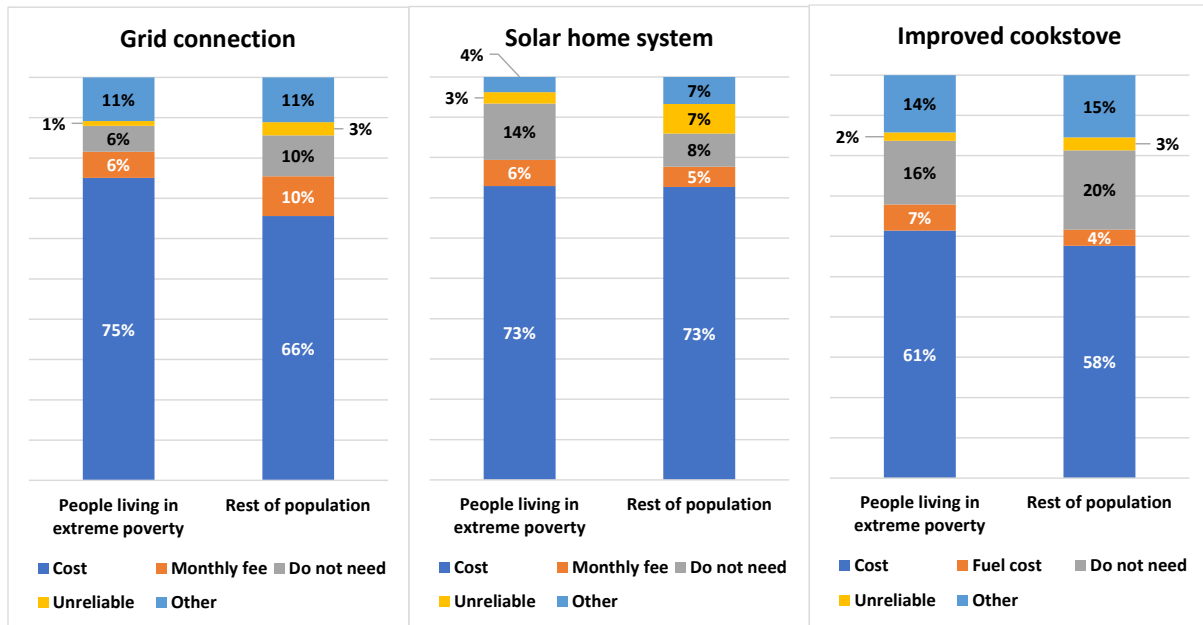


Figure 7: Reasons for unwillingness to pay for grid connection, solar home system, and improved cookstove. (based on data from World Bank, 2023h)

The main barrier to grid connection (apart from cost and distance) was the complexity of the application process (see Fig 6). In addition, a relatively small number of people living in extreme poverty had been refused a connection or were unable to connect because they did not have their landlord’s agreement to do so (primarily in urban areas).

Only ~1% of the survey respondents saw unreliability as a barrier to grid connection, or the reason they were unwilling to pay for a connection. A slightly higher, but still small, percentage (2-3%) gave this as the reason they wouldn’t be willing to buy a solar home system or improved cookstove. Low reliability, quality and suitability have, however, been reported to limit willingness to pay for solar irrigation pumps in Kenya (Practical Action, 2020a), so this may be an issue for some energy products.

Only about 2% of those living in extreme poverty with no grid connection said that they did not need one but 6% of those unwilling to pay for a grid connection and 14% of those unwilling to pay for a SHS, said it was because they did not need electricity. A slightly higher proportion (16%) of people living in extreme poverty who were unwilling to pay for an improved cookstove, said they did not need one.

Barriers to energy access for people with disabilities

People with disabilities in Kenya suffer from stigma and social exclusion. Many Kenyans believe that children born with a disability are a punishment for the sins of the mother and a disgrace to the family. Children with disabilities cannot attend school and most people with disabilities do not participate in family, social and economic activities (Rodríguez et al, 2018; NCAPD 2008). Stigma and discrimination thus form barriers to equal participation of people with disabilities in society, and disabled family members are often hidden away due to societal prejudices (Kabare, 2018). People with disabilities in Kenya lack decision-making power within the household and have insufficient information on and difficulties accessing goods, services and opportunities (NCAPD, 2008; Banks et al 2023). Lack of mobility and problems accessing (and costs of) transport combined with infrastructure design and the expectations and attitudes of families and wider society create barriers to reaching services

which may be almost insuperable for people with disabilities in Kenya (Grut et al, 2011; GSMA, 2019; Kabia et al, 2018). These barriers are also likely to apply to energy access.

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 living in extreme poverty to take up mechanism support (i.e. mechanisms 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 51% of Kenya's adult population, but only 36% of those in the poorest 40%, had an account at a financial institution in 2021 (World Bank, 2023i). For the population as a whole, the proportion of adults with an account is lower in rural areas (46%) than in urban areas (62%). The World Bank's Findex Database shows that barriers to account ownership include distance to financial institutions (affecting 16% of survey respondents); financial services being too expensive (20%); insufficient funds (46%); lack of necessary documentation (21%); lack of trust in financial institutions (13%); religious reasons (4%); or someone else in the family already having an account (9%) (ibid).¹⁴ Those living in extreme poverty are more likely to be affected by key barriers to financial inclusion including the cost of financial services and having insufficient funds to open accounts. However, levels of financial inclusion are higher in Kenya than in other countries reviewed, potentially reflecting widespread use of Saving and Credit Cooperatives (SACCOs), meaning that willingness and ability to engage in market mechanisms is likely to be higher.

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. Kenya has a relatively high level of national literacy, at 78% of the adult population in 2023, relative to other countries reviewed and a global average of 86.9% (wisevoter, 2023). However, levels of financial literacy are lower at only 38% of the adult population in 2014 (S&P, 2014).¹⁵ Barriers to education affect those in extreme poverty to a greater extent than the wider population (Global Citizen, 2020). Recent evidence from the Kenya Bureau of Statistics shows that education levels among the poorest are substantially lower than among the better off (KNBS, 2023). This suggests that additional measures to improve understanding of mechanisms is needed.

Experience borrowing from financial institutions

Experience borrowing from formal financial institutions may affect people's willingness to engage with market mechanisms. The World Bank (2023i) reports that 32% of adults in the poorest 40% of the population had borrowed any money from a formal financial institution or using a mobile money account in 2021. A slightly higher proportion (52%) had borrowed from family or friends (World Bank, 2023i). 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. However, experience is much higher than in other countries included in this review suggesting that such mechanisms are more feasible.

PAYGo infrastructure

PAYGo mechanisms typically involve payment via mobile credit (by sending a text message) (IRENA, 2020). Therefore, their reach 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. Conditions for PAYGo uptake are much better in Kenya than in other countries reviewed in this series. Network coverage is good with 95.5% of the population covered by at least a 2G network (mAccess, 2023) and 85% of adults owning a mobile phone in 2021 (World Bank, 2023i). Mobile money experience is also much higher among the bottom 40% of the population with 56% of adults having a mobile money account in 2021 (ibid). This reflects Kenya's position as a leader in the development of mobile money, since the launch of M-Pesa by Vodafone and Safaricom in the country in 2007 (Ndung'u, 2017). This suggests that PAYGo is likely to be more viable for people living in extreme poverty in Kenya than in other countries reviewed.

Factors limiting market mechanism reach to people with disabilities

Even where financial assistance is intended to support people with disabilities in Kenya, it may not reach them. For instance, under a social protection programme where persons with severe disabilities are eligible for cash transfers, it is reported that "Defining severe disability has been in itself a problem and targeting has at times been very discriminative" (KUB 2020). Similarly, under an affirmative action programme where government supplies were to be made by women, youth and persons with disabilities, people with disabilities benefitted little, with most opportunities going to women and youth without disabilities (ibid).¹⁶

High social exclusion faced by people with disabilities and their families in Kenya means that such groups are unlikely to be able to engage with energy access market mechanisms unless positive steps are taken to reach them.

Education levels are significantly lower among people with disabilities in Kenya, with 25% (compared with 15% of those without disabilities) never having attended school, and 49% not having completed primary school (Hanass-Hancock et al, 2023). This may make it more difficult for them to find out about and understand market mechanisms.

Though mobile phone ownership is high among people with disabilities in Kenya, relative to other countries, they are still less likely to own a mobile phone (90% vs 93%), or have recently used a computer (8% vs 10%), or the internet (14% vs 19%) than people without disabilities (Hanass-Hancock et al, 2023). GMSA (2019) similarly found that people with disabilities were less likely to own a mobile phone than non-disabled people – with cost, low digital literacy and disability itself preventing access and autonomous and confidential use of mobile-enabled services. They also found that more than 70% of those with disabilities who own a mobile phone have a basic or feature handset (GSMA, 2019). All of these may hamper access to mechanisms, such as PAYGo, which rely on digital technology.

9. Key findings and conclusions

- **People living in extreme poverty in Kenya have significantly lower levels of energy access than the rest of the population.** We estimate that ~34%, some 4.9 million, people living in extreme poverty have no effective access to electricity and ~88%, some 12.7 million have no access to clean energy for cooking. **Financial support will**

need to be directed to people living in extreme poverty if they are not to be left behind.

- **People with disabilities in Kenya have lower levels of access to energy than people without disabilities.** We estimate that ~0.8 million people with disabilities living in extreme poverty may be without electricity, and ~1.9 million without clean cooking energy.
- **Cost is the main reported obstacle to grid connection and adoption of solar home systems and clean cookstoves by people living in extreme poverty in Kenya.** Market mechanisms which address affordability thus have the potential to enable a significant proportion of those living in extreme poverty to achieve access.
- **The option to pay in instalments increases willingness to pay for energy access among people living in extreme poverty in Kenya,** bringing it broadly in line with the rest of the population. **Market mechanisms which spread costs over time could enable many to access energy.** However, with 6%-7% giving ongoing costs as the reason they would not be unwilling to pay for energy access, mechanisms which just spread costs over time will not reach all.
- **Between 13% and 50% (depending on the technology) of people living in extreme poverty remain unwilling to pay for energy, even in instalments and with subsidies.** More detailed understanding of their reasons (and whether further financial support, better understanding of the terms offered, or other forms of support) is needed to guide market mechanism design.
- The **application process, and being refused connection,** can be barriers to grid connection for people in Kenya. Removal of these barriers could enable more people living in extreme poverty to gain grid access.
- **Reliance on landlords seems to present a significant barrier to electricity access for those in urban areas,** so market mechanisms which incentivise landlords could bring benefits.
- **A significant percentage of people living in extreme poverty in Kenya would not buy an improved cookstove because they do not see it as necessary –** market mechanisms supporting modern energy access will need to be accompanied by awareness campaigns if they are to be successful.
- **People with disabilities in Kenya face significant additional barriers to energy access,** driven by social exclusion; lack of access to information and power to make or influence household decisions; poor mobility and difficulties accessing transport, buildings and public spaces. **Market mechanisms which take these factors into account, are needed.**
- **Those living in extreme poverty in Kenya are disproportionately affected by factors likely to limit market mechanism reach.** However, barriers appear to be less severe than in other countries and widespread use of mobile phones and M-PESA suggest that PAYGo is more viable for people living in extreme poverty in Kenya than in other countries.

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11. Endnotes

¹ The other reviews in this series are of Ethiopia, Nepal, Nigeria, Rwanda and Zambia

² 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>

³ We had previously estimated, based on regional movements in poverty rates between 2015 and 2019 (from World Bank 2022c, table 1C.1), an extreme poverty rate for Kenya of 26.3% in 2023.

⁴ Close to the average for Africa (WHO, 2022) and the median across 41 countries reviewed in the Disability Data Report 2021 (Mitra & Yap, 2021), but towards the lower end of prevalence among the 15 countries reviewed in the Disability Data Report 2023 (Hanass-Hancock et al, 2023).

⁵ $28.5\% \times 12.7\% \times 55 \text{ million} = 2 \text{ million}$

⁶ The data from this survey was re-analyzed to compare the responses given by people living in extreme poverty with responses from other people, living above the extreme poverty line.

⁷ We estimate, from figures in the Kenya Beyond Connections: Energy Access Diagnostic Report that 1% of grid connections and 45% of off-grid solutions in Kenya did not achieve tier 1 electricity access.

⁸ Only a small portion (~1%) of those surveyed responded “Yes” to this question (possibly due in part to the stigma associated with disability in Kenya, and other factors which cause levels of disability in populations to be under-estimated, but potentially also because this question formed part of a question on occupations, so it is likely that only people with disabilities who were not working were identified). As a result, the sample size was very small, and conclusions drawn from it must be treated with caution.

⁹ Percentage people with disabilities living in extreme poverty without electricity = $(23\%+5\%) \times 34\% / 23\% = 41\%$

¹⁰ Percentage people with disabilities living in extreme poverty without Clean cooking = $(76\%+9\%) \times 87\% / 76\% = 97\%$

¹¹ This was not a focus of the research, and does not exclude a link between energy needs and poverty levels.

¹² But the number of households was very small, so this finding should be treated with considerable caution.

¹³ 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.

¹⁴ The World Bank surveyed approximately 1,000 people in each of more than 160 countries included in the Index Database, using a randomly selected, nationally representative sampling method.

¹⁵ 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.

¹⁶ Access to Government Procurement Opportunities- AGPO