80% of Ugandan households use off grid solar devices. Yet the majority owns small solar lamps, which do not have the generation capacity to effectively tackle energy poverty. Access to clean energy is a basic need that directly supports people’s health, education and livelihoods, yet more than 30 million Ugandans live without electricity. The digital finance PayGo solar market is seen as a promising solution to improve energy access, but its growth is hindered by several information gaps. Customers lack information on solar products and companies lack information about customers and product demand. There is also limited understanding on the relationship between energy access and the use of wider digital finance.
Methodology

On the supply-side, we leverage mobile money data from MTN from 2016 to 2018 to gain digital energy finance market-level insights. The data covers 11.5 million transactions to 672,236 customers, representing around 75% of the digital energy finance PayGo market. We use mobile money transactions data to analyze the penetration of mobile money and solar PayGo, its historical growth, to estimate consumers’ ability to pay and to assess whether digital energy financing leads to digital financial inclusion.

On the demand side, we conducted surveys in collaboration with Schatz Energy Research Centre (SERC). 424 customers were surveyed over three years to investigate solar home system adoption and its influence on household quality of life. The survey offers insights on the type of solar products purchased, as well as how individual customers are adopting and using the product over time and what value the product creates for customers.

**SUPPLY-SIDE DATA** - DIGITAL FINANCE TRANSACTIONS FOR SOLAR PAYMENTS

**DEMAND-SIDE DATA** - TELEPHONE SURVEYS WITH SOLAR CUSTOMERS OVER THREE YEARS

**BIG DATA DASHBOARD**

- **75%** representing around 75% of the PayGo digital energy finance market in Uganda

**424 CUSTOMERS WERE INTERVIEWED OVER TIME, WHO STARTED IN 2016 WITH:**

- Small Portable Lamps, single lights (n = 171)
- Medium Mini Solar Home Systems (n = 129)
- Large Solar Home Systems (n = 124)

Outcomes and Insights

**UGANDA IS A RAPIDLY GROWING NICHE SOLAR PAYGO MARKET WITH AROUND ONE MILLION CUSTOMERS**

**Active nr of solar PayGo customers:**

- December 2016
- December 2018

There is room for expansion, as only 12% of the households are currently served and there are only 10 districts with more than 5,000 active PayGo customers.

Districts such as Masindi, Kriyandongo, Gulu, Lira, Busia, Mbarara, Hoima have more than 60 percent mobile money adoption but less than 20 percent of households have electricity access. These districts could be the primary target areas for energy companies to accelerate off-grid solar usage. Overall, it is estimated an additional 3.5 million households could be electrified using solar home systems.
PayGo makes solar more affordable as it allows to make frequent and smaller transactions (reducing from US$3 to US$2). Medium and large systems became more affordable for low income people. Around 32% of the customers in the demand side survey lived below US$3.1 per day.

People highlighted the solar systems impacted their household’s quality of life by reducing traditional fuels, often in combination with saving money and improving health and safety.

**PAYGO LEADS TO WIDER DIGITAL FINANCIAL INCLUSION FOR AROUND 16% OF THE CUSTOMERS**

About 107,000 Ugandans started using mobile money because of PayGo.

**UGANDA’S MOBILE MONEY TAX LED TO A TEMPORARY SLOW-DOWN IN PAYGO ACTIVATIONS. LIKewise, PAYGO PURCHASES QUICKLY RECOVERED WHEN THE TAX WAS CANCELLED. THIS INDICATES THAT TAXATION REGIMES IMPACT ENERGY ACCESS**

49% of customers purchased an extra solar product since their first purchase.

- 63% Solar Portable Lamps owners making another purchase
- 39% Small SHS owners making another purchase
- 39% Large SHS owners making another purchase

3.5 - 4 PayGo Payments per month. Transaction values US$3.1 to US$2 per month. People making more frequent payments at smaller average values of US$2.

88% Of customers are satisfied with PayGo.

Of customers lived below US$3.1 per day compared to 69% for Uganda overall.

68% of the customers were satisfied with the solar home system three years after the purchase.

672,000 PayGo Solar Users as of Dec 2018. 110,000 new mobile money users due to PayGo solar home systems.

*Umeme, 2017; *UBOS, 2017
RECOMMENDATIONS FOR ENERGY AND FINANCIAL SERVICE PROVIDERS

Expand energy services in geographical locations with high mobile money penetration. Districts with high mobile money adoption but little access to the grid represent a potential addressable market for off-grid solar.

Use customers transaction data to develop affordable and flexible financing methods for solar PayGo home systems. Analyzing information on people’s financial behavior, transaction frequency and amounts, their ability to pay for solar assets and purchase additional products over time, can enable companies to design user-centric and low-cost product financing methods that enable energy access.

RECOMMENDATIONS FOR THE UGANDA SOLAR ENERGY ASSOCIATION

Use mobile money data to track and accelerate off-grid energy market of Uganda. The digital energy finance dashboard can help identify target expansion areas. It shows solar digital payment transactions frequency and amounts, which indicates customer’s ability to pay. The dashboard can monitor market growth at different levels (province, district and tower level) in real time. This can be used to inform investors of the potential of the Ugandan solar sector. Finally, the dashboard can help tailor financing solutions and solar products to the needs of local markets.

RECOMMENDATIONS FOR POLICY MAKERS

Use digital finance transaction insights for grid electricity planning. The average monthly payment for solar PayGo is a reliable indicator for energy expenditure and can also be interpreted as the household’s ability to pay for electricity, which can be used for planning electrification projects.

Implement policies aimed at improving energy access and digital payments for PayGo solar purchases. Fewer people purchased PayGo systems as soon as the mobile money taxes was announced. Likewise, we found the PayGo purchases quickly recovered when the tax was cancelled.

UNCDF is the UN’s capital investment agency for the world’s 47 least developed countries. With its capital mandate and instruments, UNCDF offers “last mile” finance models that unlock public and private resources, especially at the domestic level, to reduce poverty and support local economic development.

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