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U.S. GLOBAL DEVELOPMENT LAB

Rapid Assessment Framework:
Pay-As-You-Go Solar as a Driver
of Financial Inclusion

Fall 2017

Framework Overview

- Five open-ended questions that bring together aspects of energy, mobile, and business environment
- Each question is associated with multiple possible indicators and data sources
- We will run through framework with a sampling of countries from Sub-Saharan Africa

1. How broad is rural mobile coverage?

PAYG solar can only drive mobile money adoption if customers can get a signal.



2. How much of the country is unelectrified?

PAYG solar is most attractive in areas without grid access, secondarily in areas of highly unreliable grid access.



Photo credit: Matthieu Young

3. How strong is the mobile money infrastructure?

PAYG business models using mobile-money are more likely to drive mobile money adoption when there is an existing infrastructure of mobile money providers, agent networks, and populations with experience using mobile money.



4. How affordable is home solar for target populations?

Low incomes and fuel subsidies can make it harder for solar energy to compete with alternatives.



5. How easy is it to do business?

PAYG solar companies have unique business needs - high initial capital needs, imported material, reliance on local human capacity for technical and customer service.



Summary Analysis

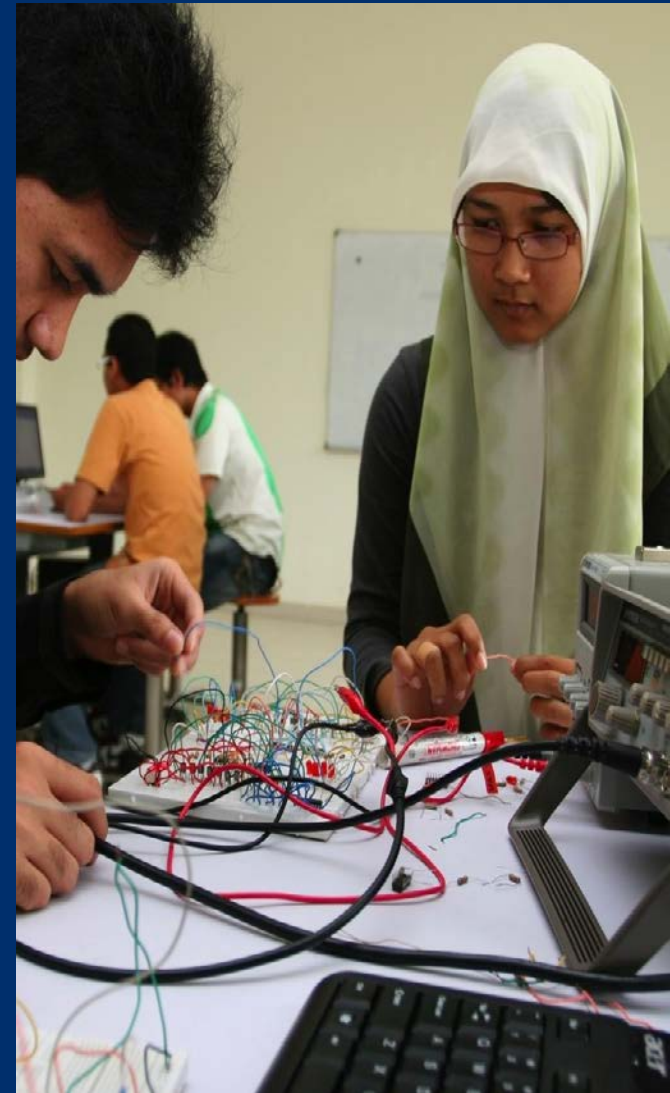


Selected Sub-Saharan African Countries

1. How broad is rural mobile coverage?

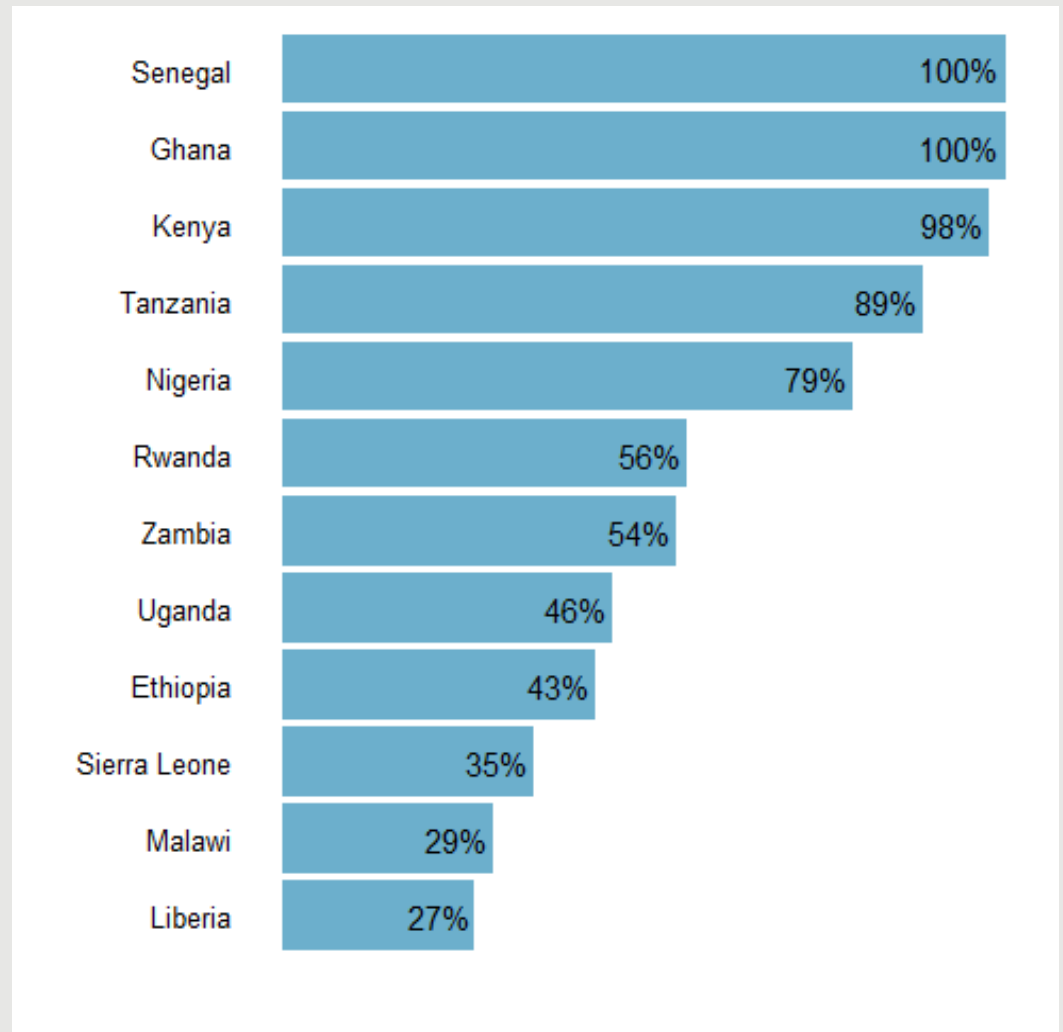
Key Indicators and Data Sources:

- Fraction of populated rural areas with >50% households mobile phone ownership
(*Demographic and Health Surveys*)
- # unique subscriptions (*GSMA Intelligence*)
- Geographic coverage of mobile networks
(*GSMA/mAccess*)



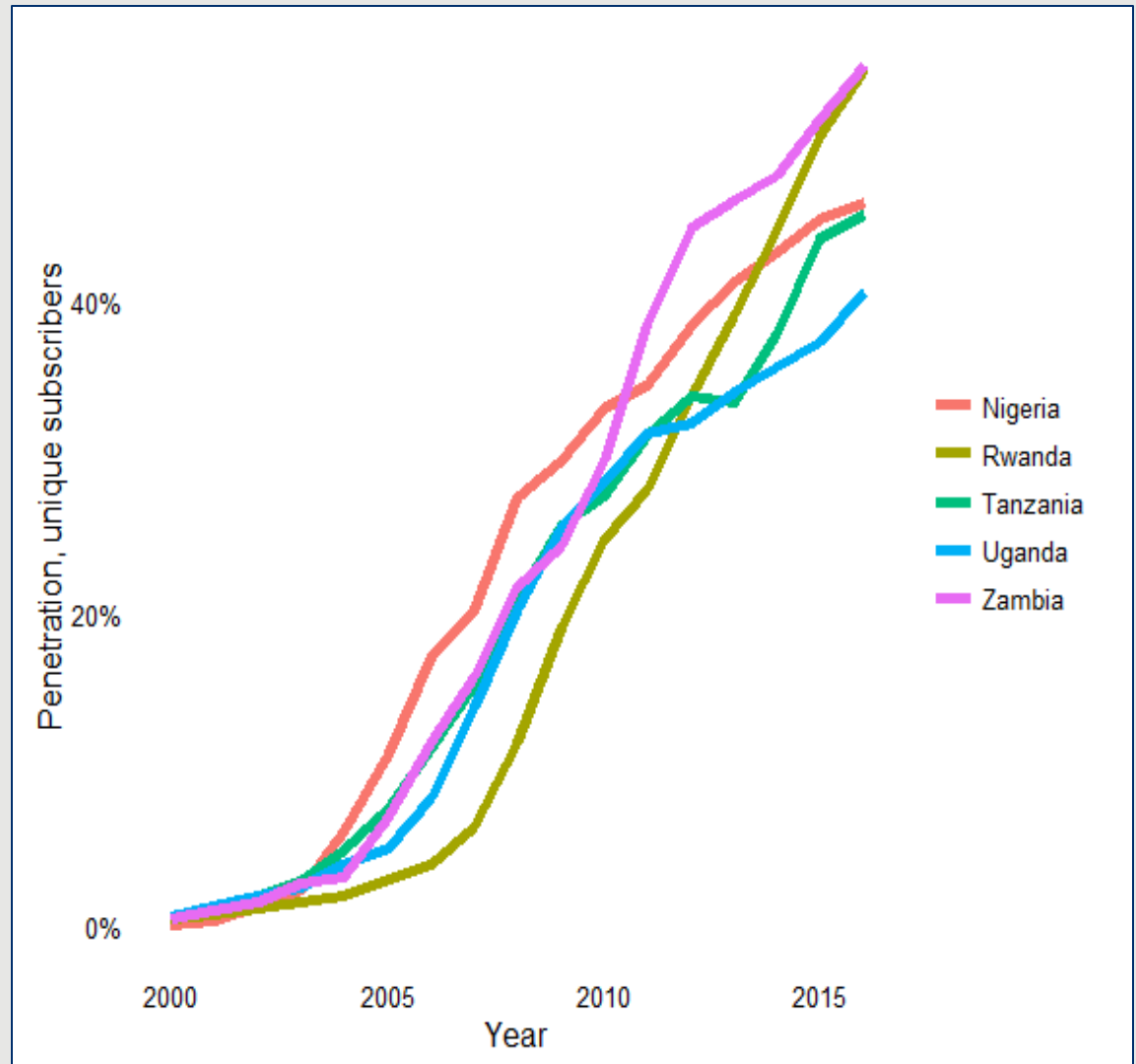
1. How broad is rural mobile coverage?

- Estimated fraction of populated rural areas with more than 50 % mobile ownership.
- Ownership data were drawn from DHS household surveys (from 2010 - 2016).
- Adoption trends from GSMA were used to extrapolate to 2016 ownership rates.

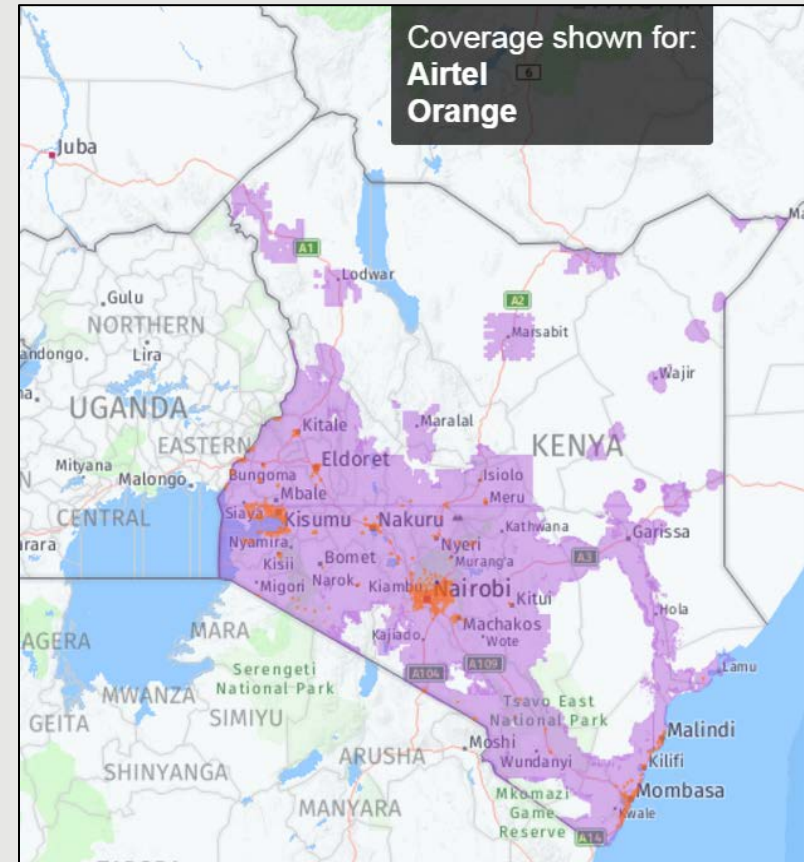
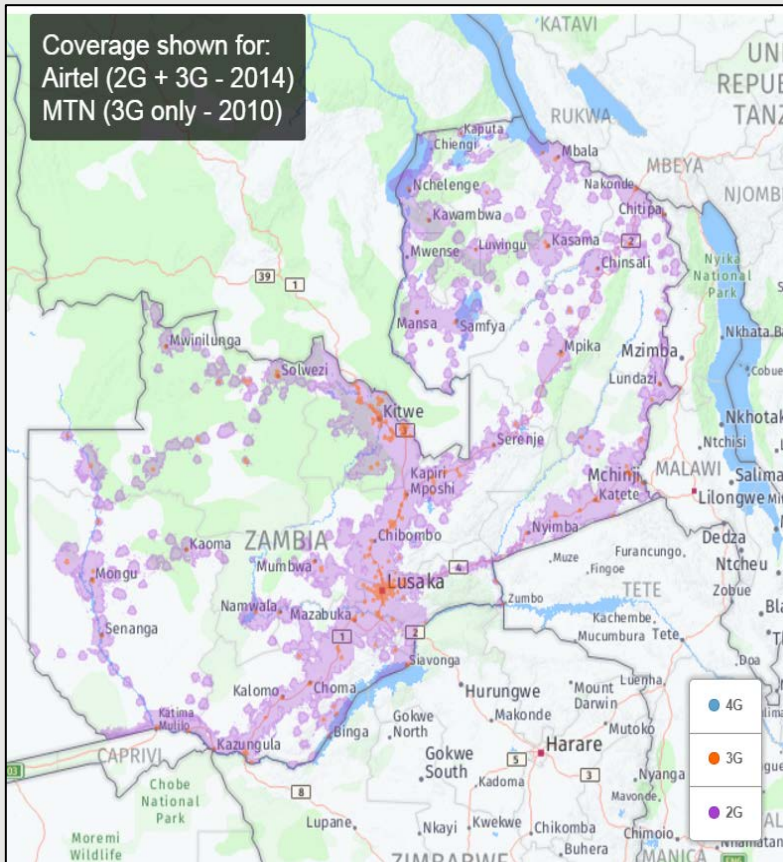


1. How broad is rural mobile coverage?

- GSMA counts the number of unique subscriptions, rather than household ownership.
- No geographic breakdown; these numbers include urban and rural customers.



1. How broad is rural mobile coverage?

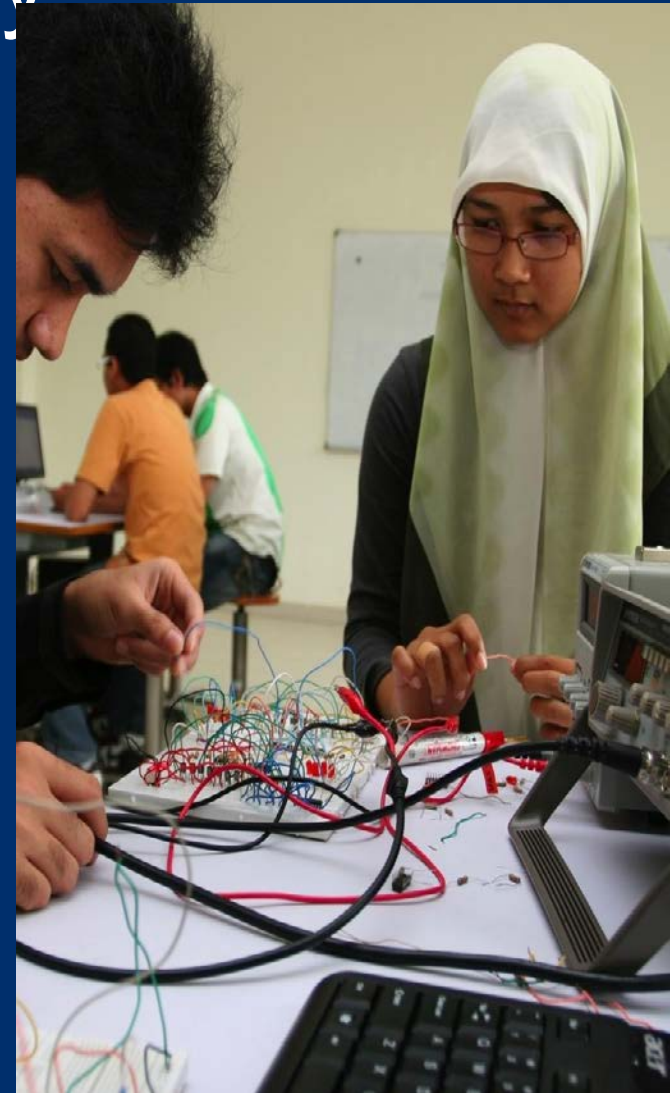


- mAccess Tool provides GIS data on mobile network coverage - self reported by MNOs

2. How much of the country is unelectrified?

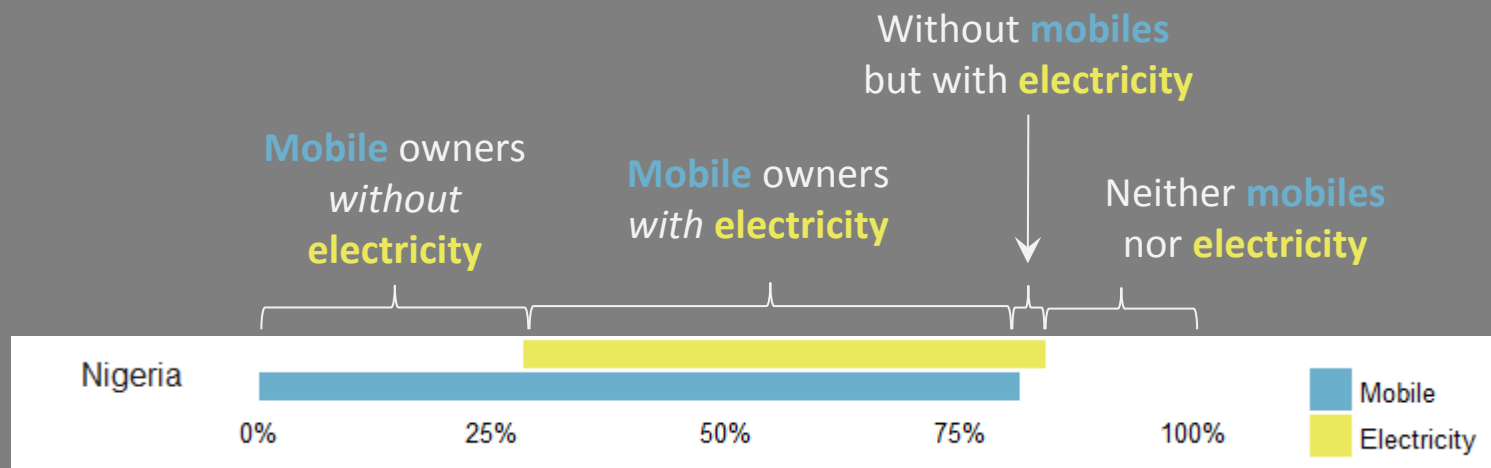
Key Indicators and Data Sources:

- What fraction of the population has access to electricity? (*Demographic and Health Surveys*)
- To what extent does mobile phone ownership overlap with access to electricity?

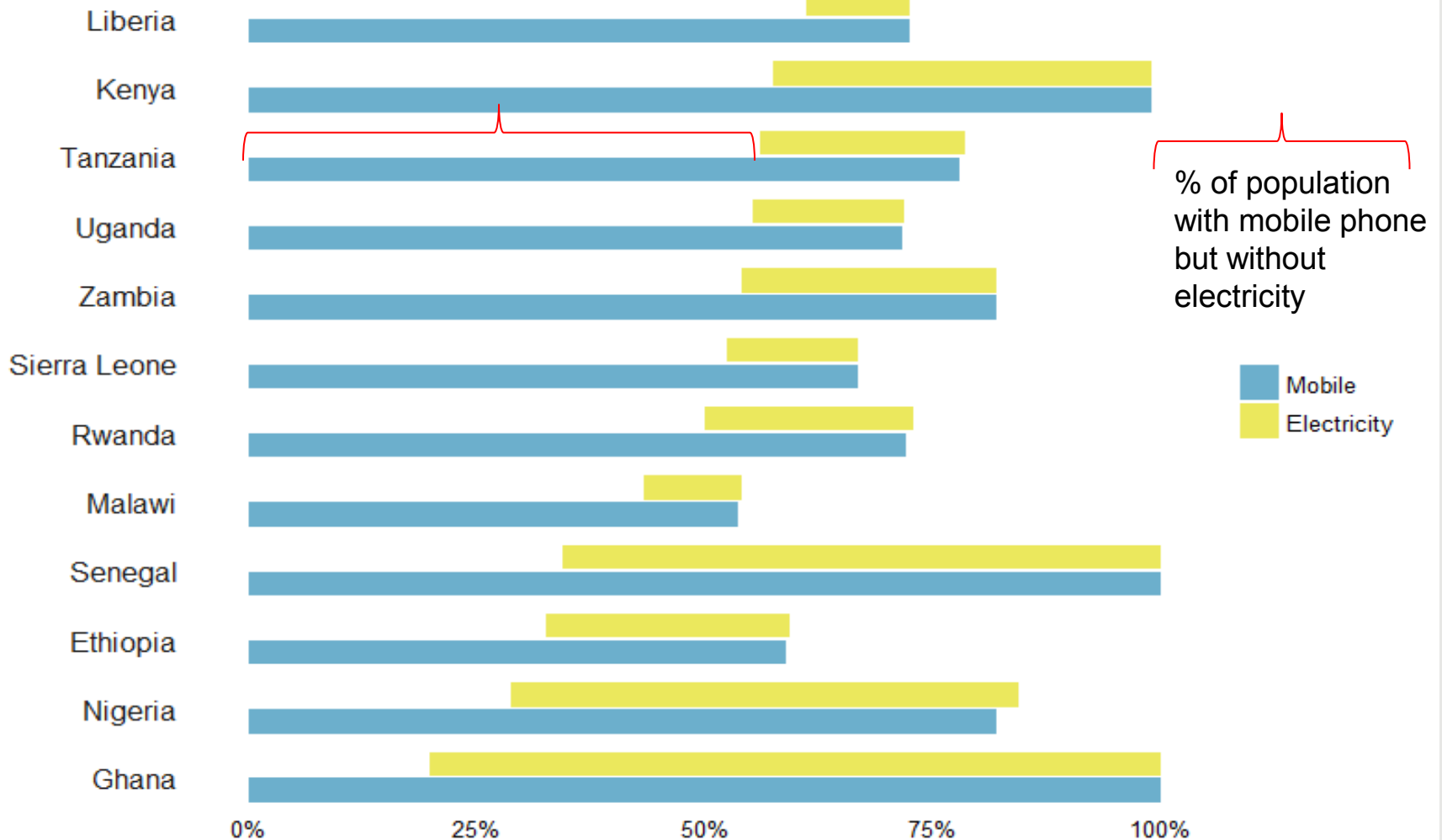


2. How much of the country is unelectrified?

By combining household-level data on **mobile ownership** and **electricity access**, we can divide a country's population into four groups:

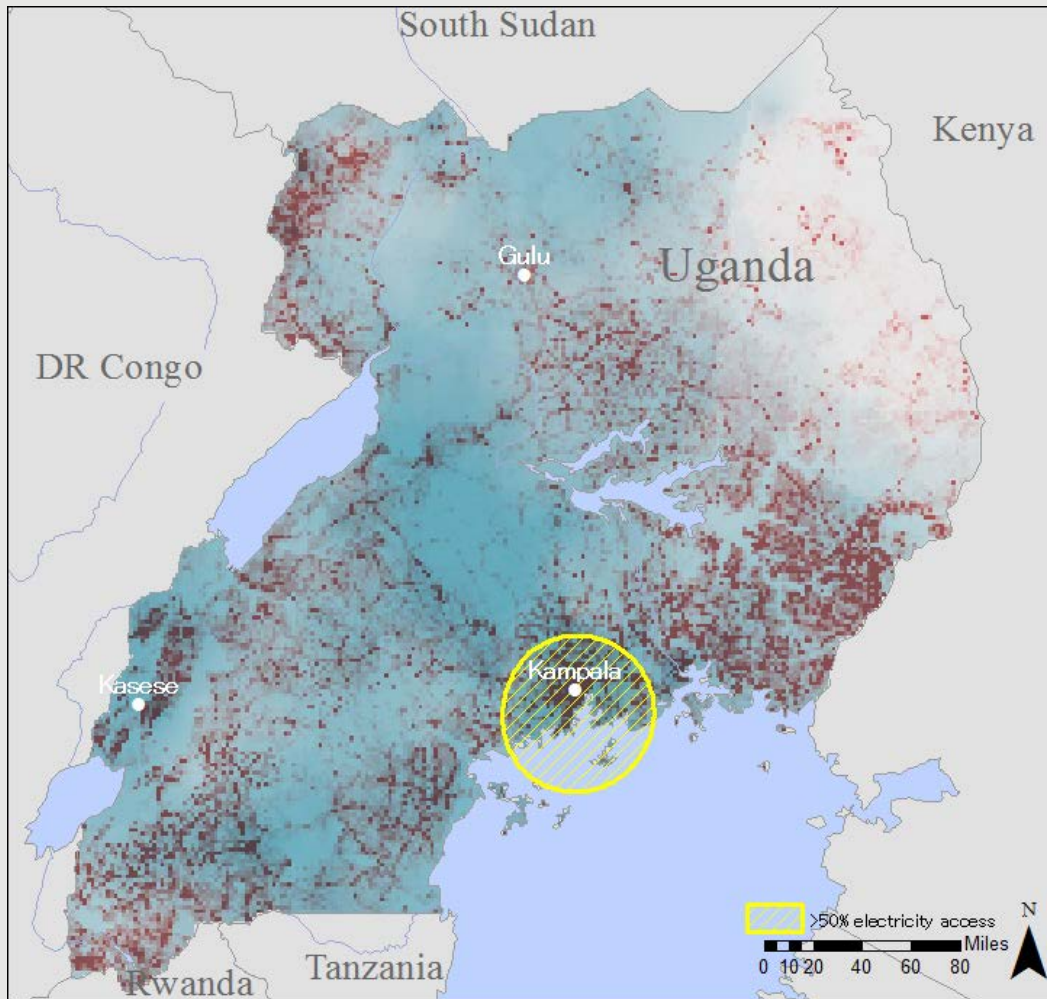


2. How much of the country is unelectrified and has access to a mobile phone?



2. Population, mobile phone ownership, and electrification

UGANDA



High mobile ownership

Low mobile ownership

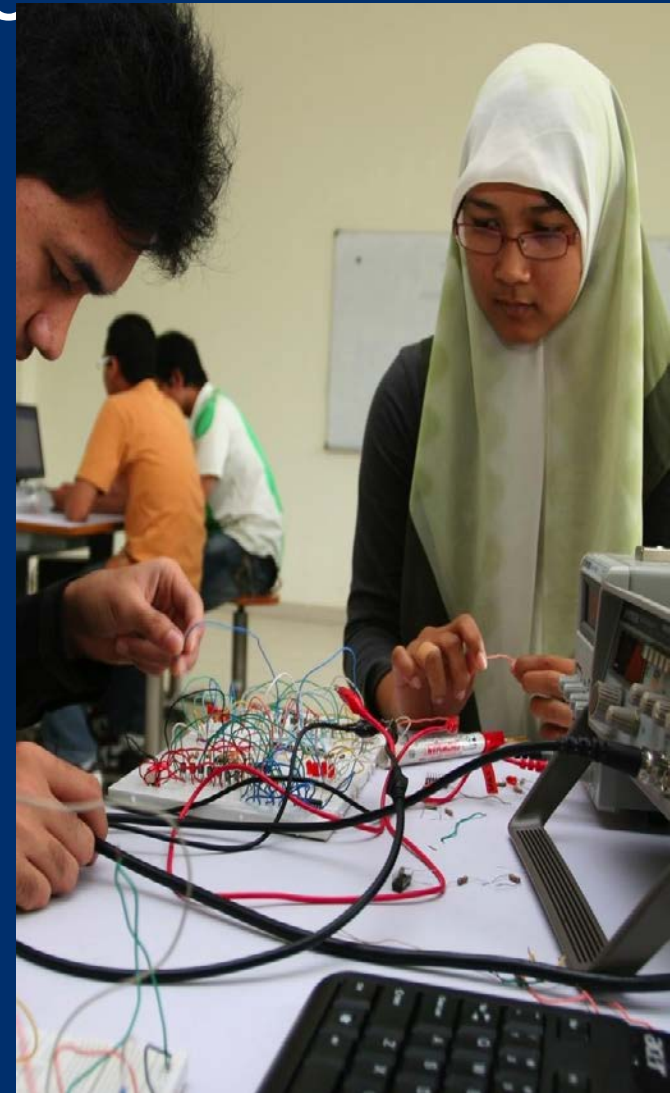


Low pop. High pop.

3. How strong is the mobile money infrastructure?

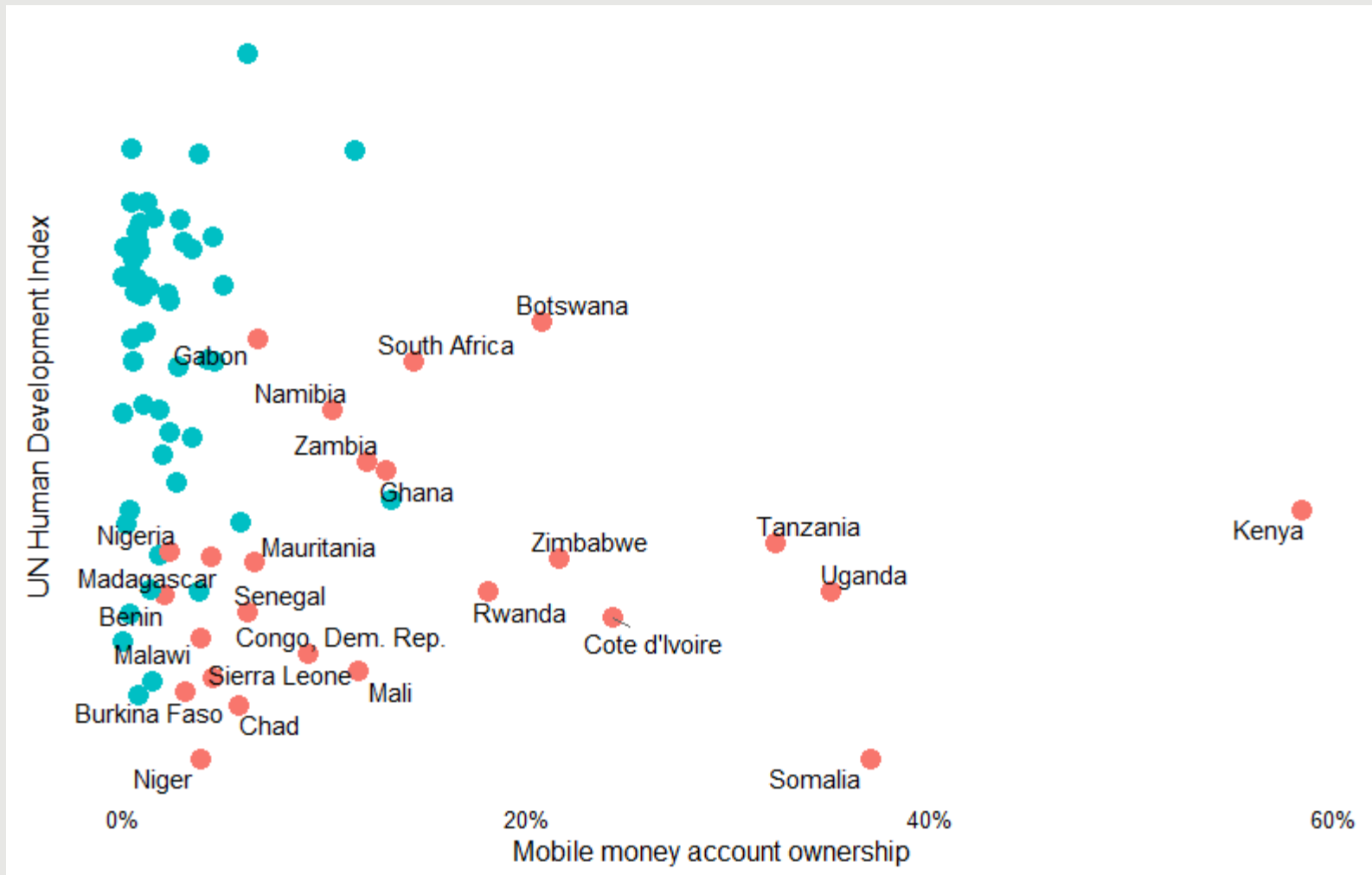
Key Indicators and Data Sources:

- Existing mobile money use (Global Findex)
- Experience with mobile money bill pay (Global Findex)
- Strength of mobile agent networks (Finclusion Lab)

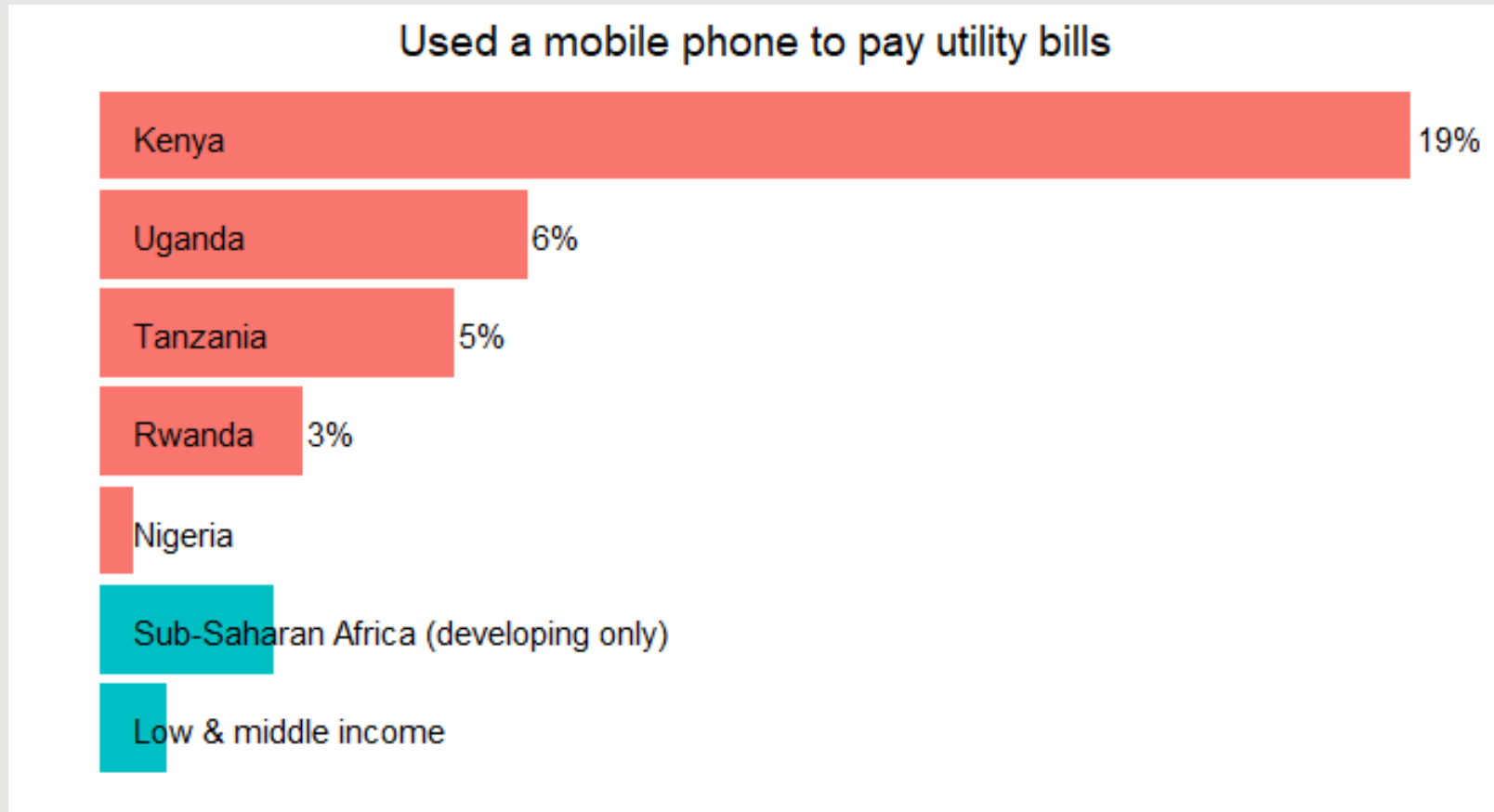


3. How strong is the mobile money infrastructure?

MOBILE ACCOUNT OWNERSHIP



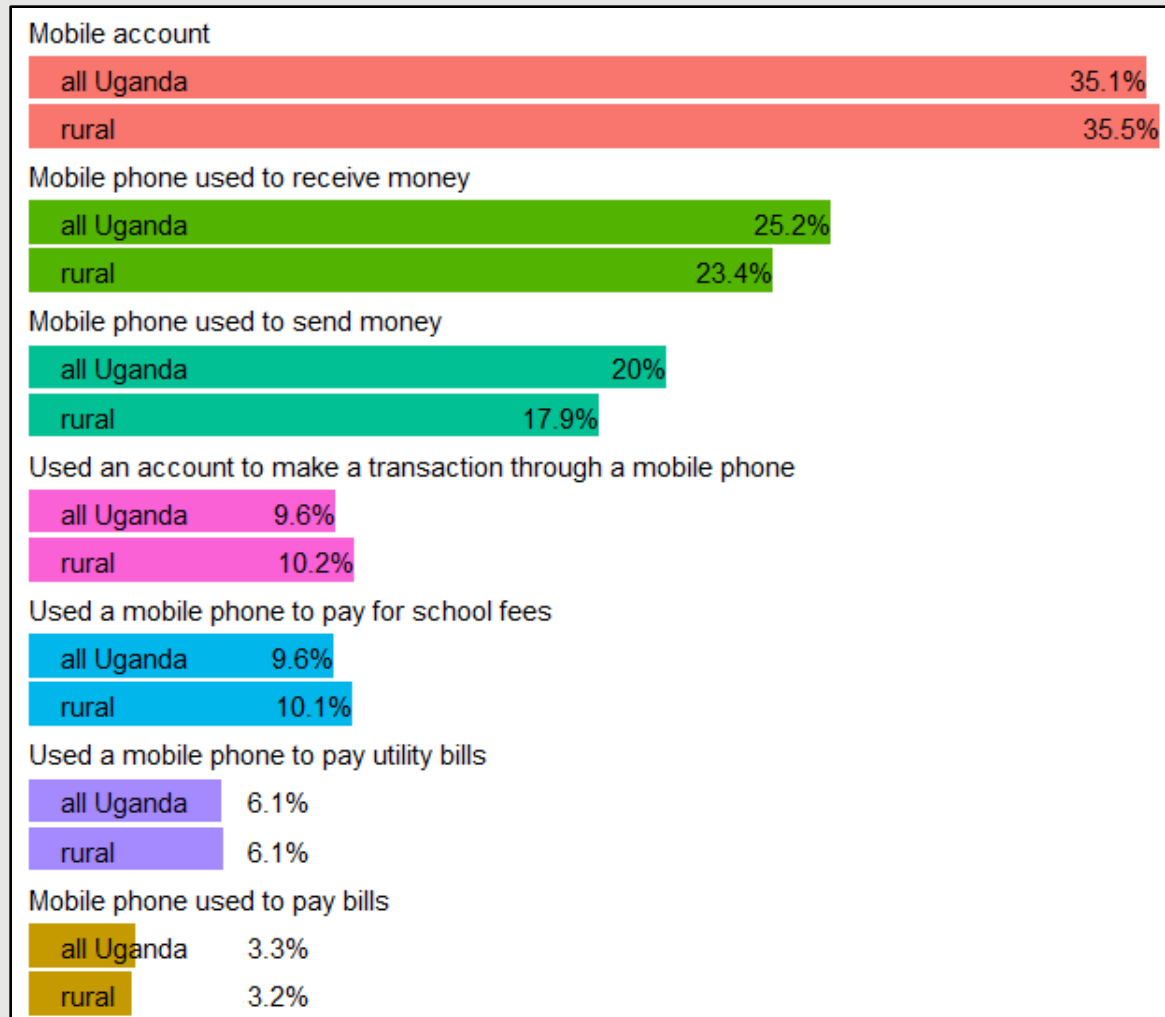
3. How strong is the mobile money infrastructure? MOBILE MONEY USE



Data from World Bank Findex

3. Mobile Money Usage

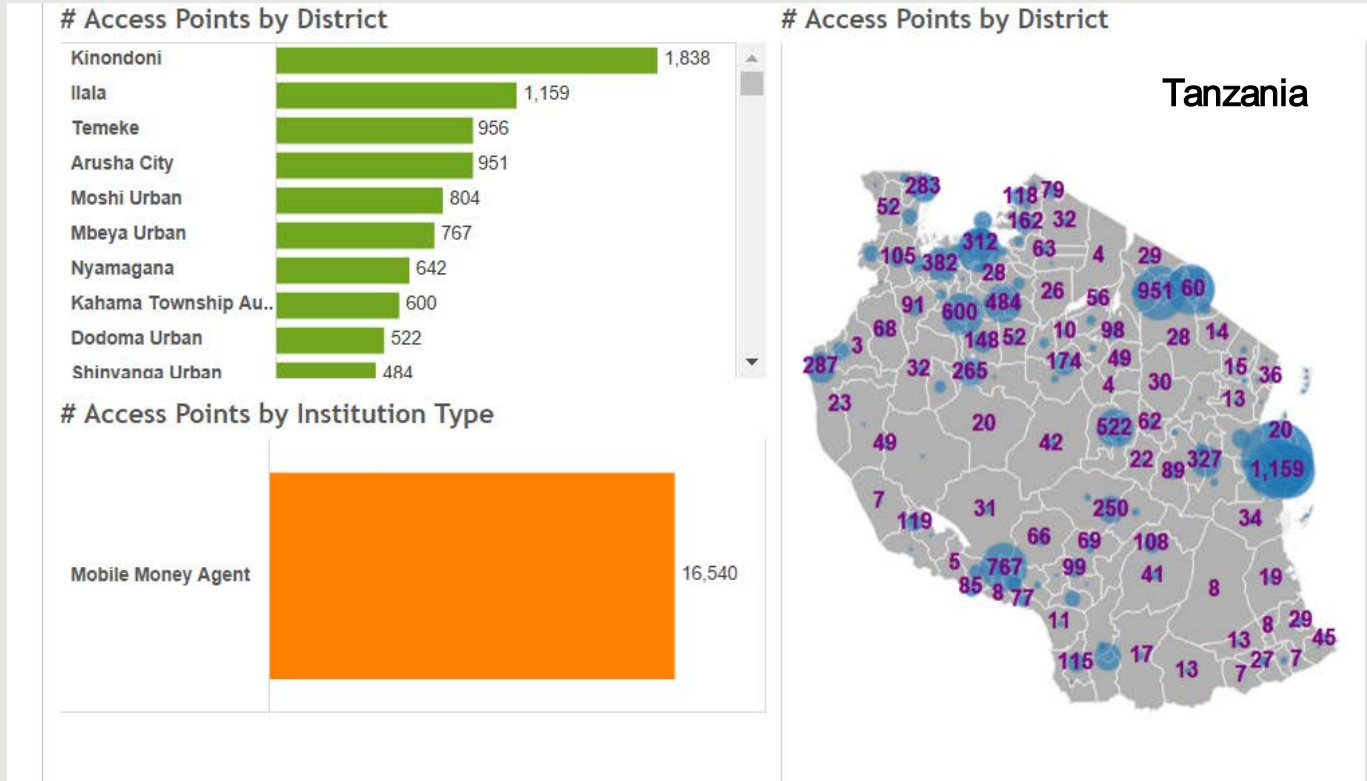
UGANDA



Data from Global Findex, collected across two waves. The first wave was in 2011, the second in 2014.

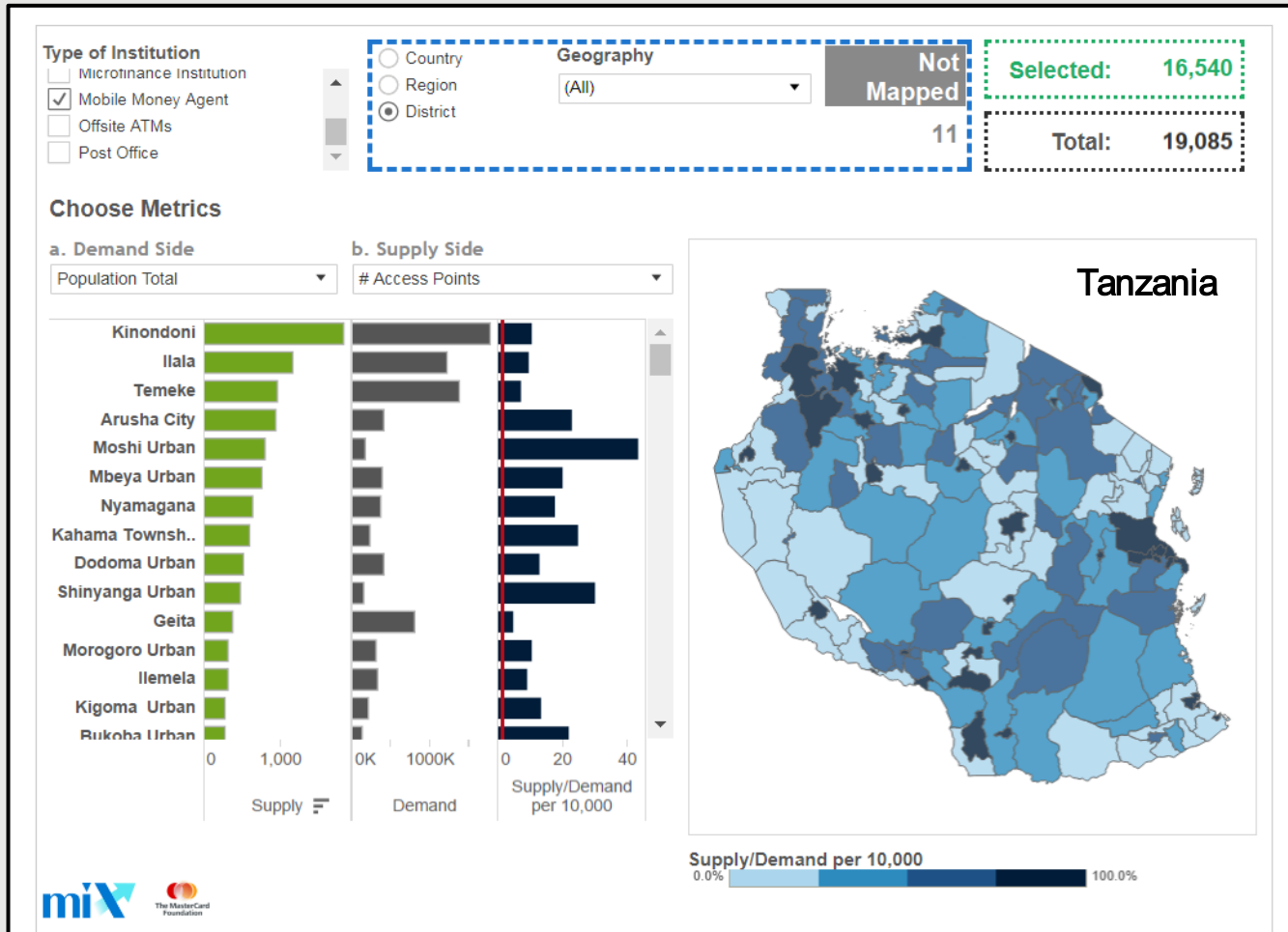
3. How strong is the mobile money infrastructure?

MOBILE AGENT COVERAGE



3. How strong is the mobile money infrastructure?

MOBILE MONEY AGENT RATIO

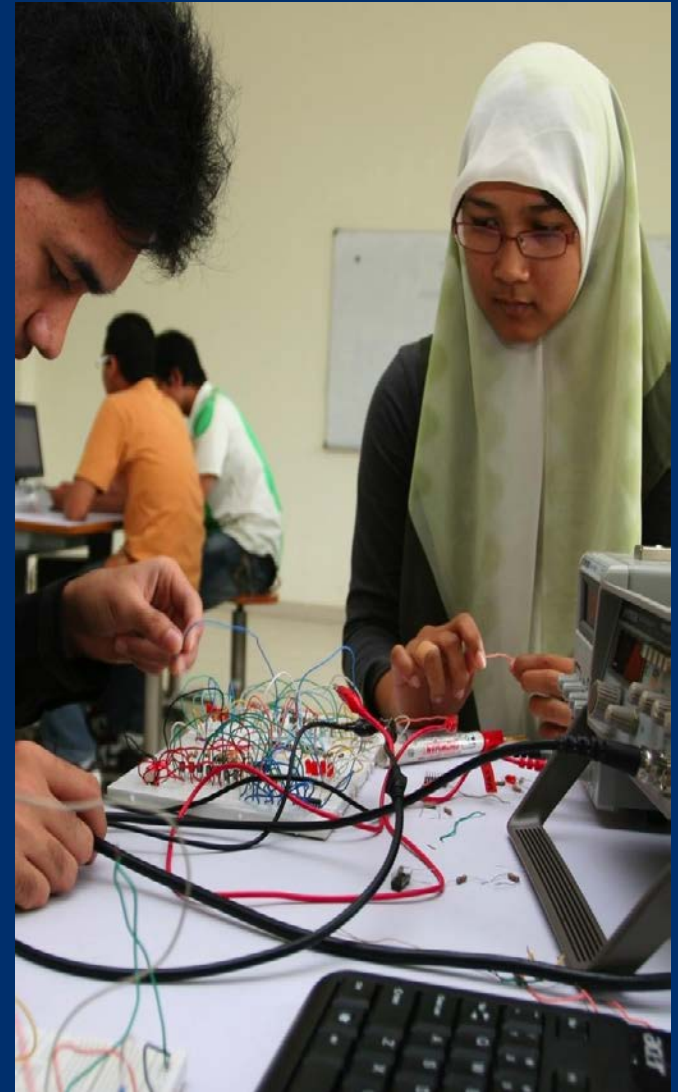


Data from MIXFinclusion Lab

4. How affordable is home solar for target populations?

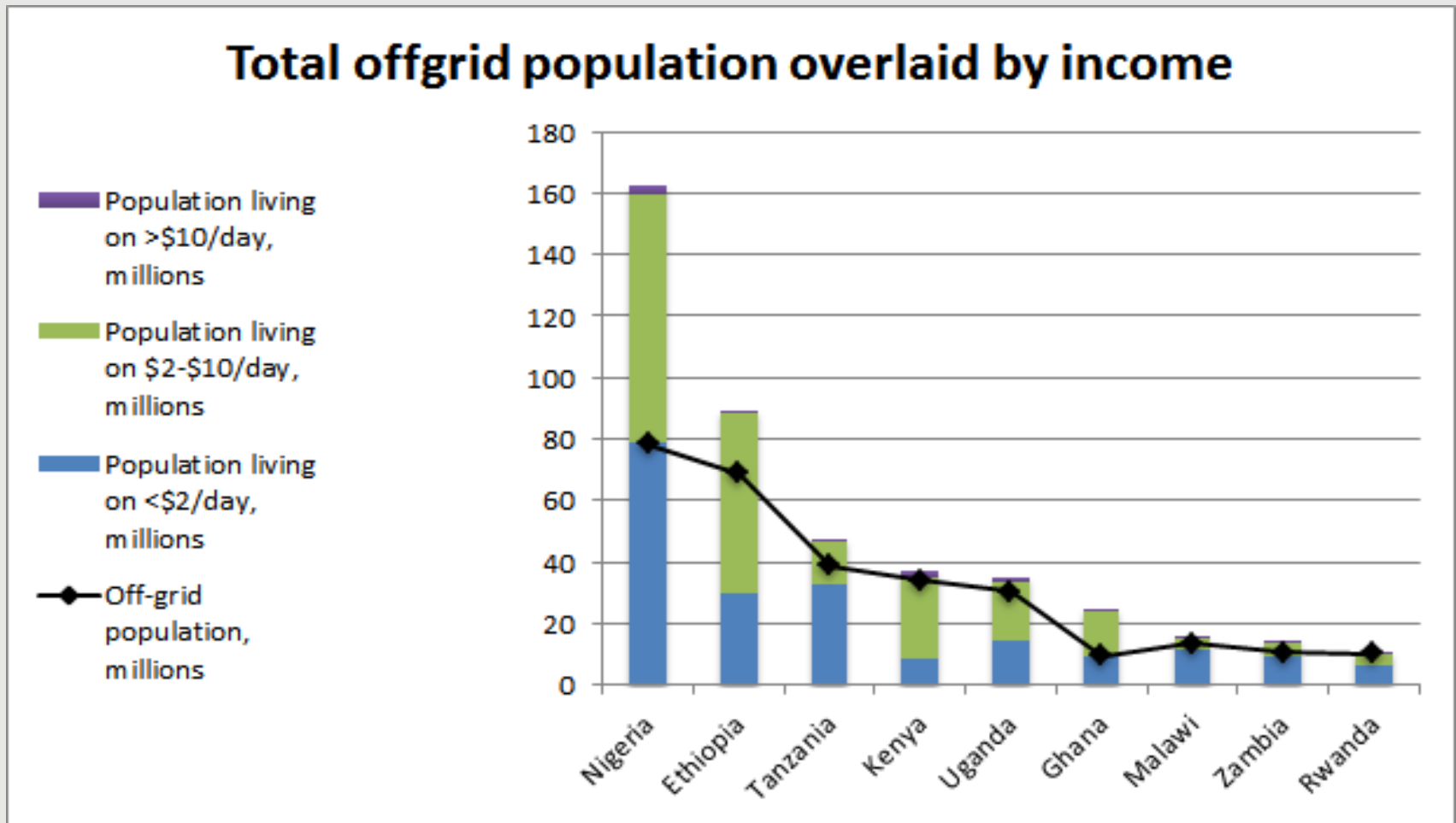
Key Indicators and Data Sources:

- Income levels of off-grid populations (Off-Grid Solar Market Trends/Pew Research Center Global)
- Average expenditures on stop-gap energy (Off-Grid Solar Market Trends, UNEP Enlighten initiative)
- Presence of energy subsidies (International Energy Agency)



4. How affordable is home solar?

INCOMES OF OFF_GRID POPULATION



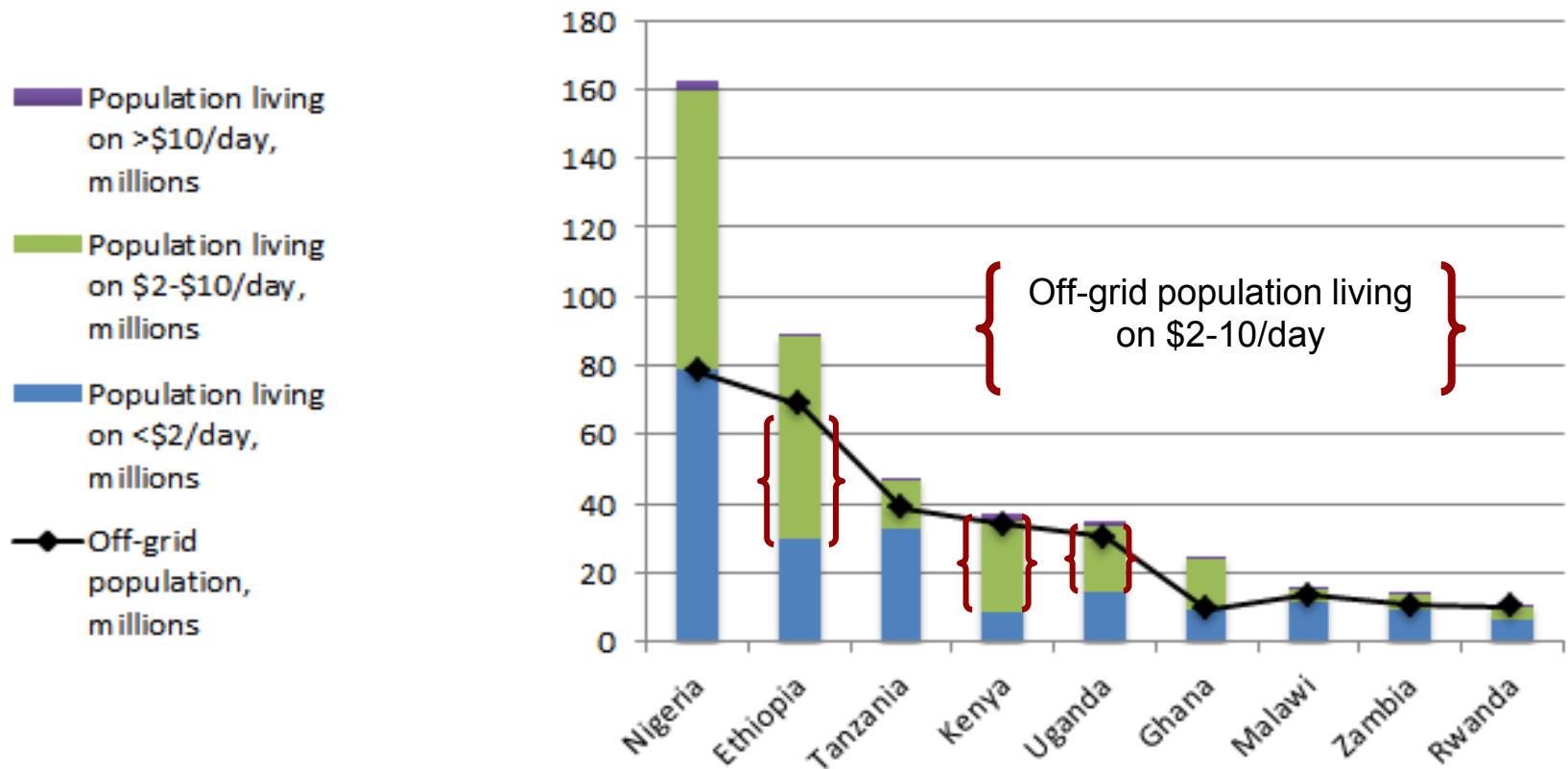
Modified from the Off-Grid Solar Lighting Report, 2016

Off-Grid Population data from [UNEP en.lighten Initiative Country Lighting Assessments](http://map.enlighten-initiative.org/) <http://map.enlighten-initiative.org/> (assessments done in 2010); Poverty data from Pew Research Center (data from 2011); Population data from World Bank (data from 2011)

4. How affordable is home solar?

INCOMES OF OFF_GRID POPULATION

Total offgrid population overlaid by income

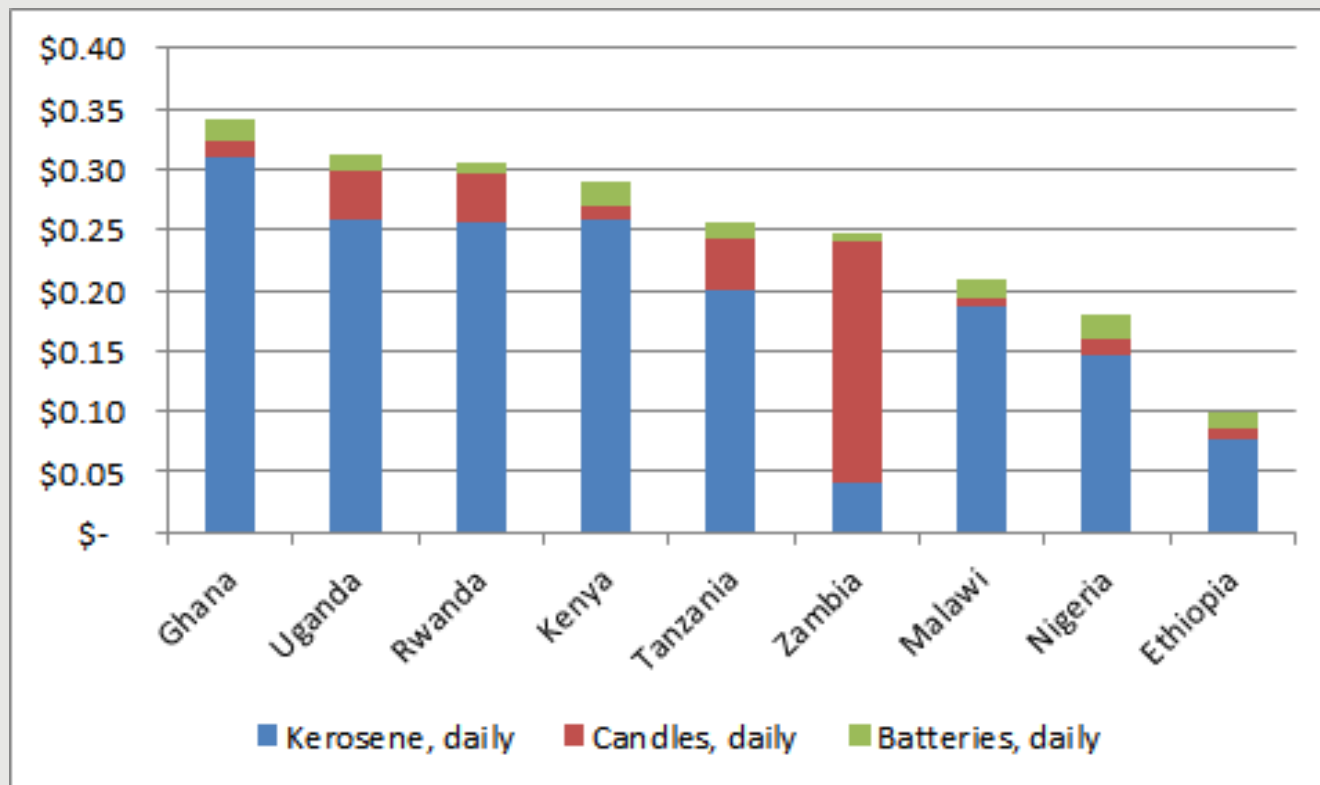


Data from [UNEP en.lighten Initiative Country Lighting Assessments](http://map.enlighten-initiative.org/) <http://map.enlighten-initiative.org/>

4. How affordable is home solar?

CURRENT EXPENDITURE ON ENERGY

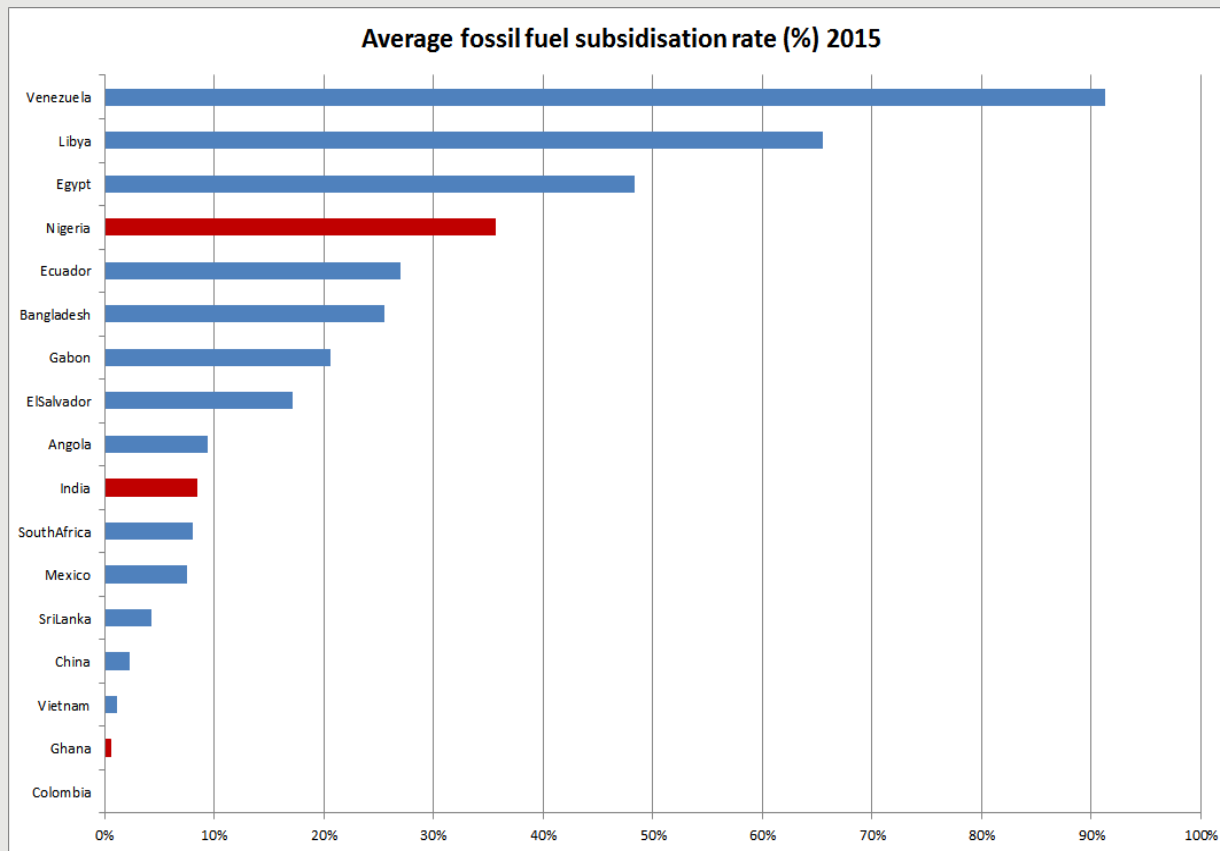
Daily Average Expenditure on Energy at Household Level, 20 12



4. How affordable is home solar?

SUBSIDIES

Fuel Subsidies

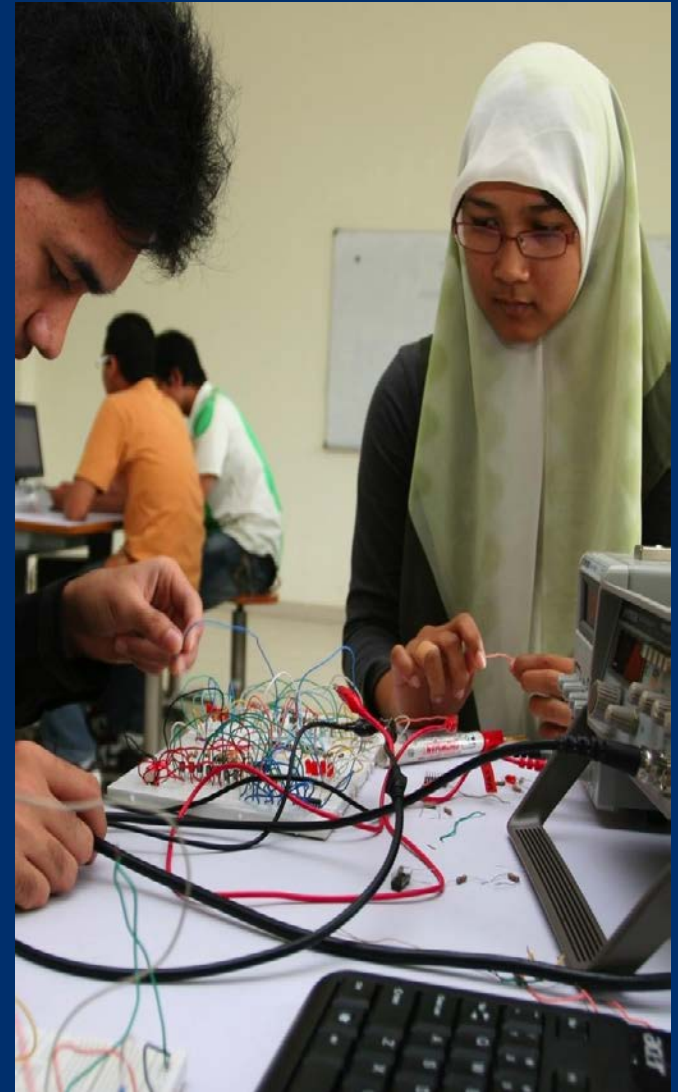


Data from [International Energy Agency](http://www.iea.org/statistics/resources/energysubsidies/). Available at: <http://www.iea.org/statistics/resources/energysubsidies/>

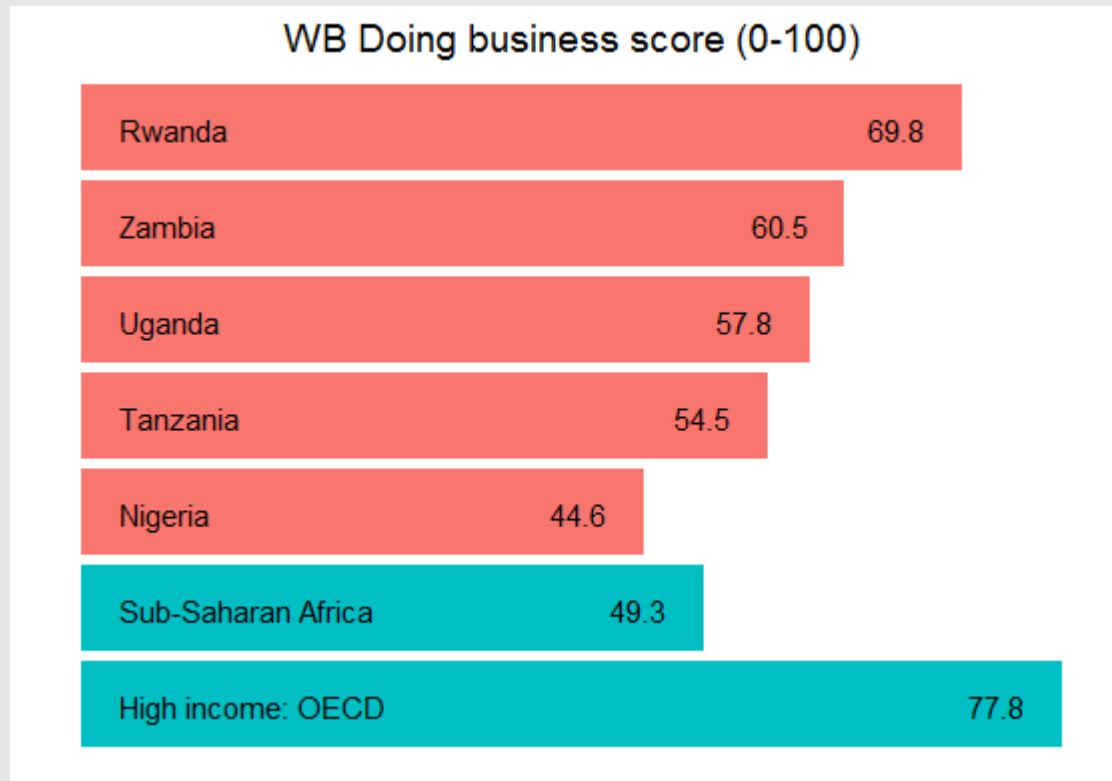
5. How easy is it to do business?

Key Indicators and Data Sources:

- Cost/Time to Import Goods (World Bank Doing Business Index)
- Tax rates (World Bank Doing Business Index)
- HDI - Indicators of human capacity (Human Development Index)

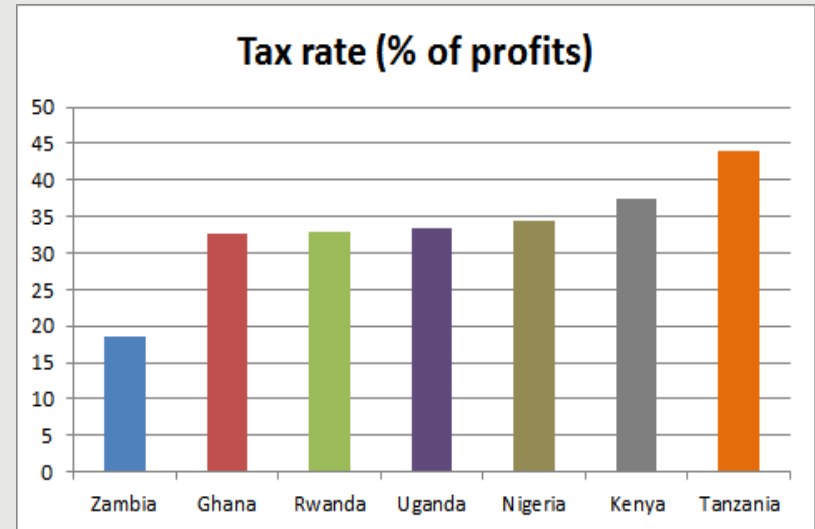
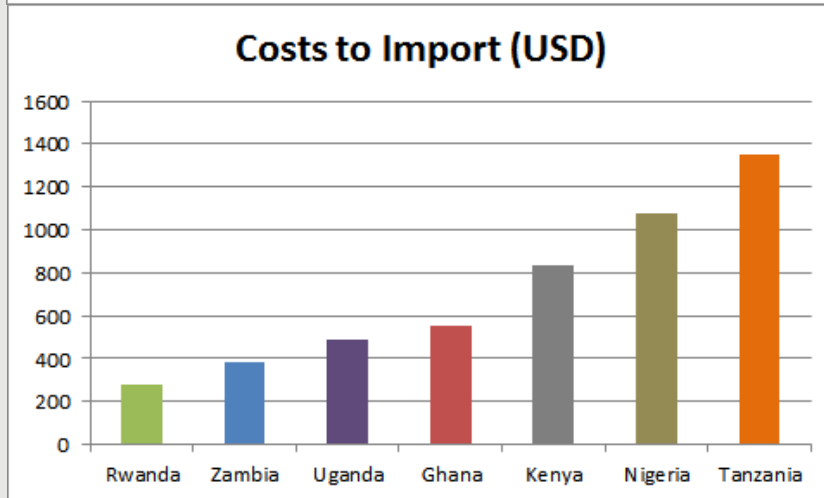
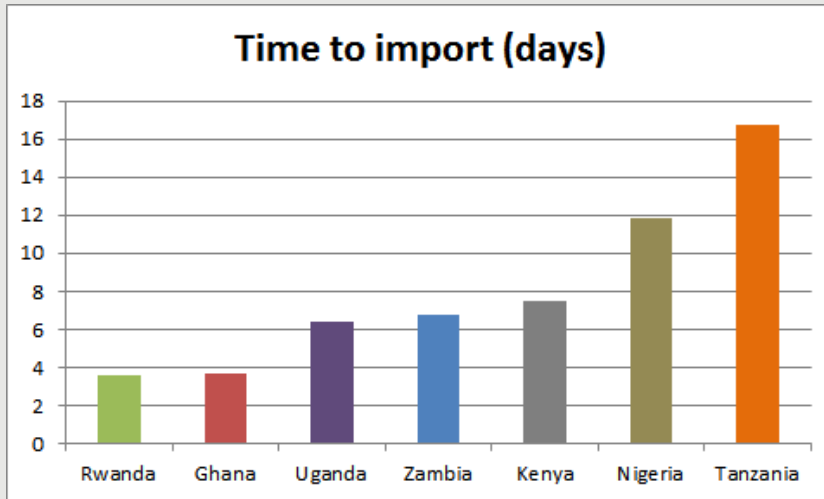


5. How easy is it to do business?



Data from [World Bank Doing Business Index](#)

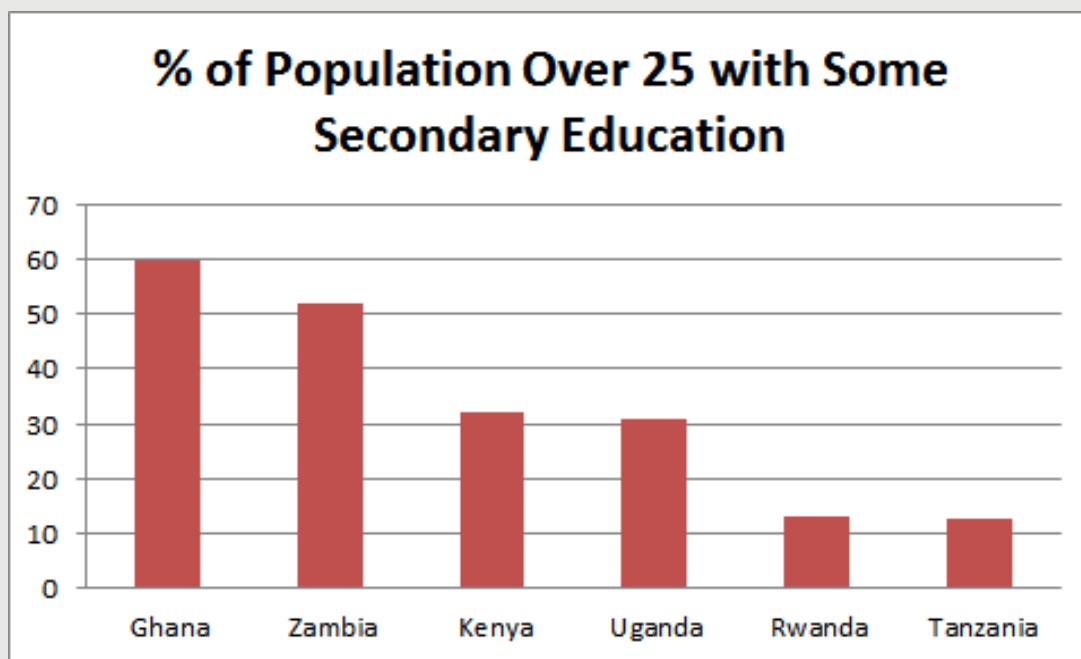
5. How easy is it to do business?



Data from [World Bank Doing Business Index, 2017](#)

5. How easy is it to do business?

Workforce Capacity



Other variables:

- Literacy rate
- Expected years of schooling
- Government expenditure on education (%GDP)
- Employment in services (as % of all employment)

Data from: Human Development Index (2015)

ADDITIONAL RESOURCES



Rapid Assessment Framework:

PAY-AS-YOU-GO SOLAR AS A DRIVER OF FINANCIAL INCLUSION

USAID Global Development Lab
Center for Digital Development
Strategy & Research
AUGUST 2017



www.digitaldevelopment.org

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Center for Digital Development
Strategy and Research Team



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ADDITIONAL RESOURCES

App to review countries side by side:

<https://ccjolley.shinyapps.io/payg-app/>