

# Mobile Payment Innovation for Sustainable Energy Access

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## Introduction



- *“Mobile is one of the world’s most potent development tools.”*  
(GSMA, 2015)



# Introduction

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- Emergence of new and innovative mobile payment mechanisms marks a breakthrough in pursuit of affordable and sustainable energy access.
- This paper explores:
  - Application of mobile payment mechanisms for decentralised off-grid renewable energy products services;
  - Critical success factors for the upscaling of effective mobile enabled payment models and;
  - Replication of successful Case Studies.



## Background and Context: The Sustainable Energy Access Imperative

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- Sustainable energy access is a Global Imperative highly prioritised on the global agenda.
- 2011 UN Secretary General Ban Ki-Moon initiated the Sustainable Energy for All global call to action.
- The United Nations General Assembly has declared 2014-2024 the Decade of Sustainable Energy for All.
- Universal access to modern energy services is one of the three key objectives of the Sustainable Energy for All global initiative.



## Distributed Off-grid Solar Products and Services

- ▶ Decentralised distributed solar stand-alone products and services- effective mechanism to energise un-electrified and under electrified households.
- ▶ These include pico-solar systems and solar home systems (SHSs).



Fig. 1. Pico-solar example-Greenlight Planet Eco Easy Buy™ - world's first Pay-as-you-go solar study light. (Source: Angaza Design)



Fig. 2. SHS example: The BBOXX 17 Kit - 50Wp panel (Source: BOXX)



## Distributed Off-grid Solar Products and Services

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- Pico- solar systems are:
  - Solar-electric products or systems;
  - Powered up using solar modules with power output range: 0.1 watt peak (Wp) up to 10-15 (Wp).
  - Includes lanterns and charging systems for powering additional small appliances;
  - Usually costs between \$10 and \$40.
- SHSs are:
  - A step-up from pico-solar systems -provide more comprehensive energy service;
  - Power output ranging from 20Wp to 150Wp;
  - Includes lighting and powering of range larger appliances (e.g. television & radio);
  - Smaller SHSs typically cost between \$300 and \$500.

# The Synergy Between Energy and Mobile

- Costs of purchasing off-grid solar systems - a barrier to entry.
- Many customers have difficulty financing off-grid solar systems through conventional consumer finance.
- Opportunity to leverage Mobile Money payment platforms to enable accessible and convenient payment for energy products and services.
- Innovative mobile-enabled payment business models can make off-grid energy products and services more affordable.



# The Opportunity-Leveraging the Power of Mobile for Energy Access in Africa

- Mobile phone penetration surpassed electrification rate in Sub-Saharan Africa.

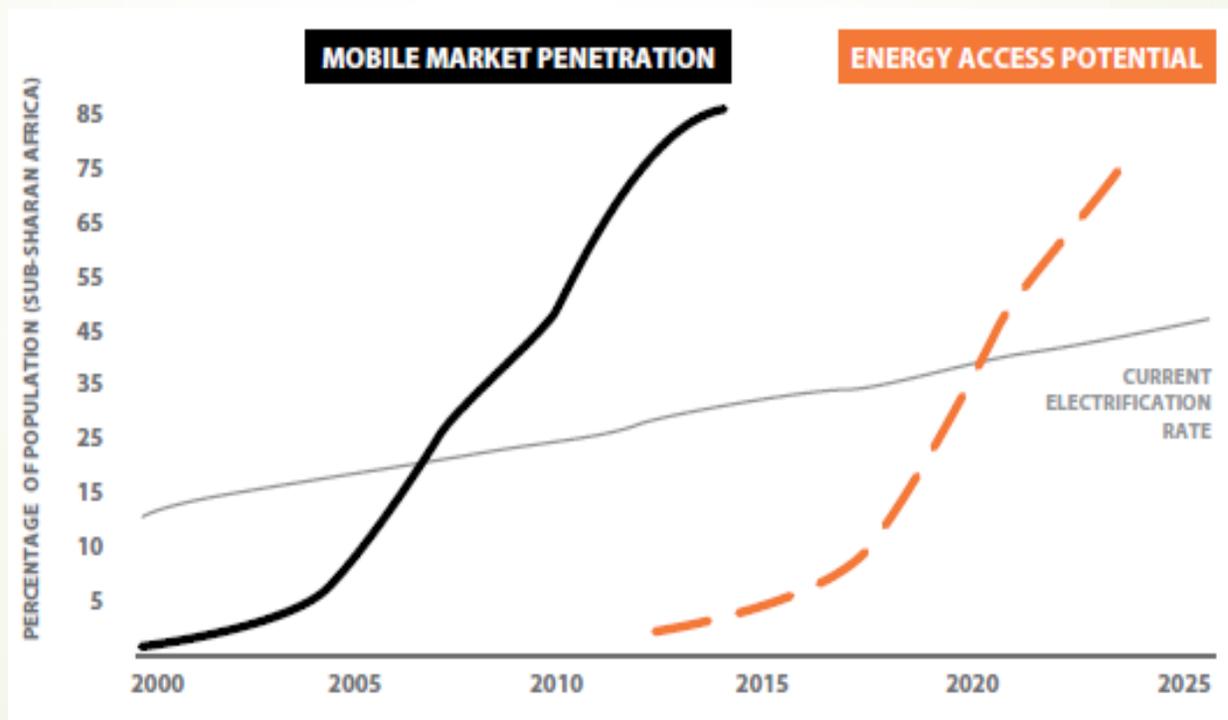


Fig. 1. Mobile Penetration in Sub-Saharan Africa-(Source: Power for All, 2014)



## The Opportunity-Leveraging the Power of Mobile for Energy Access in Africa



**MID 2013**

**400 million** unique mobile phone subscribers in Africa. More than 135 million of those subscribers are off-grid.



Within Sub-Saharan Africa more than **360 million** people have mobile network coverage, but don't have access to electricity.



Within Sub-Saharan Africa **42.4 Million** people have active mobile money accounts.



## Emergent Business Models: PAYG Innovation

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- Innovation is key in unlocking the untapped potential of Mobile Applications for energy access.
- In Africa innovative Pay-As-You-Go (PAYG) business models developed by various businesses, East Africa-Kenya, Tanzania and Uganda.
- Two models that are currently being used are “lease to own” and “energy as a service”.





## Emergent Business Models: PAYG Innovation

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- The “lease to own” model is:
- An alternative micro-financing solution where businesses provide in-house credit to the customer to finance SHSs.
- Customer makes initial payment to unlock and utilise the SHS and subsequent incremental payments towards the purchase of the SHS.
- Businesses including M-KOPA in Kenya and Uganda and Mobisol in Tanzania and Rwanda use this model.



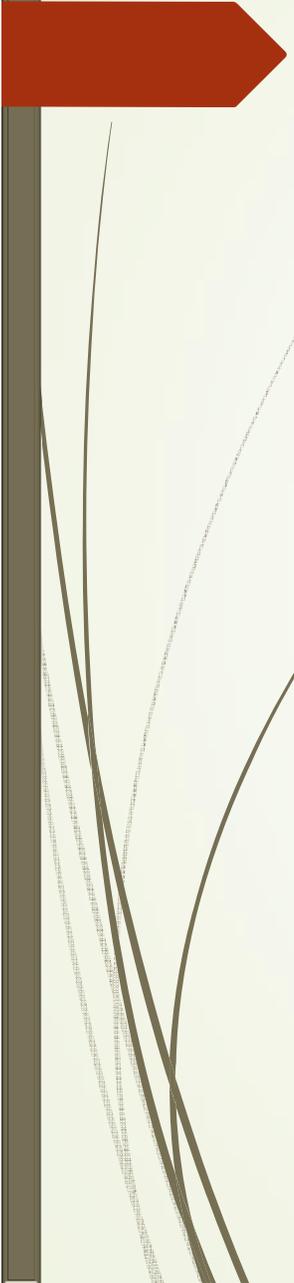


## Emergent Business Models: PAYG Innovation

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- The “energy as a service” or “fee-for-service” model:
- Provides an ongoing energy service, where the energy service business retains ownership of the SHS, charges a once-off installation fee and a recurring fee for the purchase of energy.
- This model is used by several African businesses, including Off-Grid Electric in Tanzania and Econet Solar in Zimbabwe, Lesotho and Burundi.





Business	Geographic Footprint	Distribution Model	Payment Type
M-KOPA	Kenya, Uganda	Partnership with Safaricom	Lease to own- Mobile Money Daily Fee
Mobisol	Tanzania, Rwanda	Own Distribution	Lease to own- Mobile Money Monthly Fee
Off Grid Electric	Tanzania	Own Distribution	Energy as a service- Mobile Money Daily Fee
Azuri Technologies	Kenya, Uganda, Tanzania, Ethiopia, Rwanda, Ghana, South Sudan	Partnership with Solar Aid Sunny Money	Lease to own- Scratch Cards or e-payment
Angaza Design	Kenya, Tanzania	Partnership with Solar Aid Sunny Money and Own Distribution	Lease to own- Scratch cards or mobile payment daily fee
Econet Solar	Zimbabwe, Lesotho, Burundi	Partnership with Econet Wireless	Energy as a service- Airtime Billing Daily Fee
Fenix International	Uganda	Partnership with MTN Uganda	Lease to Own- Mobile Money - Daily Fee

Source: (GSMA 2014)

## Emergent Business Models: PAYG Innovation

- ▶ Two key mobile applications that enable the PAYG model are the Mobile Money interface and the use of remote monitoring and payment through machine-to-machine (M2M) connectivity.
- ▶ Mobile Money can extend money transfer and convenient payment services to the unbanked, thereby presenting an opportunity to catalyse financial inclusion.





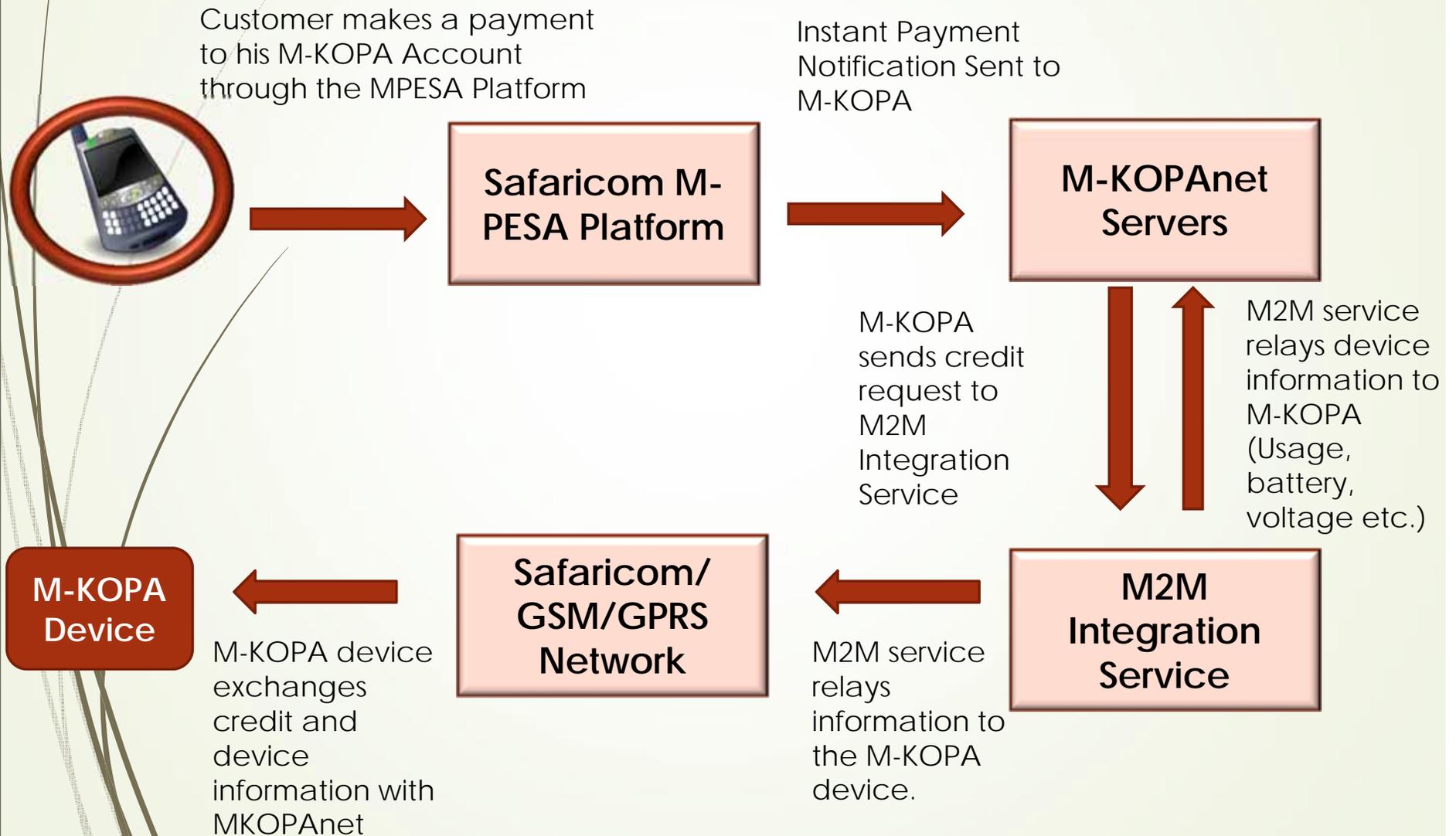
## Emergent Business Models: PAYG Innovation

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- M2M connectivity enables remote monitoring of energy usage and payments for energy services.
- Low cost GSM enabled smart metres allows energy service providers access in Real Time data : energy consumption, battery charging and discharging, and the frequency of customer payments.
- Data can subsequently be analysed to identify patterns in recharging and energy usage.



# Emergent Business Models: PAYG Innovation: Example-M-KOPA



# Challenges with Mobile Enabled Business Models

- Understanding Customer End-Use Needs.
- Gaining Customer Confidence and buy-in.

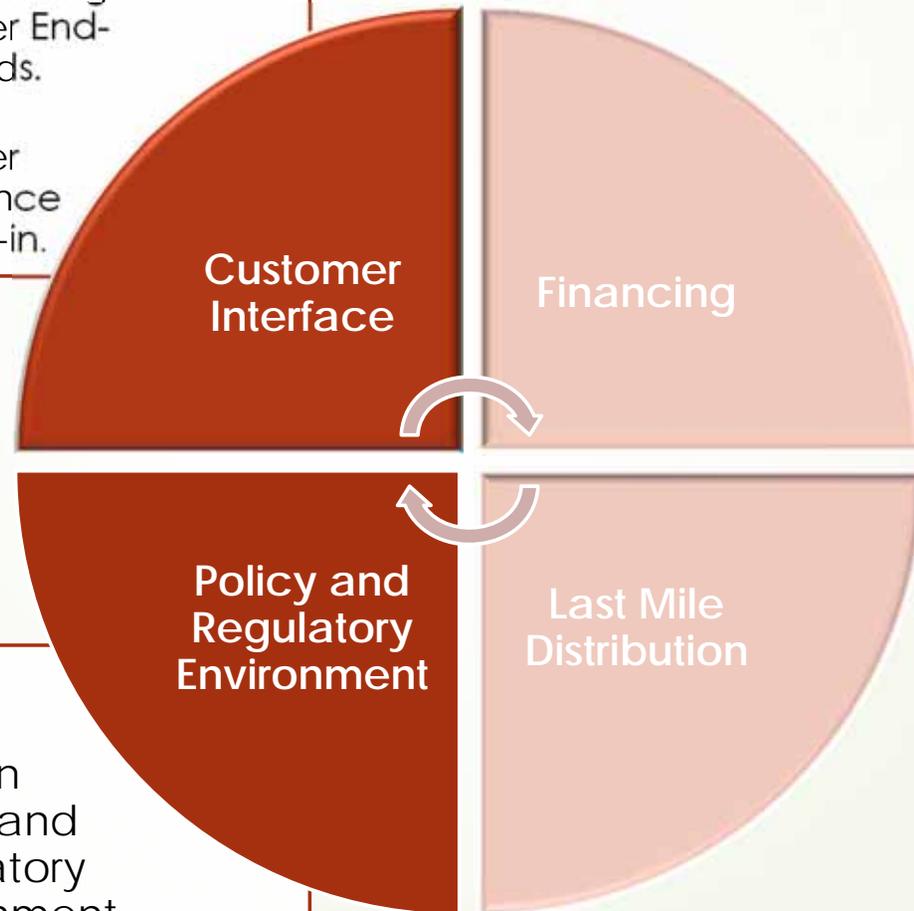
Customer Interface

Financing

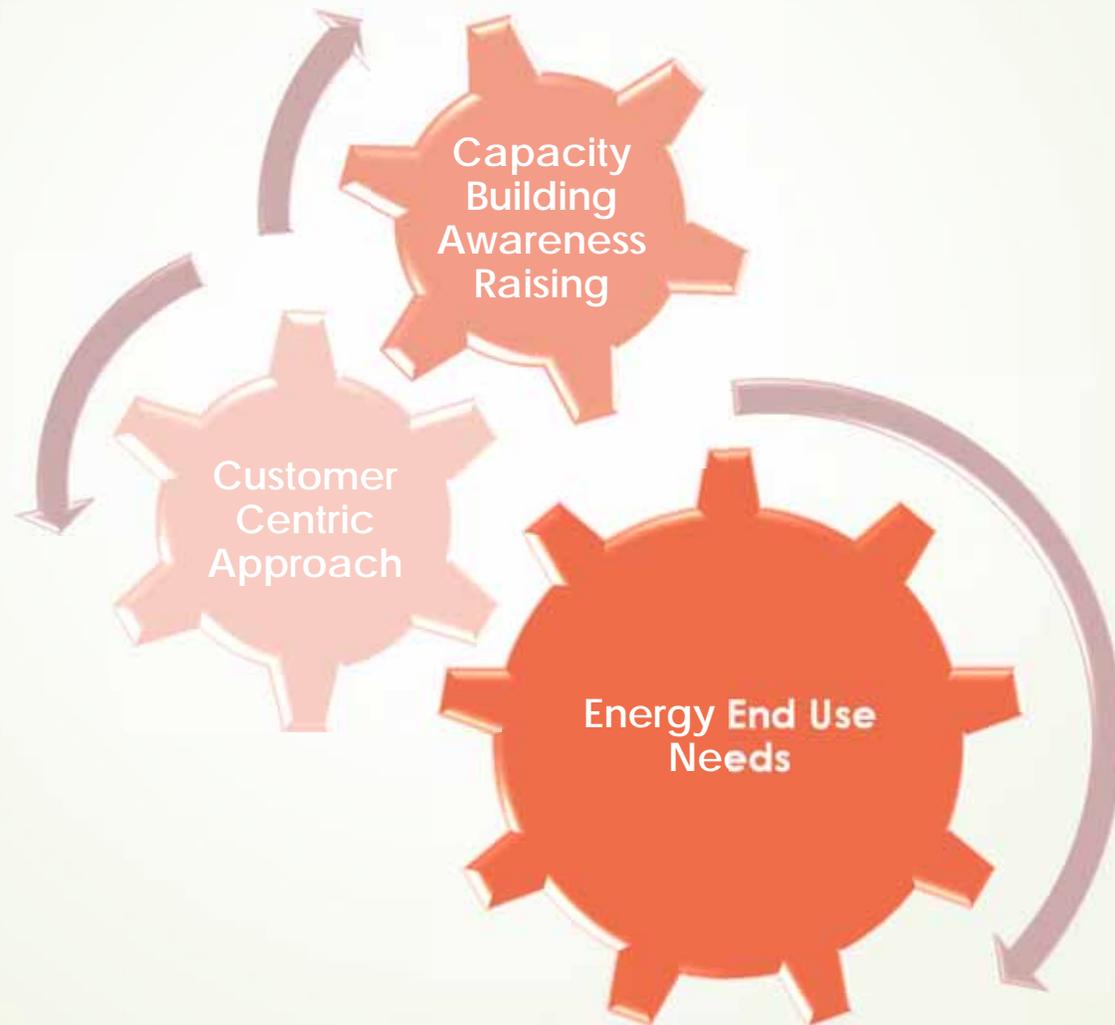
Policy and Regulatory Environment

Last Mile Distribution

- Gaps in Policy and Regulatory Environment.



## Enabling Factors: Awareness Raising and Capacity Building





## Enabling Factors: Policy and Regulatory Environment

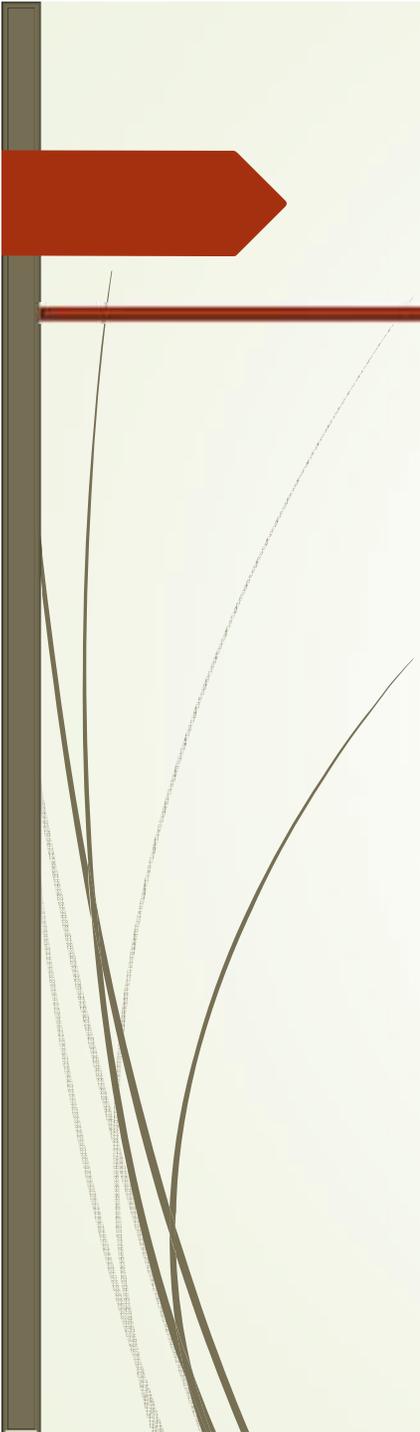
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- ▶ Success of the PAYG business model: dependent on an enabling policy and regulatory environment.
  - ▶ Policy and Regulation on Decentralised Off-Grid Renewable Products and Services;
  - ▶ Mobile Money Regulation:
    - ▶ Licensing;
    - ▶ Protection of customers' money;
    - ▶ Procedural due diligence on the customer and
    - ▶ Outsourcing to distribution agents.

## Potential Application for a South African Market

- ▶ Factors that make South African market conducive for Mobile-Energy Synergy:
  - ▶ High mobile phone penetration rate;
  - ▶ Growth of mobile money.
- ▶ Within Sub Saharan Africa, SA one of the highest unique subscriber penetration rates - most developed markets as nearly half of Sub Saharan Africa's mobile virtual network operators are in South Africa.





## Potential Application for a South African Market

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- Potential for existing energy service businesses to revisit their business models to incorporate a mobile payment interface and partner with mobile network operators.
- Example: incorporating mobile payment and M2M technology in the Rural Electrification Concession Programme could overcome challenges (e.g. long distances between customers and rural energy stores and maintenance problems) by
- Offering a convenient payment option and identifying maintenance problems through M2M capabilities.



## Conclusion

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- Opportunity for innovative mobile enabled business models to facilitate improved uptake of distributed off-grid solar products and services in South Africa.
- However, there are various challenges and changing a well-established business model could prove cumbersome, and requires a strategic shift.
- Ultimately, such a decision should be driven by:
  - the feasibility and sustainability of the business and
  - by the value-add to the customer in terms of improving affordability and accessibility in energy service provision.
- Finally an opportunity for Entrepreneurs and Innovators to develop new innovative models.

Thank You

