Mobile Payment Innovation for Sustainable Energy Access

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Whitney Pailman, Wikus Kruger and Dr Gisela Prasad
Energy Research Centre
University of Cape Town
Presented by: Whitney Pailman
Introduction

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

- 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

- 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

- **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)
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

- 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

- 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

- 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.
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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

- 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

Customer makes a payment to his M-KOPA Account through the MPESA Platform

Instant Payment Notification Sent to M-KOPA

M-KOPA sends credit request to M2M Integration Service

M2M service relays device information to M-KOPA (Usage, battery, voltage etc.)

M-KOPA device exchanges credit and device information with MKOPAnet

Safaricom/ GSM/ GPRS Network

M2M service relays information to the M-KOPA device.

Safaricom M-PESA Platform

M-KOPA Device

M-KOPAnet Servers

M2M Integration Service
Challenges with Mobile Enabled Business Models

- Understanding Customer End-Use Needs.
- Gaining Customer Confidence and buy-in.
- Gaps in Policy and Regulatory Environment.

Customer Interface

Financing

Policy and Regulatory Environment

Last Mile Distribution
Enabling Factors:
Awareness Raising and Capacity Building

- Energy End Use Needs
- Capacity Building
- Awareness Raising
- Customer Centric Approach
Enabling Factors: Policy and Regulatory Environment

- 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

- 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

- 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