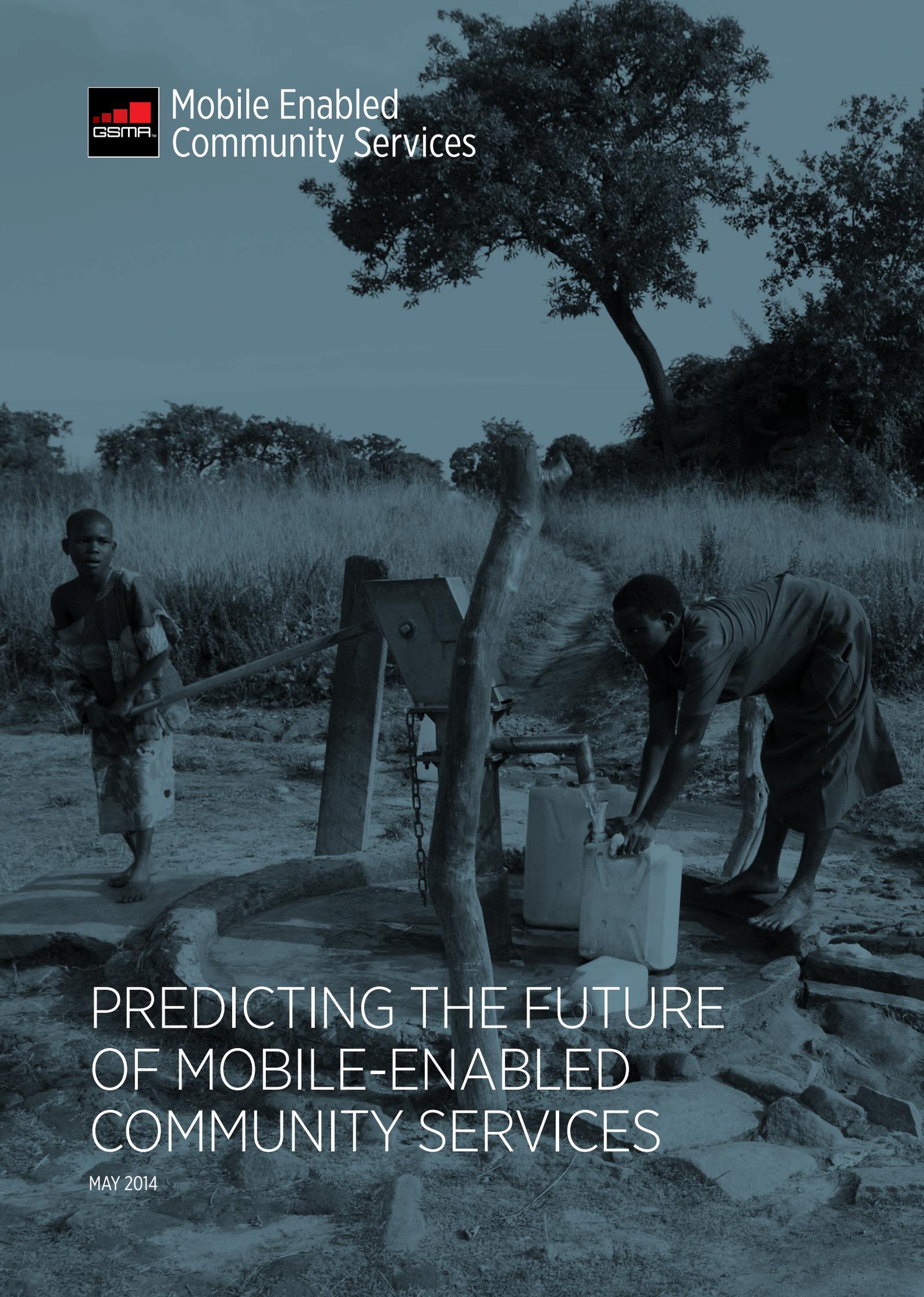




# Mobile Enabled Community Services



## PREDICTING THE FUTURE OF MOBILE-ENABLED COMMUNITY SERVICES

MAY 2014



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## Acknowledgements

The GSMA Mobile Enabled Community Services team would like to express their sincere appreciation to the UK Government's support of the programme and specifically to the team within the UK Department for International Development (DFID)'s Climate and Environment Research and Evidence Division.

## Disclaimer

This report is based on data collected through the MECS Innovation Grant Fund process, including Concept Notes and Applications, and MECS internal analysis. The data does not provide a complete picture of all activity that is occurring at the intersection of the mobile, energy and water access sectors. Furthermore, it is important to recognise that the data points (Concept Notes and Applications) are biased, as they were direct responses to the MECS Innovation Grant Fund process that had very specific criteria. That being said, the data does provide interesting insights that help to paint a picture of the direction of the industry.

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## Meet the Team



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# Welcome Note

In 2013, we launched the Mobile Enabled Community Services (MECS) Programme with the support of the UK Government. The purpose of the programme is to accelerate the efforts that use mobile technology and infrastructure to support increased and improved access to energy and water services in emerging markets.

Our 2013 Annual Report shares key insights and themes drawing upon a year of work, research and convening. This year's report focusses on the wealth of information and insights about the growth of the sector that was derived through the launch of the MECS Innovation Grant Fund. While the 13 grants awarded will result in learnings we will be able to present next year, the insights derived from analysing the pipeline of Concept Notes and Applications provide us with a look into the future of mobile-enabled energy and water services.

## Water becomes part of our scope

With our funding support, we have been able to include water as a sector focus of the Programme. While the use of mobile to support services is similar for both energy and water, the nature of the challenges are different. Our experience in 2013 has emphasised the need to think differently about the water sector and has reminded us of the need to adapt our support and efforts to the maturity of the sector.

## The Market is growing

In December 2013, we published "SIZING THE OPPORTUNITY OF MOBILE TO SUPPORT ENERGY AND WATER ACCESS"<sup>1</sup>, a detailed report presenting our methodology and results to calculating the market size for mobile-enabled water and energy services. Compared to our previous estimates on addressable markets (2011-12), this new data shows that the slow growth of energy and water access (between 1% and 2% per year for energy)<sup>2</sup> compared to the rapid expansion of GSM mobile networks (approx. 11% per year) mainly in rural locations, has widened the existing gap between access to mobile and access to utility services.

We also expect to see other drivers increase the market for mobile enabled community services in both rural and urban settings, with increased adaptation of solutions across these settings. Such drivers include continuing urbanisation alongside rapid economic growth in emerging markets, as well as decreasing technology costs.

## Interest in the sector is global

We were surprised that in the short six months since the launch of the MECS Innovation Grant Fund, we received a total of 187 Concept Notes from 35 countries. Our £2.4M fund was 12 times oversubscribed with applicants requesting a total of £29M in grants. This demand highlights the strong interest in leveraging mobile technology to support basic infrastructure service delivery to underserved communities.

1. <http://www.gsma.com/mobilefordevelopment/sizing-the-opportunity-of-mobile-to-support-energy-and-water-access>

2. International Energy Agency (IEA) 2012

## Partnerships with Mobile Operators are evolving

Beyond general sector trends, the analysis of Concept Notes also provides us with a look at the evolving nature of partnerships between service providers and mobile operators. Mobile operators are engaging in different types of partnerships which provide them the opportunity to develop light touch engagements with new partners as well as develop more integrated partnerships when the mobile operator has established trust with their partners.

## Service over technology still prevails

In our 2012 report we presented the notion that service prevails over technology: while technology underpins the business models we see, ultimately it is the quality of the service to the customer that creates successful business models. This theme is still consistent in 2013 with the models and ideas that were presented as part of the MECS Innovation Grant Fund.

## Funding Gaps remain

While the MECS Innovation Grants help to fill a funding void, there are still significant funding gaps for many worthwhile business models and innovations that did not match the specific criteria for the Seed or Market Validation grants. For example, many Concept Notes did not have a strong enough mobile channel to meet the objectives of the Fund. Others proposed pre-Seed stage ideas or requested funding to support scaling of existing mobile-enabled business models, yet without the required partnership with mobile operators for Market Validation grants.

## Looking ahead...

2014 will largely be spent focussed on supporting our grantees and working with them to extract and share learnings that can help shape and drive the mobile-enabled energy and water sectors. Our research and advisory work will continue to focus on quantifying the opportunity for mobile operators and other stakeholders to participate in mobile-enabled energy and water services. We look forward to continuing our role as market facilitators, working with our mobile operator members, tower companies, entrepreneurs, NGOs, academics, donors and investors to support our work.

This Annual Report presents:

- High level findings from the MECS Innovation Fund Concept Note Pipeline
- Details on emerging trends in business models
- An assessment of partnerships between third party companies and mobile operators
- Insights into sector funding gaps and our market development activities
- A supplement focussed on the role of mobile payments to support mobile-enabled community services

We would like to thank you for taking the time to read the report and, as always, welcome any comments or feedback you may have.

Regards,



**Mary Roach**

Programme Operations Manager

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# Introduction to the Mobile Enabled Community Services Programme

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**L** launched in 2013 with the support of the UK Government, the Mobile Enabled Community Services Programme (MECS) focusses on market facilitation to deliver the evidence, champions and trials required to drive solutions to the next phase of maturity. The Programme provides grant funding on competitive terms to support innovation and business models that leverage mobile technology and infrastructure for community services.

The Programme seeks to:

1. Raise awareness through knowledge sharing and convening, publication of case studies and business case development
2. Partner with mobile network operators and tower companies to conduct feasibility studies and establish trials
3. Seed the growth of and share learnings that support the sector via the MECS Innovation Grant Fund
4. Develop relationships with private investors and work with them to address the issues that limit crowding-in of further grant funding and follow-on commercial funding, to support the growth of the industry

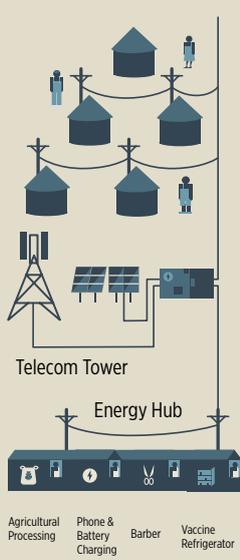
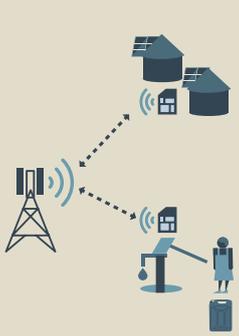
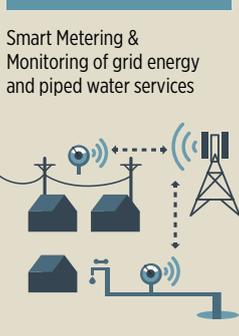
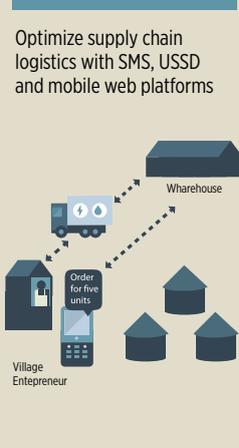
## How the Mobile Industry Can Enhance Access to Energy & Water

Based on the current footprint and maturity of the mobile industry, the MECS Programme has identified five channels that can support better access to energy and water:

1. **Mobile Infrastructure** – Leveraging the presence of telecom towers in off-grid environments to support rural electrification efforts
2. **Mobile Operator’s Distribution & Mobile Money Agent Networks** – Leveraging the distribution reach and brand of mobile operators to reach underserved customers
3. **Machine-to-Machine Connectivity** – Enabling the remote monitoring and Pay-As-You-Go capacity of decentralized utility systems
4. **Mobile Payments** – Providing flexible, convenient and secure mobile-enabled payment solutions to low income populations
5. **Mobile Services (Voice, SMS, USSD, Applications)** – Leveraging increased mobile phone ownership to collect/disseminate critical information on utility services and/or supply chain management

Figure 1 illustrates the five mobile channels that can be used to enhance access to energy and water.

**FIGURE 1**  
**MOBILE CHANNELS THAT SUPPORT MOBILE-ENABLED COMMUNITY SERVICES**

MOBILE INFRASTRUCTURE	MOBILE OPERATOR'S DISTRIBUTION NETWORK & MOBILE MONEY AGENTS	MACHINE-TO-MACHINE CONNECTIVITY	MOBILE PAYMENTS	MOBILE SERVICES
<p>The Telecom Tower acts as the anchor load for the energy system providing power for consumptive and productive use to surrounding communities via a minigrid and/or energy hub model.</p> <p>The energy can be supplied by a third party Energy Service Company (ESCO) who manages these two demands.</p>	<p>The extensive footprint of Mobile Operator's Distribution Channels and Mobile Money Agent Networks can be leveraged to reach underserved customers and distribute energy and water solutions.</p>	<p>Smart metering and monitoring over GSM networks of decentralised utility systems can improve their lifetime and efficiency, and trigger more responsive maintenance and repair. It can also enable remote on/off control of services for customers on a Pay-As-You-Go arrangement.</p>	<p>Mobile Payments (Mobile Money Services, SMS Payments, Airtime) and Mobile Savings are enabling the development of Pay-As-You-Go models and other innovative financing schemes providing affordable energy and water solutions to low income populations.</p>	<p>Mobile Services (Voice, SMS, USSD, Applications) can be used by communities, village agents, and service providers to report service delivery status, improve field force operations, optimize supply chain, or provide customer support.</p>
<p><b>Minigrid</b></p>  <p>Telecom Tower</p> <p>Energy Hub</p> <p>Agricultural Processing Phone &amp; Battery Charging Barber Vaccine Refrigerator</p>	<p><b>Distribution Network Sales</b></p>  <p>Mobile Agent's Kiosk</p>	<p><b>Solar Home System Metering &amp; Monitoring</b></p>  <p><b>Communal Water Systems (Hand pumps, Water Kiosks) Metering &amp; Monitoring</b></p>  <p><b>Smart Metering &amp; Monitoring of grid energy and piped water services</b></p>	<p><b>Mobile payments for energy and water products and services</b></p>  <p>Account Paid</p>	<p><b>Two-way communication platform to collect &amp; disseminate critical utility systems information</b></p>  <p><b>Optimize supply chain logistics with SMS, USSD and mobile web platforms</b></p>  <p>Village Entrepreneur</p> <p>Warehouse</p> <p>Order for five units</p>

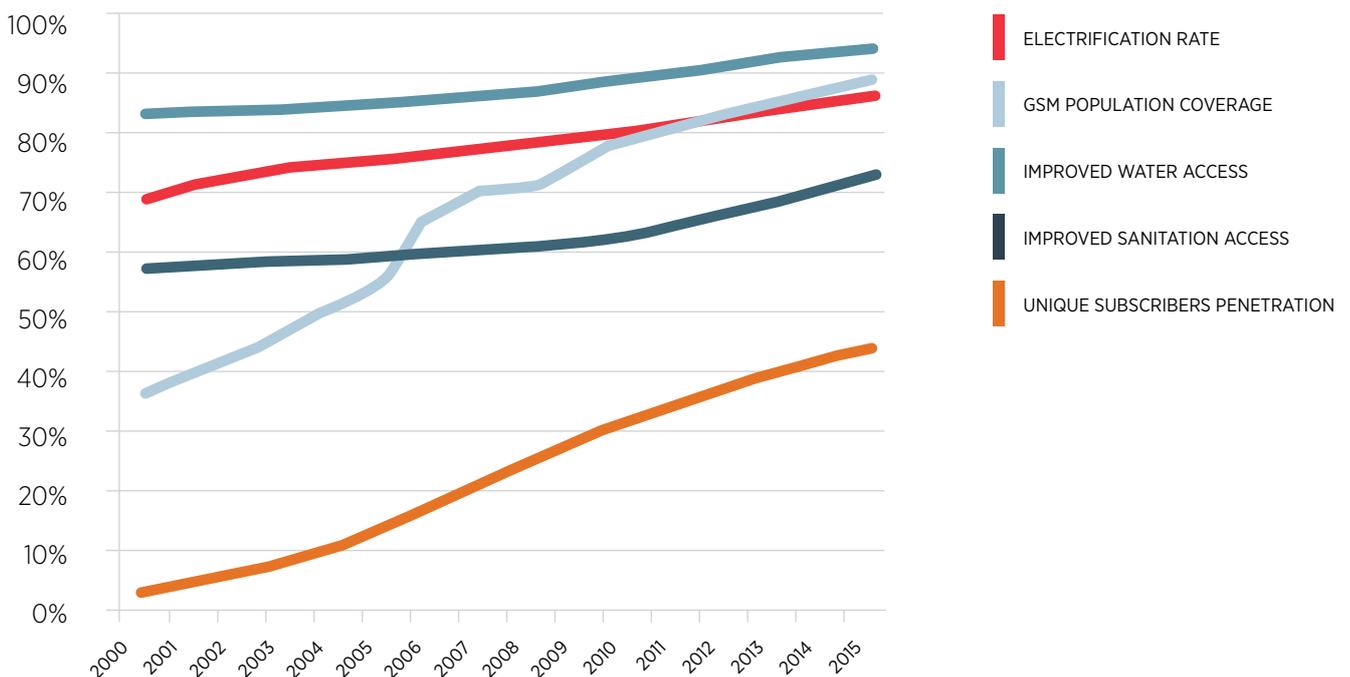
# The Market Size for Mobile-Enabled Community Services

**M**obile connectivity has grown beyond the reach of the electricity grid and piped water networks in most emerging markets, widening the gap that exists between access to mobile and access to utility services, especially for underserved populations. With GSM coverage reaching up to 84% of the population living in developing countries, the size and the reach of the mobile industry, its distribution channels, mobile payments and infrastructure offers innovative pathways to achieve reliable energy access and improved water access for underserved communities.

The key findings from our report, “SIZING THE OPPORTUNITY OF MOBILE TO SUPPORT ENERGY AND WATER ACCESS”<sup>3</sup> include:

- The total addressable market for mobile-enabled energy access is more than 643 million people in 2013 or 53% of the global population without access to electricity but covered by GSM networks (approximately 1.2 billion people) (Figure 3).
- The total addressable market for mobile-enabled water access is estimated at approximately 262 million people in 2013 or 34% of the global population without access to improved water sources but covered by GSM networks (approximately 780 million people) (Figure 4).

FIGURE 2  
**EVOLUTION OF MOBILE COVERAGE AND SUBSCRIBER PENETRATION VS ACCESS TO ENERGY, WATER AND SANITATION (2000-2015)<sup>4</sup>**



3. <http://www.gsma.com/mobilefordevelopment/sizing-the-opportunity-of-mobile-to-support-energy-and-water-access>

4. Source: GSMA, IEA, UN data (with forecast up to 2015)

FIGURE 3  
**ENERGY ADDRESSABLE MARKET (MILLIONS OF PEOPLE)<sup>5</sup>**

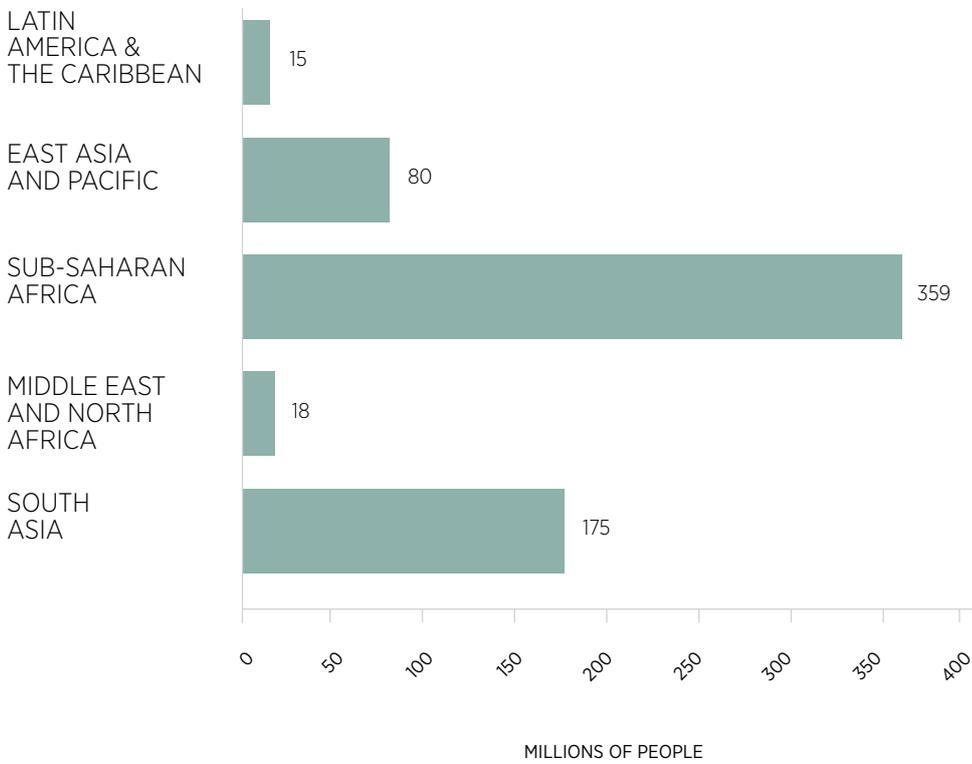
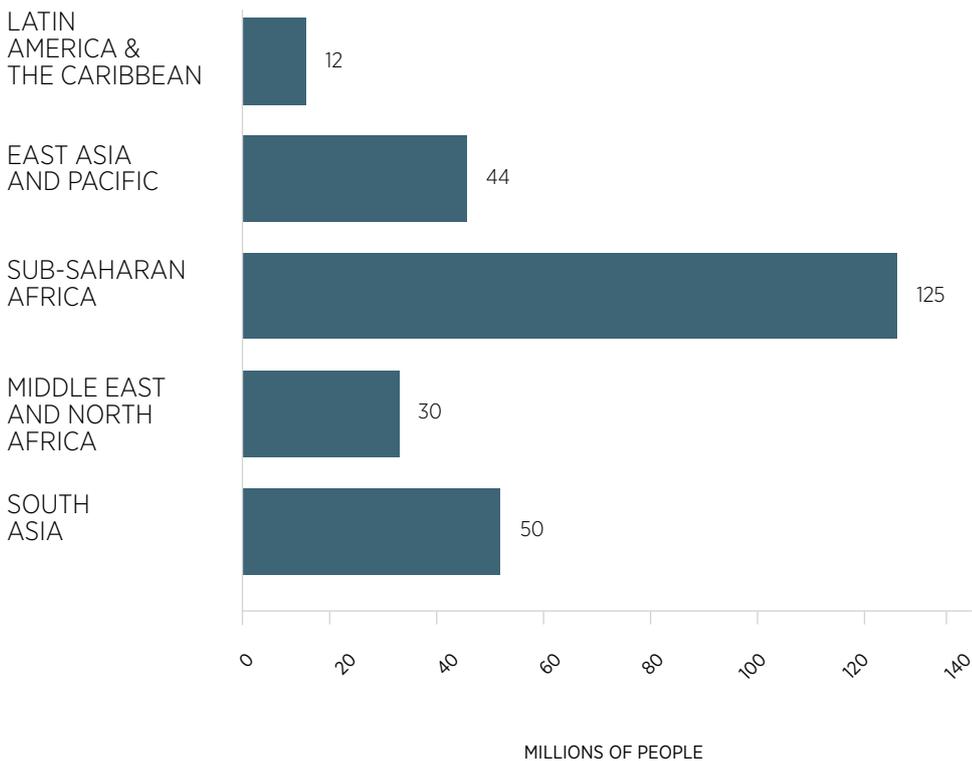


FIGURE 4  
**WATER ADDRESSABLE MARKET (MILLIONS OF PEOPLE)<sup>6</sup>**



5. Source: GSMA

6. Source: GSMA

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# The MECS Innovation Grant Fund

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**T**he MECS Innovation Grant Fund was created with GBP 2.4 million in funding from the UK Government to support the delivery of clean and reliable energy or water to underserved communities by applying mobile technology or infrastructure. The geographic focus was Sub-Saharan Africa and developing countries in Asia, although Grant Applications from other regions were considered.

The Innovation Fund Grants seek to address the following questions:

- What types of mobile technologies can support community services?
- For a solution to be adopted at scale, what building blocks are needed?
- What are the social and commercial impacts of delivering community services to rural mobile subscribers?

The lessons from these grants will be captured and shared with the wider industry via the production of publications and events.

## The Grant Application Process

Two grant types were created, the Seed grant and the Market Validation grant. Figure 5 describes the two grant streams.

A staged application process was used to select grantees. Applicants were first required to submit a three-page Concept Note and from these, shortlisted applicants were invited to submit a full Application. In both the Seed and Market Validation categories, future financial sustainability was considered as a factor in assessing the viability of the proposal. Grantees were selected by an independent panel of five industry experts.

## Outcomes

After two rounds of rigorous evaluation, 13 grants were awarded across 11 countries. Figure 6 maps the grantees. It is followed by a brief description of each grantee project.

FIGURE 5  
**DESCRIPTION OF INNOVATION FUND GRANT STREAMS**

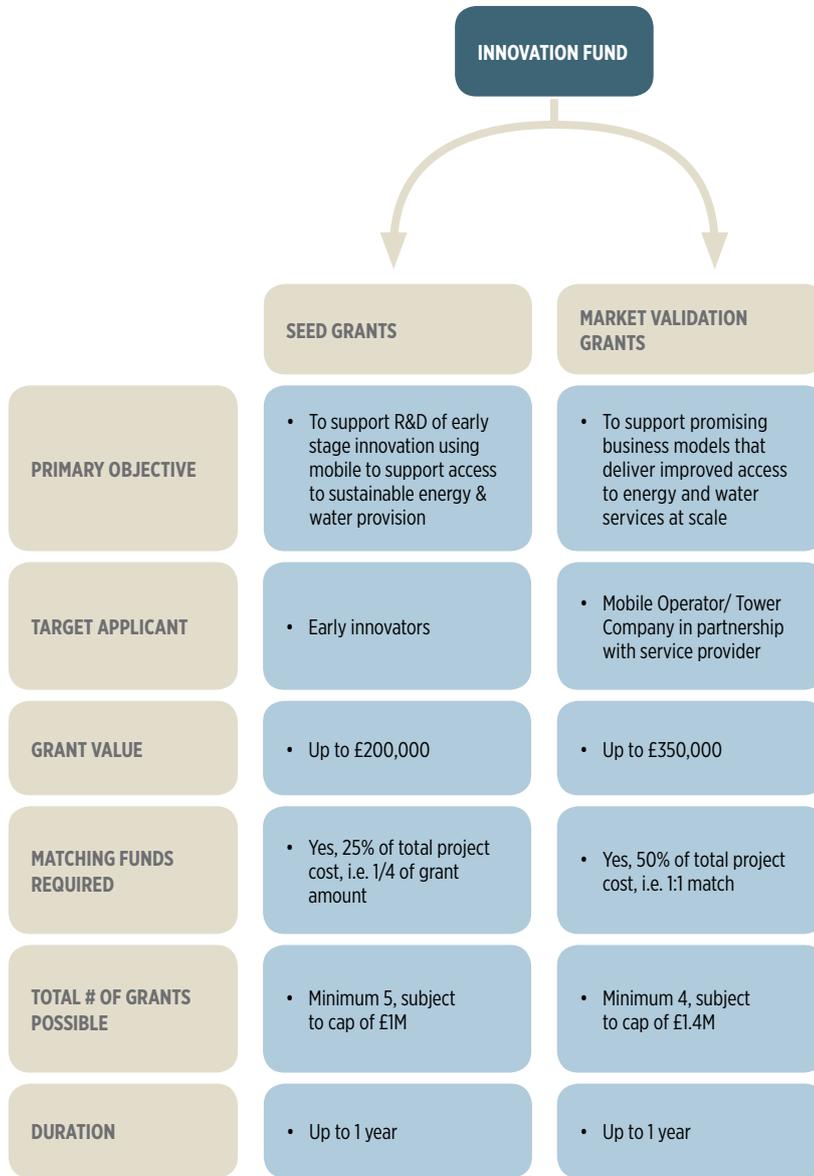
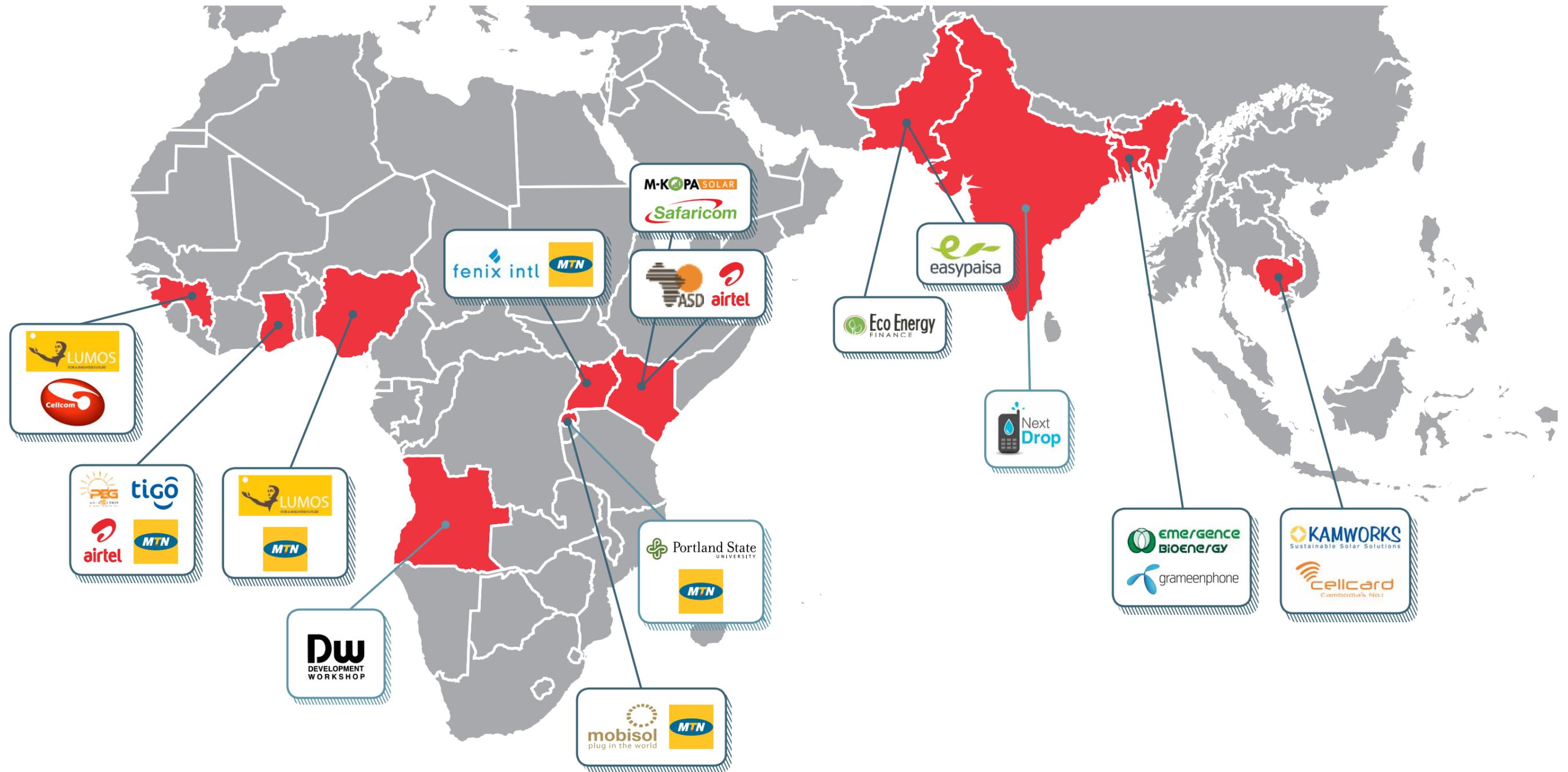


FIGURE 6  
THE GEOGRAPHICAL DISTRIBUTION OF MECS GRANTEES



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## MECS Innovation Fund Grantees

### **African Solar Designs – Kenya**

African Solar Designs, in partnership with Airtel Kenya, will provide renewable energy to power an Airtel base station and also electrify a nearby community through a mini-grid for businesses and an energy kiosk for households to access charging and solar products. This Seed grant will trial the Community Power from Mobile model (also known A-B-C telecom model), generating lessons about this business opportunity for a rural energy service company.

### **Development Workshop Angola and SeeSaw – Angola**

Development Workshop Angola, in partnership with SeeSaw, will trial a suite of mobile enabled tools to evaluate the effectiveness of peri-urban water delivery by the Provincial Directorate for Water and Energy in Huambo (Direcção Provincial de Energia e Águas do Huambo- DPEAH). The Seed grant will test the use of mobile technology to report service delivery issues in informal settlements and whether the suggested business model of field level generated data is valuable enough that local organisations self-finance the system beyond the pilot stage.

### **Easypaisa – Pakistan**

Easypaisa, a joint venture of Telenor Pakistan and Tameer Bank, will introduce an affordable, solar energy service to low income groups through an Islamic leasing model. This Seed grant will help Easypaisa to validate the business case for its unique offering and test its credit scoring methodology for the SME and Microfinance segments.

### **Eco Energy Finance (EEF) – Pakistan**

EcoEnergy Finance (EEF), in partnership with Karachi Relief Trust, will test the sale of high-quality solar products that leverage pay-to-own and UBL Omni's mobile money service. This Seed grant will explore whether providing such solar equipment increases the adoption of clean energy solutions and ability to collect payments.

### **Emergence BioEnergy (EBI) – Bangladesh**

Emergence BioEnergy (EBI), in partnership with Grameenphone and BRAC, will test EBI's Stirling generator to produce electricity from agricultural waste for telecom towers and surrounding communities. This Seed grant will trial reliable power generation by small-scale biogas plants and test the supply chain.

### **Fenix International – Uganda**

Fenix International, in partnership with MTN Uganda, will scale their new lease-to-own product, the ReadyPay Solar Power System, to enable powering of lights, phone, radios and other appliances. This Market Validation grant will test the introduction of ReadyPay home and business products through joint marketing and distribution with MTN.

### **Kamworks – Cambodia**

Kamworks Limited, in partnership with WING, a mobile money operator, and CamGSM (through its CellCard brand) will test rental services for solar home systems in Cambodia. The Seed grant will help trial the technology, test the value proposition and study payment behaviour in the Cambodian market.

### **M-KOPA – Kenya**

M-KOPA, in partnership with Safaricom, will introduce a new Pay-As-You-Go solar product to the Kenyan market targeted at small entrepreneurs. This Market Validation grant tests whether the repayment behaviours of the target customers are strong enough to support further credit-based energy financing for small and medium enterprises.

**Mobisol – Rwanda**

Mobisol, in partnership with MTN Rwanda, will test the introduction of prepaid solar home systems into a new market, Rwanda, using MTN Mobile Money for the repayment of monthly instalments. The Market Validation grant seeks to trial the acceptance of prepaid solar products by entrepreneurs in Rwanda, who base their business case on the productive use of these products. The impact on mobile money adoption and airtime usage will also be monitored.

**NextDrop – India**

NextDrop intends to build and trial a Water Information System for the Bangalore Water Supply and Sewerage Board (BWSSB) to track, monitor and validate water distribution timings, frequency or duration in real time via mobile phones. The system will be based on two-way communications between BWSSB and city residents. This Seed grant will test whether real-time information improves the reliability of water supply and ensures equitable distribution.

**Nova Lumos – Guinea and Nigeria**

Nova Lumos will partner with MTN Nigeria and Cellcom Guinée to launch a new Pay-As-You-Go solar product via mobile operators' airtime. In this Seed grant, large and modular solar home systems are targeted to home and small business users. Lessons will be generated about customer demand and pricing in these markets and benefits to mobile operators associated with a more significant role.

**Persistent Energy Ghana – Ghana**

Persistent Energy Ghana, in partnership with Tigo, Airtel and MTN, will provide prepaid solar energy services to six villages in Ghana using solar micro-grid and solar home systems. Both technologies have already been tested and are being used in Tanzania. This Market Validation grant will test the possibility of scaling an energy service business in a new market more quickly by applying proven, third party technologies.

**Portland State and Living Water International – Rwanda**

Portland State University, working in partnership with Living Water International (LWI), and with support from MTN Rwanda and the Government of Rwanda, will conduct a national level roll out of Machine-to-Machine enabled cellular reporting sensors on LWI managed hand pumps. This Seed grant will study if sensors are able to improve the cost effectiveness of delivering water through reducing operational downtime across hand pump programs.

# Part 1: Analysis of the Innovation Fund - A Pipeline of Opportunities

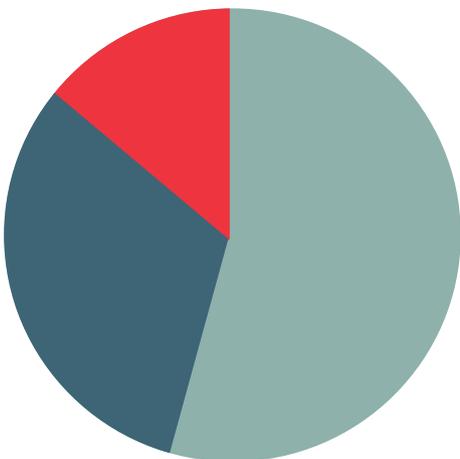
BY RAHUL SHAH, ASIA PROJECT MANAGER

In response to our request for Concept Notes for the MECS Innovation Grant Fund, we received a total of 187 Concept Notes in the first and second rounds. Of these 187, 20 Concept Notes received during the second round were virtual duplicates of those received in the first. Thus, we received 167 distinct Concept Notes from 150 different organizations in 35 countries. The response greatly surpassed our expectations and indicates the interest in the mobile-enabled energy and water ecosystem (Figure 7).

FIGURE 7  
**THE MECS INNOVATION GRANT FUND FUNNEL**

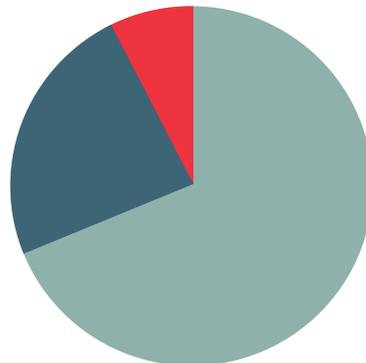
167 CONCEPT NOTES

ASIA 65  
AFRICA 89  
LATIN AMERICA 7  
OTHER 6



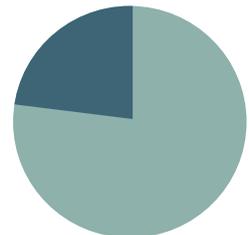
46 APPLICATIONS

ASIA 19  
AFRICA 24  
LATIN AMERICA 3



13 GRANTS

ASIA 5  
AFRICA 8



WATER
  ENERGY
  ENERGY + WATER

Each Concept Note was analysed across several dimensions (Figure 8) to identify key trends that point to the direction of the mobile-enabled energy and water industry.

This analysis revealed several trends in regional and sectoral distribution, business models, value propositions, use of digital currencies, and partnerships. The following are the key trends from the analysis of the Innovation Grant Fund Funnel.

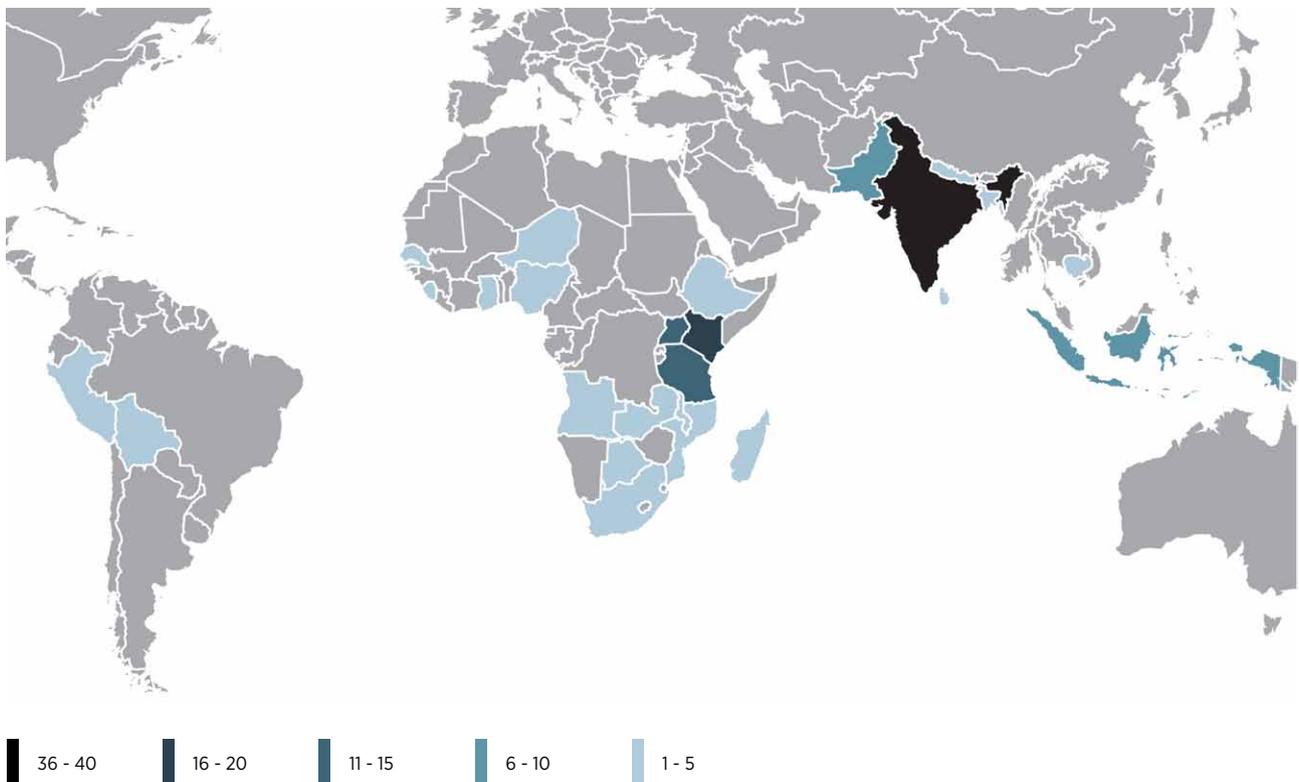
FIGURE 8  
**DIMENSIONS OF ANALYSIS**



## Africa dominates in terms of activity

Concept Notes were received from three continents and 35 countries. From a regional perspective, Africa dominated in terms of number of entries with just over half (53%) of the total entries. East Africa was the most prolific sub-region with just over one third of entries, closely followed by South Asia. From a country perspective, India was the most active country. These trends largely follow the addressable market size where Africa has the largest addressable market on a regional level with 484 million people without energy or improved water sources but living in the presence of the mobile network. Similarly, from a country perspective India has the largest addressable market for mobile-enabled services, of nearly 101 million people. The map below shows the activity in terms of Concept Notes received. Despite not actively marketing the Innovation Fund in Latin America, we received seven Concept Notes from the region indicating an untapped potential to support the region more deliberately.

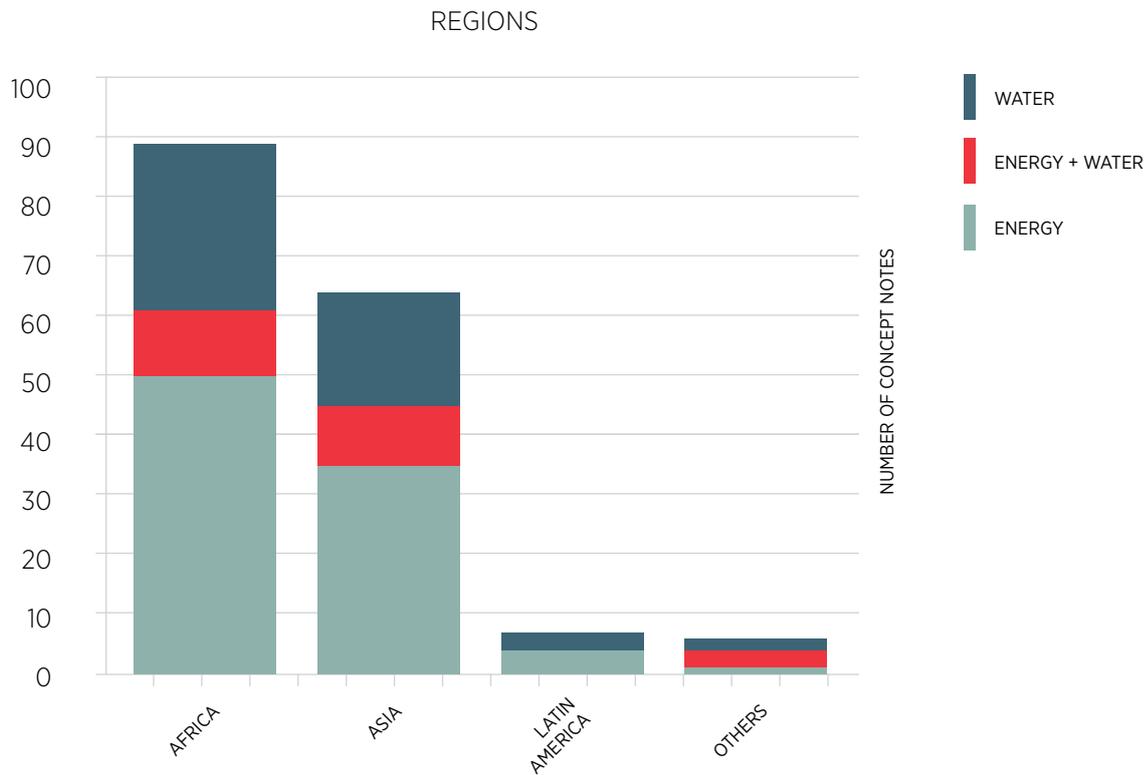
FIGURE 9  
**DISTRIBUTION OF CONCEPT NOTES BY COUNTRY**



## Energy leads water in the adoption of mobile

A majority of ideas (54%) proposed energy-only offerings followed by 31% water-only offerings, and 14% hybrid energy-and-water offerings. Whereas East Africa led South Asia overall, South Asia submitted a marginally higher number of energy-related Concept Notes. Figure 10 shows the sectoral distribution.

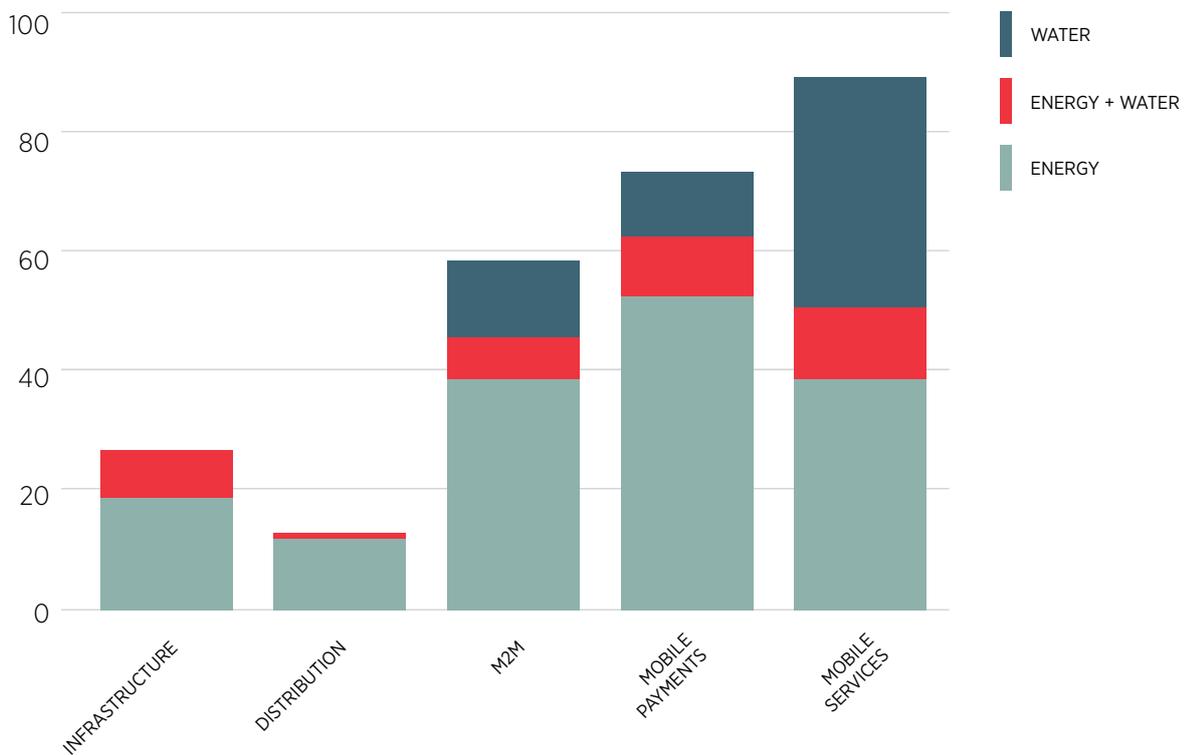
FIGURE 10  
**CONCEPT NOTES BY REGION AND SECTOR**



## Mobile Services were the most predominant mobile channel

Organisations can leverage five mobile channels to deliver mobile-enabled community services: infrastructure, distribution through mobile operators, Machine-to-Machine technology (M2M), mobile payments and mobile services. When we analysed Concept Notes along these dimensions, we found that mobile services (54%) was the most popular, followed by mobile payments (44%) and M2M technology (35%). See Figure 11 for distribution of mobile channels proposed in Concept Notes.

FIGURE 11  
**DISTRIBUTION OF MOBILE CHANNELS PROPOSED IN CONCEPT NOTES**



## Mobile will impact underserved communities from rural to urban settings

Underserved communities in rural and urban settings face very different challenges in access to energy and clean water. Rural underserved communities generally lack access to safe, affordable, convenient and healthy water and energy sources. Urban underserved communities grapple with intermittent energy and water supplies, and often pay a high price to buy small quantities, especially of water. Mobile can help address many of the challenges in rural and urban settings. However, the solutions proposed for rural and urban settings were markedly different.

Many ideas in the water sector came from technology providers that proposed making existing water service providers more efficient. On breaking down the urban Concept Notes by sector, we found seven of 10 were in the water domain, indicating that urban water services represent an important opportunity for service improvements via mobile.

## Pay-As-You-Go financial flexibility is popular

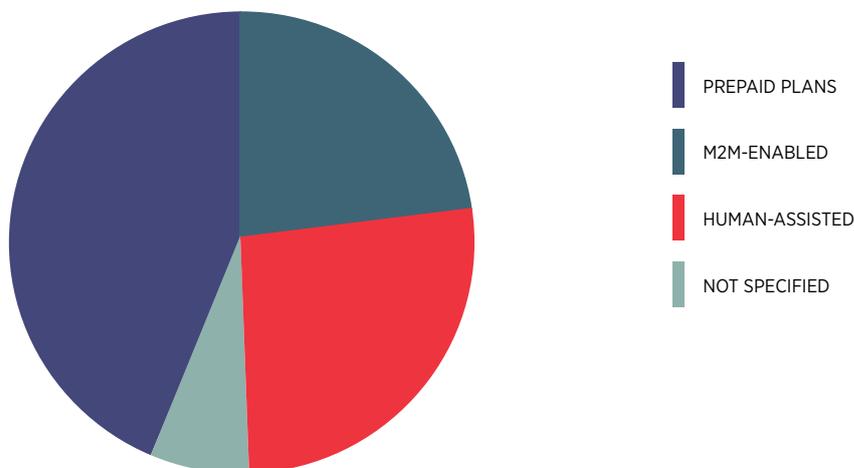
The need to match consumers’ spending on energy or water services to their variable income streams was demonstrated by the popularity of Pay-As-You-Go (PAYG) solutions for energy products or services and water services. Mobile channels support two primary aspects of PAYG Business Models: payment collection and credit/information transfer. Nearly 55% of all Concept Notes proposed a PAYG model for financial flexibility; of these, two-thirds suggested mobile payments and half leveraged mobile communications to transfer credit to an energy or water device.

From a technical perspective, broadly speaking, there are two modes to transfer credit to a PAYG device: M2M-enabled and human-assisted. With M2M-enabled PAYG, credit is transferred automatically to the device (usually over the mobile network) once the user makes a payment. Human-assisted PAYG can take several forms: the user enters a code into the device; uses a mobile phone (for example, over the phone’s Bluetooth interface) or another portable device to transfer credit; etc. Human-assisted PAYG is cheaper because it does not require a GSM module and SIM, or an ongoing service plan for the device. Therefore it does not require reliable mobile network coverage at the point of installation. More importantly, it does not allow for remote monitoring so collecting data on system performance and customer usage requires a visit to the customer home.

Of all Concept Notes offering PAYG, 23% proposed M2M-enabled credit transfer and 26% proposed human-assisted credit transfer. Despite advances in technology, 44% of Concept Notes did not propose to leverage mobile communications to support credit transfer, upload system diagnostics or intelligently monitor consumption. Instead, they offered a prepaid plan for a promised service level. The prepaid method generally requires periodic collection of fees using mobile money or cash. Using a person to collect cash poses a challenge to scalability. It is more prone to error, delayed deposits of fees leading to increased working capital requirements, etc. As hardware and service plan costs decrease, we expect more organisations to adopt technology to offer PAYG. Figure 12 shows the proposed adoption of credit transfer modes in the 91 applicable Concept Notes.

Another key trend we observed was that solar equipment capacity stretched to both ends of the scale. While only one organisation proposed a sub-watt, low-end solar lantern with short term financing, several organizations proposed “entre-prise”<sup>7</sup> class solar systems that offered an income generation opportunity. The risks associated with these expensive systems are higher for both buyer and seller. So the flexibility and control offered by PAYG technology becomes even more important for these systems. Financial flexibility with PAYG is further discussed in Part 2.

FIGURE 12  
**CREDIT TRANSFER MODES TO SUPPORT FINANCIAL FLEXIBILITY**



7. We define a new term – “entre-prise” class systems – to refer to systems designed to create entrepreneurial opportunities. For example, an entrepreneur can use a 50W solar system to offer phone charging services.

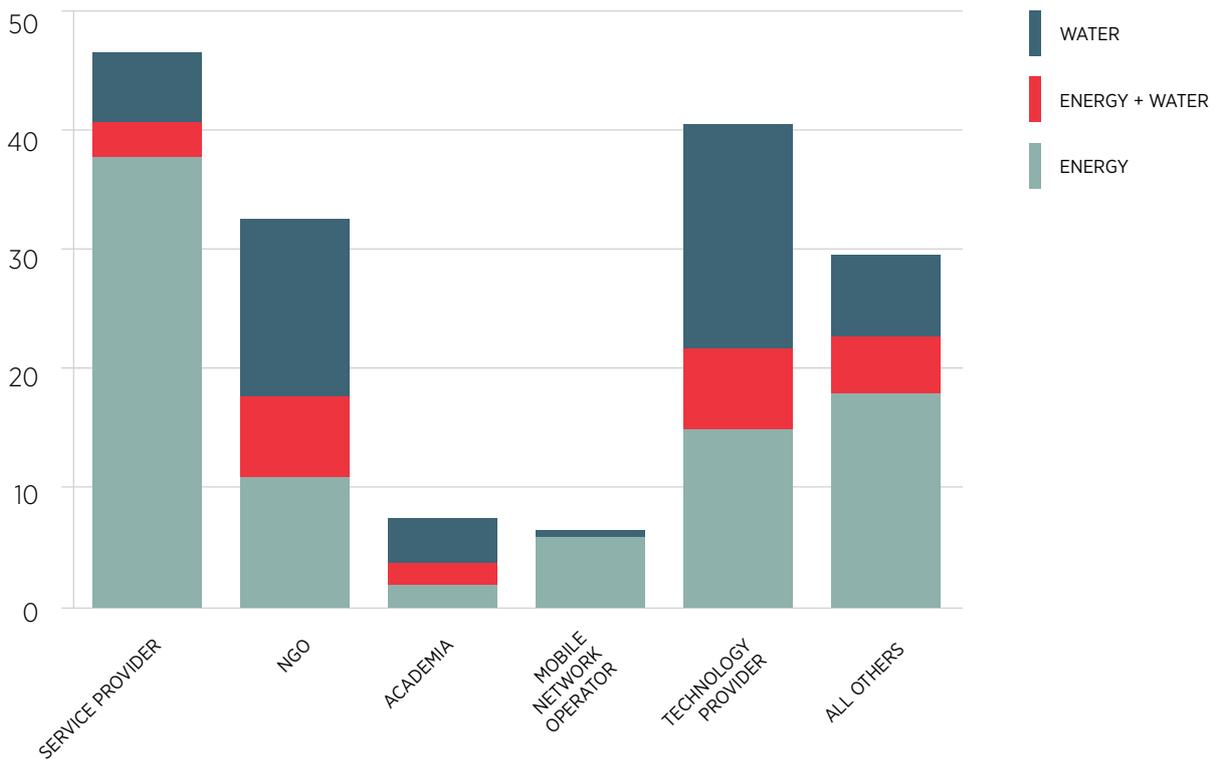
## Mobile payment options have become very popular

The method proposed for consumer payments indicates just how popular mobile payment options are becoming. Of the 124 Concept Notes that would collect payment from consumers, more than 60% proposed using mobile-related payment options: mobile money, airtime, other (loyalty points) or a combination. The Supplement in this report provides more details on these types of payments.

## Insights into Lead Organisation

When we analysed the lead organisation in Concept Notes across sectors, we saw very interesting trends that differentiate energy and water. Figure 13 shows that among energy-only Concept Notes, 42% were led by energy service providers. In the water-only Concept Notes, 36% were led by water technology providers and another 36% by academia and NGOs. Service providers led barely 10% of the water-only Concept Notes. Most technology providers were in the concept development stage, implying that they were defining and creating solutions rather than water service providers driving the solutions. The fact that service providers did not participate more actively in water-only Concept Notes may mean that they are less aware of the capabilities of mobile in the water sector.

FIGURE 13  
**LEAD ORGANISATION BY SECTOR**

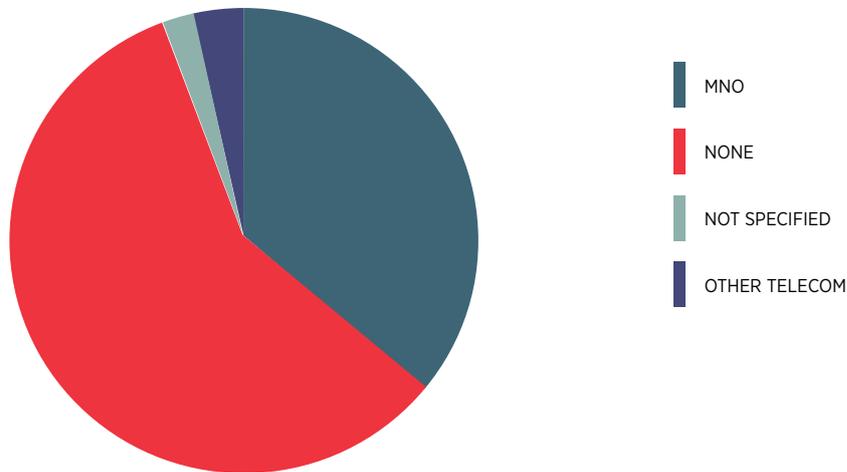


## Partnerships with mobile operators span a spectrum of engagement

Just over a third of the Concept Notes listed a mobile network operator as a partner, while an additional 4% of Concept Notes proposed partnerships with other telecom players including tower companies, telecom O&M services providers, and mobile money operators. Figure 14 illustrates the distribution of telecom partnerships proposed at this stage.

As part of the full Application, applicants were required to submit a Partnership Plan. The Partnership Plans reveal that mobile operators can engage in partnerships by sharing a variety of assets. The assets shared, and the types of partnerships formed, span a spectrum which is discussed in detail in Part 3.

FIGURE 14  
**PROPOSED TELECOM PARTNERSHIPS AT CONCEPT NOTE STAGE**



## Key statistics about MECS Innovation Fund Grantees:

- All four Market Validation grantees and four of the nine Seed grantees were from Africa. The remaining Seed Grants were awarded in Asia.
- At the Concept Note stage, 36% of proposals involved a partnership with an MNO while 77% of awarded grantees have partnerships with MNOs.
- Two Seed grants, one each in Africa and Asia, were awarded to organisations trialling the Community Power from Mobile model leveraging the tower infrastructure of mobile operators.
- Nine of the 10 energy grantees offered financial flexibility with PAYG.
- All three grantees in the water sector proposed the government as a future paying customer.
- Nine of the 13 grantees offered an income generation opportunity for customers.

# Part 2: Trends in Mobile-Enabled Business Models

BY ILANA COHEN, AFRICA PROJECT MANAGER

**K**ey trends are emerging in the business models for mobile-enabled water and energy services. These are driven by the limitations of traditional service delivery which have left market segments untapped. In this light, business model trends strongly reflect regional variations, different sector challenges and initiatives, and the maturity of mobile ecosystems. These trends underpin two primary insights:

1. **Energy:** Pay-As-You-Go (PAYG) business models are very popular, with many variations reflecting regional differences, uses of mobile-based currency, growing energy demands and cultural contexts.
2. **Water:** Promising examples of mobile solutions for water service delivery exist, with opportunities to accelerate learning and expansion of these models.

## Energy Models: Predominance of Pay-As-You-Go

Of the 167 Concept Notes, 91 proposed energy-only products and services. Of these, 78% included at least one PAYG business model.

Focusing on this large group, the key emerging trends include:

1. Wide variation exists in PAYG energy business models
2. Business models reflect regional and cultural contexts
3. Mobile money is the payment currency of choice
4. M2M-enabled equipment can inform business model refinement
5. Growing consumer energy demands

### Variation in PAYG Energy Business Models

Mobile-enabled PAYG energy business models vary by the mechanism through which energy is delivered to customers, the payment structure and the collection method. The four general models observed are as follows:

TABLE 1  
**PAYG BUSINESS MODEL DESCRIPTION**

PAYG BUSINESS MODEL	DESCRIPTION	POTENTIAL MOBILE CHANNELS
<b>RENTAL OF CHARGED ENERGY DEVICES</b>	The rental of charged lanterns or batteries where customers pay by the charge or on a subscription basis.	<ul style="list-style-type: none"> <li>• Mobile Money</li> <li>• Machine-to-Machine</li> <li>• Infrastructure</li> <li>• Mobile Services</li> </ul>
<b>MINI-GRIDS</b>	A decentralised energy grid serving a small number of households and businesses, for which customers pre-pay for electricity.	<ul style="list-style-type: none"> <li>• Mobile Money</li> <li>• Machine-to-Machine</li> <li>• Infrastructure</li> <li>• Mobile Services</li> </ul>
<b>FINANCED PURCHASE OF SOLAR HOME SYSTEM</b>	Solar Home Systems that customers start using immediately and pay for through instalments with the customer ultimately achieving asset ownership (models vary by the precise legal arrangement as to when ownership is achieved).	<ul style="list-style-type: none"> <li>• Mobile Money</li> <li>• Machine-to-Machine</li> <li>• Mobile Services</li> <li>• Distribution Channels</li> </ul>
<b>ENERGY AS A SERVICE FOR SOLAR HOME SYSTEM<sup>8</sup></b>	Solar Home System that customers use and pay for as a continual energy service, with no eventual customer ownership of equipment.	<ul style="list-style-type: none"> <li>• Mobile Money</li> <li>• Machine-to-Machine</li> <li>• Mobile Services</li> <li>• Distribution Channels</li> </ul>

An observed trend in Concept Notes was the combination of multiple PAYG business models offered by energy service providers. This likely reflects continued experimentation to identify the best PAYG models in new markets, as well as offering multiple energy service options (e.g. mini-grid plus rental of charged device) to match different consumer needs and thus tap into multiple market segments. Overall, this is a promising sign of the strengthening of these mobile-enabled energy services models.

The differences between the two Solar Home System models- financed purchase and energy as a service- are particularly interesting, where the technology may be identical, but the business model design differs, as described in the table below. There is debate about the benefits of one model over the other, yet the answer is largely dependent on context.

8. Solar Home System were the predominant energy technology proposed in Concept Notes, although certain organisations proposed selling home biogas solution

TABLE 2

**BUSINESS MODEL COMPARISON: FINANCED PURCHASE VS. 'ENERGY AS A SERVICE' FOR SOLAR HOME SYSTEM**

	HARDWARE	PAYMENT MODEL	OWNERSHIP	SERVICE SUPPORT
FINANCED PURCHASE	Individual infrastructure for households or businesses; different M2M technologies can be used to enable remote control of the unit	Various instalment arrangements and possible down payment, with eventual end to payments as outlined in the contract with customer	Customer eventually owns asset	Service and support may be provided, some offering additional service support after warranty period
ENERGY AS A SERVICE	Same as above	Continuous payments for life of service contract, with possible down payment initially	Service provider always maintains ownership of the asset	Service and support are key offering over the life of the contract

**THE COMMUNITY POWER FROM MOBILE MODEL IS STILL EMERGING**

Last year's Annual Report focused on the Community Power from Mobile model, which leverages mobile infrastructure as part of the business model. All of the Concept Notes received by the MECS Innovation Grant Fund to trial this model uses the rental of charged devices or mini-grids on a PAYG basis to serve customers. The number of Concept Notes received (16%) to trial this model suggests that interest exists, however with the limited trials that have occurred, most have failed to scale or attract wider investment. The challenge of this model is for a rural Energy Service Company (ESCO) to provide reliable energy to an off-grid base station as a secure revenue stream that balances potentially inconsistent revenue from households and businesses nearby. A bankable contract for providing power to the mobile industry supports the ESCO's financials, but high infrastructure costs mean the model has a long capital recovery period.

Two of 13 MECS Innovation Fund Grants will trial this model, and will contribute to the body of knowledge which further the understanding of the viability of community power from mobile.

African Solar Designs in Kenya will trial an ESCO model which serves an Airtel tower and several surrounding businesses through a solar array and grid connections, yet services households through an energy kiosk for household energy equipment.

Emergence BioEnergy Inc in Bangladesh will test two mini-grids which will be powered by biogas, supplying energy to Grameenphone's mobile towers and households and businesses.

Emergence BioEnergy Inc's model has two key aspects - the purchase of power by Grameenphone<sup>9</sup> as an anchor client and by the community to make the decentralised service sustainable, and farmers selling sufficient bio-waste to Emergence BioEnergy for power generation.

**Business models reflect regional and cultural contexts**

The four types of Energy PAYG business models show somewhat different continental and regional distribution according to different market contexts. At the local level, there is also variation, which in part reflects cultural preferences.

Figures 15 and 16 depict the distribution of models by regional and sub-regional levels. While mini-grids appear to be of equal interest in Asia and Africa, they dominate in South Asia. The greater number of mini-grids models in South Asia, compared to models for individual energy equipment, likely reflects the cost effectiveness of centrally connecting denser populations compared to Sub-Saharan Africa's more dispersed populations.

9. Grameenphone has piloted this model previously; <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/04/cpwhitepaper161211interactive2.pdf>

FIGURE 15  
**PAYG ENERGY MODELS PROPOSED IN ASIA AND AFRICA**

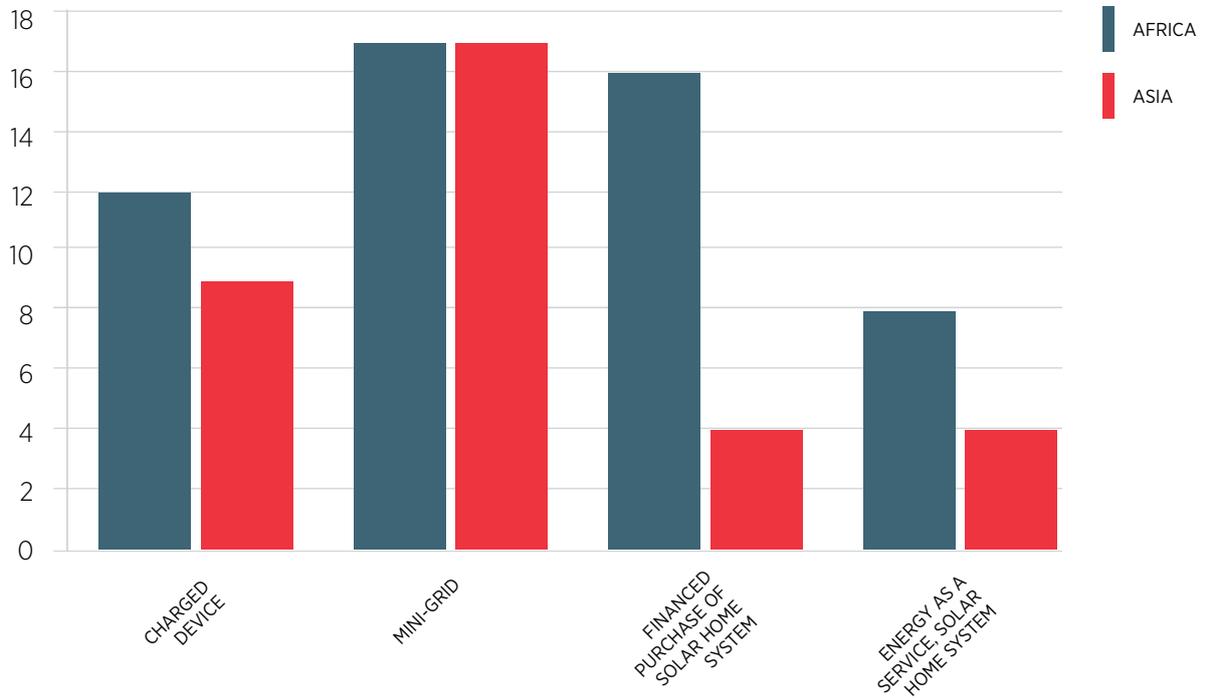
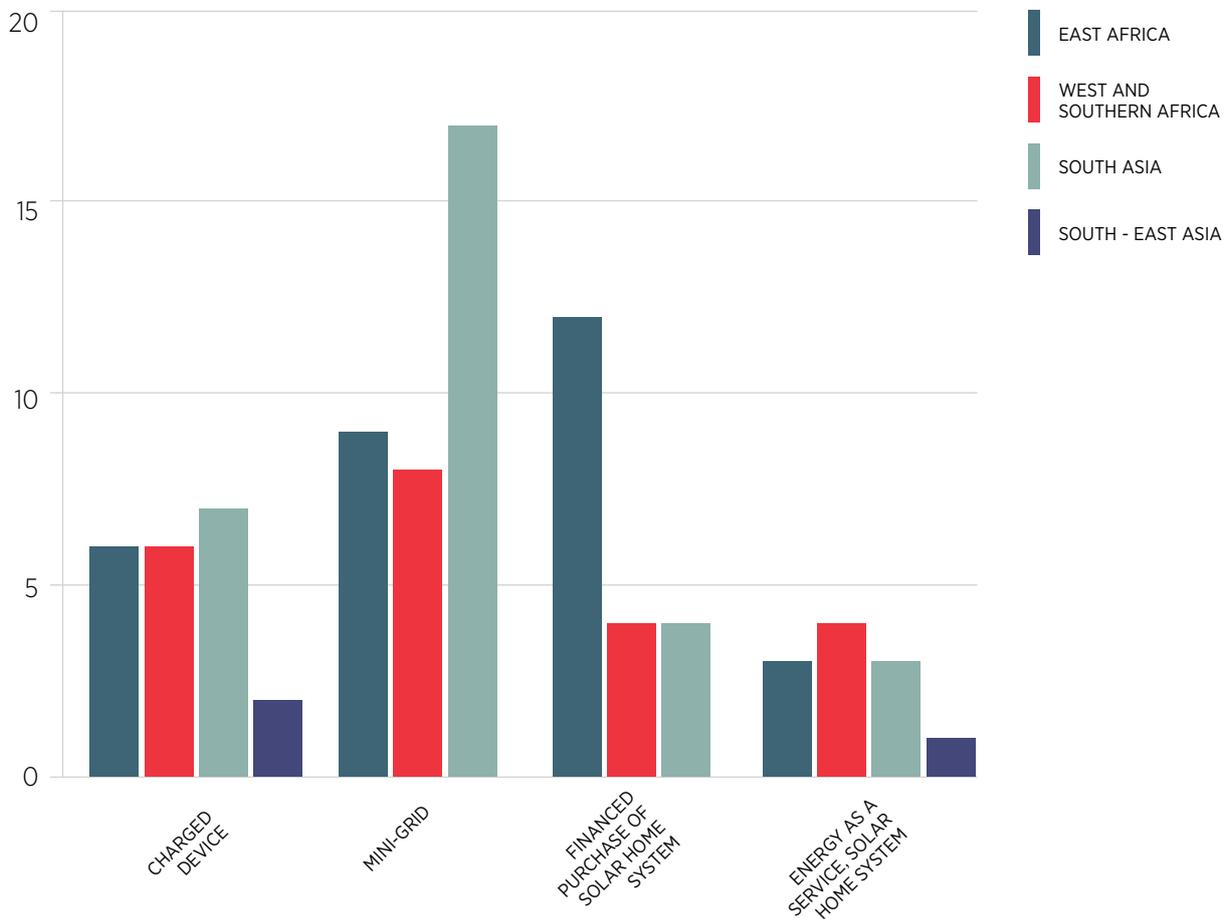


FIGURE 16  
**REGIONAL VARIATION IN PROPOSALS FOR DIFFERENT PAYG ENERGY MODELS**



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In contrast, there is likely greater interest for the financed purchase of solar home systems in Africa than in Asia, with the highest interest in this model coming from East Africa compared to other sub-regions. The reasons may partly be the more dispersed populations in Africa and possibly historical international initiatives in the region, as well as the strong mobile money penetration. Initiatives such as Lighting Africa have pushed for pico solar products to serve the rural poor in Africa since 2008.<sup>10</sup> Adoption has been gradually increasing and retailers have continued to explore wider opportunities in this market.

Closely related to regional differences, business models vary depending on localised cultural context. For example, asset ownership through financed purchase of household equipment may be associated with high social status, or in contrast, lack of customer familiarity or trust may be best suited to a continuous service contract. Additionally, business models vary to match customers' current energy spend, based on energy demand and current pricing of substitute products. This willingness to pay determines which type of technology and service will be affordable to customers and profitable to businesses. The below example demonstrates one MECS grantee that has very specifically designed their business model to address cultural contexts.

### KAMWORKS ADAPTING PAYG TO CAMBODIA

Kamworks is testing an innovative rental model for solar home systems in rural Cambodia. Today, 75% of the population is not connected to the grid, and households often hesitate to buy solar products because of the perceived risks associated with poor quality products. As many villagers cannot afford to pay upfront for the systems and also to overcome the trust barrier, Kamworks has designed a mobile-enabled solution that allows them to rent the products at an affordable rate. And since WING, a major mobile payment provider, is involved, customers can easily pay for their rental fees using their mobile phones.

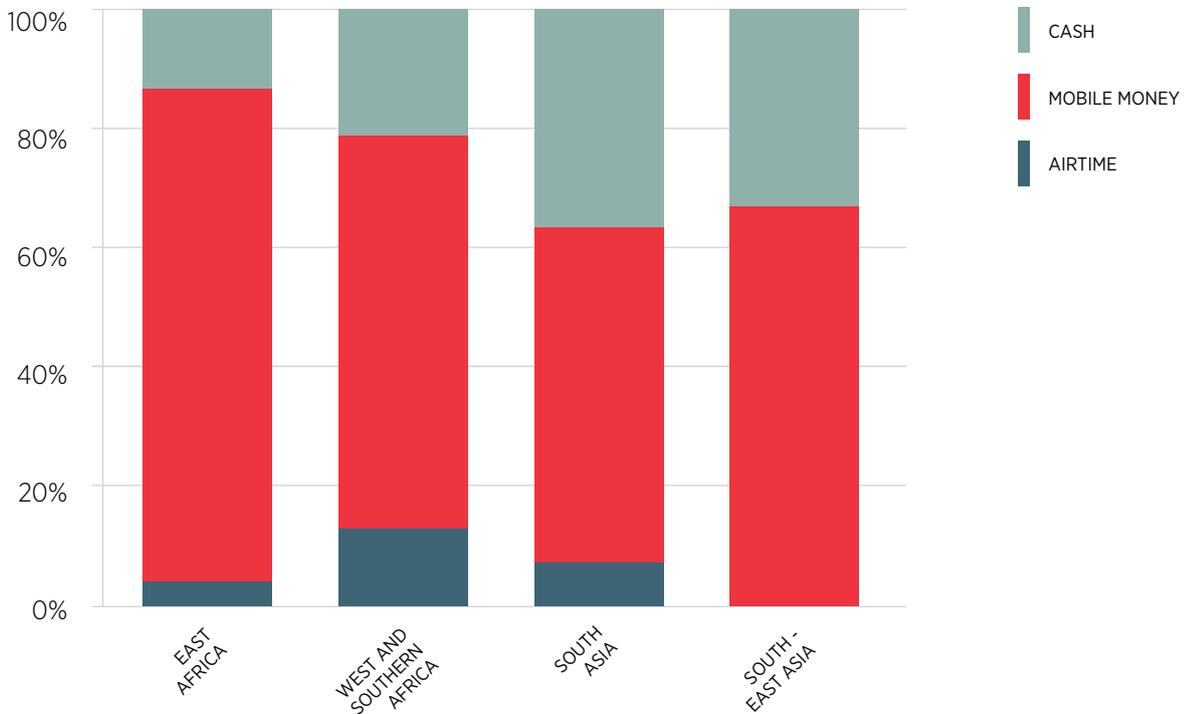
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10. <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21514564-menuPK:34480-pagePK:34370-piPK:116742-theSitePK:4607,00.html>

**Mobile money is the currency of choice**

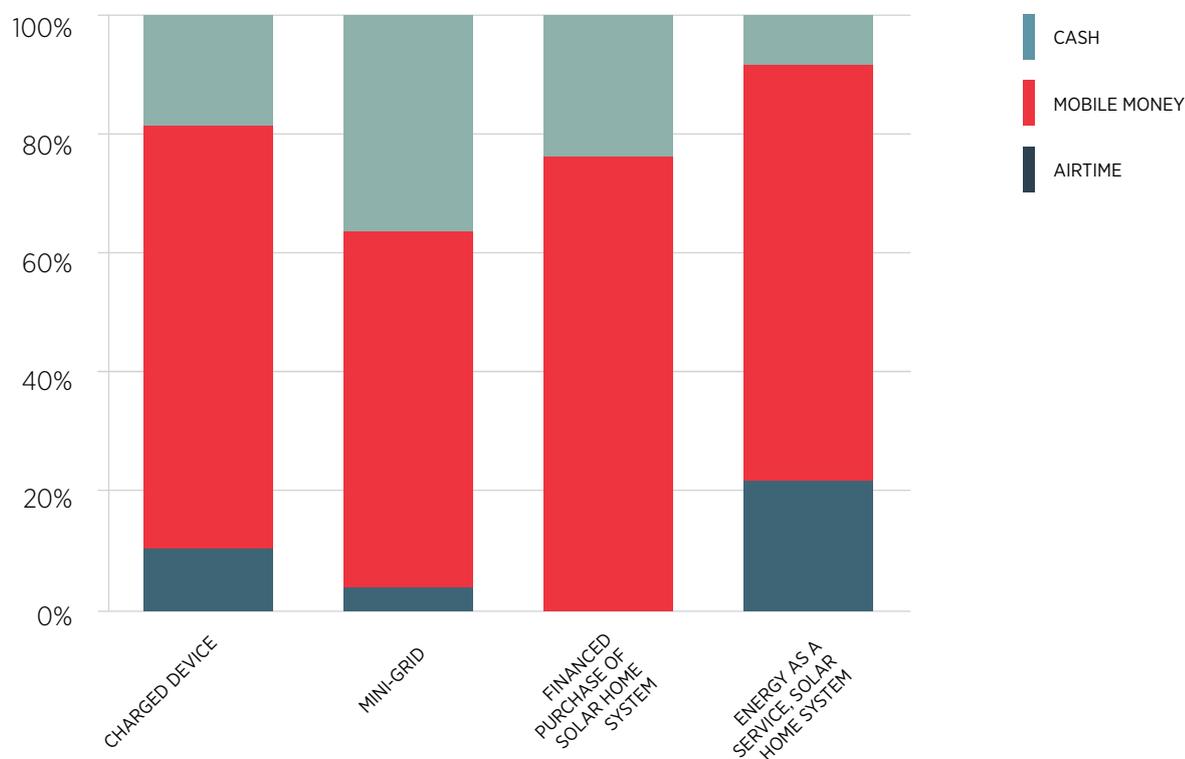
The significant interest in using mobile money for PAYG energy services, compared to other currencies- namely cash, yet some use of airtime- is demonstrated in the figures below. Mobile money was the most commonly proposed currency in each of the regions. Looking at the regional variation, however, mobile money was unsurprisingly proposed with the greatest frequency in East Africa where the mobile money deployments are more mature. This trend strongly reflects conclusions of the *State of the Industry 2013: Mobile Financial Services for the Unbanked*: "In 2013, mobile money has significantly expanded outside of Sub-Saharan Africa, although the lion's share of live mobile money services remains in East Africa."<sup>11</sup> Further key findings from this report and discussion of the use of mobile payments for energy and water services are included in the Supplement.

FIGURE 17  
**PROPORTION OF CONCEPT NOTES USING EACH TYPE OF PAYMENT OPTION BY REGION**



11. Pénicaud, Claire and Arunjay Katakam (2014). "State of the Industry 2013 – Mobile Financial Services for the Unbanked". GSMA Mobile Money for the Unbanked

FIGURE 18

**PROPORTION OF CONCEPT NOTES USING EACH TYPE OF PAYMENT OPTION BY PAYG BUSINESS MODELS**

Regional differences in the proportion of Concept Notes proposing mobile money indicate that all of the mobile money ecosystem components may not be ready in less mature deployments: from East Africa, 75% of all PAYG proposals used mobile money compared to only 53% in South Asia. A robust mobile money ecosystem to support PAYG energy services requires, in addition to an easily-integrated bill payment service, a strong and well-distributed agent network, and accessibility and use by target customers (unbanked and underserved populations). More mature mobile money deployments from Sub-Saharan Africa tend to have these, yet these characteristics are lacking in more nascent or stagnant deployments. This is reflected in Figure 17 showing the majority of Concept Notes relying on cash are in South Asia, of which eight are in India. All of the Market Validation grants for scaling services, which depend on mature mobile payment ecosystems, are operating in Sub-Saharan Africa (three in East Africa). Figure 18 shows the proportion of payment options for each type of PAYG Energy model, which also corresponds to the sub-regional variation of the different models (Figure 16).

In India, mobile money is not widely adopted by the unbanked (i.e. target customers for new PAYG energy services) due to several regulatory barriers; one of which is the “Know Your Customer” compliance requirements for mobile financial service providers which are bank-grade and therefore exclude many unbanked people who lack that level of personal identity documents.<sup>12</sup>

Yet given the trend of operators growing their mobile money services by supporting transactions from external companies and building this ecosystem (please read the Supplement for further details), we expect greater opportunities in the near future to use mobile payments for PAYG energy (and water) services across more regions. Indeed, an important part of the MECS Innovation Grant Fund will be learning lessons around the ability to apply mobile money in different markets.

12. Mobile Money Association of India and GSMA, 2013. “Submission to the Reserve Bank of India’s (RBI) Committee on Comprehensive Financial Services for Small Businesses and Low-Income Households.” Position Paper, 13 November, 2013.

## CAN AIRTIME BE A VIABLE ALTERNATIVE PAYMENT OPTION?

Airtime as a payment option was proposed in four Concept Notes. In some cases, this may be an alternative in the absence of a robust mobile money platform, while in others it may have more to do with the energy service provider's relationship with the mobile operator. Airtime payments may offer benefits, but could have potential drawbacks. It may give mobile operators an alternative path to participate in this market and increase ARPU. However, airtime is less fungible than mobile money, and regulatory barriers – especially those set up by central banks that tightly control MNO-led mobile money deployments are likely to view airtime with an even sharper lens – may prevent it from scaling universally.

### M2M-enabled equipment informs business models and operations

M2M-enabled energy equipment and smart meters can provide real-time data on customer behaviour and equipment performance, which can be used to refine and develop business models and operations. For example, knowledge about what appliances or devices customers are powering (e.g. the number of phones being charged), and their energy demand at different times of day informs which type of energy service they use the most. It might also inform changes to pricing models, opportunities to upsell to larger equipment, or technology improvements. This real-time data also allows for the development of preventative maintenance systems, which can improve the life of energy equipment. Thus M2M can provide an understanding of consumer behaviours that allows for user centric design to inform the next generation of service delivery models.

However, the real-time data benefit of M2M-enabled equipment for business model development needs to be weighed against the cost of the technology and the network's reliability. Valuable data can still be obtained without M2M technology, yet data collection potentially requires in-person visits and does not always yield the same level of detail. The presence or absence of M2M technology also relates to the preferred method of credit transfer as discussed in Part 1.

## INCREASING THE VIABILITY OF MINI-GRIDS

A visible trend was the interest in using smart meters to improve mini-grid load management, where this can be a particular challenge when serving a small number of connections with variable demand. 57% of PAYG mini-grid Concept Notes used M2M connectivity, which in most cases was to support smart metering. As the cost of smart meters decreases, and the use of mesh networks (alternative communication technologies like Zigbee) helps reduce data costs of meters, these may make the mini-grid model more viable. The interest in mobile payments for mini-grids may also help to improve revenue collection in remote areas. As these trials develop, mini-grid business models may be able to attract greater investment for scaling.

### A market trend to serve higher energy demands

A noticeable trend across all energy-only Concept Notes was business offerings to meet growing energy demands by using mobile channels to unlock financing options for larger and more expensive systems. These were often "entre-prise" systems (30W- 200W) designed to offer entrepreneurial income-generating opportunities such as haircutting and phone charging. The customer repayment history for these larger systems is not yet established and it is postulated that income generating activities will provide the revenue to customers to keep up with larger payments. 37% of all energy proposals included income generation as one of the customer value propositions and four grant recipients will be trialling such systems: Fenix International, Mobisol, M-KOPA, and Nova Lumos.

## Water Models: From Promising Pilots to a Maturing Sector

There is interest in a range of mobile applications to improve domestic water services, yet the strength of these models is still nascent compared to mobile-enabled energy models observed through the MECS Innovation Grant Fund. At this stage, the high level trend in mobile enabled water services, is a focus on service deliver monitoring and mobile payments and billing. A more granular analysis of water models requires more data points and research beyond the scope of the Fund and report.

The nascency of water when compared to energy is likely a result of differences in sector histories between the two (see below box), as well as the complexity of water sector challenges, which are discussed in more detail below.

The maturation of these models for wider adoption and replication requires continued trialling of pilot-stage models and greater stakeholder engagement around the sector challenges, for which several recommendations can be made.

### The MECS Innovation Grant Fund suggests a nascent water sector

Mobile-enabled water models are nascent when compared to energy, an indication from key statistics from the Innovation Grant Fund. Figure 7 shows that 31% of all Concept Notes were for water compared to 54% for energy. This gap widened significantly at the Application and grant stage with only three of thirteen grantees working on water, all of which are Seed grants. Additionally, under 12% of water-only Concept Notes were led by water service providers (compared to 36% led by technology providers, and another 36% by NGOs and academia) suggesting that the driving force is external to primary water sector players. Furthermore, many water proposals lacked consideration for a financially sustainable model, and only 19% suggested governments as clients following proof of concept, despite governments being a key stakeholder and funder of the water sector in most countries.

### A SHIFT TO SUPPORT SERVICE DELIVERY IN THE WATER SECTOR

The maturity of mobile-enabled water models compared to energy stems partly from different initiatives and developments in these sectors in recent years. As discussed in the previous section, energy has seen significant initiatives to promote solar technologies for new decentralised service models to reach the underserved.

Comparatively for water, there has not been a dramatic revolution in service technologies. Yet there has been a gradual shift in sector focus from initial infrastructure to service delivery outcomes, which has started to drive interest in mobile solutions for service monitoring. For example, the achievement of the Millennium Development Goal to halve the number of people since 1990 without access to improved water services by 2015 was met with frustration by many practitioners. The reality of high rates of non-functional hand pumps and the decline of urban piped services means that many people once considered to have access, no longer do.

Furthermore, the Millennium Development Goals do not include specific water quality standards, and many “improved” sources by current definitions can be unsafe. Thus, in the last few years sector focus has shifted to measure the holistic quality of service delivery (in terms of reliability, quality and quantity) and the sustainability of acceptable levels of service. As more donors, governments and service providers follow this shift, more uses of mobile for monitoring service delivery will be trialled, best practices will emerge, and sustainable solutions scaled and replicated, thus strengthening models for mobile-enabled water services.

## Examples of Mobile-Enabled Water Services

While the factors above suggest further development of models is required, there are many promising early-stage mobile-enabled water service models. The dominant categories of existing models, as well as those proposed in Concept Notes, are outlined below, along with more detailed descriptions and examples, and further case studies included in the MECS Africa and Asia reports.<sup>13</sup>

- **Manual reporting of water service delivery:** Consumers and/or field staff report information about water flows and quality via mobile services
- **Remote monitoring of water service delivery:** Mobile-enabled sensors or smart meters provide real-time data about water flows and quality
- **Billing and payment systems:** Mobile services and mobile payments are used to support cost recovery for household water usage

An interesting technology model that combines remote monitoring of service delivery and billing and payment systems is automated water kiosks. These are stand-alone systems for water treatment and dispensing which are M2M enabled and may use mobile or digital payments. While the Grundfos Lifelink in Kenya and the Sarvajal system in India have continued to develop, three newer organisations with similar water kiosks submitted Concept Notes for Haiti, Nepal and India. These automated water kiosks have interesting potential, with some strong pilots underway, yet business models are still being proven as current costs may be high relative to willingness to pay.

TABLE 3  
**USING MOBILE SOLUTIONS TO ADDRESS WATER SERVICE DELIVERY CHALLENGES**

SERVICE DELIVERY CHALLENGE	MODEL FOR SERVICE IMPROVEMENT AND MOBILE CHANNELS	EXAMPLES
<p><b>Not knowing when or where water is being delivered</b></p> <ul style="list-style-type: none"> <li>• Piped networks lack real time monitoring to detect leakage, theft, or equitable distribution to all</li> <li>• Remote hand pumps and boreholes remain broken for long periods without an active maintenance programme</li> </ul>	<ul style="list-style-type: none"> <li>• Manual reporting of functionality, leaks or theft via mobile services (voice/SMS/data); can rely on consumers or field staff to report</li> </ul>	<ul style="list-style-type: none"> <li>• Development Workshop Angola and SeeSaw in Huambo, Angola (Grantee)</li> <li>• NextDrop in Bangalore, India (Grantee)</li> </ul>
	<ul style="list-style-type: none"> <li>• Automated remote monitoring of functionality, leakage and/or volume in real time using - GSM-enabled M2M; can be mobile-enabled sensor for standpipes and smart meters for networks.</li> </ul>	<ul style="list-style-type: none"> <li>• Portland State University, Sustainable Water, Energy and Environment Technology Laboratories and Living Water International in Rwanda (Grantee); Oxford University and Rural Focus Limited in Kenya.</li> </ul>
	<ul style="list-style-type: none"> <li>• Automated water kiosks using M2M to track service functionality.</li> </ul>	<ul style="list-style-type: none"> <li>• Sarvajal in India; Grundfos Lifelink in East Africa.</li> </ul>
<p><b>Water quality needs to be verified</b></p> <ul style="list-style-type: none"> <li>• Absence of water quality monitoring and distribution of information to consumers</li> </ul>	<ul style="list-style-type: none"> <li>• Manual reporting of water quality by trained users through testing kit and reporting by SMS or mobile application.</li> <li>• Automated water kiosks using GSM M2M to monitor treatment processes.</li> </ul>	<ul style="list-style-type: none"> <li>• mWater with a mobile application that reads water quality tests and geo-locates results and alerts official and the public to risks.</li> <li>• Sarvajal in India; Grundfos Lifelink in East Africa.</li> </ul>
<p><b>Limited cost recovery to support operations and maintenance</b></p> <ul style="list-style-type: none"> <li>• Inability of some consumers to pay large monthly water bills</li> <li>• Limited access to in-person pay points</li> <li>• Cash collection not transparent</li> </ul>	<ul style="list-style-type: none"> <li>• Payment via mobile payments</li> <li>• Pre-payment via smart meters or digital point of sale (could be as part of automated kiosk)</li> <li>• Meter reading via mobile applications</li> </ul>	<ul style="list-style-type: none"> <li>• Main water utilities in Uganda, Tanzania, Kenya, and more are offering mobile payments (see box below)</li> <li>• Nakuru Water and Sanitation Services Company in Nakuru, Kenya.</li> </ul>

13. MECS Africa: <http://www.gsma.com/mobilefordevelopment/the-synergies-between-mobile-energy-and-water-access-africa>

MECS Asia: <http://www.gsma.com/mobilefordevelopment/the-synergies-between-mobile-energy-and-water-access-asia>

## BENEFITS OF MOBILE WATER PAYMENTS

A recent University of Oxford study of mobile-enabled payment methods used by the Dar es Salaam Water and Sewage Company demonstrates these benefits of mobile payment methods for water services.<sup>14</sup> These payment methods (which in their study include mobile money, mobile banking, and wireless pay points that allow cash payments to be transferred electronically), led to higher revenue collection per customer, and those customers using mobile-enabled payments made more payments per year. Looking at customer behaviours, those using mobile-enabled payments tended to make multiple payments, indicating an important way to offer more flexible payments for greater cost-recovery from low-income households.

A previous University of Oxford study identified variable customer adoption rates of mobile water payments across 20 urban water service providers in Africa. Recommendations to increase adoption included educating customers and making mobile money transaction fees more affordable with incremental payments (particularly to suit lower income customers).<sup>15</sup>

In rural Tanzania, the NGO MSABI<sup>16</sup> is trialling the use of a water maintenance insurance scheme that communities pay for with mobile money. Communities and schools have nominated an individual responsible for sending US\$4/month by mobile money to the insurance account in order to pay for future repairs of rope pumps.

### Water sector challenges

The status of mobile-enabled water models partly reflects the history of the sector, and its key challenges. These challenges are described below, and the complexities are particularly important to understanding the opportunities and barriers for mobile-enabled water services.

- The physical properties of water and its life-sustaining nature mean that water service delivery has multiple dimensions requiring multi-dimensional solutions.
- Historically, there has been limited achievement of cost recovery with governments and donors often heavily subsidising operations and maintenance.
- Water service delivery includes a broad group of stakeholders, with government playing a key role, which may result in weak accountability mechanisms and slow-moving progress.

### The multiple dimensions of water service delivery require multi-dimensional solutions

Water service delivery is infrastructure intensive, and the infrastructure must be managed to effectively provide water services that meet multiple conditions:

- Reliable in terms of hours of access and functionality,
- Accessible in terms of proximity to households and affordability,
- Sufficient in quantity for health and hygiene, and of
- Safe water quality for consumption.

14. Krolikowski, A., Fu, X. and Hope, R. 2013. *Wireless Water: Improving water Provision Through Mobile Finance Innovations*. University of Oxford, UK.

15. Hope, R., Foster, T., Krolikowski, A. and Cohen, I. 2011. *Mobile Water Payment Innovations in Urban Africa*. December 2011, School of Geography and the Environment and Skoll Centre for Social Entrepreneurship at Said Business School, Oxford, UK.

16. MSABI stands for the Swahili phrase "Maji Safi kwa Afya Bora Ifakara," which means "Safe Water for Better Health".

Insufficient and unsafe water can immediately lead to serious health impacts, with contamination risks also increased by intermittent supplies in piped networks. Around the world, there are almost 1.7 billion cases of diarrheal diseases each year, with this leading to the second greatest cause of death among children under five. Safe drinking water and adequate sanitation and hygiene can prevent a significant portion of this disease burden.<sup>17</sup> In emerging market contexts, poor infrastructure management and maintenance has often led to declining services levels threatening safe water, sanitation and hygiene. For example, in Sub-Saharan Africa, an estimated one in three hand pumps are broken at any given time<sup>18</sup> forcing people to rely on unsafe or distant water sources. Piped network coverage in the region's urban areas has remained at 15% since 1990, despite rapidly growing urban populations,<sup>19</sup> and unmaintained networks face high levels of leakage and unaccounted for water. Where the piped network doesn't reach or is unaffordable, the underserved are forced to collect from kiosks with inflated pricing.

### **A history of limited cost recovery threatens sustainability of services**

The limited cost recovery for operations and maintenance in the water sector is a large part of what drives poor management and declining service levels. At the institutional level, this lack of cost recovery can result from historical views of free water and subsidies from governments and donors, and the slow transformation toward economically sustainable water service models. Although there is now wide agreement that water service delivery must be paid for, there are different approaches to how pricing and subsidies should be structured between consumers, governments and donors to achieve cost recovery. Yet, the reality is that cost recovery for operations and maintenance is often still lacking, as shown by a study of 23 African countries in which 40% of utilities were not achieving this.<sup>20</sup> At the service provider level, limited cost recovery results from ineffective billing and collection systems that may rely on in-person payments. Particularly, in rural and informal settlements, non-digital payment systems rely on cash and lack transparency and accountability. In urban networks in Asia, high levels of non-revenue water through leakage, theft and unbilled customers represent significant financial losses, estimated at US\$ 9 Billion/year.<sup>21</sup>

### **Accountability across multiple stakeholders, including government**

A range of stakeholders are involved in water services, including consumers, water service providers, NGOs, and multiple layers of government, yet accountability between them is often missing. Government institutions may play a role at local and district levels, and certainly at national levels, where they are ultimately accountable for services that are safe, accessible, sufficient and affordable (including when services are contracted to private companies). They therefore play a key role in monitoring and overseeing acceptable levels of service delivery. At the same time, it is the water service providers and their consumers who are most familiar with water service delivery problems, potentially leaving a gap between institutional levels. NGOs may fill in where government and water service providers lack resources, yet this can be ad-hoc and lack accountability. Thus, amidst the many stakeholders, there are gaps in accountability and between policies and practices, yet engaging all stakeholders for improvements can be slow moving.

17. World Health Organisation, 2013. *Diarrhoeal disease Fact Sheet N330*. <http://www.who.int/mediacentre/factsheets/fs330/en/>

18. *Rural Water Supply Network, 2009. Handpump Data, Selected Countries in Sub-Saharan Africa*. <http://www.rural-water-supply.net/en/resources/details/203>

19. WHO/UNICEF, 2013. *Progress on Sanitation and Drinking Water, 2013 Update*. Joint Monitoring Programme for Water Supply and Sanitation. [http://www.wssinfo.org/fileadmin/user\\_upload/resources/JMPReport2013.pdf](http://www.wssinfo.org/fileadmin/user_upload/resources/JMPReport2013.pdf)

20. Banerjee et al., 2008 *Cost Recovery, Equity, and Efficiency in Water Tariffs: Evidence from African Utilities*. Africa Infrastructure Country Diagnostic, Working Paper 7. The International Bank for Reconstruction and Development/The World Bank: Washington DC.

21. Asian Development Bank, 2010. *The Issues and Challenges of Non-Revenue Water*. Frauendorfer, Rudolf and Liemberger, Roland. <http://www.adb.org/sites/default/files/reducing-nonrevenue-water.pdf>

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## Recommendations for the water sector

Strengthening early-stage models of mobile-enabled water services to demonstrate benefits for replication and scaling requires further trialling and sharing of evidence, as well as greater consideration of the identified sector challenges.

Specific recommendations include:

### **Increase trials and sharing of evidence**

More funding should support additional trials to identify best practices and key lessons to be shared widely to foster model refinement and replication.

### **Exchange learning between sector stakeholders and technology providers**

The majority of mobile solutions seek to improve service delivery through monitoring, yet given that the majority of Concept Notes were led by non-water service providers, more learning is needed between them to deepen understanding of priority service delivery challenges and the evolving mobile solutions. The multiple stakeholders involved in water service delivery mean this type of learning and exchange requires dedicated time and forums.

### **Strengthen the role of government and water service providers in the development of mobile solutions**

Greater learning between actors should catalyse early engagement for governments and water service providers to take a stronger role in the development of mobile solutions. Many Concept Notes we received lacked evidence of significant engagement with service providers and governments. Yet solution development needs to align with government, service provider and consumer priorities, and the institutions' ability to respond to data with improved management and urgent investments. Monitoring services developed with these considerations in mind can also support accountability and commitment between stakeholders to avoid one-off water point surveys.

The barrier may be that this engagement with multiple stakeholders can be slow-moving. Governments and service providers may be challenged to take on stronger roles developing solutions given limited resources and shifting government priorities. However, the risk otherwise is that tools will fail when they do not match service provider and government priorities and budgets.

### **Consider potential models for financial sustainability**

The challenges the water sector faces in cost recovery can make it difficult to identify a model for financial sustainability of a new mobile solution, especially if current cost recovery models are failing. For example, it can be difficult to determine whether costs should be passed on to end customers or these should go to some level of government. Indeed, a handful of Concept Notes presented interesting ideas for mobile to support improved water services, but failed to consider financial sustainability, which likely also reflects a lack of stakeholder engagement. This consideration is crucial where the cost of adding the tool to an existing (and likely in-debt) service must equate to a service benefit or cost savings.

# Part 3: Partnering with Mobile Network Operators

HÉLÈNE SMERTNIK, MARKET INTELLIGENCE ANALYST

**H**ow can mobile network operators (MNOs) help increase access to energy and water services to underserved populations of emerging markets? What role do they play in improving the delivery of community services? Although the link might not be straightforward, MNOs have a critical role to play and are increasingly aware of the opportunity to actively engage in this sector, moving beyond simply acting as communication providers, and are starting to position themselves as core service providers, in partnership with third party organisations.

Some of the main barriers addressed in last year's Annual Report regarding partnerships with MNOs still hold true:

1. the time required to build relationships with the mobile industry,
2. the need to have tried and tested business models and
3. proving the ability to scale from Day 1.

However, over the last year, the level of interest from mobile operators in energy, and more recently water, projects has grown. This change is rooted in a better understanding of the opportunity, as well as the early signs of success from pioneering organisations in the sector. Services providers' offerings have matured and so has their value proposition to mobile operators. Simultaneously, new actors – MNOs and service providers alike – are entering the market, piggybacking on the experiences and lessons learnt by early pioneers, reflecting a larger array of partnerships in the ecosystem.

## Assets Shared by Mobile Operators In Partnerships

To better understand mobile operators' role in the growing space of mobile-enabled community services, we reviewed the 25 MECS Innovation Fund Applications<sup>22</sup> that had MNOs as partners or as lead applicants, as well as their detailed partnership plans. This analysis showed that mobile operators can provide a suite of assets and capabilities to support the service providers' delivery of community services:

- **Information** – MNOs share market information with their partners (e.g. telecom tower site survey information, network coverage maps)
- **Connectivity** – MNOs provide access to their core assets including SIM cards, access to SMS and voice, data and USSD – sometimes at discounted rates
- **Mobile money** – MNOs grant access to their mobile money platform, through which the service provider can collect payment for products and services (please see the Supplement for more details).
- **Sales and distribution** – MNOs allow partner organisations to use their agent or distribution network to sell products and services
- **Branding** – MNOs lend their logo and branding to the new product or service

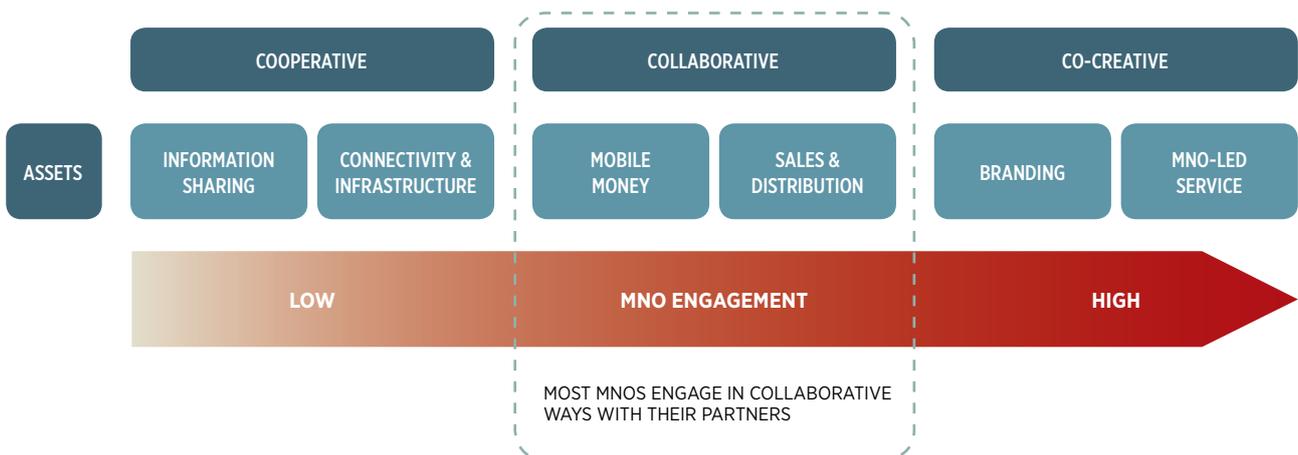
22. Out of 46 total Applications

## From Cooperative to Co-Creative Partnerships

The sharing of the assets listed above requires varying degrees of engagement and trust from MNOs and can be plotted along a spectrum of engagement, illustrating the different types of partnerships they can form with third party service providers (see Figure 19). These partnerships can be categorised using 100%Open’s partnership model: Cooperative, Collaborative and Co-creative.<sup>23</sup> MNOs sharing information - such as procurement information or mobile tower GPS coordinates - represents a light touch engagement. On the other hand, MNOs integrating a service to their back-end systems represents a higher level of engagement.

- **Cooperative Partnerships** can include the exchange of information and know-how to support joint projects and temporary alliances or to access new markets.
- **Collaborative Partnerships** combine Intellectual Property, and co-design services to be delivered.
- **Co-creative Partnerships** includes co-creating, merging and co-owning new ideas, offerings or business models.

FIGURE 19  
**SPECTRUM OF MNO’S ASSETS CORRELATED TO PARTNERSHIP MODELS**



### The Cooperative Model: An entry-level partnership

According to our data set, 15% of partnerships were considered Cooperative<sup>24</sup> where the assets the mobile operator partners offered were limited to information sharing and connectivity capabilities. This model presents an easy way for MNOs to enter into partnerships with third party providers who are often in early stages of development.

### PORTLAND STATE UNIVERSITY AND LIVING WATER INTERNATIONAL

The Sustainable Water Energy & Environmental Technologies Laboratory of Portland State University is working with the NGO Living Water International to deploy GSM-enabled remote monitoring sensors to collect performance data on energy, water, sanitation and infrastructure projects. MTN Rwanda will provide Portland State University technical support and access to their data service at preferential rates.

23. [www.100open.com](http://www.100open.com). A consultancy specialising in open innovations and partnerships.

24. Idem

There are varying degrees of engagement within the Cooperative partnership model. While providing connectivity, some MNOs can offer preferential tariffs or free SIMs to their partner.

Similarly, MNOs can also agree to go a step further than simply sharing information by sharing learnings from pilot projects, e.g. the consumer usage or mobile service uptake. This further engagement reflects MNOs' willingness to grow their relationship with the partner service provider to lead to the pilot's success and improve the working business model.

### **The Collaborative Model: A more demanding yet popular type of partnership**

Integrating into mobile operators' mobile money service and using their sales & distribution channels require a higher level of engagement and represents a collaborative partnership approach. MNOs providing these services often have established long-term partnerships with trusted service providers and are well aware of the sector's opportunity.

## **MOBISOL AND MTN RWANDA**

With the support of MTN Rwanda, Mobisol has launched their GSM-Enabled Solar Home Systems in Rwanda. The systems, geared towards entrepreneurs, can support phone charging businesses and lantern charging stations. MTN Rwanda is supporting the distribution of Mobisol systems using local agents, providing connectivity at preferential tariffs and will facilitate the integration of mobile money via API for Mobisol's IT back-end.

From the pool of Applications with mobile operator involvement, 60% presented Collaborative partnerships. The Collaborative model builds on top of the Cooperative model and requires a higher level of engagement from MNOs.

### **The Co-creative Model: A more recent type of partnership**

Examples of MNOs fully engaging, sharing their brand or, even, leading the provision of a full turnkey service to customers with the support of third party partners are less common, although 25% of Applications presented this form of partnership. Through our review of Applications, most MNOs in this category are piloting new services to support revenue growth or market differentiation. They are more willing to take risks as they are likely to have learnt lessons from early pioneers who have built up the industry's understanding of the opportunity and business models in the energy and water sector.

## **EASYPAISA'S SOLAR PROJECT**

Easypaisa's (Telenor Pakistan and Tameer Micro Finance Bank mobile money platform) solar project illustrates a Co-creative partnership. The project consists of Easypaisa bringing together a leasing and solar product company to trial an Islamic leasing model for solar products under a jointly-branded product. Easypaisa's strong engagement in the project reflects their strategy, to differentiate themselves by providing new innovative products to their customers in a highly competitive mobile market<sup>25</sup> where there are 9 mobile operators and 7 mobile money services.<sup>26</sup>

25. Telenor Pakistan's mobile market share is of 24.82% in Q4 2013, GSMA Intelligence data

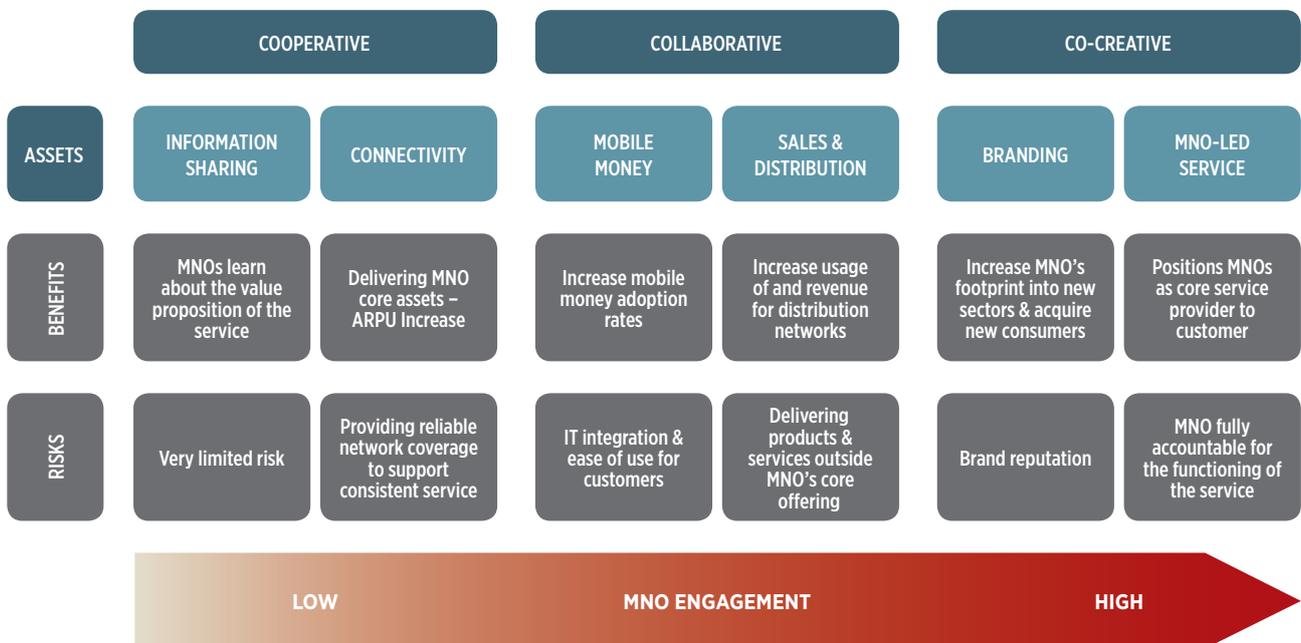
26. Over a population of 180 million people, Easypaisa serves more than 5 million customers a month. <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/07/Telenor-Pakistan.pdf>

## The level of engagement mirrors the risk/reward profile

We have seen the ways in which MNOs can deliver significant added value to their partners through sharing of core assets, but what are the benefits and risks for the mobile operators to get involved in the development of a mobile-enabled community service or product? Figure 20 presents the risks and rewards for mobile operators across the spectrum of partnerships.

Reducing customer churn, increasing utilisation of MNOs' services including airtime and data, revenues and brand extension, increasing mobile money transactions, operational efficiencies are some of the main incentives for the mobile operator to engage. As Figure 20 illustrates, the more engaged the MNO, the higher the potential benefits. Providing a full turnkey service will allow mobile operators to position themselves as core and innovative service providers and to diversify their revenue streams.

FIGURE 20  
**BENEFITS AND RISKS FOR MNOS WHEN ENTERING IN PARTNERSHIPS**



### OTHER ASSETS REQUIRING HIGH TRUST: INFRASTRUCTURE

Mobile infrastructure, as an asset, was treated separately for the purposes of this analysis as the outsourcing of energy from MNOs to a third party is a separate model, presenting its own degrees of engagement, benefits and risks.

The sharing of infrastructure with partner Energy Service Companies (ESCOs) requires high levels of trust from MNOs who will rely on the ESCOs to power their tower 24/7 in order to maintain the network. Any losses in power will result in serious losses and directly impact the MNOs ability to fulfil their license's Service Level Agreement.

Furthermore, ESCOs who engage in community power from mobile by providing power to the telecom tower and surrounding community do not require access to other assets such as marketing or distribution channels.

With high engagement and more benefits also come higher risks for MNOs. The main risks for MNOs to take into account are operating outside of their core competencies, a lack of technical expertise, as well as distributing and selling new products and services.

However, as the number of Applications in the Collaborative and Co-creative partnership models suggests, the market opportunity is maturing while reducing risk in the sector. MNOs are also increasingly aware of the role that they can play, engaging at various steps of a partner's business development and with different degrees of investment.

The review of the MECS Innovation Fund Applications has shed light on the different types of MNO partnerships. MNOs new to the sector might choose to enter into a Cooperative partnership model and wait until they have built a stronger relationship with their partner to move towards a more engaged, higher risk and higher reward, Collaborative or Co-creative model. Some MNOs might decide to jump straight to the high engagement end of the spectrum. Despite being early days, MNOs appear increasingly willing to engage more deeply with their partner organisations in order to scale and grow the role of mobile in the energy and water sectors.

# Part 4: Towards Maximising the Impact of Grant Funding

CHARLOTTE WARD, PROGRAMME DEVELOPMENT MANAGER

**T**he growth of mobile-enabled services for energy and water has been and is still largely driven by start-ups and entrepreneurs. A proof of concept and the potential to scale remains critical to attract investors and drive higher engagement partnerships with mobile operators. This drives up the need for soft financing and support to organisations before they are attractive to commercial investment.

The MECS Innovation Fund Grants aim to carry out specific tests that will create new insights on the effectiveness of mobile-enabled services to improve sustainable and scaled deployments. All this is invaluable for building the knowledge base of other grantors supporting the energy and water sectors, and of investors providing equity and working capital to grow the businesses through and beyond the market development stage.

This section will show there is a continued investment need for grant programmes that focus on aspects like sharing lessons learnt and involving later stage investors up-stream. It highlights some trends in financing energy and water, and describes the intended results of our activities to support our grantees and other start-ups get follow-on funding.

## The Real Investment Need for Grants

The response to the £2.4 million MECS Innovation Fund in the two rounds in 2013 was far greater than we had predicted:

- We received 167 unique Concept Notes from 35 countries
- Applications in total asked for £29 M in funding
- The two rounds were twelve times oversubscribed in value

“We see the value in grants for specific areas, when these are not market distorting. So for new developments the value is in research and development, feasibility studies and testing new markets. In the markets where we work the customers (when low-income) are new and uncertain, products and services are new and as is sometimes the technology. Companies should be helped and incentivized to look at these markets otherwise the costs are just too high and unsure to ‘experiment’.”

Saskia van der Mast,  
DOB Equity

This indicates the growing acceptance of the role that mobile technology can play as an enabler to sustainable water and energy services. It also signals the need for more risk capital to develop commercially-viable models, where innovation is funded despite the high probability of failure. The quote above from an impact investor active in the mobile and development space illustrates very clearly the role of grants, but with some caution attached.

Vigilance is needed against grants misleading the market and grant makers failing in their responsibility to create the right landing strip for later-stage capital. While grants can support the sector as it matures in terms of financial viability, they may provide opportunities for too much experimentation and not enough execution discipline, taking the focus away from commercial viability. If this is not well managed, grants can result in a lack of quality investment opportunities. Including investors early on to provide input to grant projects is important, because they will help reduce the risk of models and projects being supported without a concern for success beyond the grant.

## A Funding Gap Still Exists, Providing Room for Others

Our grant funding rounds in 2013 have made us question what future grant rounds could look like, to fill remaining funding gaps, incorporate focus areas and achieve substantiated results. The Application process drew attention to some gaps in funding needs, where we were unable to support applicants due to funding criteria. There are three areas, where our own or other funding should pay attention to in the future:

1. Organisations that had an idea or concept in mind that they want to develop and test, but without field level pilots that produce usable data within the required 12-month time frame of the MECS Innovation Fund Grants. These Concept Notes required longer term grant periods and carried greater risks than our grants could sustain.
2. Organisations that have a working proof of concept in the field and are ready for growth within the same market require working capital, but will struggle to offer a short-term attractive return on investment to non-donors. From our perspective, the project did not display new innovation using the GSM network, nor sought to validate the model and service in partnership with a mobile network operator, so it sat between the “seed” and “market validation” funding stages.
3. Organisations developing and testing technologies for improving supply chain management in rural settings. Frameworks and applications or open-source projects that will create such technologies and solutions may enable an ecosystem of services that serve multiple use cases. Their value is in re-use in multiple sectors, such as supply chain management for entrepreneurs, for a wider range of end-user cases and to create a driver to reaching scale.<sup>27</sup> There is a need for funding the development of frameworks to cover high upfront costs that are often not feasible for early-stage or even mid-size companies.

## Trends in Financing

Trends identified in financing of the energy and water sectors (specific to mobile-enabled services and more broadly) help to support the points made in this section.

### Energy Sector:

1. **A growing number and range of financing organisations are looking at funding energy access.** They range from private, niche small impact investors to larger players like the US African Development Foundation, Deutsche Bank Social Impact Fund and the Commercial Bank of Africa.<sup>28</sup> This could reflect a maturing sector with a better record of sustainable impact and a growing customer-base.
2. **There is a growing demand for a large amount of debt that needs to be met to finance the step-change from proof of concept to market development and to scale.** As was highlighted in our last Annual Report,<sup>29</sup> manufacturers need working capital debt to make product. Energy access organisations need funding to buy product, support inventory and in many cases extend further credit to their customer to service growth, including directly through consumer financing using models such as lease-to-own and pay-as-you-go. Ideally, staged multi-year financing is required through a credit facility with an initial principal repayment period to suit the repayment behaviours of the customers. Interest payments need to be palatable for the start-up and allow a grace period to cover an initial phase of repayments.

27. Scaling Mobile for Development, GSMA Intelligence, August 2013

28. <http://www.m-kopa.com/media/latest-news/>

29. Service over Technology: Defining the Role for Mobile in Energy Access, GSMA, January 2013

3. **Loan guarantees as a first-loss stop to start-ups who provide consumer financing and who can get debt on good terms may be explored further.** Loan guarantees have been established to stimulate small energy entrepreneurs through support to local financial institutions to develop loan products.<sup>30</sup> But less developed are loan guarantees for the larger sector of energy service companies. These financial structures are present in other social impact sectors as a form of credit enhancement taken from the traditional financial markets. They can encourage the flow of capital to these investment opportunities by improving their risk-return profiles and, thus, incentivising more investors to invest.<sup>31</sup> High net-worth individuals, governments and VC funds could play a role.

## ENERGY FUNDERS

Since 2013 alone, excluding GSMA, grant funds for off-grid energy made available include:

GRANTOR	AMOUNT
AECF Renewable Energy and Climate Adaptation Technologies in Mozambique <sup>32</sup>	US\$10.0 M
USAID's Powering Agriculture Prize <sup>33</sup>	Twelve winners of US\$ 0.8 M – US\$ 1.5 M
GE/ US African Development Foundation's Off-Grid Energy Challenge for productive services <sup>34</sup>	US\$ 0.6 M, with further US\$1.4 M funding to be announced in 2014
National Geographic's Terra Watt prize <sup>35</sup>	US\$ 0.25 M
Asian Development Bank's Energy for All initiative <sup>36</sup>	US \$60,000

Recent investments in mobile-enabled energy service providers:

INVESTOR	ENERGY SERVICE PROVIDER	AMOUNT AND TYPE OF INVESTMENT	AIM
Asian Development Bank (March, 2013)	SIMPA Networks	US\$ 2.0 M Equity	Include demonstrating the commercial viability of investing in small scale distributed solar, and mobilize more funds into the sector <sup>37</sup>
Khosla Impact (October, 2013)	Bboxx	US\$ 1.9 M Equity (Series A)	Include supporting R&D for remotely monitored batteries, the launch of mobile and web ERP systems that enable consumer financing and to help create a credit facility in its subsidiary Bboxx Capital, for financing Pay-as-you-go systems in Uganda, Democratic Republic of the Congo and Kenya <sup>38</sup>

30. These have been well reported on for example by GVEP with the support of USAID, the Garfield Weston Foundation, Jump Up and Barclays Bank (<http://www.gvepinternational.org/en/business/access-finance>)

31. Catalytic First Loss Capital, GIIN, Issue Brief, October 2013

32. [http://www.ruralelec.org/fileadmin/DATA/Documents/Webinars/2013-03-20\\_REACT\\_Presentation\\_Moz\\_Launch.pdf](http://www.ruralelec.org/fileadmin/DATA/Documents/Webinars/2013-03-20_REACT_Presentation_Moz_Launch.pdf)

33. <http://poweringag.org/2013-winners>

34. <http://www.adf.gov/offgrid/USADPowerAfricaChallenge-Round1.htm>

35. <https://www.terrawattprize.com/>

36. <http://www.adb.org/sites/default/files/pub/2013/maximizing-access-energy-poor-developing-asia.pdf>

37. <http://simpanetworks.com/2013/03/19/adb-asian-development-bank-signs-2m-equity-investment-in-simpa/>

38. <http://www.greentechmedia.com/articles/read/why-khosla-is-investing-nearly-2m-in-this-plug-and-play-solar-firm>

## WASH sector

1. **The return on investment still remains unknown.** There is growing proof of the willingness of customers to pay for services offering cleaner, more efficient and reliable water services, but the return on investment still remains unknown whilst the additional value of water is limited and cost recovery is not attained at scale. However, financiers may be attracted to the lack of debt on the balance sheet of start-ups growing from universities or NGOs that have been historically grant funded.
2. **Spinning-out in to commercial entities can be a struggle.** Development of water delivery systems has largely been led by NGOs and academic establishments, often in partnership with the government sector. Systems demonstrating success in operational cost recovery show potential for proven replicable service models. With that and recognising the limitations of grant funding, operations are seeking to develop into viable commercial offerings, often partnered with the research powerhouse inside the academic organisation that incubated them.
3. **A gradual change of approach by donors to realise a role in proving commercially-viable models (see below box).** The WASH sector has a long history of being heavily grant and public sector funded, focusing on installing systems rather than improving sustainable service delivery. Commercial models for improved water delivery are less developed than in the off-grid energy sector, rooted in a debate on payment for service.

## WASH FUNDERS

Recently closed and open grant funding facilities for the WASH sector include:

GRANTOR	ORGANISATION	AMOUNT	AIM
'WASH for Life': U.S. Agency for International Development (Development Innovation Ventures) and the Bill and Melinda Gates Foundation	Many	US\$ 17.0 M	To identify, test, and transition to scale promising approaches to achieving cost-effective, sustained, scalable services in developing countries
Asian Development Bank 'Facility for Pilot and Demonstration Activity'	Many	US\$ 2.0 M	To support the testing and validation of pilot approaches to policies, technologies and business models to improve sanitation management and water services delivery with the intent to replicate and scale-up successful approaches across the region
U.S. Agency for International Development (USAID) Development Innovation Ventures (DIV)	mWater <sup>39</sup>	US\$ 0.1 M	To test a mobile app that lets health workers analyze water quality test kits from local sources and share this information on their global, open-source water monitoring database, in Mwanza, Tanzania.
U.S. Agency for International Development (USAID) through an academic consortium led by UC Berkeley, following Mercy Corps and the Lemelson Foundation	SweetSense Inc (commercial arm of the Portland State University's SWEETLab) <sup>40</sup>	US\$ 0.25 M Leveraging other grants (US\$ 0.18 M)	For R&D of machine-to-machine enabled cellular reporting sensors on hand pumps, building off other grants awarded to develop the technology and fund deployments,

39. <http://mWater.org/news/div>

40. <http://www.pdx.edu/sweetlab/>

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## What MECS hopes to achieve through our activities with investors

There are a relatively small (albeit growing) number of donors and impact investors familiar with mobile-enabled services and many more that could be active, based on their intentions to invest for social impact and financial return in emerging markets.

In a new and constantly innovating sector, creating deal flow is a challenge, as is finding the information to evaluate the real opportunities. New and unproven business models are difficult to evaluate due to a lack of information to analyse new service delivery models, and to construct and conduct due diligence that enables high-quality deal flow. There is also difficulty in finding businesses that have commercially-viable models, or the high potential of achieving it.

Several challenges in funding models and services in emerging markets will be addressed to some extent if the findings from our grantee projects illustrate the potential for scalable, replicable and sustainable models in partnership with the mobile industry. The MECS Innovation Fund Grants that focus on speeding growth of services and attracting mobile operators to partner, replicate and scale could attract commercial investors, if outcomes and learning are successful and are built upon.

To avoid creating a bubble of organisations or projects that have received grant funding and have nowhere to go next, investors inputs need to be included upstream to ensure our grantees and others have a soft place to land. A clear and important way to provide input from investors is to involve them in creating metrics linked to the next stage capital, providing them with information they need to invest in the business, that illustrate the performance and impact for each company, model or market.<sup>41</sup> However, much of the conversation within the impact investing industry has focused on identifying and building a framework of appropriate metrics to measure impact. An opportunity exists to support a similar initiative to agree upon the indicators that illustrate traction and performance in early-stage businesses, which answers the questions that an equity or debt investor need ask.

Some of the challenges faced in financing the sector have provided a gap that GSMA can help to fill, based on our sector expertise and thought leadership, knowledge creation from our Innovation Grant Fund and our broad network of stakeholders.

To better present the opportunity and to link the expectations and requirements of service and technology providers seeking capital and those of the investors, MECS aims to achieve the following outcomes:

- Inform a better dialogue between financiers and the service and technology providers seeking capital, through a greater understanding of investors' approach and challenges
- Highlight key metrics and performance indicators that function to illustrate the sustainability of services
- Provide virtual and real networks between funders and the service and technology providers
- Provide analysis and case studies of business models, including the role of the mobile industry

If you have any comments or suggestions about the work we are doing to improve financing in the sector, or about anything in this chapter, please contact us at [meecs@gsm.com](mailto:meecs@gsm.com).

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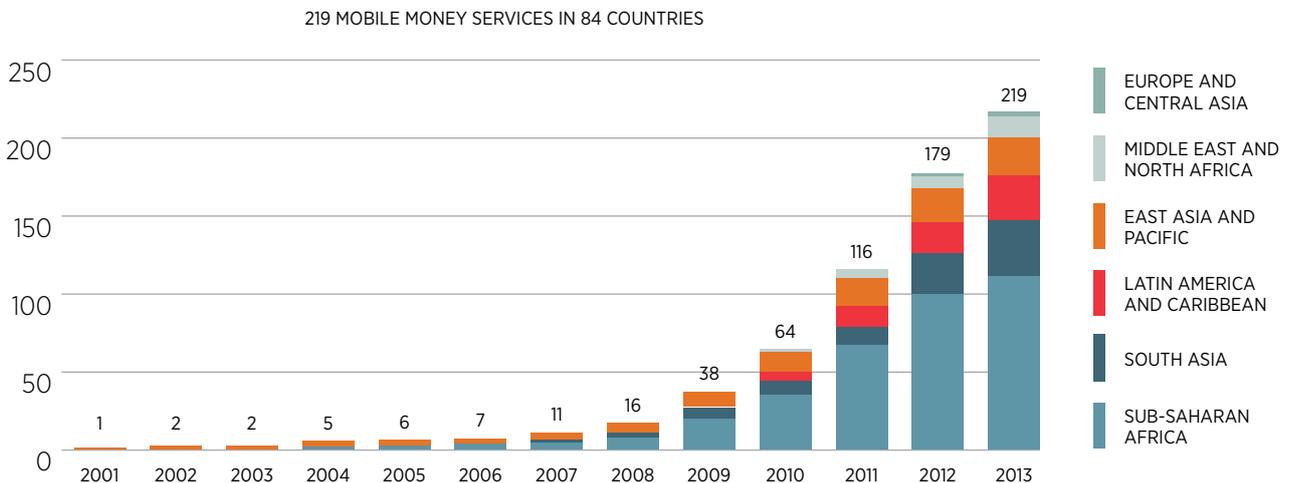
41. Simon Desjardins from the Shell Foundation quoted in "From Blueprint to Scale: The Case for Philanthropy in Impact Investing" by Harvey Koh, Ashish Karamchandani and Robert Katz April 2012

# Supplement: The Role of Digital Currencies and Bill Payment in Mobile-Enabled Community Services

BY HÉLÈNE SMERTNIK AND ILANA COHEN, WITH SUPPORT FROM LARA GILMAN AND GUNNAR CAMNER

**M**obile money was the currency of choice in the MECS Innovation Grant Fund Concept Notes. This aligns with key findings from the *GSMA's State of the Industry 2013: Mobile Financial Services for the Unbanked* report. Primarily, operators are building out broader mobile payment ecosystem services (i.e. beyond person-to-person transfers), and bill payment services have the potential to strongly impact mobile money growth. The State of the Industry annual survey estimates that 86% of mobile money deployments surveyed offer bill payment, with nearly 12% planning to launch this service within the next year. Furthermore, looking at the global mix of mobile money products in 2013, 10.8% of the total value of mobile money transactions came from bill payment (second to person-to-person transfers at 68.3% of the value of all transactions). These developments support the prediction from last year's Community Power from Mobile Annual Report, that there could be an opportunity for PAYG energy and water services to drive expansion of mobile money services by reaching populations that are unbanked, underserved and often late adopters of mobile financial services.<sup>42</sup>

FIGURE 21  
**GROWTH IN MOBILE MONEY DEPLOYMENTS AROUND THE WORLD**



42. [http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/02/SOTIR\\_2013.pdf](http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/02/SOTIR_2013.pdf)

## KEY FINDINGS FROM THE STATE OF THE INDUSTRY 2013 REPORT

- “The mobile money industry continues to grow and is now expanding across more regions. With 219 services in 84 countries at the end of 2013, mobile money is now available in most developing and emerging markets. While the majority of services remain in Sub-Saharan Africa, mobile money has significantly expanded outside of the region in 2013.” (p. 2)
- 51.7% of the live mobile money deployments are in Sub-Saharan Africa, followed by 16.1% in South Asia, with a continuous spread in deployments outside of Sub-Saharan Africa over the last 3 years. (p. 9)
- “In 2013, transactions involving external companies\* have been driving the growth in mobile money globally, representing 29% of the value transacted in June. These transactions are also growing much faster than airtime top-ups and on-net transfers.” (p. 36)
- \*External companies includes: “bill payments, bulk payments, merchant payments, international remittances, transfers between mobile money accounts and bank accounts as well as off-net P2P transfers to unregistered users.”

Mobile Network Operator’s and Mobile Money Operator’s interest in developing more partnerships to drive the adoption of their services is welcome news to water and energy organisations active in the sector. To unlock the opportunity to leverage mobile payments and digital currencies, and support the growth of mobile financial services, the needs, capabilities and resources of third party partner organisations needs to be considered in evolving bill payment offerings.

## MNOs’ Bill Payment Offerings

Mobile Network Operators (MNOs) can offer two types of mobile bill payment to service providers: airtime and mobile money. There are a few ways by which MNOs can provide these services, requiring different levels of technical and financial investments. These options are progressively evolving to allow for more flexible and customised payments while protecting the security of MNOs’ mobile payment platforms. The three options identified are:

- **Pre-set bill payments** are the most basic mobile payment model
- **Customised billing services** demand more technical and financial investment from both MNOs and service providers as it calls for the integration of the billing functionality of the service provider to the MNOs’ mobile money platform.
- **Shared APIs** are still in their early days as MNOs are exploring the practicalities of offering this model.

## AIRTIME VS MOBILE MONEY

It is worth mentioning that all 3 models can use airtime or mobile money, although as mentioned earlier airtime finds its limitation in providing payments to end-users. Using pre-paid airtime as a payment method allows the service provider to bill the MNO’s current GSM customers and can be used when there are no mobile money services in place. However, there is a marginal dilution as airtime includes taxes and distribution costs, which can account for up to 20-30% of the value.

Before deciding on their billing strategy, service providers should evaluate their offering’s potential margins versus the transaction volumes as well as the MNO’s mobile money penetration.

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## Pre-set bill payments

One of the most basic means for service providers to partner with MNOs is via a pre-existing bill payment product. Service providers receive a bill payment ID number from MNOs and are responsible for communicating it to their customers. The digital payment can be done via airtime or mobile money.

Depending on the relationship between service providers and MNOs, the MNO may create a specific bill payment option on the mobile money menu for the service provider's particular service.

The advantages of mobile bill payment are:

- It is easy and readily available for the service provider to use, once they are approved as a vendor
- It guarantees a high level of security as no IT integration is required thanks to a standardized interface, accessible to the collector via web access
- It allows for a light touch technical and financial investment from MNOs

The main limitation of bill payment is the lack of customisation to accommodate the service provider's specific needs. Depending on MNOs' bill payment interface, this model may not allow for real-time deductions, leading to unpredictable frequency of payment to service providers, nor flexible pricing models. The bill payment model is therefore a suitable solution that meets the basic, and limited in volume, payment acceptance needs of service providers but not beyond.

## Customised billing services

MNOs can offer to integrate their mobile payment platform to the service providers' back-end system, and possibly, allow for changes to their platform for the specific needs of the product or service being paid for by the customer.

This customised billing service is a contractual model, requiring a closer partnership between MNOs and service providers, and requiring a higher level of engagement from MNOs.

As opposed to bill payment, this mobile payment model better responds to the specific needs of service providers while meeting mobile operators' different security requirements.

Due to the heavier investment (in capital and human resources) required, MNOs will most often enter into bilateral partnerships and customised billing with (larger) service companies, where the volume of transactions (in number and value) justifies the investment. Currently, these bilateral partnerships are driven by large utility companies such as electricity and water utilities.

## Shared APIs

The development of shared APIs by MNOs allows service providers to adapt their back-end system and directly integrate with MNOs' payment platform through a middleware, without having to go through a ground-up integration process. This model will demand a high initial capital investment from the MNO but, once the API is established, there will be no further major investment.

Shared APIs will allow for a more flexible integration of service providers' products to MNOs' platforms and opens up the opportunity for smaller sized service providers who have the technical capabilities to complete the IT integration.

However, shared APIs are not yet widely available for mobile bill payment services and operators need to ensure they can develop secure and functional APIs in order to protect their customers.

## Evolving mobile payment services: From pre-set bill payments to shared APIs

MNOs may choose to maintain a bill payment or contractual relationships with service providers. However shared APIs have the capacity to improve the stickiness of products and loyalty of its customers by providing a user-friendly, high-quality service for service providers.

As the need to uncover opportunities to drive payments on MNOs' platforms and the demand for mobile payment innovations increases, we expect to see more mobile operators consider how shared APIs can advance their business.

Table 4 summarises the mobile payment services MNOs can offer to its partnering service providers and the different advantages and limitations that each of these presents.

TABLE 4  
**COMPARISON OF MOBILE BILL PAYMENTS SERVICES**

	PRE-SET BILL PAYMENT MODEL	CUSTOMISED BILLING SERVICE	SHARED APIS
TECHNICAL FLEXIBILITY	No flexibility in functionality or pricing.	Tailored solution created to meet specific needs of one provider.	Fully flexible: the MNO makes functions and rules available, and the business tailors the payment mechanism into its service.
EASE OF IMPLEMENTATION	Uses the MNO's existing payment system, no additional efforts	Requires a full system integration	Once put in place by the MNO, requires integration on the service provider's back-end
COSTS	Very limited costs to the MNO	Relatively expensive due to the bespoke integration required	One time initial investment from the MNO with small maintenance costs.
SECURITY	Very limited risk, full security	Managed risks: The ground up integration will ensure that both parties' risk requirements are taken into account.	Considerable amount of risks due to the novelty of the market
A SOLUTION TARGETED TO:	Mid-size companies or NGOs with minimal technical requirements seeking to collect standard payments. No need for specific technical integration.	Larger service companies, where there are enough volumes to justify the MNO's investment.	Smaller sized, tech savvy, service providers

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# Abbreviations

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<b>ESCO</b>	Energy Service Company
<b>MNO</b>	Mobile Network Operator
<b>MECS</b>	Mobile Enabled Community Services
<b>GSMA</b>	GSM Association
<b>CPM</b>	Community Power from Mobile
<b>NGO</b>	Non-Governmental Organisation
<b>PAYG</b>	Pay-As-You-Go
<b>M2M</b>	Machine-to-Machine
<b>WASH</b>	Water, Sanitation and Hygiene



For more information on the GSMA's Mobile Enabled Community Services programme, please email: [meecs@gsma.com](mailto:meecs@gsma.com)