

Mobile for Development Utilities

Achieving SDGs 6 and 7: The promise and impact of mobile technology



GSMA Mobile for Development Utilities

The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with almost 300 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces industry-leading events such as Mobile World Congress, Mobile World Congress Shanghai, Mobile World Congress Americas and the Mobile 360 Series of conferences.

For more information, please visit the GSMA corporate website at www.gsma.com

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The Mobile for Development Utilities programme improves access to basic energy, water and sanitation services in underserved communities using mobile technology and infrastructure. Our work encompasses any energy, water and sanitation service provided to a community, which includes a mobile component, whether it is voice, SMS, USSD, Machine-to-Machine, NFC, a mobile operator's agent network or tower infrastructure. We aim to seize the opportunity, leveraging mobile technology and infrastructure to enhance access to affordable and reliable energy, clean and safe water and sanitation services in underserved communities. The GSMA Mobile for Development Utilities programme receives support from the UK Government and Scaling Off-Grid Energy.

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SCALING
OFF-GRID
ENERGY:
A GRAND CHALLENGE
FOR DEVELOPMENT



Scaling Off-Grid Energy is a global partnership founded by the U.S. Agency for International Development, Power Africa, the UK Department for International Development's Energy Africa campaign, the Shell Foundation – a UK-registered charity, and the African Development Bank. The Grand Challenge for Development aims to extend energy access to 20 million households across sub-Saharan Africa through off-grid household solar solutions.

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Cover images courtesy of Mobisol, Wonderkid Multimedia Ltd. and Loowatt.

Forewords

It is not uncommon today for individuals to own a mobile phone, yet lack basic services, such as reliable energy to light their home or power their business, safe drinking water or household sanitation. These services are essential to any individual's well-being and socio-economic development, but universal access is far from a reality.

With widespread availability and rapid growth in emerging markets, mobile presents a key opportunity to address this gap. Thanks to funding from the UK Department for International Development (DFID), which has been part of this journey since 2012, and a new partnership with Scaling-Off Grid Energy: a Grand Challenge for Development, the GSMA Mobile for Development Utilities programme has been catalysing this opportunity, impacting over four million people to date with improved access to energy, water and sanitation.

We have been excited to see maturing business models that combine a variety of mobile channels to deliver essential utility services, particularly mobile money, machine-to-machine communications and mobile services. These emerging business models in the mobile industry are a beautiful example of aligning a social purpose—helping to achieve UN Sustainable Development Goal 6 (Clean Water and Sanitation) and Goal 7 (Affordable and Clean Energy)—with an important commercial opportunity. We are encouraged by the growing number of partnerships between mobile operators and utility service providers, which are improving the lives of underserved customers, stimulating markets, empowering small businesses and saving lives.

We are excited to share the growth of the mobile-enabled utility services since our last annual report. We hope the lessons highlighted in this report, as well as the future innovation trends we have identified, will stimulate discussion and contribute to further growth in the sector. We will continue to support the important role the mobile industry is playing in tackling the pressing needs of the underserved while also creating commercial value.



Mats Granryd

A handwritten signature in black ink, appearing to read 'Mats Granryd', written in a cursive style.

Director General GSMA

Mobile technology is now central to business, to service delivery, to entertainment and to communication across the world. It is transforming banking, radio, television, agriculture and commerce. It allows people in some of the poorest countries in the world and in some of the most remote areas to access services, markets and information. And international development agencies and NGOs are just beginning to harness its incredible potential for saving and changing lives. There is so much more we can do. But this report shows some of the progress that has already been made.

The UK Department of International Development (DFID) is proud to have been part of the growth of the mobile-enabled utility sector since its inception, through its partnership with the GSMA Mobile for Development (M4D) Utilities programme. Since 2012, DFID and the GSMA have been working together to leverage mobile technology to achieve the Sustainable Development Goals of universal access to affordable, reliable and safe energy, water and sanitation by 2030. To date, we have funded 34 organisations, which are on the road to becoming scalable and commercially viable:

- Pay-as-you-go (PAYG) solar is a flagship example of how mobile technology has made clean energy affordable for over 8 million people, whilst creating a thriving commercial market in Africa. DFID and GSMA were early supporters of this sector through their grants to M-KOPA, Mobisol, Lumos, Fenix and other PAYG companies, who are now achieving increasing consumer base and diversifying their offerings to help customers move up the energy ladder.
- Digitising utility companies can lead to improvements in the efficiency of water delivery, overcoming the challenges such as bill payment and collection, reliability, and improving customer service. We were particularly impressed by a new business called Wonderkid, who developed digital tools for utilities across Kenya, providing more reliable access to water for over 500,000 people.

With the selection of nine new projects in 2017, we are excited to see what new solutions are emerging at the forefront of the sector. The increased engagement of mobile operators in energy, but also in water and sanitation services, is a welcome development that will help increase the reach of these services. We congratulate and welcome the new GSMA Innovation Fund grantees, and look forward to the results of their developing businesses.

Finally, DFID is encouraged by the growing body of research and evidence generated by the successful implementation of the M4D Utilities programme, showcased in this report. We encourage mobile operators, academics, entrepreneurs, governments, and investors alike to utilise this evidence to grow and scale this sector, and to join us in engaging in this thriving environment.



Rory Stewart OBE MP

Former Minister of State for International Development



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PROGRAMME IMPACT

2012-2017

KEY FIGURES



43

organisations
awarded
grants



GBP 2,589,784
awarded to Phase 1 grants

GBP 3,426,470
awarded to Phase 2 grants

GBP 1,600,000
committed to Phase 3 grants (to date)



25

Energy



13

Water



5

Sanitation



17

Case Studies
published

USD 275,000,000

Raised by our grantees in investment
from the private sector following our
Innovation Fund contribution¹

FUNDED PROJECTS AND STUDIES IN

27

COUNTRIES

1 Latin
American
country



17 African
countries



8 Asian
countries



1 Oceanian
country



Market assessment studies
for MNOs in 9 countries:



4

Studies for
Orange



2

Studies for
Etisalat



2

Studies for
Ufone



1

Study for
NCell

DIRECT BENEFICIARIES



4,542,410





Introduction

The GSMA Mobile for Development Utilities programme was launched in 2012, with the support of the UK Government, to promote the role of mobile technology in increasing and improving access to basic utility services in underserved communities. Over the last five years, we have been supporting partnerships between the mobile industry and utility service providers, which together are unlocking innovative new business models to deliver energy, water and sanitation.

This annual report shares our progress over the last 18 months and highlights key insights and trends in the mobile-enabled utility space. The evidence is

based on our engagement with the mobile industry, utility service providers and our Innovation Fund grant projects, which are supported by both the UK Government and Scaling Off-Grid Energy. This report demonstrates the important role of mobile in improving the delivery of essential services to the underserved, and showcases the progressively viable business models being implemented. We are excited to see evidence that the mobile industry is increasingly aware of the ripe business opportunity in the utility sector, and that this is leading to more mature and effective partnerships.

Mobile and the Sustainable Development Goals

Mobile technology has become one of the most powerful platforms for accelerating progress on the United Nations Sustainable Development Goals (SDGs). By leveraging the reach of mobile networks and widespread availability of mobile technology, the GSMA is committed to working to reach these goals by 2030.






In developing countries, the rapid growth of the mobile industry has outpaced the growth of infrastructure and

services that are essential to economic development. Our programme focuses specifically on access to clean water and improved sanitation (SDG 6) and clean and affordable energy (SDG 7). A vast number of households globally do not have access to energy, water and sanitation, but are covered by mobile networks. These individuals constitute a large addressable market² for whom mobile-enabled utility solutions could make a real difference.

1. The early-stage investment provided through our Innovation Fund has helped several companies demonstrate proof of concept for their models, which in turn has attracted large-scale private sector investment. The majority of this investment has been in PAYG solar companies Lumos (USD 90 million), M-KOPA (USD 80 million), Fenix, d.light, Mobisol and PEG.

2. The addressable market was calculated based on those without access to either energy, water or sanitation who lived within 2G or 3G mobile network coverage (coverage data as per GSMA Intelligence estimates).

Addressable Market: total utility access gap and individuals within the access gap covered by 2G/3G networks

		Total access gap	Addressable market
7 AFFORDABLE AND CLEAN ENERGY 	 ENERGY	1.1 BILLION ³ PEOPLE	855 MILLION PEOPLE
	 WATER	848 MILLION ⁴ PEOPLE	373 MILLION PEOPLE
6 CLEAN WATER AND SANITATION 	 SANITATION	2.48 BILLION ⁴ PEOPLE	1.97 BILLION PEOPLE

Since our last [annual report](#), the electricity access gap has narrowed. This is due to overall higher electrification rates worldwide, including off-grid energy, which is often supported by mobile technology. The addressable market figures for water and sanitation have increased in line with new WHO-JMP standards on WASH access,⁴ widening the total access gap, while 2G and 3G coverage in those areas has also increased. In these sectors, innovations being trialled have yet to scale and have a significant impact on the access gap.

The promise of mobile-enabled utility solutions is that their impact can be felt far beyond access to basic services. Our grant projects have demonstrated that improving access to energy, water and sanitation also helps to improve health, education, income generation and other areas that enhance the lives of underserved people. Indeed, mobile-enabled utility solutions can unlock progress on all the SDGs.

3. World Bank, SE4ALL database from the SE4ALL Global Tracking Framework led jointly by the World Bank, International Energy Agency and the Energy Sector Management Assistance Program, 2016.

4. WHO, 2017, "Progress on drinking water, sanitation and hygiene", http://who.int/water_sanitation_health/publications/jmp-2017/en/

MOBILE CHANNELS

How is mobile advancing SDG 6 and SDG 7?

Mobile payments



Mobile money



SMS payments



Mobile credit



Remote and secure payment collection



Digital record of payments

Machine-to-machine (M2M) connectivity



Smart metering and monitoring of utility systems via GSM networks



On/off control of services to customers on PAYG arrangement



Improve lifetime and efficiency, trigger maintenance and provide insights into customer behaviour

Mobile services



Voice



SMS



USSD



Apps



Report service delivery status



Optimise supply chains



Provide customer support

Infrastructure

Telecom towers used as anchor loads for micro-grid and/or energy hub providing energy to surrounding communities.



Sales, distribution and branding



Leverage MNOs' extensive sales and distribution networks



Benefit from the MNO's recognisable and trusted brand

Customer data



Creditworthiness assessments



Perpetual payments

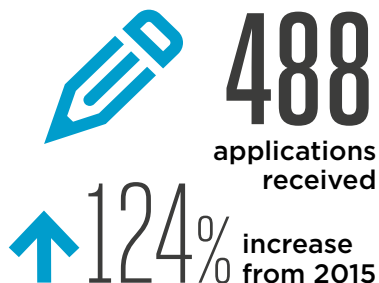


Rent-to-own models

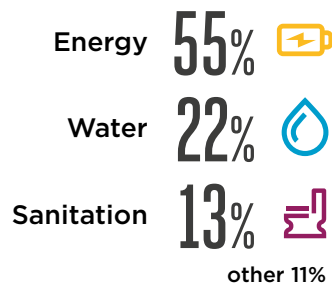
PROGRAMME HIGHLIGHTS: 2016-2017

OUR INNOVATION FUND A NEW ROUND OF FUNDING

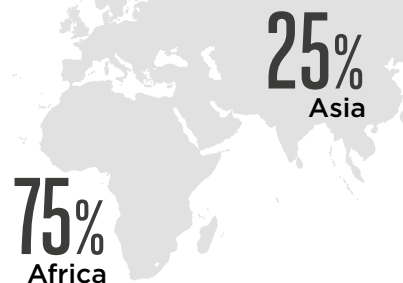
VOLUME OF APPLICATIONS



SECTOR



GEOGRAPHY



9 new grants awarded

We are currently selecting our final grantees.

Completed 21 grants in 2017, and are currently publishing lessons from each grant, including:

Loowatt

Loowatt



Wonderkid



Gham Power



Sanergy

MNO ENGAGEMENT

LAUNCHED OUR CHAMPIONS NETWORK



1ST MNO WORKSHOP

held in Dar es Salaam, Tanzania



KNOWLEDGE SHARING AND CONVENING:

2 insight reports published on [PAYG solar](#) & [PAYG in greenfield markets](#).



MARKET-BUILDING ACTIVITIES:

investor webinar series with **7** speakers from foundations, impact funds and funding platforms

2-day working group convened in Tanzania



Pilot of our **IPN Hub** concluded



> connecting **4** entities (MTN Rwanda, Tigo Rwanda, BBOXX and Off Grid Electric)



45 organisations in attendance



> processing **hundreds of thousands** unique payment transactions to date.

Looking ahead

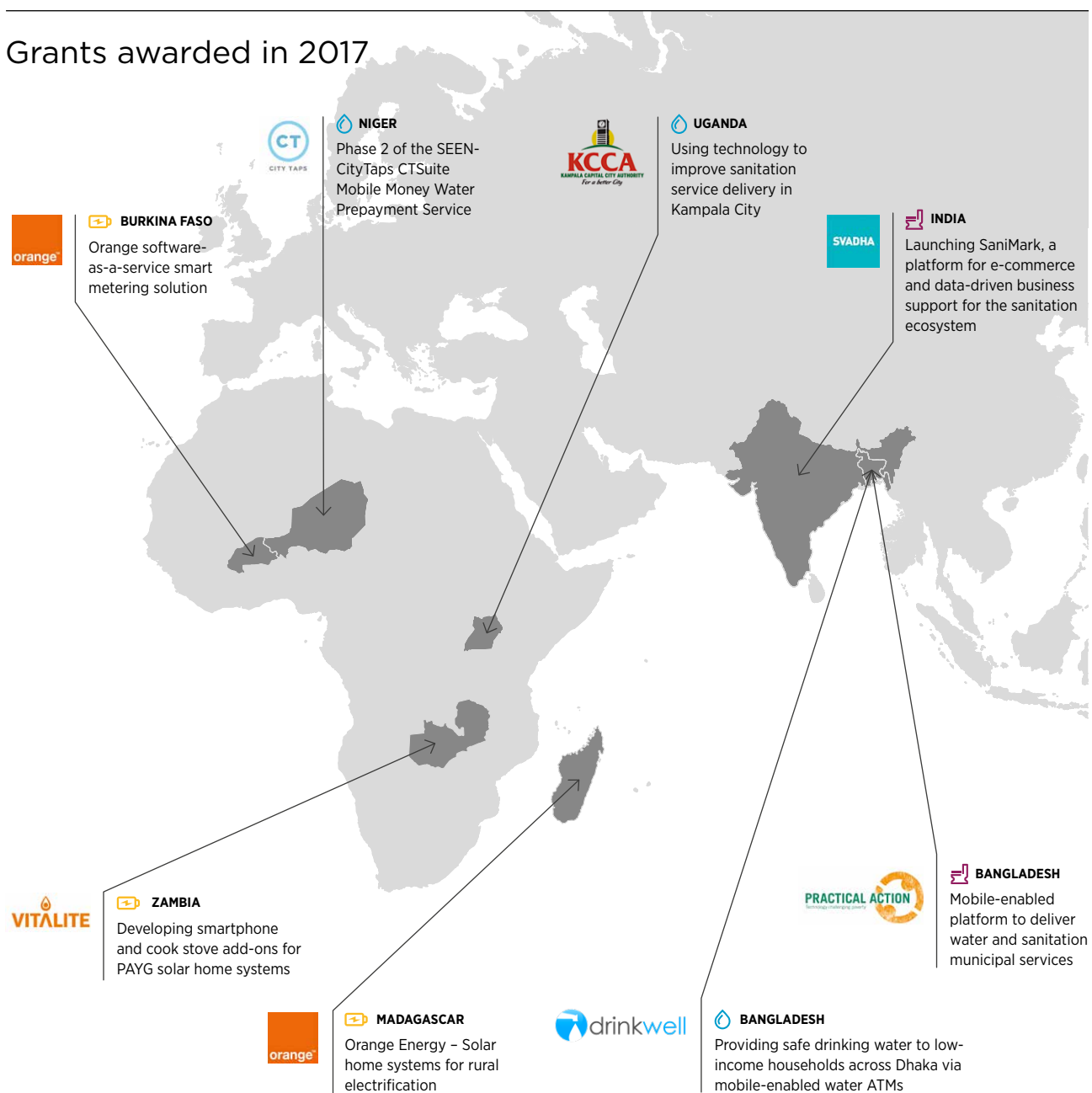
Our programme is excited to support a new cohort of grantees in 2018, by helping them to trial their business models and bring them to scale.

We recognize there is still more work for be done to bring service providers and Mobile Network Operators (MNOs) together. The Mobile for Development Utilities programme will ramp up engagement efforts with MNOs to encourage them to take a more active role in

the sector, and continue to support service providers by promoting the benefits of mobile technology for their innovations and businesses.

We will continue to explore future opportunities in this space through a new series of reports on emerging innovations and technologies that could support access to energy, water and sanitation.

Grants awarded in 2017



1. Unlocking access to energy through mobile

Mobile technology has been unlocking new and innovative models for energy access, creating opportunities to make significant progress on SDG 7. The International Energy Agency (IEA) recognised this in its World Energy Outlook for 2017: *“The combination of declining costs for solar and decentralised solutions and new business models making use of digital,*

mobile-enabled platforms has increased the number of available solutions to cater to those currently without electricity access.”⁵

We have seen powerful examples of how these new solutions are changing the lives of individuals who, until now, have been underserved.



Mobile-enabled micro-grids are bringing energy to the most remote locations where the grid is unlikely ever to reach. In the Khotang region of Nepal, Gham Power partnered with NCell to create two micro-grids with telecom towers as anchor tenants, providing both energy and mobile coverage. Gham Power worked with eSewa to accept mobile payments from customers.

“We don’t have to live in the dark anymore. I think that is the biggest impact created by the micro-grid service.”

Bhakta Bahadur Khatri, Chyasmitar

“It has become easier to conduct household activities like cooking and preparing meals. I can work till late at night.”

Januka Khatiwada, Harkapur



Bottom-of-the-pyramid households are increasingly able to purchase or rent **solar home systems (SHS)** for lighting using mobile payments, displacing dirty and expensive non-renewable sources. D.light worked with Digicel and ReVolt to reach over 14,000 underserved customers.

“I really appreciate the SHS because it took me out of darkness. Now I just have to press a button and I have light. I am afraid of the dark. It has changed my life. You hear about candles falling on tables, on tablecloths; candles are really disgusting. I don’t like them. Candles dirty your house, they can even start a fire. I am able to save money on the two to three candles a day that I used to buy. I feel safe with [the SHS] because before I go to sleep I put on one of the lights outside and it lights up my yard; if someone comes in I would be able to see.”

Carlo Saint Hillaire, Léogâne

5. International Energy Agency, 2017, “Energy Access Outlook 2017”, <https://www.iea.org/access2017/>

The GSMA Mobile for Development Utilities team has been fostering collaboration on mobile-enabled energy solutions since 2012, when interaction between the off-grid energy sector and the mobile

industry was still in early stages. Today we are excited to see growing evidence that this model is viable and the important commercial and social opportunities these partnerships can create.

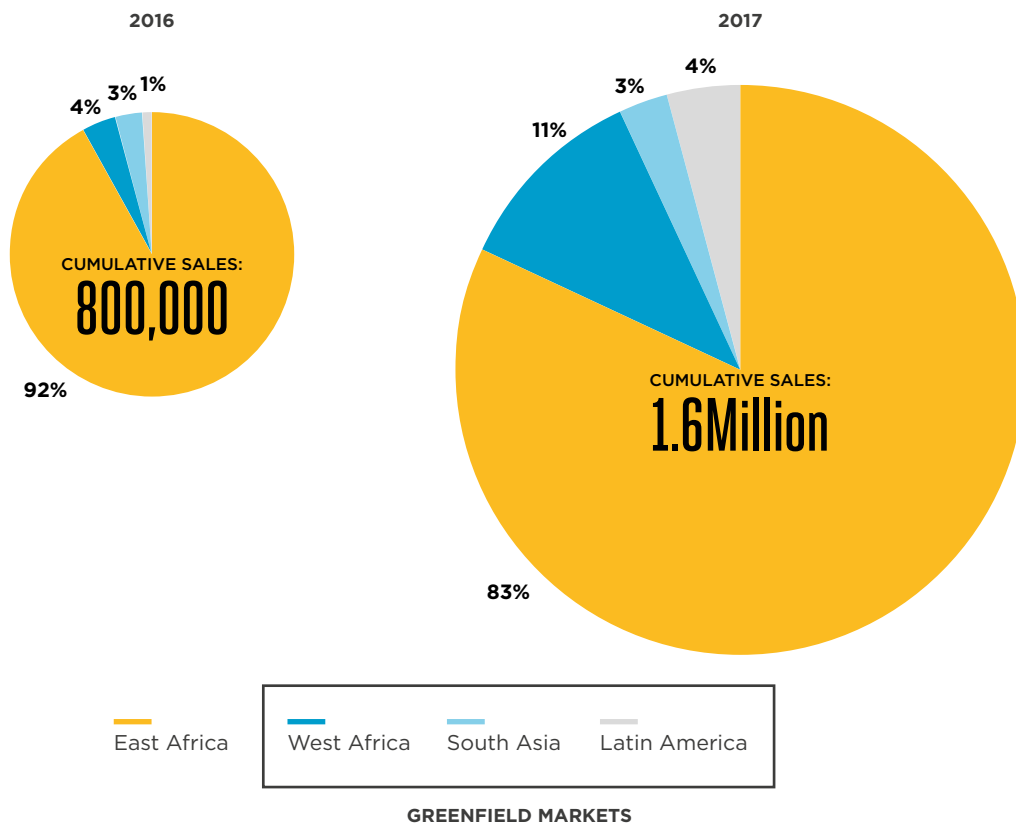
The success of PAYG solar

Pay-as-you-go (PAYG) solar is a flagship example of how mobile technology can help to make clean energy affordable and create sustainable business models. The model emerged from a convergence of several mobile technologies—mobile payments, M2M connectivity and cloud computing—and is beginning to achieve impressive commercial scale.

In fact, the PAYG model has the potential to reach unprecedented scale. It has successfully unlocked a

large segment of the solar off-grid market by allowing lower income customers to buy solar products on credit or pay small fees for continuous use. GSMA data found that by mid-2017, over 1.6 million PAYG solar units had been sold,⁶ and an estimated 8.5 million individuals had benefitted from access to clean and reliable energy in their homes. PAYG solar home systems (SHS) represent 10 to 15 per cent of SHS sold globally today, but account for most of the sector’s recent growth.⁷ Two of our early grantees are examples of this growth:

Share of total PAYG sales by region



6. GSMA Mobile for Development Utilities, December 2017, "Going greenfield with utility pay-as-you-go models: Enabling access to water, sanitation and energy in and beyond East Africa", <https://www.gsma.com/mobilefordevelopment/programme/m4dutilities/going-greenfield-with-utility-pay-as-you-go-models-enabling-access-to-water-sanitation-and-energy-in-and-beyond-east-africa>
 7. Hystra, 2017, "Reaching Scale in Access to Energy: Lessons from Practitioners", <http://hystra.com/a2e>



Mobisol

Mobisol has expanded significantly since receiving a GSMA grant in late 2013. Today the company has installed 85,000 solar home and business systems in Rwanda, Tanzania and Kenya, reaching 500,000 beneficiaries. Mobisol focuses on large SHS that can deliver sufficient power to illuminate households as well as power appliances and productive devices. Mobisol has recently acquired Lumeter, one of the largest providers of PAYG software. This move combines the companies' hardware and software expertise to deliver more PAYG functionalities. Stefan Zelazny, Chief Innovation Officer at Mobisol said, *"We see the Lumeter acquisition as a key step in our plan to expand the pay-as-you-go market for Mobisol, its off-grid partners and other technologies beyond solar."*⁸



Lumos

Since receiving a GSMA grant in 2014, Lumos is now implementing a nationwide roll-out of mobile electricity across Nigeria in partnership with MTN. Lumos has sold 65,000 solar systems and announced it had raised USD 90 million from private equity investors—the biggest fundraising round to date for the off-grid market, according to Bloomberg. In November 2017, Lumos launched a nationwide PAYG solar service in Côte d'Ivoire in partnership with MTN Côte d'Ivoire. MTN Côte d'Ivoire representative Frank Logroan said, *"We are confident that this new service will benefit our customers and communities with a quality, affordable alternative electricity solution."*⁹

Another clear sign the PAYG solar sector is advancing is the large amount of private capital invested in several key players recently. The PAYG model relies on debt financing to offer SHS on credit, but in the model's early stages this proved difficult to raise from risk-averse lenders. However, in the last two years, the positive performance of PAYG companies has begun to reverse this trend. In January 2017, Bloomberg New Energy Finance reported that USD 380 million had been invested in PAYG solar companies in debt, equity and grant capital, and 2017 brought additional investments of up to USD 100 million.¹⁰

The fact that the PAYG industry is beginning to attract significant capital demonstrates that investors are recognising the commercial promise of the sector and displaying higher levels of confidence in its positive trajectory. There is now a large community of international funders injecting money into the sector, including 17 foundations, 21 impact investors and a number of venture capital funds. CDC Group, the UK's Development Finance Institution has invested heavily in the sector and explains it this way: *"We want to help fill the gap to allow SHS companies to continue to scale, develop track record and reach profitability."*¹¹ The following are a few notable examples of investment in PAYG companies.

8. Clean Technica, 2017, "Mobisol acquires Lumeter to Expand Off-Grid Solar Pay-As-You-Go Solution", <https://cleantechnica.com/2017/06/29/mobisol-acquires-lumeter-expand-off-grid-solar-pay-go-solution/>

9. Africa Business Communities, 2017, "Lumos launches nationwide solar electricity service in Côte d'Ivoire", <https://africabusinesscommunities.com/news/lumos-launches-nationwide-solar-electricity-service-in-cote-divoire/>

10. Bloomberg New Energy Finance, 5 January 2017, "Off-Grid and Mini-Grid: Q1 2017 Market Outlook", <https://about.bnef.com/blog/off-grid-mini-grid-q1-2017-market-outlook/>

11. Solarplaza, 12 October 2017, "The state of solar power financing in Africa", <https://www.solarplaza.com/channels/markets/11728/state-solar-power-financing-africa/>



Fenix is acquired by ENGIE

In October 2017, Fenix International was acquired by French utility multinational ENGIE. This move is a major development in helping the company raise additional millions in debt capital. *“By joining forces with ENGIE we will greatly accelerate the path to our vision,”* said Lyndsay Handler, CEO of Fenix.¹² The acquisition signals ENGIE’s commitment to *“decentralized, decarbonized, digital energy solutions as a way to fulfil their goal of reaching 20 million people by 2020.”*¹² It is also the first major acquisition in this space, an important marker of how these models are maturing. Fenix received a seed grant from the GSMA in 2013 to scale its PAYG SHS business in Uganda.



M-KOPA Solar raises USD 80 million

This round of funding represents the largest commercial debt facility to date in the PAYG off-grid energy sector. The funding comes from CDC (USD 20 million), FMO (USD 13 million), Norfund (USD 13 million) and Stanbic Bank (USD 9 million). Jesse Moore, CEO and co-founder of M-KOPA says, *“It’s part of an emerging trend for development partners and investors to look at more cost-effective ways to fund last mile connectivity.”*¹³ M-KOPA has now reached 500,000 customers with energy and is launching new products, including a solar TV developed as part of its GSMA grant in 2013.



PEG raises USD 13.5 million

PEG has raised USD 13.5 million in funding through a combination of debt and equity financing to reach 500,000 people with PAYG energy in Ghana and Côte d’Ivoire. Hugh Whalan, CEO of PEG, says, *“We are excited that we can now accelerate our growth plans in key West African markets. It is testament to the quality of the opportunity that all previous investors have participated in the Series B equity financing.”*¹⁴ The licensing of M-KOPA solar products to PEG was originally developed as a result of PEG’s GSMA grant in 2014 to trial licensing and replication from East to West Africa.

Despite these successes, becoming a global solution is still long and challenging road for PAYG solar. Success stories are still primarily confined to East Africa, with providers looking to expand into emerging West African markets such as Nigeria, Côte d’Ivoire and Ghana. Asian markets still have important differences and challenges, such as high levels of competition from the commodification of the market and a mobile

money ecosystem that is either nascent or based on over the counter models (OTC), in which customers make payments through an agent rather than their own mobile wallets. The Mobile for Development Utilities team remains committed to seeking a deeper understanding of Asian markets and helping to foster an ecosystem of sharing best practices and communication across regions.

12. PV Magazine, 19 October 2017, “ENGIE to acquire lease-to-own solar company Fenix International”, <https://www.pv-magazine.com/2017/10/19/engie-to-acquire-lease-to-own-solar-company-fenix-international/>

13. M-KOPA Solar, 10 October 2017, “Press Release: M-KOPA secures US \$80 Million Commercial Debt Funding”, <http://solar.m-kopa.com/wp-content/uploads/sites/4/2015/02/M-KOPA-Debt-Announcement.pdf>

14. Disrupt Africa, 27 October 2017, “Solar company PEG Africa secures \$13.5m funding”, <http://disrupt-africa.com/2017/10/solar-company-peg-africa-secures-13-5m-funding/>

Emerging trends in mobile-enabled energy

Beyond lighting for customers: follow-on financing schemes and new products

PAYG models are increasingly allowing providers to establish long-term relationships with customers. A number of companies have begun to leverage these customer relationships to sell upgrades, appliances and other financial services to those who successfully repay their initial product. These have taken several different forms:

- **Additional appliances and bundling, such as TVs and radios:** These products allow customers to move from basic lighting up the energy ladder to larger appliances (some for productive use) or even to products that have key health benefits, such as water filters and better quality cookstoves. Additional appliances provide reinforcing sales for PAYG solar providers, as they create a need for greater power capacity.
- **Financial services, including loans and insurance:** PAYG companies can capitalise on the collection of customer data and payment histories for credit scoring, allowing customers to access financial services. For example, Fenix is offering customers access to financing for school loans and PEG is offering health insurance.¹⁵

Growth of MNO-led business models for PAYG solar and grid power

Over the last few years, the mobile industry has become increasingly aware of both the promising business opportunity and the important role it can

play in the energy sector. With over 1.6 million mobile money transactions recorded every month to top up PAYG products in September 2016,¹⁶ the direct benefits to MNOs are clear. Beyond simply providing payment and communication platforms, we have seen growing interest from MNOs around the world in launching and leading their own PAYG solar models, as well as smart metering and pre-paid energy platforms for centralised urban grids and mini-grids. Our 2017 Innovation Fund saw more proposals from MNOs, three of which received grants: two of which are launching PAYG solar business models, and the other is deploying pre-paid smart metering for mini-grids.

Growing MNO interest in developing smart-metering and pre-paid solutions for grid power is evident in a few deployments and in several proposals submitted to the Innovation Fund. In Africa, Orange received a grant to replicate its mobile-enabled grid management in Tunisia with mini-grids in Burkina Faso. From our past round of grantees, Dialog Sri Lanka continues to work with the national energy utility, LECO, to develop a pre-paid metering solution. The proposals from other MNOs suggest growing interest in building their own metering and billing platforms by leveraging their networks, billing and mobile money platforms.

We are excited to see MNOs embracing the business opportunity of utility services. These MNO-led grants will test their potential to become the driving business entity for launching and scaling these models, and will help us to better understand the true commercial value of these services for MNOs. It will also test whether MNOs' brands and vast customer networks can scale these services at the rapid rates needed to achieve SDG 7.

15. To reward its solar customers, PEG has developed a programme delivering free health insurance. Health emergencies that drain family savings are a primary reason why customers stop repaying their loans on their rent-to-own solar systems. Partnering with BIMA and Prudential Lifelivable, PEG now offers free hospitalisation insurance cover to customers to overcome this challenge and reward customer loyalty. The project has been piloted with over 2,000 families and is being scaled across PEG's markets.

16. GSMA Mobile for Development Utilities programme, January 2017, "Lessons from the use of mobile in utility pay-as-you-go models", <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/01/Lessons-from-the-use-of-mobile-in-utility-pay-as-you-go-models.pdf>

PAYG is being replicated beyond solar lighting

The success of PAYG solar in East Africa has encouraged other sectors to replicate the model. Using the same functionalities as PAYG solar systems (mobile payments, M2M and mobile services), new products at an early stage of commercialisation include PAYG cookstoves, solar-powered irrigation, water

delivery and sanitation products. In the water sector, for example, CGAP has identified four clear service delivery models based on mobile technology: water bill payments (both pre-paid and post-paid), pay-as-you-drink (public pre-paid water access through water ATMs or pre-paid household meters), digital credit to offset connection costs and the transfer of government subsidies through digital channels.¹⁷



Credit: M-Kopa

17. CGAP, April 2017, "Quenching a Thirst: Digital Finance and Sustainable Water Service for All", <http://www.cgap.org/sites/default/files/Brief-Quenching-a-Thirst-Apr-2017.pdf>

Beyond SDG 7: the impact of mobile-enabled energy

SDG 7, which calls for clean, reliable and affordable energy, is not just an end in itself—it is also a key ingredient of economic growth, human development and environmental sustainability, and is deeply intertwined with the achievement of several other SDGs, as exemplified by our grantees.

3 GOOD HEALTH AND WELL-BEING



Mobile solutions make clean energy appliances more affordable, allowing customers to experience health improvements from inhaling fewer toxins (e.g. reduction in coughing or respiratory issues).

67 per cent of [Devergy](#) customers who previously relied on kerosene noticed a change in the health of their household members since reducing use (Source: Acumen).

4 QUALITY EDUCATION



Lighting increases educational opportunities, with customers reporting an increase in the average hours per day children study after sunset.

"VIA [[Village Infrastructure Angels](#)] very much helped with homework. With kerosene there was no incentive; children have problems with their homework. Solar is helping fathers and mothers help with children's homework."
– VIA customer

5 GENDER EQUALITY



Mobile-enabled utility services can help drive women's digital and financial inclusion, and empower them as local entrepreneurs or sales agents.

[KopaGas](#) found that 98 per cent of customers were women who purchased PAYG LPG cooking gas via mobile money. They employed women from the local SACCO for marketing, training and pre-sales operations.

8 DECENT WORK AND ECONOMIC GROWTH



Energy supports income-generating activities and entrepreneurship. Businesses report longer opening hours due to better lighting, as well as new commercial activities, such as phone-charging businesses.

"After connecting with [Gham Power](#), we have been able to run our business for longer hours; we have recently introduced computer classes as we have enough power to run several computers. Our efficiency has also increased; now the computer classes run in the morning and in the evening. We can also carry out printing jobs during the evening" – Tika Rai, Gham Power customer

13 CLIMATE ACTION



By making clean energy sources more affordable, mobile-enabled energy solutions play an important role in displacing non-renewable dirty energy sources, such as kerosene and diesel generators.

Having connected over 500,000 households to solar power in five years, [M-KOPA](#) estimates it has reduced 380,000 tonnes of CO2 from the burning of kerosene.

17 PARTNERSHIPS FOR THE GOALS



Collaboration between MNOs, energy providers and international donors is a powerful example of partnerships that are accelerating progress on the SDGs.

"[Mobile-enabled energy] is a beautiful example of a convergence between an SDG—SDG 7—with a business opportunity, of doing good and doing good business." – [Mats Granyrd](#), Director General of the GSMA

Mobile for Energy Access Campaign

Decades ago we could not have imagined that mobile technology would be enabling off-grid energy access. In the late 1990s and early 2000s, as mobile operators entered African markets, they quickly surpassed fixed line telephony access. However, growth in mobile access did not really take off until the introduction of pre-paid or pay-as-you-go airtime and low-cost handsets, which made mobile more affordable and allowed services to reach areas with no other communication access.

The journey of PAYG solar companies has been similar. They have surpassed access to fixed grid infrastructure and are finding innovative new ways to make solar technology, which is increasingly available, even more affordable for low-income consumers in areas that do not currently have energy access.

“The energy nexus is as exciting as when mobile money started to take hold... This is the last great frontier: the energy access deficit.” – Strive Masiyiwa, founder and CEO, Econet

MNOs and service providers have already taken important steps to leverage the ubiquity of mobile to deliver energy to underserved consumers. Great strides have been made in improving access to energy in the past few years, and the enabling partnerships and collaborations between service providers and MNOs should be commended. However, there is still much work to do to achieve SDG 7, and MNOs are uniquely placed to do much more to accelerate energy access through mobile technology.

Through the **Mobile for Energy Access Campaign**, the GSMA calls on MNOs to seize the business opportunity in the energy access deficit while positioning themselves at the frontier of innovation, using the same building blocks that helped to connect billions through mobile for the first time. MNOs that position themselves for the opportunity must begin by:

- Developing robust mobile platforms, such as mobile money and IoT platforms, that have the necessary components for widespread use by third parties, for example:
 - Open APIs (application programme interfaces) that enable sophisticated and real-time integration; and
 - Mobile money agent networks that are strategically trained and located.

- Developing clear processes for establishing commercial agreements and partnerships with utility service providers that can leverage operators’ assets.
- Dedicating resources to assess how business objectives can be met by different types of engagement in innovative, mobile-enabled utility services, whether via operator-led business models, in-house product development or varying degrees of commercial agreements and business partnerships.

The Mobile for Development Utilities programme will continue to highlight the achievements of the sector and call the mobile industry to action, through greater support and participation in the sector through partnerships, finding clear ways to work with innovators, leveraging their M2M technology, expanding their agent networks or deploying robust bill pay services.



“Telecom’s convergence with energy will be far more relevant to billions of people. And that’s exciting.”

Strive Masiyiwa, founder and CEO, Econet

2. Maturing mobile-enabled water and sanitation service models demonstrate impact and sustainability










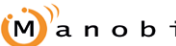










As with energy, mobile channels can also improve water and sanitation service delivery. Mobile money and mobile services (mobile apps, SMS, voice and USSD) can enable remote payment, real-time data collection, and effective communication and monitoring. These tools not only enable new business models, but also provide the transparency and accountability essential for sustainable service delivery.

The GSMA Mobile for Development Utilities programme has watched the sector evolve from a

promising beginning, when additional trials were still needed and lessons had to be shared,¹⁸ to today, when there is a growing body of evidence that mobile is having an impact on water, sanitation and hygiene (WASH). In this section, we share how our Innovation Fund grantees and other organisations have implemented mobile channels in their services, as well as hard data on the benefits of mobile technology. We conclude by looking at other approaches to delivering financially sustainable water services and considerations for MNOs.

18. GSMA, May 2014, "Predicting the future of mobile-enabled community services", https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/05/GSMA_MECS_Annual-Report-2013.pdf

Use of mobile channels in water and sanitation

		Mobile channel			
		 Mobile services	 Mobile money	 Machine-to-machine connectivity	
Innovation Fund grantees		   	    	 	   
Upcoming grant projects in Phase 3		 <p>Svadha is developing a sanitation e-commerce platform to enable sanitation entrepreneurs to deliver quality sanitation products and services.</p>	 <p>Kampala Capital City Authority aims to improve access to safe and reliable faecal sludge collection and transportation services by upgrading a GIS mobile tracking application, to integrate it with mobile money, and a call centre to link residents of informal settlements of Kampala to pit emptiers.</p>	 <p>CityTaps is scaling its smart metering and PAYG subscriber management solution for water utilities.</p>	
Testimonials	<p><i>"We are very happy because now we do not need to rely on the bill. We get notifications, and paying takes as long as getting the Orange top-up card and sending the SMS."</i> – CityTaps end user</p> <p><i>"eWATERtap is really important. We used to go collect water at the well before, but now we use the water from the eWATERtap to drink and bathe. People go today to the well only when they don't have eWATER credit. The water is good for us and keeps us healthy and since we had it, our children no longer have stomach aches."</i> – Africa Water Enterprises eWATERtap end user</p>				

Through these grant projects and others, hard evidence of the impact of mobile technology on WASH is mounting. As the following case studies demonstrate,

mobile is helping to optimise costs and resources, improve revenue collection and gross margins, and make data more available and transparent.

Impact of mobile on WASH, by the numbers:

SANERGY designs, manufactures and sells low-cost, high-quality sanitation facilities called Fresh Life Toilets (FLT) to Fresh Life Operators (FLOs). FLOs pay for their toilets in installments using mobile money. By deploying automatic SMS reminders when installments are due, Sanergy increased the on-time payment rate from 50 per cent to 75 per cent. With this improvement, Sanergy now only requires one credit officer for every 275 FLOs and expanded its credit line by a factor of five.

Sanergy uses mobile technology at every step of the sanitation value chain,¹⁹ including in its waste collection logistic processes. Over the course of one year (June 2016 to July 2017), its network expanded by 40 per cent at a rate of 60 FLT installed every month. To optimise waste collection routes, the GPS locations of its toilets are recorded and updated continually through mobile, optimising collection routes as the toilet network evolves. Waste collection staff are thus able to service more FLTs and the cost per kilogram of waste collected actually dropped by 20 per cent in this period, both crucial metrics in the race to keep costs down as more FLTs are installed to serve the community's sanitation needs.

SMS PAYMENT REMINDER

75%  of payments made on time

 **1** credit officer per **275** toilet operators


 **5 times** credit line increased

SAFE WATER NETWORK, in partnership with mWater, launched a mobile monitoring app to digitise operational data collection for peri-urban and rural small water enterprises. By transitioning away from a paper-based manual system to a mobile app that collects water station data like sales, meter reading and water quality, Safe Water Network achieved a 50 per cent reduction in monitoring costs. The mobile monitoring system and issue reporting platform, both developed by mWater, reduced the time staff spent on monitoring activities, travelling to report data, and analysing and correcting it. Incidental expenses, such as fuel and accommodation costs, also decreased. Real-time issue reporting and remote diagnostics reduced maintenance response time per station by a third, from 12 hours to eight hours per month.

Such operational optimisation is crucial to Safe Water Network as it continually strives, with the support of mobile technology and other innovations, to increase the gross margins of water stations and reduce the time it takes to break even with operating costs. Safe Water Network is now piloting the use of mobile money, smart meters and water ATMs to further improve the scalability and sustainability of its water stations.

MOBILE APP FOR DATA COLLECTION FOR PERI-URBAN AND RURAL WATER ENTERPRISES

 **50%** reduction in costs

 **33%** reduction in station downtime

19. GSMA, Mobile for Development Utilities, August 2015, "The Role of Mobile in Improved Sanitation Access", <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/08/The-Role-of-Mobile-in-Improved-Sanitation-Access.pdf>

CLEAN TEAM, a provider of household container-based sanitation²⁰ set up by Water and Sanitation for the Urban Poor in Ghana, achieved 97 per cent customer registration to mobile payments for sanitation services. This was an effort to reduce the time and costs associated with collecting cash payments from customers for bi-weekly toilet servicing. As of September 2017, 81 per cent of payments were collected through mobile money and 55 per cent are now made in advance, which never happened prior to the rollout of mobile money payments.

By offering a flexible and convenient payment channel, Clean Team improved its cash flow, reduced its collection costs by 11 per cent, automated payment reconciliation and gained a real-time view of customer payments and credit. This has translated into a 40-point increase in gross margin from negative to positive over a one-year period, and account managers are now able to focus on business development rather than chasing delinquent customers.²¹

MOBILE MONEY PAYMENTS FOR TOILET SERVICING



WONDERKID developed a suite of mobile tools for water utilities - a mobile app for meter reading, customer-initiated meter reading by SMS, and a customer care system for complaints and bill queries. At Kisumu Water and Sanitation Company (KIWASCO), one of 21 utilities where Wonderkid has deployed its solutions, complaint resolution time dropped from 15 days to six days, and meter reading efficiency by utility staff increased by eight per cent. The various efficiencies led to an eight per cent increase in billed revenues and a 28 per cent increase in collected revenues between August 2015 and December 2016, which allowed KIWASCO to expand its service to new customers and increase the number of billable accounts by nine per cent.

MOBILE TOOLS FOR WATER UTILITIES



MANOBI developed a digital management platform for Water Pipe Systems (WPS) operators, complete with mobile water bill payment and profit and loss management functionalities that facilitate commercial financial investment in expanding water networks. WPS operators use the mobile app to record the performance of their piped networks, and end users can use mobile money to pay their water bills. The Government of Benin decided that all 500 government-funded WPS would be equipped with MANOBI's digital platform to improve governance and track water service performance.



20. In container-based sanitation (CBS), human faeces are contained in sealable, removable cartridges, which are then collected and transported to treatment facilities. The delivery of empty cartridges and collection, transport, safe disposal and treatment of full ones form the basis of a commercial business model for toilet provision and servicing.

21. Data from Clean Team.

The M2M mobile channel and WASH

In the WASH sector, the M2M mobile channel has attracted a great deal of interest in remotely monitoring and controlling services, but these models have had mixed results. While the use of M2M for remote control, such as smart meters and water ATMs that turn water on or off based on payment status, shows promise in terms of technical viability, remote sensing still faces some challenges. [Upande](#), in partnership with BRCK, developed GSM-enabled water flow monitoring devices to provide a low-cost solution for monitoring and managing non-revenue water. During the grant period, they struggled with the reliability of the data loggers due to weather damage and water seepage, vandalism, theft and unreliable mobile coverage. They repeated the field testing cycle of build-measure-learn (as advised by the GSMA report, "[IoT development journey for utility enterprises in emerging markets](#)") more than four times.

Sanergy, in partnership with SweetSense, trialled mobile-enabled sensors in its Fresh Life Toilets to estimate fill levels and waste collection scheduling. Waste collectors and toilet operators used the sensors to record servicing events and request assistance. Sanergy found that the high cost of the sensors themselves, as well as operation and maintenance, did not warrant a scaled deployment to its entire network of toilets. Sanergy did, however, find sensors useful for understanding its internal processes better, which led to improvements.

In a previous grant project, [Portland State University](#)/SweetSense saw a clear benefit to sensor-enabled rural water hand pumps, which significantly reduced repair times (86 per cent reduction to ad hoc maintenance without sensors). However, the long-term future of the solution still depends on lower sensor costs and financial support for ongoing maintenance services.

Bundling and platform sharing: other paths to financial sustainability

In the quest for financial sustainability, organisations may bundle services to diversify and increase their revenue streams beyond core water and sanitation services.

Samagra, for instance, provides community toilet facilities in informal settlements in India and a variety of value-added services, such as mobile recharge, bill payment and financial services. Their centres also sell cookstoves and solar lights, mirroring solar PAYG companies like M-KOPA, which offers water tanks to its customers based on their PAYG payment history. These service bundles allow Samagra to attract and retain users to achieve profitability.

Another way to become financially sustainable by making mobile technology more affordable is to share a service or platform as widely as possible, to allow other organisations to benefit at a lower cost. x.runner, SOIL Haiti, Clean Team, Sanergy, Sanivation and Loowatt, are the founding members of the Container Based Sanitation Alliance (CBSA), which is looking at combining the individual efforts of its members to create a common platform that would serve the wider CBS sector with common functionalities customised to each service model and context. mWater has taken a similar approach: once a feature has been paid for and developed for one organisation, for example, Safe Water Network's issue-reporting functionality, it is made available to all free of charge.

Mature mobile-enabled WASH service models reveal benefits for MNOs

As the evidence shows, mobile technology has clearly demonstrated its value in mobile-enabled WASH business models. The efficiency, cost and resource optimisation, improved revenue collection and greater data transparency mobile enables have been critical to the financial sustainability of WASH services. As mobile technology becomes a de facto solution for WASH utility service providers, MNOs stand to benefit from greater use of their services and assets.

For example, with the support of Wonderkid, KIWASCO's customers increased their use of mobile money to pay water bills, which translated into a 71 per cent increase in the number of mobile money transactions and a 50 per cent increase in the value of these transactions. For MNOs, this signals an opportunity to collaborate with organisations in the WASH sector and provide them with enterprise solutions to leverage various mobile services, from mobile data to SMS, M2M, SIM packages and mobile money, and to see the commercial benefits for them both.



3. Taking the pulse: MNOs confirm the market opportunity in the utilities sector

The GSMA Mobile for Development Utilities team has spent the past few years consolidating evidence on the benefits of MNOs engaging in the utilities sector in emerging markets. Through our grants and research, we have collected data and examples that validate the business case for MNOs. Now, we have gone back to the MNOs to ask them about their key value drivers and challenges they have experienced.

Twenty-five MNOs currently involved in the deployment of mobile-enabled utility services in

Sub-Saharan Africa and South and Southeast Asia responded to our questions. The commercial and social opportunity in the sector is clear to MNOs, and this has been confirmed beyond the survey, by the growing number of partnerships and the few pioneering MNOs leading the deployment of utility services.

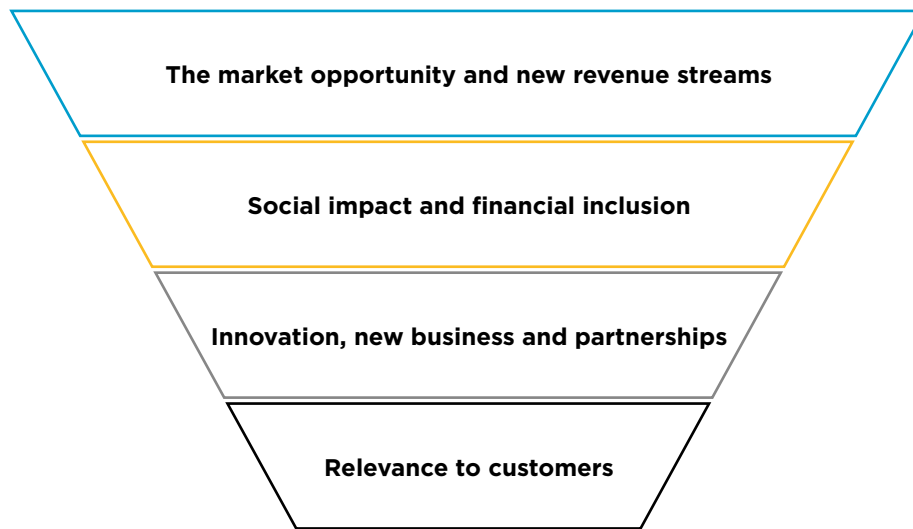
However, for the sector to continue to grow, several key challenges need to be addressed, both internally (within MNOs) and externally (within the sector).

MNOs confirm the commercial and social opportunity in the utilities sector

MNOs interviewed in both regions identified the same reasons for engaging in the utilities sector. The strongest value drivers were the market opportunity

and generating new revenues, followed by social impact and innovation.

Main value drivers for MNOs to engage in the utilities sector



The market opportunity and new revenue streams

As discussed in Section 1, the market opportunity in the energy, water and sanitation sectors is significant. MNOs are aware of this untapped opportunity and are looking to develop or support new services to reach these potential customers, either through partnerships with utility providers or as leaders of these utility services.

In terms of new revenue streams, MNOs across Africa and Asia consider mobile payments for utility services one of the principal avenues for growth. In Asia, M2M connectivity and, more broadly, Internet of Things (IoT) services are considered the most interesting potential source of new revenue in the utilities space. Although still a nascent market, a few MNOs are developing IoT solutions for utility services, such as Dialog in Sri Lanka, which is working with the national electricity utility to implement pre-paid smart metering.

Fostering innovation in the market and staying relevant to customers

While innovative services may be riskier and have lower initial return on investment than traditional telecom products, they allow MNOs to remain competitive with over-the-top players and position themselves as drivers of technology in their countries working for the benefit of all, especially communities that are not yet connected. This is particularly important as voice and messaging revenues in Sub-Saharan Africa have gone down: from 11 per cent growth in 2013 to two per cent growth in 2017.²² Several MNOs have shown an appetite for innovation, notably Orange, which is positioning itself as a leader of mobile-enabled energy solutions, launching several decentralised energy and smart metering solutions in their African markets, such as Mali, Burkina Faso and Madagascar.

22. GSMA Intelligence, 2017, "The Mobile Economy, Sub-Saharan Africa 2017", <https://www.gsmainelligence.com/research/?file=7bf3592e6d750144e58d9dcfac6adfab&download>

Coupled with the need to be innovative is the need to stay relevant to customers. In most emerging markets, retaining customers is challenging as people are used to having more than one SIM and switch mobile operators depending on the best daily offer and availability of networks. This creates significant losses for MNOs, but developing services that help to meet their customers' daily needs, such as energy, water and sanitation services, can help to reduce customer churn and foster brand loyalty. When Telenor Myanmar began investigating partnerships in the energy sector, relevance to customers was one of its key drivers for addressing the significant energy access gap in off-grid areas of the country.

Social impact: another strong value driver for MNOs

When it comes to engaging in the utility sector, MNOs pointed to social impact as the second part of the equation—almost, if not just, as important as the commercial opportunity. The mobile industry was the first to commit to the Sustainable Development Goals (SDGs) in 2016,²³ and several MNOs are leading the

way by partnering in the deployment of critical energy, water and sanitation services in line with SDG 6: Clean Water and Sanitation, SDG 7: Affordable and Clean Energy, and SDG 13: Climate Action.

Digicel Haiti is one MNO that has placed an emphasis on socio-economic inclusion, particularly access to energy. It has created a separate decentralised energy company, Re-Volt, to deploy solar home systems for underserved communities in peri-urban areas of Haiti. After 12 months of roll-out, customers had decreased their kerosene usage by 34 per cent and increased the number of hours they could light their homes from five to eight hours per day. We look forward to sharing more results of this grant in a future case study.

MTN is another MNO that values the strong social impact of partnerships with utility providers, and currently supports the roll-out of PAYG solar in seven African countries. In Uganda, MTN indicated that partnering with PAYG solar provider Fenix International had driven more purpose to the brand.²⁴



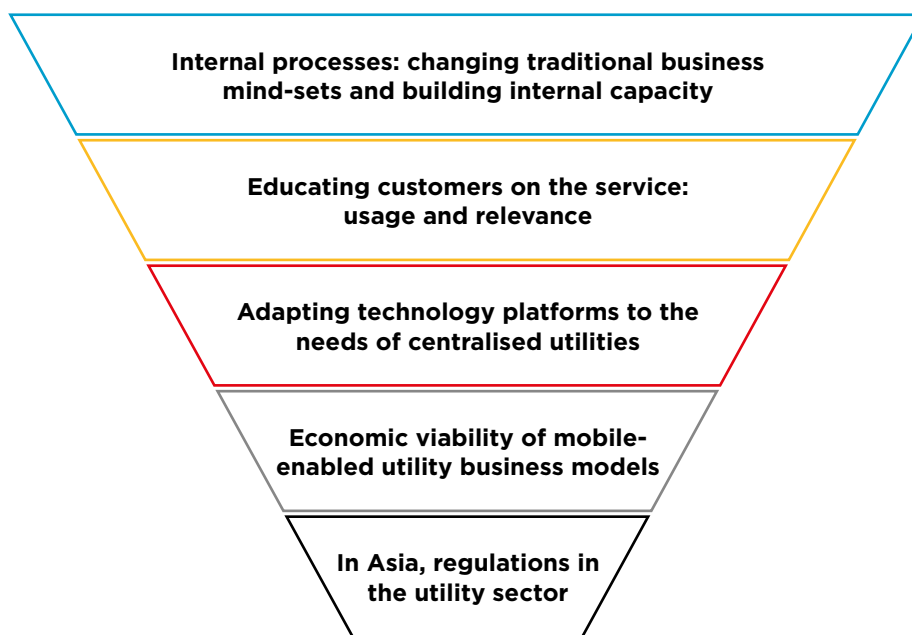
23. UNDP, 2017, "UNDP and GSMA partner on mobile technology for global development goals", <http://www.undp.org/content/undp/en/home/presscenter/pressreleases/2017/04/27/UNDP-and-GSMA-partner-on-mobile-technology-for-global-development-goals.html>

24. GSMA, 2017, "The power of mobile to improve access to energy - Fenix and MTN Uganda's story", https://www.youtube.com/watch?v=DniS4y_NOLQ

Key barriers to successful mobile-enabled utility services

Despite the benefits of engaging in the utilities sector, MNOs also identified key barriers to overcome, both internal and external.

Main barriers to MNOs engaging in the utilities sector



Internal processes: changing traditional business mind-sets and building internal capacity

Adapting traditional ways of working, becoming more flexible to allow research and development for new and innovative services, and accepting longer return on investment, are some of the main internal challenges MNOs face. Moreover, working on innovative solutions, such as utilities services, is difficult to prioritise over core services like data or voice, especially with slower returns as consumers are introduced to new products and services.

MNOs also need to build internal capacity by having dedicated staff who understand the sector and help to

shape the right products and services. This is especially true when MNOs move beyond just providing technical platforms, such as mobile money, to support both the distribution and sale of a utility solution.

To tackle these internal challenges, some MNOs have developed separate entities to incubate innovation. Telenor Pakistan has created an in-house accelerator, Velocity, to provide the flexibility to operate differently and encourage innovation among potential partners by providing them with support, such as with their mobile services, facilities and marketing. The accelerator has already supported 11 graduates who, cumulatively, have raised several hundreds of thousands dollars.

Educating customers on the usage and relevance of mobile-enabled utility services

Ensuring that customers understand how to use a mobile-enabled utility product or service is a challenge. This challenge becomes even greater if the customer also needs to learn how to use the mobile technology itself, for example, learning how to use mobile money as well as an SHS. Without this education effort, uptake will be limited and, ultimately, so will mobile usage. To ensure adoption of innovative utility services, experience has shown there needs to be constant emphasis on customer education and awareness, from initiation to scale.

The degree to which MNOs are involved in customer education varies, and the utility service provider partner may prefer to take the lead on educating end users. However, MNOs are responsible for educating customers on the use of their services—notably mobile money—which in turn can support the uptake of other mobile-enabled utility services.

Adapting technology platforms to the needs of centralised utilities

MNOs we interviewed that work with centralised utilities (e.g. the national grid or national piped water providers) emphasised the effort required to build customised solutions. This is due to the technology gap between MNOs and centralised utilities, which are usually much further behind in digitising their processes and back-end systems. This makes integrations much more time consuming and requires a great deal of discussion to educate the utility about the digitisation of its processes.

Economic viability of mobile-enabled utility business models with significant hardware costs

MNOs that support or lead heavier infrastructure projects (e.g. metering or mini-grid solutions) stressed the high investment required for these projects. As explained in its grant case study,²⁵ Ncell had difficulty finding a viable business model for its project with Gham Power, which deployed mini-grids to power both its off-grid towers and surrounding communities. Since the pilot ended, Ncell and Gham Power have been discussing how the value proposition can go beyond initial CAPEX savings.

MNOs leading and addressing challenges in the utilities sector

It is clear that the challenges and risks will vary depending on an MNO's level of engagement. For example, Orange's leadership in the energy sector has been driven strongly at group level, which may help them counter some of the challenges identified above, particularly ensuring internal alignment and support for these projects and building internal capacity to deliver services efficiently. Similarly, Telenor Pakistan created Velocity to bring innovation in-house.

The challenges we have outlined are key focus areas for MNOs, and the wider ecosystem will need to be mindful of these to ensure successful engagement in the utilities sector. The MNOs taking a leadership role in the utilities sector and the growing number of partnerships with utility providers²⁶ are evidence of the business and social opportunity in the utilities sector.

25. GSMA, October 2017, "Gham Power: Finding a replicable model for mobile-enabled micro-grids with Ncell in Nepal", <https://www.gsma.com/mobilefordevelopment/mgrantee/gham-power-nepal-private-limited>.

26. GSMA Mobile for Development Utilities programme, 3 November 2017, "Key findings from our 2017 application rounds of the Mobile for Development Utilities Innovation Fund", <https://www.gsma.com/mobilefordevelopment/programme/m4dutilities/key-findings-from-our-2017-application-rounds-of-the-mobile-for-development-utilities-innovation-fund>.



Interview with GSMA M4D
Utilities champion Maarten
Boute, Chairman of Digicel Haiti,
on the partnership with Re-Volt
to power Haitian households



Please describe Digicel's partnership with Re-Volt. What are the specific assets and services Digicel offers?

Re-Volt leverages the Digicel Mon Cash Mobile Money platform and distribution network. Digicel also offers Re-Volt in-kind support, such as access to customer data (e.g. consumption information), access to Digicel staff, as well as facilities. Finally, Re-Volt uses Digicel SIMs for its IoT solar home systems.

To date, how has Digicel benefited from its partnership with Re-Volt?

During the grant period, the number of mobile money users grew in large part because of the use of solar home systems: 43 per cent of SHS customers are new mobile money users and 94 per cent of customers surveyed confirmed that they had signed up for a mobile money account because they needed to make payments for their SHS. Not only did the SHS product drive adoption of mobile money, but it also led to active utilisation on a monthly basis, as approximately 80 per cent of customers had active systems each month.

The customer ARPU grew by 20 per cent after buying a PAYG SHS, from 759 Haitian Gourde (USD 12.12) to 913 Haitian Gourde (USD 15).

Our brand perception improved because the product really does make a difference in people's lives: we saw a 34 per cent reduction in the use of dirty - and expensive - kerosene. Households could be lit for a guaranteed five hours, with the majority having either five to eight hours or eight to ten hours a day of electricity. By the end of the grant, we saw that 90 per cent of customers had a positive impression of Digicel - exceeding our initial target. This was slightly higher for male users than female users, and we realise we have to do more gender-targeted marketing.

Our brand perception improved because the product really does make a difference in people's lives: we saw a 34 per cent reduction in the use of dirty - and expensive - kerosene.



What have been some of the challenges for Digicel on this project and how did Digicel overcome them?

Education of the customer and the MNO is key: very few customers initially understood how the SHS worked and how mobile money works. On the other hand, while there are similarities between the PAYG handset offering and the PAYG solar system, it is a new sector and Digicel staff had a steep learning curve to understand the technology and the right distribution model.

Adapting the pricing model: It has been difficult to develop pricing that provides a good value proposition for customers as well as large enough margins to attract commercial capital to scale the business.

Where does Digicel see future opportunities in the mobile-enabled energy sector?

Digicel is interested in moving into the smart and pre-paid metering space for traditional grid customers. Re-Volt's off-grid solutions could be converted to an inverter in this new scenario.

TV content is also an interesting area to move into for MNOs. Digicel's subsidiary NuTV is a DBVT broadcaster that could benefit from the larger solar home systems.



This is a summary of the full interview, which will be available [here](#) in early 2018. The GSMA Mobile for Development Utilities programme will also be publishing a case study in Q1 2018 on the partnership between Re-Volt and d.light.

4. Instant Payment Notification (IPN) Hub

In February 2016, the GSMA Mobile for Development Utilities programme and Mobile Money programme (funded by the Mastercard Foundation) came together to create a service that could connect PAYG utility service providers to multiple mobile operators with just one integration: the **Instant Payment Notification (IPN) Hub**. The IPN Hub not only enables small PAYG utility service providers to easily integrate with mobile operators, but also serve their customers more efficiently by instantly notifying them about payments made using mobile money, a critical requirement for billers to automatically track payments in real time (e.g. to turn on the light).

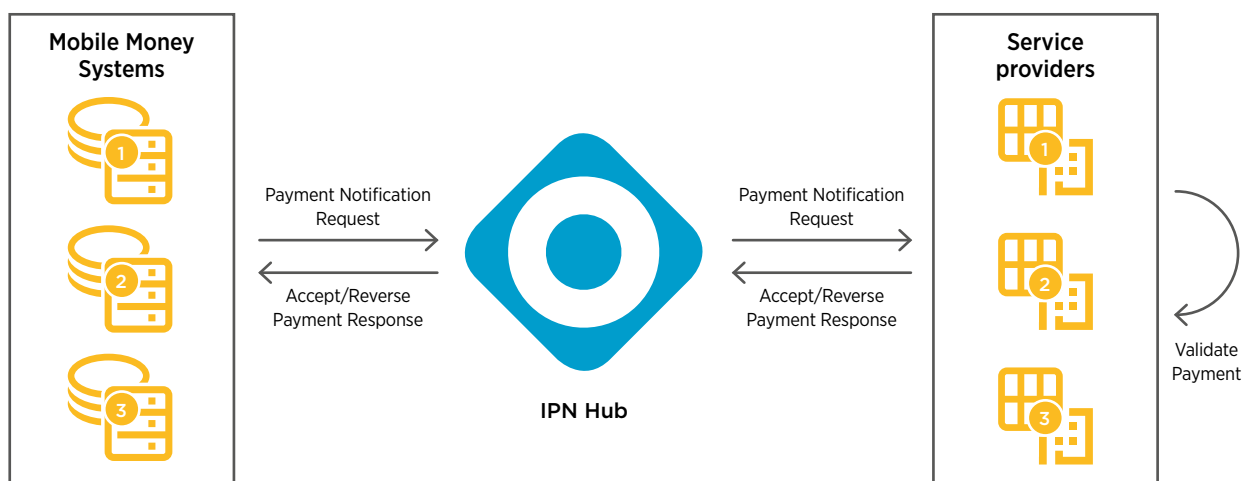
It is important to note that while the IPN Hub connects different PAYG solar providers and mobile operators,

it does not actually process payments. PAYG solar providers must still forge contracts and **settle funds directly** with operators outside the IPN Hub.

How does the IPN Hub work?

The scope of the initial pilot focused only on the PAYG solar sector and only on processing notifications. This simplicity and agility adds to its strength and versatility. Although the IPN Hub was developed primarily to support the PAYG solar sector, where the need for real-time integration has been greatest, the IPN functionality can also be used for other solutions that may be explored in the future, such as water, sanitation and school fees.

IPN Hub technical architecture



Pilot in Rwanda and initial results

The IPN Hub was developed for GSMA by the vendor Symbox in February 2016 and went live in Rwanda on 1 December 2016. The hub connects four entities (**MTN Rwanda, Tigo Rwanda, BBOX and Off Grid Electric**) and has processed notifications for more than hundreds of thousands unique payment transactions so far. Since the IPN Hub went live, there have been no instances of downtime.

While the volume of transactions has been promising, we also conducted a rapid evaluation of the IPN Hub in Rwanda (24–26 April 2017) to better understand the impact it has had on the ground. Testimonies were collected from a range of stakeholders (mobile operators, service providers and end users/customers of PAYG solar services) who indicated that the Hub has had a positive impact, mainly through **smoother integrations** for service providers; **instant payments** and service provision for customers; and **less manual work** for both operators and service providers.

Stakeholder testimonials

- “The IPN Hub has reduced the amount of time taken to supply energy to a customer from 2+ hours to 3 minutes.” - PAYG solar service provider
- “It now takes just a few minutes to receive energy. My family is no longer vulnerable to snakebites in the dark”. - PAYG solar customer
- “It is much smoother to connect to operators via the IPN Hub than directly.” - PAYG solar service provider
- “With the IPN Hub, we can connect to multiple service providers at once. It has also improved the end user experience.” - Leading mobile operator

Lessons from the IPN Hub trials:

1. The IPN Hub addresses the administrative challenges of time and cost.

Before connecting to the IPN Hub, PAYG solar providers had to manually download payment transactions from MNO portals and then

upload these to their own systems. This was an administrative challenge staff faced repeatedly. It was not only labour-intensive and time-consuming, but also led to mistakes that in turn required PAYG solar providers to set up and maintain expensive call centres to handle customer complaints and queries. On the management side, staff spent a significant amount of their time liaising with MNOs, often just trying to get integrations in place.

2. Integrations can be challenging at first, but the process gets smoother with time.

Despite consensus among mobile operators and PAYG solar service providers about the usefulness of the IPN Hub, it took a lot of stakeholder engagement to get the integration off the ground. However, once integration was completed with one operator, the time it took to connect other operators and service providers decreased. It was observed that every integration was quicker than the last, owing to the vendor’s greater familiarity and expertise with the complexities of the platform, and more players willing to come on board the Hub if there were already other members.

3. Even in markets well served by aggregators, PAYG solar companies can struggle.

Lacking the middle layer aggregators provide, markets with low aggregator penetration were the first target markets for rolling out the IPN Hub. However, even in markets well served by aggregators, the ability and willingness of aggregators to provide handholding and bespoke support to small PAYG solar service providers is limited. Often in these markets, smaller players fall below the required threshold to attract their interest. This not only limits competition and diversity in the PAYG solar industry, but also results in limited choices for the end user, not to mention the additional charges of having an aggregator in the nascent PAYG solar industry. Thus, we believe that the IPN Hub is equally valuable in both types of markets.

The way forward

The IPN Hub has provided a successful proof of concept in Rwanda. The next few months will see this tool rolled out in new markets, and potentially new use cases to enable a growing ecosystem of PAYG solar companies that depend heavily on mobile money providers.



5. Service provider toolkits: mobile money integration

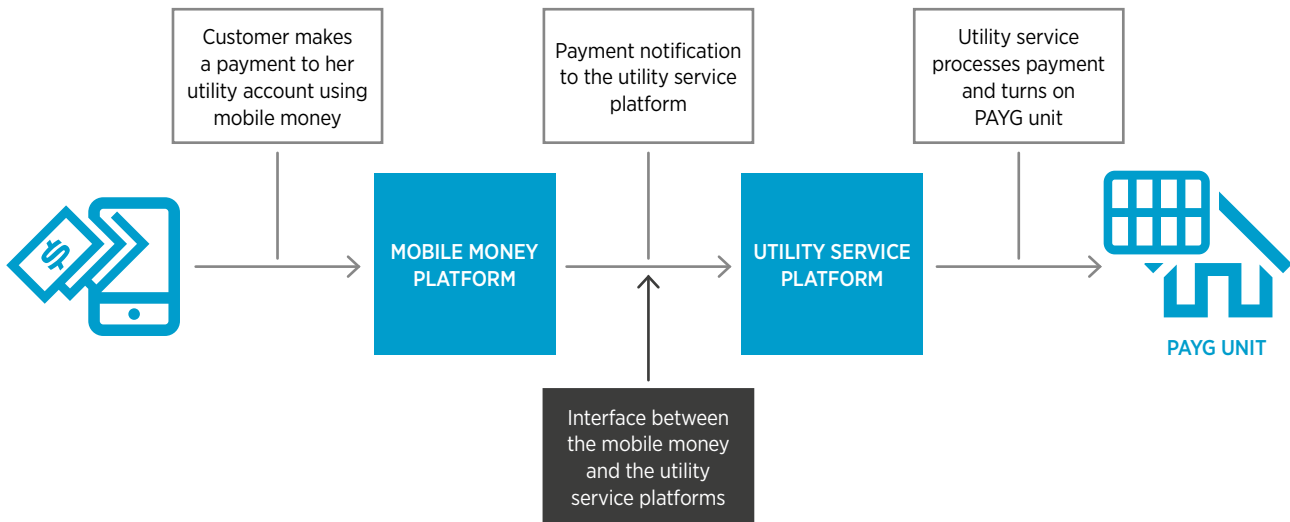
To help the mobile-enabled utility ecosystem grow, the Mobile for Development Utilities programme has a new initiative to address the challenges utility service providers face in leveraging mobile tools. Our new ‘service provider curriculum’ will consist of a series of toolkits, created in cooperation with service providers and the mobile industry, that will provide guidelines

and frameworks for how to tackle recurring challenges, streamline processes and facilitate cooperation.

First, we focused on a common frustration of utility service providers: the need for more information on mobile money integration, including the business case, regulations and different approaches.

[Our Mobile Money Integration Toolkit](#), created in 2017 in partnership with the GSMA Mobile Money team and in consultation with a number of service providers, seeks to address the challenge of choosing the most appropriate technical integration option for mobile money. It covers the questions of if and when to integrate with a mobile money provider and how to approach integration with a mobile money platform (whether directly through an MNO or through a mobile money aggregator).

What is mobile money integration?



Mobile money integration is when a utility service provider's platform connects, communicates and interacts with a mobile money provider's platform at a systems level. This happens automatically and without user intervention. The mobile money platform's Application Programming Interface (API) dictates how the integration occurs.

Integration enables utility providers to process a payment in real time - a crucial feature for the PAYG model. As discussed in the previous section, receiving an Instant Payment Notification (IPN) when a customer makes a payment allows the provider to immediately unlock the pay-as-you-go device (e.g. the solar home system or pre-paid water meter). The IPN, obtained through an interface between the utility service provider's platform and the mobile money platform, is one of the key reasons for integration with mobile money platforms. However, there are also other methods of obtaining a payment notification, as outlined later in this section.

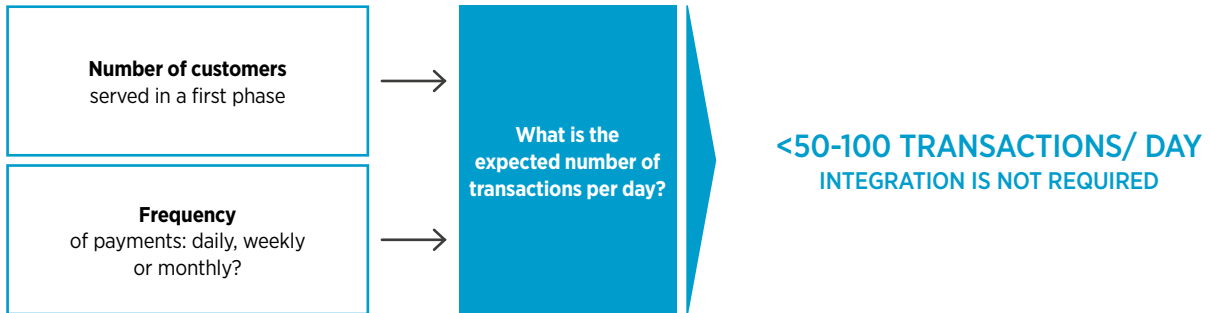
There are several benefits to integrating the utility service provider's systems with the mobile money platform.


- **Increased payment collection:** Following their integration with MTN Rwanda and Tigo Rwanda through the IPN Hub, BBOXX received over 50,000 transactions per month, up from less than 10,000.
- **Improved real-time service:** The average switch-on time from the moment a customer made a mobile payment decreased from 1.5 hours to seven seconds once BBOXX was able to receive an instant payment notification from MTN Rwanda and Tigo Rwanda.
- **More efficient customer care.**
- **Set up building blocks for growth and scale, and build a basis for partnerships with MNOs.**

Considering if and when to integrate

Mobile money integration takes time and investment, so a business case must justify the need for integration. Our toolkit invites service providers to carefully consider whether integration is necessary and, if not, to explore alternatives, such as using standard SMS or

web payment notifications, or transferring transaction files. Our recommendation is to base this evaluation on the forecast volume of transactions processed, dictated by the number of customers and frequency of transactions. The rule of thumb is as follows:



 There is value in integration above a certain scale. Rule of thumb: For less than 50 - 100 transactions/day, integration is not required.

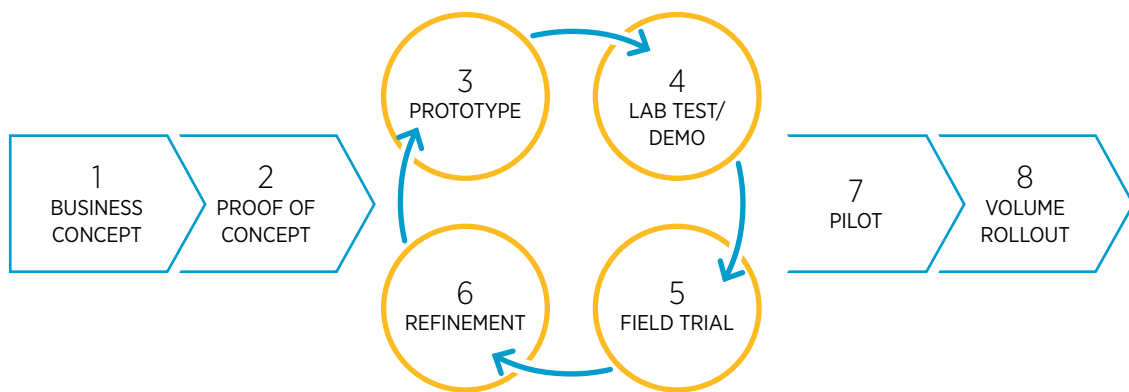
To develop a full picture of the integration commitment, we encourage careful consideration of the costs involved. Integrating directly with an MNO, or with an aggregator, will determine the costs involved, as well as the output received in terms of

support, speed of integration and transaction fees. The toolkit details these differences to help make informed decisions about who to integrate with and what it will cost. The main costs to consider are:

Fees	<ul style="list-style-type: none"> • Transaction fees: either a percentage of each transaction or a flat-fee • Setup fees: one-off costs from the platform vendor for integration • Minimum guarantee: charged by the mobile money provider or aggregator if the monthly volume of transactions is deemed too low or uncertain • Support fees: for example, fees per troubleshooting ticket raised • Reporting fees: to access more advanced reporting and data analysis functions • API fees: API integration or pay-per-use fee
Additional costs	<ul style="list-style-type: none"> • Resources: human resources with expertise in integration • Time: three to six months (according to interviewees) • Impact on internal systems: upgrade processes and staff training • Incentives and commissions: to encourage agents and educate customers

Our next toolkit will focus on understanding the value and use case for the **Internet of Things (IoT)** technology in utility models. IoT is increasingly being used to improve the service and efficiency of existing utility products, and new business models and products are being tested in which IoT connectivity helps to generate new value.

Our toolkit will highlight the key steps in IoT development, from prototyping to roll-out. This journey, developed in partnership with ESEYE, is built on an iterative approach and build-measure-learn feedback loops, and takes between 70 and 80 weeks on average, from proof of concept to post-pilot volume roll-out. Our toolkit will make key recommendations for service providers undertaking this journey, including cost allocations, tips for testing prototypes, and considerations when selecting the best type of connectivity for the specific requirements of the product or service.



What's next for mobile-enabled utilities?

Since our programme began in 2012, we have witnessed and supported innovation in mobile-enabled utility models, scaling and replication of services, and greater social and commercial impacts. As we look to 2018 and beyond, we plan to keep a close eye on some particularly interesting areas of growth and development:



Testing mobile operators' increased appetite for leading mobile-enabled utilities models. We anticipate interesting results as several MNOs launch their own energy service models—both PAYG solar and pre-paid smart metering for grids. If operators can demonstrate that their local market knowledge, brand recognition and technological expertise help to rapidly scale these models, this could create an interesting shift in existing market structures, for example, where there has already been some shift away from completely vertically integrated PAYG solar companies. However, to get there, MNOs will need to overcome some key challenges, such as accessing financing, distribution and sales of hardware, and entering the new regulatory environment of energy.



We will be keenly watching how mobile money and PAYG utility services evolve. We anticipate that GSMA's IPN Hub can play a crucial role in providing many MNOs and PAYG companies (not only energy, but also water and sanitation) with the basic building block of real-time mobile money integration. And as investment and consolidation in PAYG solar increases, we will be watching to see the value that mobile money continues to carry for enabling the strong repayment portfolios that local banks and foreign investors demand.

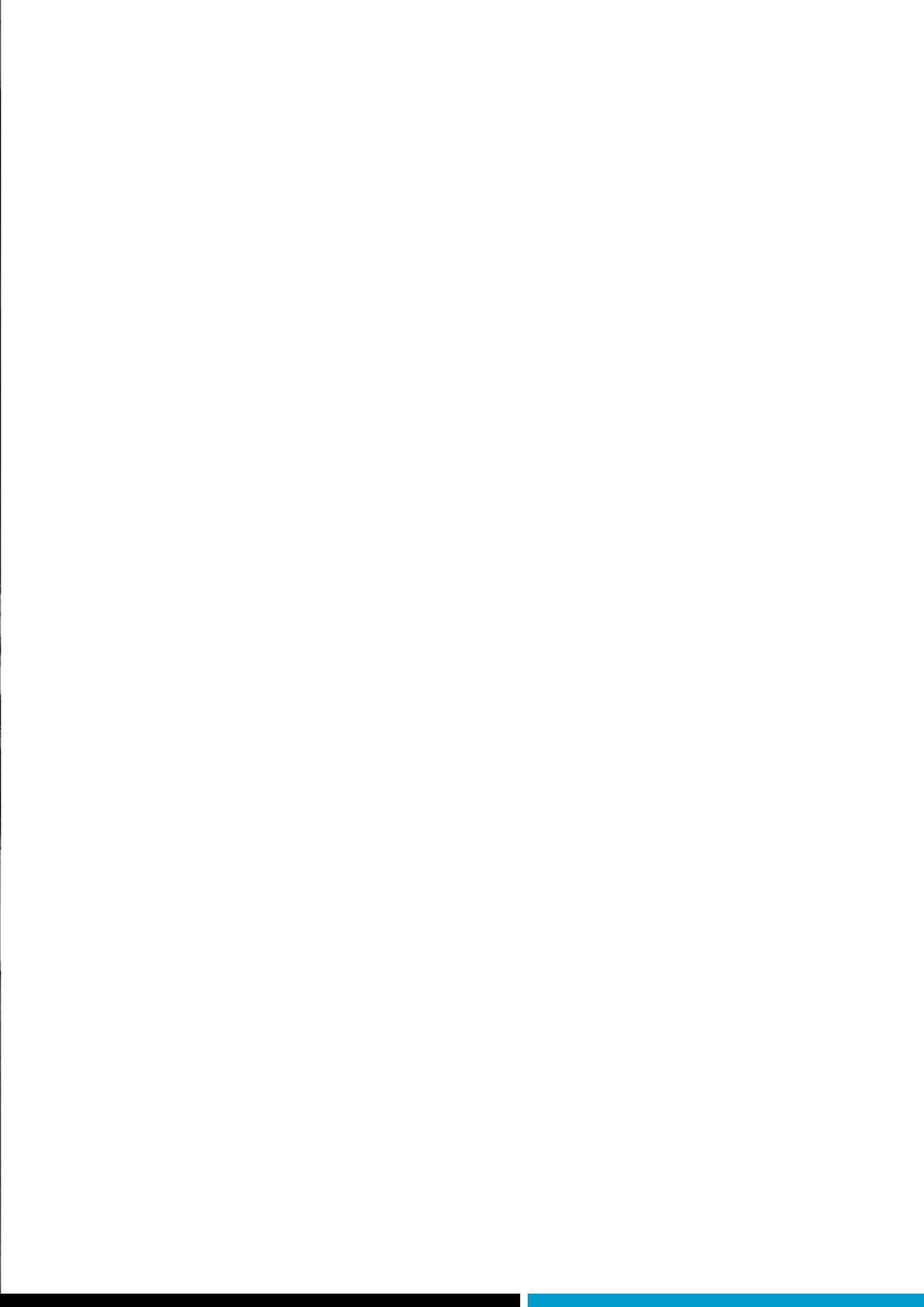


We anticipate even more mobile-enabled water and sanitation businesses will use mobile payments. The next step will be testing whether more transparent and efficient collection of water payments through mobile will make water service providers more investable, as we have seen with energy. We will particularly look forward to the future impact of our grants to Manobi and Wonderkid in this space.



Finally, we cannot help but feel excited for what the **future of data and new technology** holds for the mobile industry. Will blockchain show promise by reducing transactional costs? Will MNOs seize the opportunity to roll-out LPWA IoT platforms? Will GSM cellular M2M go beyond remote control and monitoring to catalyse machine learning that allows solar or water systems to perform better based on environmental conditions and usage patterns? Will customer-approved use of mobile usage data become the biggest predictor of creditworthiness?

As we watch these trends over the coming years, we look forward to working with all our stakeholders, to support your work on the frontier of innovation, bring you best practices and case studies, and help partners work together to build mobile-enabled energy, water and sanitation services for the underserved communities who need them most.





For more information on the Mobile for
Development Utilities programme visit:
[www.gsma.com/mobilefordevelopment/
programmes/m4dutilities](http://www.gsma.com/mobilefordevelopment/programmes/m4dutilities)

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