

A black and white photograph of a woman in a village setting. She is standing on a dirt path, looking down at a mobile phone in her hands. She is wearing a dark, short-sleeved dress and high-heeled shoes. In the background, there are several small, rustic buildings with corrugated metal roofs. A dog is visible in the foreground on the right, and another person is walking in the distance. The overall scene is a typical village street.

Mobile For Development Utilities

MOBILE FOR SMART ENERGY SOLUTIONS

SENEGAL

HELENE SMERTNIK - NOVEMBER 2014

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Introduction

In Sub-Saharan Africa, 599 of the 936 million people (~64%) lack access to electricity¹. Yet mobile networks have become the predominant infrastructure covering approximately 74% of the population.² The gap between access to mobile and electricity services has widened from 2000 to 2012 to the point where, today, we estimate that more than 358 million people in Sub-Saharan Africa are covered by mobile networks but don't have access to electricity.

The ubiquity of mobile services presents a growing opportunity for energy service providers – national utilities in urban areas and energy service companies in rural areas - as well as governments, to leverage GSM networks and technologies to dramatically improve and expand energy services to new scales. Innovative smart solutions, including smart meters and mobile enabling services, can be used to more rapidly and accurately send information between service providers, devices and customers. Smart meters, can help energy providers improve the management of their connections, through remote monitoring and more efficient billing processes. Mobile enabling services can provide notably improved communication with customers, data management platforms and remote customer payments. As a result, energy providers can address the key service delivery challenges they face: reducing losses and recovering costs to ensure reliable services and connect more customers.

In this light, at the end of 2013, the GSMA Mobile for Development Utilities programme (M4D Utilities), with the support of the UK Department for International Development (DFID), began working with Orange to explore the opportunity for and role of mobile operators in partnering with energy service providers to support the deployment of smart solutions for improved energy access in Sub-Saharan Africa.

This research included desk-based and field-based research in three selected countries, Botswana, Senegal and Côte d'Ivoire, as well as learnings from attending the African Utility Week 2014 in Cape Town, South Africa. The findings from Senegal are discussed in more detail in this case study and the full research report "Mobile for Smart Solutions: How Mobile can Improve Energy Access in Sub-Saharan Africa" is available [here](#).

Following a first discontinued pre-paid meter deployment in 2005, Senelec, Senegal's national utility, is pursuing a new strategy to tackle its losses. The utility is currently installing non-smart pre-paid meters for households and tendering for smart meters for large power users. Senelec's grid does not however reach everyone as 43% of the population lacks access to electricity. Given the ubiquity of mobile networks, mobile operators are well positioned to act as strong partners for energy service providers, across urban and rural areas, by offering a suite of services beyond connectivity, including customer communication and mobile payment solutions to improve the country's energy services and increase access to electricity.

¹ International Energy Agency, 2013

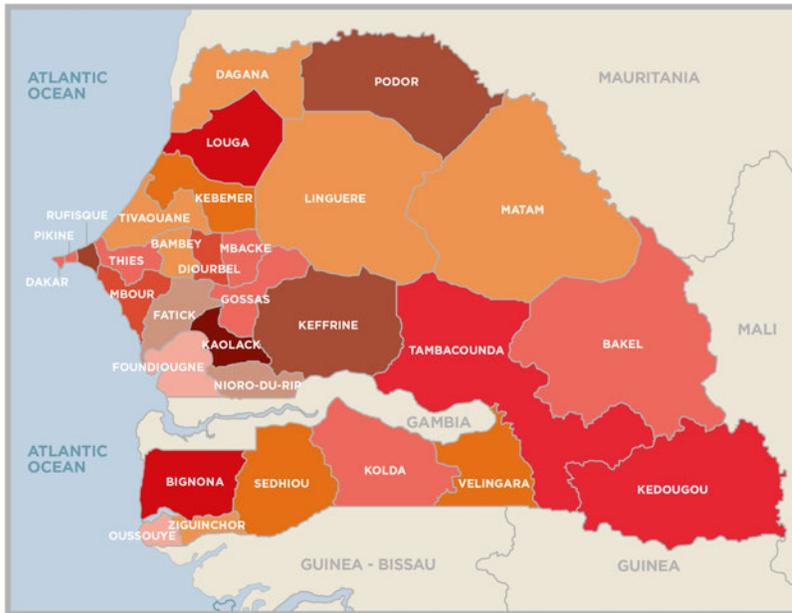
² GSMA M4D Utilities, Sizing the Opportunity of Mobile to Support Energy and Water Access, 2014. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/12/Sizing-the-Opportunity-of-Mobile_Nov-2013.pdf

1 Key Statistics – Senegal

1.1 Geography

The Republic of Senegal is a coastal country located in the most Western part of Africa’s Sahel region, sharing its borders with five other countries: Gambia, Guinea-Bissau, Guinea, Mali and Mauritania. The country has a national territory spanning 196,722 km² and is divided into 14 regions, and subdivided into 113 municipalities, 370 rural communities and 14,400 villages.³ Dakar, with a population of over 1 million, is Senegal’s capital.

Figure 1: Senegal administrative map



1.2 Demographics and economics

Senegal has a population estimated at 14 million, with 57% of the population living in rural areas and 43% in urban centres.⁴ Despite the country’s political and economic stability, Senegal faces significant development challenges as shown in Table 1, with a low ranking in the Human Development Index (163 out of 187 countries)⁵, an unemployment rate estimated at 10.2%⁶ and a high level of poverty, with 34% living on less than US\$1.25 a day.⁷

³ World Bank Data, 2013 <http://donnees.banquemondiale.org/indicateur/SP.RUR.TOTL.ZS>

⁴ World Bank Data, 2013

⁵ UNDP Human Development Index, 2013 <http://hdr.undp.org/en/countries>

⁶ International Monetary Fund, 2013 <http://www.imf.org/external/pubs/ft/scr/2013/cr13194.pdf>

⁷ “The Gini coefficient of inequality is estimated at 38; compared to the average of 42 in sub-Saharan Africa.” <http://www.worldbank.org/en/country/senegal/overview#1>

Table 1: Key regional indicators*

Indicator	Senegal	Botswana	Cote d'Ivoire	South Africa	Kenya	Uganda
Population ⁸	14,133,280	2,021,144	20,316,086	52,981,991	44,353,691	37,578,876
GDP per Capita (current USD) ⁹	1,072	7,317	1,521	6,618	994	572
HDI Ranking ¹⁰	163	109	171	118	147	164
Rural population (%) ¹¹	57%	43%	47%	36%	75%	85%
Population living on less than \$1.25/day (PPP) (% of population) ¹²	34.1% in 2011	13.4% in 2009	35% in 2008	9.4% in 2011	43.4% in 2005	37.8% in 2013

*Note: The countries selected for this table include the three analysed as part of the study with Orange (Botswana, Cote d'Ivoire and Senegal) and others that provide comparison between West, East and Southern Africa.

1.3 Energy access

Senegal's national electrification rate is estimated at 57%, although urban and rural electrification rates vary significantly at 97% and 27% respectively (Table 2).

Table 2: Regional electrification rates¹³

	Senegal	Botswana	Côte d'Ivoire	South Africa	Kenya	Uganda
Electrification rate (%)	57	43	59	83	23	15
Urban electrification rate (%)	97	43	80	94	71	67
Rural electrification rate (%)	27	43	37	64	8	5

Senelec, the government-owned national electricity utility, manages 60% of the total installed capacity (584 MW)¹⁴ while the remaining 40% is managed by Independent Power Producers (IPPs) including GTI-Dakar and ESKOM-

⁸ World Bank Data, 2013

⁹ Ibid

¹⁰ UNDP data, 2014 <http://hdr.undp.org/en/countries>.

¹¹ World Bank Data, 2013.

¹² World Bank Data bank, years vary.

¹³ Sustainable Energy for All, Global Tracking Framework. Data from 2010. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/05/24/000445729_20130524104654/Rendered/PDF/778890v20GTF0o0OfficeUse0Only090.pdf

NOTE: Alternative Data is available from the International Energy Agency, World Energy Outlook which uses 2011 data. However, the data presented here was used to develop the addressable market numbers given below.

Manantali.¹⁵ IPPs sell their electricity exclusively to Senelec, which is in charge of national transmission and distribution of electricity.

The Agence Senegalaise pour l'Electrification Rurale (ASER), created in 1998, is the main state entity to manage rural electrification. The ASER organizes rural Senegal into a “concessionaire” system of large scale concessions and of small scale Local Initiatives for Rural Electrification (ERILs). The ASER provides financial and technical assistance to the large concessions that are allotted to private operators (often large companies or utilities) through a competitive bidding process.¹⁶ The ERIL projects are set up by local public or private organisations such as village groups, NGOs or enterprises that support energy access through mini-grid systems or decentralized solar home systems in areas where large concession companies have not planned to develop in the near future.¹⁷ The ASER is responsible for selecting the local organisations that will work at the ERIL level.

In both models, the ASER can provide up to 80% of the required investment while the service provider must contribute a minimum of 20%. The objective of the ASER's model is to improve rural electrification by increasing the sources of funding and the actors in the rural electrification sector.

Energy access challenges

Senelec's challenges

One of Senelec's main challenges is non-technical losses, which include meter failure, tampering or illegal connections¹⁸ and represents 9% of the utility's total losses. While this percentage is low relative in comparison to the region's average (20 - 30%¹⁹), it amounts to 20 billion FCFA or over US\$41 million in losses per annum. Non-technical losses at the household level are often due to the utility's inefficient billing process (e.g. bills not arriving to the customer) or inefficient or delayed meter installation. Although non-technical losses are more present at the household level, large power users' poor repayment behaviour has a severe impact on the Senelec. The heavy penalty that is currently being put in place for individuals and companies caught tampering with electricity cables or stealing from the grid of up to 5 years imprisonment²⁰ is expected to considerably reduce non-technical losses.

Off-grid energy service providers' challenges

Initial pilot projects in rural electrification in the 1990s failed due to the lack of monitoring, of coordination between the sector's actors and of defined goals. As a result, the government is working on a new approach to rural electrification, better integrating public and private partners, as well as local communities, to ensure the diversification of investment sources and the viability of decentralised energy solutions.

¹⁴ REEEP, 2014 <http://www.reegle.info/policy-and-regulatory-overviews/SN>

¹⁵ Energypedia, https://energypedia.info/wiki/Senegal_Energy_Situation#Electricity_Generation

¹⁶ ASER, 2006, http://www.globalelectricity.org/Projects/RuralElectrification/Nairobi/Day-1_fichiers/Case%20Study%20ASER%20Senegal.pdf

¹⁷ Energypedia, https://energypedia.info/wiki/Solar_Hybrid_Systems_-_Operator_Models

¹⁸ ESMAP, 2009,

http://www.esmap.org/sites/esmap.org/files/P099234_AFR_Monitoring%20Performance%20of%20Electric%20Utilities_Tallapragada_0.pdf

¹⁹ Ibid

²⁰ Agence de Presse Senegalaise, 2014 http://www.aps.sn/articles.php?id_article=128183

However, interviews with off-grid energy service providers (ESCOs) highlight the lack of political will continues to be one of their biggest hurdles:

- The state's limited funding and the lack of regulation that would allow ESCOs to sell electricity back to the grid are considered to limit the viability of decentralised renewable energy businesses.
- Private ESCOs deploying a mini-grid to serve a local community need to individually negotiate on the selling price of electricity with the ASER and the Electricity Regulatory Commission, resulting in lengthy procedures. The process is however more straightforward for ESCOs selling solar home systems, which do not have to go through the same approval process.

Additionally, ESCOs, whether providing solar home systems or mini-grids, mentioned the issue of last mile distribution, impacting the availability of decentralised energy products and services in remote and hard to reach areas. The cost of these solutions is often hard to absorb for communities in these areas, without innovative financial solutions.

1.4 Mobile network operators and GSM coverage

The three mobile network operators in Senegal are Orange-Sonatel, Tigo and Expresso, covering 86% of the population (Table 3). In early 2014, Orange-Sonatel led the market with 56.5% market share, Tigo held 22.8% and Expresso had 20.6%.²¹ The country largely has 2G coverage while a significant portion of urban areas have 3G coverage.

Table 3: Regional mobile statistics²²

Indicator	Senegal	Botswana	Côte d'Ivoire	South Africa	Kenya	Uganda
GSM Connections	14,838,666	3,256,021	21,411,382	77,305,618	32,417,003	21,396,443
Unique Subscribers	7,222,729	1,531,206	10,046,389	36,523,961	18,925,153	10,891,973
Market Penetration, per unique subscriber	47.68%	75.12%	47.75%	66.74%	41.49%	27.84%
Population Coverage	86%	95%	98%	100%	95%	97%
Number of Operators	3	3	7	4	4	7

²¹ GSMA Intelligence Data from Q2 2014

²² GSMA Intelligence Data from Q2 2014

Mobile money

Five mobile money providers are operating in Senegal, two MNOs: Orange Money, Tigo Cash, as well as Wari, Yoban'Tel and Afrimarket Senegal, according to the GSMA Mobile Money for the Unbanked.²³ Orange Money launched its bill payment for electricity in 2012 and has progressively grown its customer base. Senegal however is a competitive market in terms of digital payments, with not only the mobile network operators' bill pay service but also wire transfer services such as Wari, the Post Office or Joni Joni.

1.5 Addressable market: Leveraging mobile to enable energy access

The current figures for Senegal shows that mobile coverage has reached 86% of the population, yet approximately 43% of the population lacks access to electricity. The addressable market – defined as the population living without access to electricity but within the vicinity of the GSM network - is estimated at over 3.2 million people²⁴, for whom mobile technology could be leveraged to enable energy access (Table 4). The five mobile channels identified to help improve energy access are illustrated in Annex 1.

Table 4: Energy addressable market²⁵

Indicator	Senegal	Botswana	Côte d'Ivoire	South Africa	Kenya	Uganda
Population without access to electricity	7,211,562	1,095,792	10,401,821	12,497,825	33,990,140	30,416,462
Energy Addressable Market	3,250,096	982,665	7,526,216	11,081,009	30,009,848	28,840,999

²³ GSMA, Mobile Money for the Unbanked deployment tracker, 2014 <http://www.gsma.com/mobilefordevelopment/programmes/mobile-money-for-the-unbanked/insights/tracker>

²⁴ GSMA, Sizing the Opportunity of Mobile to Support Energy and Water Access, 2014

²⁵ Ibid

2 Electricity Metering and Payment

2.1 Metering: Current status and challenges

Senelec serves 1,000,000 customers to date. Most urban households are equipped with analog electro-mechanic meters, of which 25,000 are pre-paid. The utility is currently in the process of rolling out an additional 200,000 pre-paid analog meters for households and is also completing a tendering process to deploy 15,000 smart meters for large power users.

Equipping large power users with smart meters is part of Senelec's strategy to reduce and eliminate fraud and late payments. These smart meters will use the GSM network for the backhaul (concentrator to the utility data base) and Power Line Communication (PLC) between the meter and the data concentrator whenever possible. When PLC networks are not available, Senelec will use GSM networks. Information will be sent back to the database once a month, between midnight and 6 am (off-peak time to keep costs low), in addition Senelec has the ability to collect data on an ad-hoc basis. The tender for 15,000 smart meters and 350 concentrators was being finalized at the time of the report.

Lessons from Senelec's first pre-paid meter deployment

The first pilot deployment of 25,000 pre-paid meters started in 2005 but was discontinued. This pilot highlighted some challenges in deploying pre-paid meters, which Senelec has taken into account in the launch of new meter technologies:

- Inadequate software integration:
Initially, Senelec requested a customized Customer Relation Management software from their South African vendor. What seemed like a strategic decision, resulted in a version of the software that could not be upgraded and led to the discontinued investment in the pre-paid meter deployment.
- Weak distribution network:
Points of Sales (POS) for purchasing pre-paid vouchers were reduced to Senelec's main offices once the pilot was discontinued. As a result, customers who initially were expecting a more convenient service found that they could only get their pre-paid vouchers at the main offices, often waiting in long queues.
- The choice of meter hardware:
The first 25,000 pre-paid meters installed in 2005 were mono-bloc non-smart meters for small power users (<6kW). Moving forward, Senelec has chosen to switch to split non-smart meters with keypads installed outside the house which are expected to reduce the possibility of tempering of meters.
- Revenue reduction with pre-paid meters:
The pre-paid electricity service significantly decreased the revenues that the Senelec was receiving from its customers despite guaranteeing better repayment rates.

2.2 Payment: Current status and challenges

At the exception of the 25,000 pre-paid meters that are still in place today, meters are more commonly post-paid. Payments for electricity can be done in a few ways, including Orange Money, Wari and Joni Joni. Yet, the Senelec's IT systems are not configured to support seamless integration and real-time customer account settlement. In the case of Orange Money post-paid bill payment service, Senelec sends Orange Money its customer file to upload onto the mobile money platform. Customers are then informed via SMS that their bill is available and can settle the payment via mobile payment. Once the payment is done, Orange Money updates the customer file and send it back to the Senelec.

Challenges to date

Post-paid services have presented some challenges, some of the main ones include:

- Inadequate SMS alerts to customers: Utility customers using Orange Money receive monthly SMS alerting them that their bill is available while they are expected to pay their bills every two months, reflecting a lack of file synchronisation between Senelec and Orange.
- Lengthy process: With the existing interface, a whole day can go by between a customer's payment to the Senelec through a mobile money platform and the clearance of the account.
- Inadequate payment method: In line with the way customers prefer to pay for mobile credit, pre-payment is most convenient for end users.

These challenges make the case for MNOs to provide pre-paid mobile bill payment and work with utilities on improving the integration process for real-time customer account settlement, which will significantly improve the billing process.

3. The Opportunity for Smart Solutions and the Role of MNOs

3.1 How a smart solution can help improve energy access

Smart solutions refer to the suite of information communication technologies, including GSM, which can be used to more rapidly and accurately send information between service providers, devices, and customers. This includes one-or two-way smart-meters, as well as the enabling services, which support customer engagement, such as remote payments and billing reminders. This smart communication technology can help answer energy providers' main challenges while better understanding and responding to end customers' energy needs. The main components of a smart solution are the household meter and the mobile enabling services required to serve customers.

Although there will be variations in the solutions that are deployed in on-grid and off-grid areas, the main benefits of smart solution deployments include:

- **Improving billing efficiency:** Inefficient billing systems is one of the main challenges of energy providers resulting in manual collections, leakage of revenues due to a lack of transparency in collection and poor repayment rates. A smart billing solution, allowing for pre or post-payment of energy bills, will allow the energy provider to monitor payments and ensure repayments while offering the end customer an efficient way to pay for the service.
- **Better understanding of customer usage:** Currently most on-grid and off-grid energy providers must visit their customers' homes to take meter readings, or to evaluate or service decentralized solutions. Remote monitoring and control of infrastructure via a smart meter improves clarity on customer usage and demand, allows for easier detection of illegal connections or early warning systems for technical issues and for the remote shut-off of customers.

3.2 Beyond connectivity: How mobile network operators services can support energy access

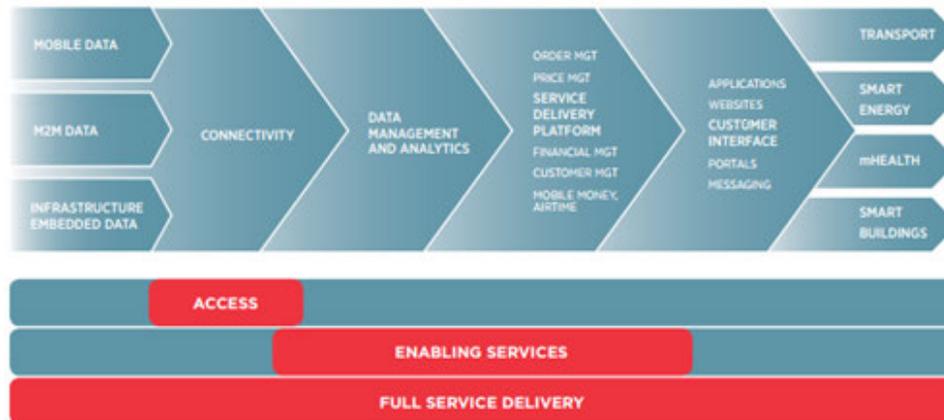
The spectrum of opportunities for operators to support smart service delivery are depicted in Figure 1 below. Providing connectivity services (i.e. SIM cards, voice, SMS and data) is the core of what MNOs can offer to support the deployment of smart solutions, but their value is magnified by providing additional enabling services. MNOs can broaden their offering, providing a full suite of services targeted at smart and non-smart meter deployments that can be leveraged by utilities and ESCOs.

The four key services MNOs can offer to support smart solutions, include:

- Connectivity/managed connectivity - connecting infrastructure and individuals' handsets to central servers and databases;
- Data aggregation/analysis - providing data about the status of connected smart meters and smart grid assets; combining data from multiple sources to produce new insights;
- Service delivery - delivering real-time consumption information to people and machines that will enable them to adapt and respond to events; the use of mobile money to support pre- and post-payments
- Customer interface - providing customer support operations, such as call centers and web portals, as well as delivering messages to subscribers.²⁶

These MNO services can be bundled into three levels of business offerings: access, enabling services and full service delivery as show in figure 1 below.

Figure 2: Mobile for smart service delivery: Beyond connectivity



3.3 Sizing the opportunity for smart solutions in Senegal

Table 5 below shows the different approximate number of households on and off-grid in Senegal. For each market segment, there are different opportunities to leverage components of smart solutions - both mobile enabling services and smart meters - to improve energy service and increase access.

Opportunity for mobile enabling services by customer segments

As presented in Figure 2, enabling services go beyond connectivity and support customer engagement, such as remote payments and billing reminders.

²⁶ GSMA, Guide to Smart Cities The Opportunity for Mobile Operators, 2013 http://www.gsma.com/connectedliving/wp-content/uploads/2013/02/cl_sc_guide_wp_02_13.pdf

On-grid households

On-grid, the opportunities to leverage mobile enabling services, are strong in urban or peri-urban areas (e.g. informal settlements), where mobile networks and mobile money are more widely available. As households that are connected to the electricity grid can be assumed to have a mobile connection, the market opportunity for mobile enabling services is equivalent to the number of grid connections (almost 1 million households).

Off-grid households

Off-grid areas present a large market potential for mobile enabling services in Senegal, as a large part of those living off the electricity grid have GSM coverage. However, mobile money as one of the key mobile enabling services will need to be made more widely available through dealers in those areas, followed by registration and education of customers. Orange Money Senegal's partnership with the UN World Food Programme is an example of how mobile operators are partnering to extend the use of mobile to rural, off-grid areas.

Opportunity for smart meters by customer segments

The opportunities for smart metering to improve and increase energy access for each market segment are considered in Table 5 below in Senegal, presenting the different approximate number of households that are connected to the national grid in rural and urban areas.

Table 5: The rural and urban off- and on-grid market segments

User Type	OFF-GRID		ON-GRID		
	Rural Households	Urban Households	Rural Households	Urban Households	Large Power Users
Number of users (households)	933,015	92,612	302,111	667,889	30,000
Comment on the market	Almost 1 million households do not have access to electricity but are likely to have GSM coverage, presenting the largest market potential, in terms of volume, of smart solutions in the form of GSM-enabled decentralised energy solutions	Possibly illegally connected	Senelec implements load limitations on on-grid rural households and is considering the implementation a tariff system to improve payment flexibility	Of which only 200,000 households are currently being installed with pre-paid meters	Of which half are being installed with smart meters

On-grid households

Theoretically, there is a potential for GSM-embedded meters installed at the household level, yet the benefits may not outweigh the costs. That is why Senelec has opted for the adoption of non-smart pre-paid meters for this customer segment. The pre-payment option is expected to facilitate payment of electricity and eliminate the risks of non-repayment (which are already relatively low in Senegal), thereby increasing the potential for more connections. While 200,000 households are expected to be equipped with pre-paid meters in the next few years (one meter per household), more than 450,000 households will still need to be retrofitted.

Off-grid households

Most off-grid households are using traditional fossil fuels or batteries for their energy needs. However, Senegal's market for decentralized energy services, such as solar home systems or mini-grids, is growing and offers an alternative to traditional, non-renewable energy sources. There are more than 1,000,000 households that are off the electricity grid, in both urban and rural areas, but that are likely to have access to mobile network coverage. This means that while using PLC or other communications path makes more sense when available (i.e. on-grid), GSM networks are the most efficient and available channel to transmit data in off-grid areas. The benefits of using smart metering solutions in off-grid areas is particularly interesting for mini-grid systems, allowing the management and recording of data as well as controlling households energy loads.

In light of this significant untapped market, there is a clear opportunity for MNOs to support ESCOs in addressing the lack of energy access in off-grid areas, by leveraging their mobile money services or providing connectivity to allow the remote monitoring and control of off-grid solar home systems or mini-grids. These decentralized energy solutions are rapidly scaling in East Africa and, given the right environment and partners, these models could develop in Senegal.

Large power users

Large power users are an important customer segment and, given their significant energy needs, require a tailored approach. It is estimated that there are 30,000 large power users in Senegal, of which half will be equipped with smart meters in the coming years. Following this first pilot and lessons that will be learnt, there will be an opportunity to expand to more customers. Furthermore, there may be opportunities for mobile operators to offer corporate energy management solutions that use the GSM network to remotely monitor and control groups of appliances.

4. Recommendations

Mobile enabled services to support communication and payment

In the case of Senegal, the strongest opportunities for mobile operators to support smart service delivery may be in offering a suite of mobile services to Senelec and its customers as well as other ESCOs. Across the spectrum of possible MNO services, those with the greatest potential to provide immediate benefits to energy service providers are customer communication and payment. Focusing on these two enabling services, MNOs can provide support to utilities' and ESCOs' smart and non-smart meter deployments in urban on-grid as well as rural off-grid markets.

As the Senelec was in the process of planning the roll-out of smart metering solutions for large power users during the time of the study, there is an opportunity for MNOs to explore the opportunity to offer their more sophisticated services around connectivity and data management, developing partnerships with multiple suppliers.

- **Communication**

During this study, it appeared that better communication between the utility and its customers, around recurrent issues such as load shedding and peak demand control, although seemingly simple, would have a high impact on the customer experience and trust. There is an easy win for MNOs to provide Senelec with bulk SMS services to alert customers of power outages and remind them to turn off appliances during peak demand for instance. For operators, this may also serve as a trigger for customers to use their mobile payment services to purchase pre-paid energy. Furthermore, this service can be of value to many service providers with high volumes of clients, e.g. other utilities and public sector organisations.

- **Mobile payment**

There is a strong opportunity for MNOs to increase the number of customers using mobile money for pre-paid electricity and to replicate this service with more bill pay partners. Offering bill pay services with more partners will also encourage customers to keep a higher balance in mobile money accounts in order to be able to easily pay multiple bills, and at the same time reduce churn for operators

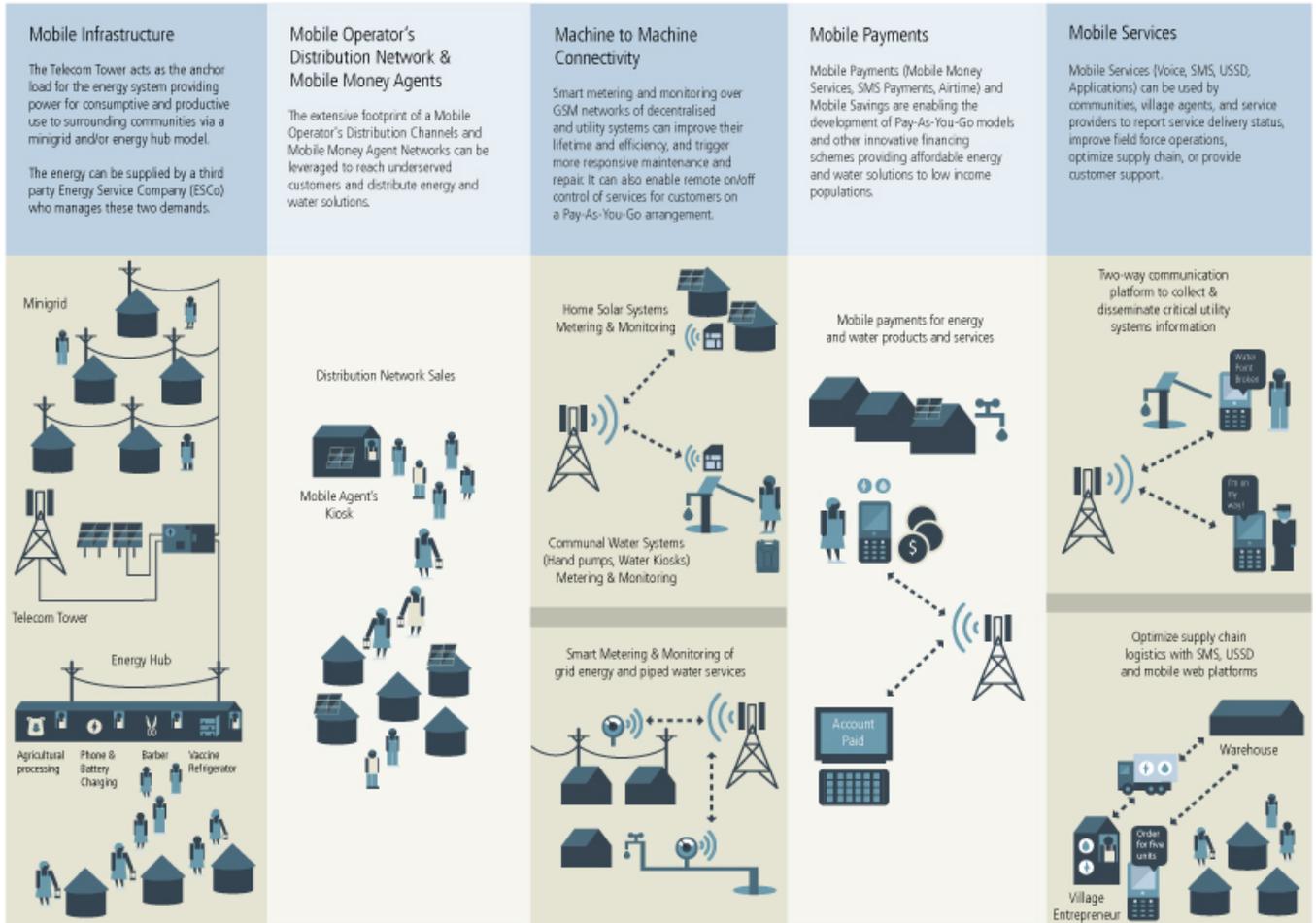
Concluding Remarks

After a first pre-paid meter trial, Senegal is re-embarking onto a new infrastructure and technology upgrade and appears to have laid out a strategic approach in order to reach its objectives and improve energy service delivery to its customers.

There are opportunities for mobile network operators to support both the utility - in the areas it will reach – and ESCOs in the off-grid areas, by offering a suite of mobile services to support smart service delivery of energy access across the country. Among the suite of services, providing the communication services between the utility and the customer as well as offering a flexible payment solution via mobile bill payment are identified as bringing the highest value to the partners, across the on and off-grid areas of Senegal.

Annex 1

Five Mobile Channels to improve Energy Access



About the GSM Association

The GSMA represents the interests of mobile operators worldwide. Spanning more than 220 countries, the GSMA unites nearly 800 of the world's mobile operators with 250 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and Internet companies, as well as organisations in industry sectors such as financial services, healthcare, media, transport and utilities. The GSMA also produces industry-leading events such as Mobile World Congress and Mobile Asia Expo.

For more information, please visit the GSMA corporate website at www.gsma.com. Follow the GSMA on Twitter: @GSMA.

About Mobile for Development - Serving the underserved through mobile

Mobile for Development brings together our mobile operator members, the wider mobile industry and the development community to drive commercial mobile services for underserved people in emerging markets. We identify opportunities for social, economic impact and stimulate the development of scalable, life-enhancing mobile services

About the GSMA Mobile for Development Utilities Programme

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, Machine2Machine, 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.

About Orange

Orange is one of the world's leading telecommunications operators with sales of 41 billion euros in 2013 and has 161,000 employees worldwide at 30 June 2014, including 101,000 employees in France. Present in 30 countries, the Group has a total customer base of more than 236 million customers at 30 June 2014, including 179 million mobile customers and 16 million fixed broadband customers worldwide. Orange is also a leading provider of global IT and telecommunication services to multinational companies, under the brand Orange Business Services.

Contact

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