The background image is a dark, monochromatic photograph of a slum. It shows several buildings with corrugated metal roofs. In the foreground, a line of laundry, including various patterned and plain fabrics, is strung across the scene. Several tall, thin utility poles with cross-arms and wires are visible against a dark sky. The overall atmosphere is gritty and urban.

Mobile For Development Utilities

MOBILE FOR SMART ENERGY SOLUTIONS

CÔTE D'IVOIRE

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 and third-party energy service companies - as well as governments, to leverage GSM networks and technologies to dramatically improve and expand energy services to new scales. Deploying innovative smart solutions, including 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 and role of mobile operators in partnering with energy service providers to support 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 Côte d'Ivoire are discussed in more detail in this case study, while the full research report "Mobile for Smart Solutions: How Mobile can Improve Energy Access in Sub-Saharan Africa" is available [here](#).

The government of Côte d'Ivoire and the Compagnie Ivoirienne d'Electricite (CIE), the national utility, are currently developing a strategy to leverage smart meters to improve the country's electricity management. CIE's grid however does not reach everyone as 61% of the population lacks access to electricity. Given the ubiquity of mobile networks, including in remote areas, mobile operators are well positioned to act as strong partners for utilities as well as off-grid energy service companies across urban and rural areas, by offering a suite of service beyond simple connectivity, including customer communication and mobile payment solutions to improve Côte d'Ivoire's current energy access.

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 – Côte d'Ivoire

1.1 Geography

The Republic of Côte d'Ivoire is a coastal country located in West Africa, sharing its borders with Ghana, Burkina Faso, Mali, Guinea and Liberia. The country, with a national territory spanning 322,462 km², is divided into 14 districts, 33 regions and 8,513 localities.³ Yamoussoukro is the political capital, while Abidjan is the heart of the country's financial activities.

Figure 1: Côte d'Ivoire map



1.2 Demographics and economics

Côte d'Ivoire has a population estimated at 23 million with 53% of the population living in urban areas and 47% living in rural areas.⁴ Following ten years of political crisis (2002-2012), the country is experiencing a steady recovery. Côte d'Ivoire is now the second largest economy of West Africa with an 8.8% GDP growth in 2013⁵, supported by the government's National Development Plan for 2012-2015.

Despite the recent economic growth and a low unemployment rate (4% of the population in 2012), the country still faces significant development challenges as shown in Table 1, ranking low in the Human Development Index: 171 out of 187 countries.⁶ This reflects the unequal distribution of wealth, with 35% of the population living on less than US\$1.25 a day.⁷

³ World Bank Data, 2013

⁴ Ibid

⁵ African Economic Outlook, 2014 http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2014/PDF/CN_Long_EN/Cote_divoire_EN.pdf

⁶ UNDP Human Development Index, 2013 <http://hdr.undp.org/en/countries>

⁷ Ibid

Table 1: Key regional indicators*

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

According to the World Bank, Côte d'Ivoire's national electrification rate is estimated at 59% with a significant gap between rural and urban areas, with electrification rates of 37% and 80% respectively (Table 2). However figures vary depending on the definition used: the CIE also considers the electrification penetration determined at the locality level, which is 34% and the household electrification rate, which is 26%.¹³ These varying figures reflect the challenges of achieving full energy access at a household level, even in a country with relatively good electrification rates.

Table 2: Regional electrification rates¹⁴

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

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, years vary

13 As of 2012, data provided by Compagnie Ivoirienne d'Electricite (CIE)

14 Sustainable Energy for All, Global Tracking Framework. Data from 2010. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSPIB/2013/05/24/000445729_20130524104654/Rendered/PDF/778890v20GTF0o0OfficialUseOnly090.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.

Côte d'Ivoire's national grid is mainly concentrated in urban and peri-urban areas. In November 1990, the State handed over the generation, transmission and distribution of electricity to a private utility, the Compagnie Ivoirienne d'Electricité. Until recently, national legislation gave the CIE the exclusive right to transmit and distribute electricity, while Independent Power Producers (IPPs) could sell their electricity to the CIE. However, the "Code de l'électricité" is currently being amended to allow the distribution of electricity by other energy providers. The three IPPs currently operating in Côte d'Ivoire are Ciprel, Azito and Aggreko. Thanks to a strong generation capacity, the country exports electricity to neighbouring countries including Burkina Faso, Ghana, Bénin, Togo, and Mali.¹⁵ Yet, while Côte d'Ivoire has a significant installed capacity, additional efforts are required to extend energy access to the 41% of the population that currently lacks it.¹⁶

The Rural Electrification Program of Côte d'Ivoire is a government-led initiative which is responsible for the rural electrification outside of the area covered by the CIE. Following a first, incomplete, Rural Electrification Plan in 1995, the government developed a new Rural Electrification Plan (2012 – 2030) to fulfil the president's mandate to electrify all villages of more than 500 people by 2030, focusing on two parallel actions: extending the national distribution network and moving towards decentralized photovoltaic energy sources. The total cost of this new plan is estimated at 580 billion FCFA (US\$1.2 billion) in investments.¹⁷

Energy access challenges

Compagnie Ivoirienne d'Electricite's challenges

The CIE faces many challenges including non-technical losses, non-repayments (CIE has a 50% collection rate¹⁸) and technical losses; power outages estimated at 49 hours per year per customer.¹⁹ The utility has also confronted serious revenue deficits in large part due to the country's political crisis: between 2002 and 2012, the population received electricity but repayments to the CIE were erratic due to the difficult access to some of these areas for billing and collection agents. Recovering from this period requires the utility to be focused on ensuring that repayment rates and other losses are reduced to a minimum.

Off-grid service providers' challenges

Four million people are without access to electricity in rural areas of Côte d'Ivoire²⁰ and use diesel as one of their main source of energy, which is expensive and polluting.²¹ ESCOs highlighted the need to reduce costs of energy as a priority to encourage the deployment of decentralised energy solutions in the country, notably by lowering solar tax

¹⁵ Proparco,

http://www.proparco.fr/webdav/site/proparco/shared/PORTAILS/Secteur_privé_developpement/PDF/SPD18/SPD18_Amidou_traore_FR.pdf

¹⁶ SE4all report, 2013, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/05/24/000445729_20130524104654/Rendered/PDF/778890v20GTF0o0Official0Use0Only090.pdf

¹⁷ Anare, 2012, <http://www.anare.ci/assets/files/pdf/documents/atel-semin/4MMPE-SNE2012-Rapport-Com3-Electrification-Rurale.pdf>

¹⁸ Bloomberg, 2013, <http://www.bloomberg.com/news/2013-05-23/ivory-coast-power-utility-plans-exports-as-profit-grows.html>

¹⁹ ESMAP, 2009

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

²⁰ The rural population of Côte d'Ivoire is estimated at 10,810,000 people and with an electrification rate of 37%

²¹ Anare, 2012

policies, encouraging local production of hardware, standardising electric equipment and extending the distribution network of decentralised energy solutions. Additionally, a better use of the funds available for rural electrification (~50 billion FCFA, or US\$95 million, for 500 localities per year) as well as a diversification of the sources of investment – public and private – are other elements which would support energy access in underserved areas of Côte d'Ivoire.²²

Decentralized renewable energy solutions are still nascent in Côte d'Ivoire, however the large number of responses by Energy Services Companies (ESCOs) to the Ministry's first tender for decentralised energy projects, signals an interest in the private sector to support energy access. Projects submitted included off-grid mini-grid systems and solar home systems.

1.4 Mobile network operators and GSM coverage

There are currently seven mobile network operators (MNOs) in Côte d'Ivoire covering 98% of the population (Table 3): Orange, MTN, Moov/Etisalat, Koz, Green Networks, Aircom and YooMe²³. In early 2014, MTN and Orange held respectively 37% of the market, Moov/Etisalat had 19%, Koz, 4%, Green Networks 2% and Aircom, less than 1% market share.²⁴ The country largely has 2G coverage while a significant portion of urban areas have 3G coverage.

Table 3: Regional mobile statistics²⁵

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

²² Ibid

²³ In April 2014, YooMe entered the Ivorian market, as the first LTE network in West Africa, <http://www.yoomee-africa.com/newsroom/top-news/22-top-news/159-yoomee-côte-d-ivoire-launched-the-first-lte-in-ivory-coast>

²⁴ GSMA Intelligence Data from Q2 2014, or most recent possible

²⁵ GSMA Intelligence Data from Q2 2014

Mobile money

As highlighted in the GSMA Mobile Money for the Unbanked report²⁶, mobile money has taken off in Côte d'Ivoire: "In June 2013, CelPaid, Moov, MTN, Orange, and Qash Services had together registered close to 5 million mobile money accounts, 35% of which are active²⁷. It is quite an impressive number considering there are only 9.6m unique mobile subscribers in Côte d'Ivoire (the mobile market has 20.1m GSM connections and a high degree of multi-SIMing)."²⁸ Since 2013, the number of unique subscribers and GSM connections has continued to grow (Table 3).

1.5 Addressable market: Leveraging mobile to enable energy access

The current figures for Côte d'Ivoire suggest that mobile population coverage has reached 98% yet, 41% of the population lacks access to electricity. In other words, many Ivoirians have access to the mobile network before they have 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 7.5 million people²⁹, 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 market³⁰

| Indicator | Côte d'Ivoire | Senegal | Botswana | South Africa | Kenya | Uganda |
|--|---------------|-----------|-----------|--------------|------------|------------|
| Population without access to electricity | 10,401,821 | 7,211,562 | 1,095,792 | 12,497,825 | 33,990,140 | 30,416,462 |
| Addressable Market ³¹ | 7,526,216 | 3,250,096 | 982,665 | 11,081,009 | 30,009,848 | 28,840,999 |

²⁶ GSMA Mobile for the Unbanked, 2014, http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/05/MMU_Cote_dlvoire_Turnaround_Story.pdf

²⁷ On a 90-day basis

²⁸ GSMA Intelligence

²⁹ GSMA M4D Utilities, 2014, Sizing the Opportunity of Mobile to Support Energy and Water Access

³⁰ Ibid

³¹ The addressable market is calculated as the population living without access to electricity but within the vicinity of the GSM network

2. Electricity Metering and Payment

2.1 Metering: Current status and challenges

The CIE serves 1,200,000 connections to date, mostly in urban and peri-urban areas. The majority of meters used by the CIE are analog electromechanical meters, with the exception of 120,000 pre-paid non-smart meters installed in 2004-2005. However, as stressed during the country's first Africa Smart Grid Forum, which took place in Abidjan in May 2014, the CIE realised the necessity to upgrade their meters to avoid being left with obsolete equipment.³² One of the utility's objective in hosting this event was to better understand their options in terms of smart metering technologies to support the development of their strategy, learning from Asian and European countries where smart solutions are more developed.

As a result, the utility is investigating the opportunity of piloting hybrid GSM / Radio Frequency smart meters for large power users as well as supporting the government's public lighting upgrade and energy efficiency initiatives. In addition to smart meters, the CIE is aiming to switch the majority of its household customers to pre-paid analog meters in order to improve the utility's repayment rates and offer a more convenient service to its customers. Finally the utility is considering the implementation of a "Politique d'effacement" for households, whereby small power users voluntarily agree to have their power turned off at given times, in exchange for guaranteed power the rest of the day and, possibly, at preferential tariffs.

Failed first smart meter trials: Lack of internal communication

The CIE first trialed smart meters at the end of the 1990s but the pilot was discontinued. Internal miscommunication, leading to upheaval from collections agents who were worried about losing their employment was mentioned as one of the possible reasons why the trial was not completed. This situation highlights the importance of clear communication, whether externally to customers who will have their meters upgraded or internally among employees. Collection agents – 800 agents in the case of the CIE – need to be part of the upgrading process, informed and trained to their new task.

2.2 Payment: Current status and challenges

At the exception of the 120,000 meters which allow pre-paid bill pay, post-payment is the main way customers in Côte d'Ivoire pay for electricity. Yet, the CIE'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, CIE 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 utility.

³² http://africasmartgridforum2014.org/fr/fichier/rapport-general_forum_africa_smart_grid_fr.pdf

However, post-paid Mobile Money services have presented some challenges, some of the main ones include:

- Inadequate payment method – Post-paid payment is inconvenient and not in line with the way customers prefer to pay for mobile credit, via pre-payment which is most convenient for end users.
- Lengthy process – With the existing interface, a whole day can go by between a customer's payment to the CIE through a mobile money platform and the clearance of the customer's account.

The above 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. Nonetheless, pre-paid services also present their own challenges as the CIE's first experience highlighted.

Pre-paid services

In 2004-05, the CIE implemented a first pre-paid meter pilot and 120,000 meters were deployed. The challenges faced by the CIE in the deployment have resulted in the following lessons being learnt:

- Need for linear tariffs for pre-paid electricity: One of the main challenge was that inadequate fee structure for pre-paid electricity customers. Under post-paid electricity contracts, the customer's bi-monthly bill includes a fee for electricity consumed (variable) as well as an additional fixed fee for premium and agent collection charges. However, the fixed fee, calculated on a bi-monthly basis, was not adapted to support pre-paid billing. During the first purchase, done within the two-month period, the fixed fee would be deducted from the total amount of electricity credit purchased by the customer. Subsequent payments made during the same two-month period would not incur an additional fixed fee. If the customer did not buy any electricity credit during a six month period (3x2 months), three times the fixed fee would be deducted from the electricity credit purchased. The perceived variable application of the fixed fee confused customers as they were never sure of exactly how much electricity they would receive for their money spent. The CIE has worked with the government and the regulatory authority to establish a linear tariff for the fixed fee for pre-paid customers, which will be implemented for pre-paid metering solutions moving forward.
- Agents are necessary: Although the CIE expected to be able to reduce their agent costs through pre-paid meters by eliminating the need for meter reading and payment collections, fraud became harder to control suggesting that agents were still necessary.
- Weakness of the distribution network: Although some third-party vendors were given permission to distribute pre-paid electricity in addition to CIE's offices, the distribution network was not widely extended. The limited possibility for customers to buy energy credit at any time did not encourage customers to switch to pre-paid electricity.

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 supporting 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 MNO services can support energy access

The spectrum of opportunities for mobile 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 third-party 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.³³

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 Côte d'Ivoire

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 - 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.

³³ 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 (1.2 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. Furthermore, additional efforts will be required to support registration and education of new customers.

Opportunity for smart meters by customer segments

The opportunities for smart metering to improve and increase energy access for each market segment are considered below.

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

| User Type | OFF-GRID | | ON-GRID | | | Large Power Users |
|------------------------------|--|------------------|--|---|-----------------------------------|---|
| | Rural Households | Urban Households | Rural Households | Urban Households | Public lighting | |
| Number of users (households) | 1,260,000 | Unknown | 540,000 | 1,200,000 | 8,000 | 4,000 |
| Comment on the market | The CIE aims to connect over 600,000 currently off-grid rural households by 2020, possibly deploying pre-paid meters | Unknown | Possibility to implement load management on on-grid rural households | All on-grid urban households are equipped with analog electromecanic meters (120,000 of which are pre-paid) | Possibility to trial smart meters | The CIE is planning to trial smart meters for Large Power Users |

On-grid households

As seen in Table 5 above, there are currently over 1.7 million households, across on-grid rural and urban areas that could benefit from pre-paid smart or non-smart solutions. Theoretically, there is a potential for GSM-embedded meters installed at the household level, yet the benefits may not outweigh the costs. Although the utility's strategy might evolve, it appears that the CIE will focus on providing non smart pre-paid meters for households. The pre-payment option will facilitate improved revenue and cost recovery for electricity services by reducing the risks of non-repayment, thereby increasing the potential for more connections.

Off-grid households

Rural off-grid areas represent a significant addressable market in terms of potential new smart meter connections, as more than 1.2 million households do not have access to electricity but are likely to have access to GSM coverage. Given 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.

Large power users and public lighting initiatives

Large power users are an important customer segment for the CIE as they represent approximately 75% of its revenue. They represent at least 4,000 customers for the CIE. Answering their energy needs while controlling their consumption and payment behaviour is therefore crucial and requires a tailored approach. The CIE is discussing the piloting of a hybrid GSM/ Radio Frequency smart metering system for large power users. There are also other opportunities worth exploring to provide smart solutions to support the government's current public lighting initiative, in line with its efforts to improve energy efficiency.

4. Recommendations

Mobile enabling services to support communication and payment.

In the case of Côte d'Ivoire, the strongest opportunities for MNOs to support smart service delivery may be in offering a suite of mobile services targeted at the CIE, its customers and third-party 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 ESCO's smart and non-smart meter deployments in urban on-grid as well as rural off-grid markets. These services will benefit the utility and the customer as well as create stickiness that help operators reduce churn as well as bring in revenue.

Communication

During this analysis, it appeared that better communication between the CIE 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 the CIE with discounted bulk SMS to alert customers of power outages and remind them to turn off appliances during peak demand. Customers would also benefit from receiving information about their meter credit more directly to their phones, thus encouraging them to pre-pay more regularly and improving payment recovery for CIE. Furthermore, these types of customer communication services can be of value to many other service providers with high volumes of clients, e.g. other utilities and public sector organisations.

Mobile payment

Pre-payment has been identified as a key tool for utilities and off-grid ESCOs to support the delivery of reliable services to customer and considerably improve revenue collection. There is a strong opportunity for MNOs to increase the number of customers using mobile money payments for pre-paid electricity and to replicate this service with more bill pay partners. This firstly requires mobile money distribution networks to be widened so that topping up mobile money can become a more convenient option. 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.

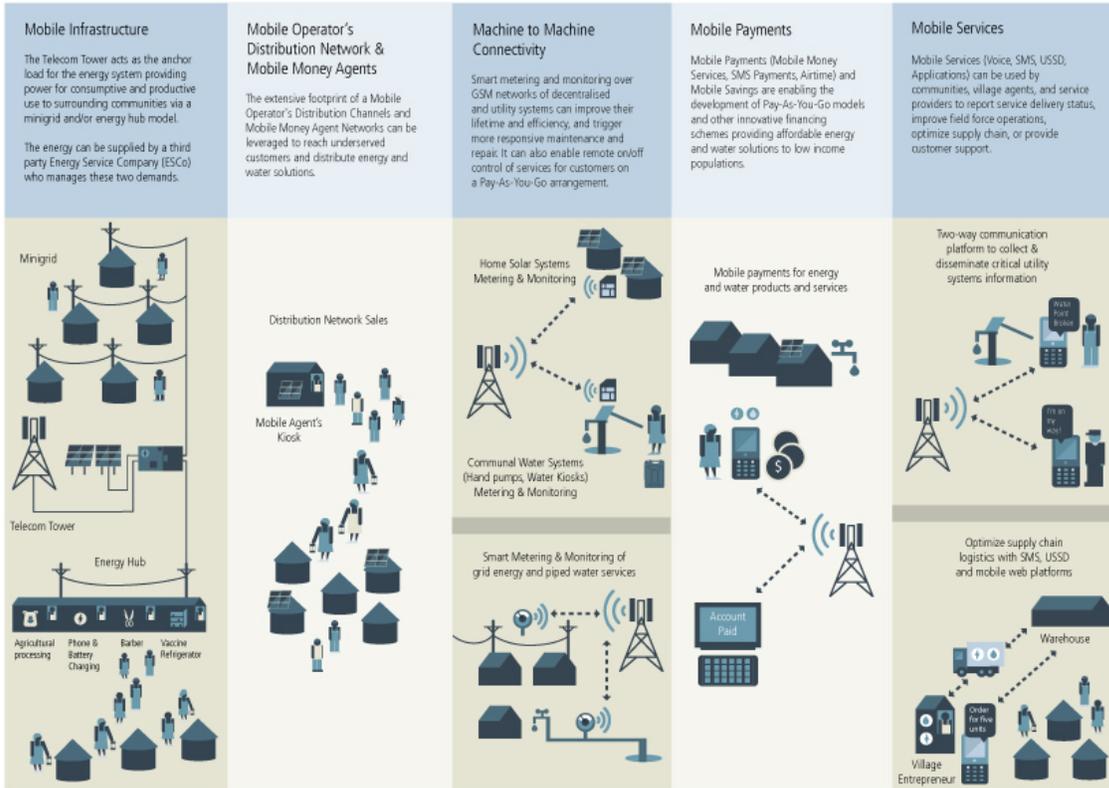
Concluding Remarks

The conditions for a successful uptake of smart solutions to improve energy access in Côte d'Ivoire are present: the country is economically strong as it is recuperating from a political crisis and has a strong installed energy capacity. It will be crucial for the CIE to adopt a clear and holistic strategy which will not only consider the metering technology but rather consider the delivery of a smart solution, which will help solve Côte d'Ivoire's energy access challenges – 10.4 million people still lack access to electricity in the country.

There are opportunities for mobile network operators to support both the utility - in the areas it will reach – and ESCOs in off-grid areas, by offering a suite of mobile services to support smart service delivery of energy access. Among the suite of services, providing the two-way communication interface between the utility and the customer, through smart meters, 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 Côte d'Ivoire.

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

For more information on the GSMA's Mobile for Development Utilities Programme, please contact us on m4dutilities@gsma.com

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