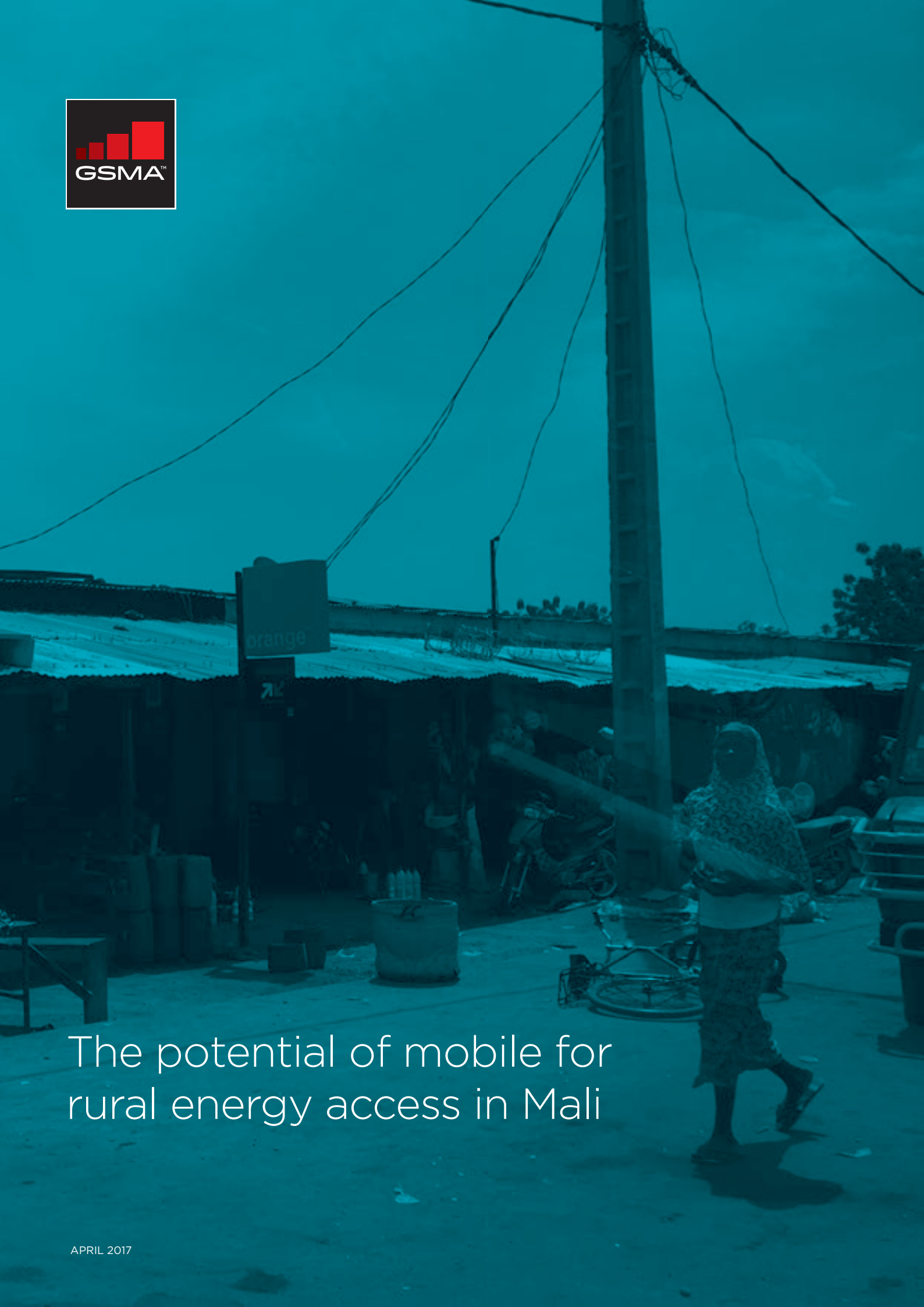

The potential of mobile for rural energy access in Mali

APRIL 2017

The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with more than 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 and the Mobile 360 Series conferences.

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Orange is one of the world's leading telecommunications operators with sales of 40,9 billion euros in 2016 and 155,000 employees worldwide at 31 December 2016, including 96,000 employees in France. Present in 29 countries, the Group has a total customer base of 263 million customers worldwide at 31 December 2016, including 202 million mobile customers and 18 million fixed broadband customers. Orange is also a leading provider of global IT and telecommunication services to multinational companies, under the brand Orange Business Services. In March 2015, the Group presented its new strategic plan "Essentials2020" which places customer experience at the heart of its strategy with the aim of allowing them to benefit fully from the digital universe and the power of its new generation networks.

The Mobile for Development (M4D) Utilities programme promotes the use of mobile technology and infrastructure to improve or increase access to basic utility services for the underserved. Our programme focuses on any energy, water or sanitation services which include a mobile component such as mobile services (voice, data, SMS, USSD), mobile money, machine-to- machine (M2M) communication, or leverage a mobile operator's brand, marketing or infrastructure (distribution and agent networks, tower infrastructure). The programme receives support from the UK Government

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Executive summary

In Mali, 26% of the population has access to electricity, leaving 11 million people off the grid, mostly in rural areas.[1] In contrast, mobile networks are a predominant infrastructure, covering 90% of the population.

However, over the last decade, with the support of the Government of Mali and international organisations such as the World Bank and the Agence Française de Développement, rural electrification rates have increased — from 1% in 2000 to around 10% in 2015.[2] Solar and other renewable energies are also progressively replacing fossil fuel sources in off-grid areas, especially in small-scale applications: renewables already account for 10% of rural energy services.[3] There are currently 60 private decentralised energy providers in Mali (called Sociétés de Services Decentralisés or SSDs) working under the mandate of the Rural Energy Agency (AMADER), and since the 1990s they have installed 200 mini-grids[4] and connected approximately 12,000 customers.[5]

1. International Energy Agency, 2015 http://www.worldenergyoutlook.org/resources/energydevelopment/energyaccessdatabase/
2. Numbers vary between the International Energy Agency (9%) and the AfDB (15%), http://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Profil_ER_Mal_Web_light.pdf
3. African Development Bank, 2015, "Energies renouvelables en Afrique", https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/energies_renouvelables_en_afrique-profil_pays_du_mali.pdf
4. Field-based research
5. Ibid

To capitalise on this growing rural energy market and strong addressable market, public and private actors need to work together to develop efficient decentralised energy solutions and reinforce existing mini-grid networks, as more than 50% are either partly operational or not at all.[6] Strategic changes within the AMADER, including a change of management and a new emphasis on improving the efficiency of rural installations, combined with renewed financial support from international organisations, will be critical to Mali becoming a frontrunner in improved access to decentralised energy in the Sahel region. The capacity of installed mini-grids is currently 15 MW and the aim is to reach 61% rural electrification by 2033.[7]

Mobile technology can support this effort. In more mature mobile money markets,[8] decentralised energy providers have been able to leverage mobile money to help unlock financial access to decentralised energy solutions, such as solar home systems (SHS) and mini-grids. GSM-enabled machine-to-machine (M2M) connectivity, which allows these energy solutions to be monitored and controlled remotely, is a solution many providers are choosing to secure their assets and collect data on their customers' energy consumption. Mali's decentralised energy providers are currently looking into integrating mobile technology and partnering with MNOs to tackle some of their main challenges: low customer repayment rates (as low as 70%[9][10]), lack of flexible payment structures, and low visibility into the performance of their mini-grids.

Mali's dynamic telecom sector can help tackle the energy access gap. Two mobile network operators (MNOs), Malitel and Orange, currently cover 90% of the population,[10] with a third expected to enter the market in 2017 and encourage more competition.

Mobile money could be a major opportunity as it is a growing service offered by both MNOs. Orange is aggressively developing its offer in Mali with 3.5 million customers[11] and is looking to expand to untapped parts of the country, especially rural areas. Deploying mobile-enabled pay-as-you-go (PAYG) solar home systems can, in addition to unlocking financial access to electricity for lower income clients, also support the expansion of mobile money in less accessible areas. Although M2M technology is still in its infancy in Mali, representing just 0.08% of all mobile connections,[12] the progressive expansion of 3G networks (currently covering 36.2% of the total market population)[13] and the 4G rollouts planned for 2017 could support the growth of that market segment for MNOs and allow them to introduce M2M services for solar home systems and mini-grids, including remote monitoring and control solutions.

The GSMA Mobile for Development Utilities programme, with the support of the UK government, collaborated with Orange Mali to identify the opportunity for MNOs to partner with decentralised energy providers in the deployment of mobile-enabled PAYG solar home systems and mini-grids to improve rural energy access, while also offering a solution to drive MNO revenues and strengthen subscriber loyalty. This report highlights the key findings of this work and offers recommendations for three key stakeholders: MNOs, decentralised energy providers, and government and international institutions.

6. Field-based research
7. African Development Bank, 2015, "Energies renouvelables en Afrique", https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/energies_renouvelables_en_afrique-profil_pays_du_mali.pdf
8. To date, 95% of sales of mobile-enabled SHS (estimated total of 800,000 systems) have been in East African markets where mobile money is widespread (Kenya, Uganda, Tanzania, and Rwanda). GSMA Mobile for Development Utilities Programme, January 2017, "Lessons from the use of mobile in utility pay-as-you-go models", http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/01/Lessons-from-the-use-of-mobile-in-utility-pay-as-you-go-models.pdf
9. Field-based research
10. GSMA Intelligence, Q4 2015
11. Field-based research
12. GSMA Intelligence, Q4 2016
13. Ibid

Key recommendations

Mobile network operators

In a relatively mature mobile market, introducing new products and services can be a valuable way to build customer loyalty and bring new customers on board. Providing solutions for decentralised energy providers that leverage mobile money and M2M technology could yield similar results. Our recommendations for MNOs are:

- To facilitate the integration of mobile money for decentralised energy services that, in turn, will increase customer usage of mobile money, especially in rural areas where mobile money penetration is only 30%;[14]
- To develop more M2M services, since only a few thousand M2M SIMs are currently in service in Mali,[15] as well as an Internet of Things (IoT) proposal for energy providers, allowing them to benefit from M2M connectivity without having to bear the high costs; and
- To partner with local decentralised energy providers that have the capacity to scale, while leveraging strong MNO brands to provide a critical service to rural communities.

Decentralised energy providers

Leveraging mobile money and M2M technology, together with an MNO's brand and marketing experience, will help providers tackle several persistent challenges. Our recommendations for energy providers are:

- To leverage the growing mobile money market to help providers scale their activities;
- To explore smart metering for mini-grids and use decentralised energy as a case to develop the nascent M2M technology; and
- To clearly outline the mutual benefits, which will help to ensure strong and sustainable partnerships with MNOs.

Government and international institutions

In parallel with the Government of Mali's efforts to develop the rural and renewable energy sector, updating current regulations will enable a more efficient and performance-based industry. Redirecting rural energy subsidies, which currently reward the installation of mini-grids rather than operations and maintenance, would encourage decentralised energy providers to strive for long-term results.

14. Interview with Orange Money
15. Interview with Orange Business services unit

Country overview

Socio-demographics and economics

Mali is a landlocked country, sharing borders with Algeria, Mauritania, Senegal, Guinea, Ivory Coast, Burkina Faso, and Niger. The country is divided between a sparsely populated, predominantly desert landscape in the North (regions of Tumbuktu, Kidal, and Gao) and a densely populated South (regions of Mopti, Koulikoro, Kayes, Segou, and Sikasso).

Figure 1

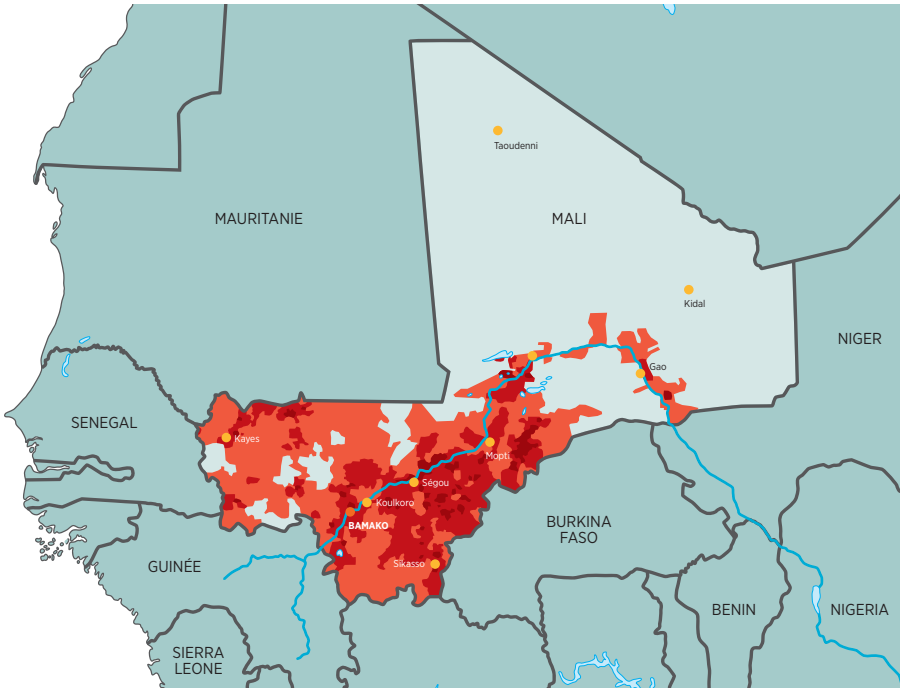
Map of Mali

KEY

- Capital City
- Major Towns/Cities
- Principal River

Density of Population (Hab/km^2)

- <5
- 6–30
- 31–70
- >70



The last census (2009) recorded a population of 14.5 million, but it is estimated that 18 million people now live in Mali, the majority in rural areas (60 % of the population). While Mali experienced a drop in national poverty from 55.6% in 2001 to 43.6% in 2010,[16] regional differences persist, especially between the North and the South. Mali ranks very low, 179th out of 188 countries, on the United Nations Human Development Index for 2015. The security crisis in recent years has slowed the country's socio-economic development and has made business in the North very difficult.

Table 1

Socio-economic indicators in Mali compared to neighbouring countries[17]

	Mali	Niger	Burkina Faso	Senegal
Population	18,000, 000	19,899,120	18,105,570	15,129,273
GDP (USD)	13.10 billion	7.14 billion	11 billion	13.78 billion
GDP/capita (USD)	724	359	590	900
HDI (ranking of 188 countries)	179	188	183	170
Urban %	40	19	30	40
Rural %	60	81	70	60
People living on less than $1.90 a day	49.25 (2009)	50.3 (2011)	55.3 (2009)	38 (2011)

Note: Neighbouring countries were selected to provide a regional comparison with Mali

Energy access

Mali's national electrification rate is estimated at 26% (below Sub-Saharan Africa's average of 32%), leaving 11 million people without electricity, mostly in rural areas.[18] Another 800,000 people only have access to an unreliable grid.[19]

Table 2

Energy access in Mali[20]

Indicator	Mali	SSA
% national electrification rate	26	32
% rural electrification	9	17
% urban electrification	53	59
Population without electricity (millions)	11	634
Population with unreliable grid (millions)	0.8	–

16. World Bank, http://www.worldbank.org/en/country/mali/overview
17. World Bank data, 2015
18. International Energy Agency, 2015
19. African Development Bank Group, 2015, "Renewable Energy in Africa, Mali Country Profile", https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Profil_ER_Mal_Web_light.pdf
20. International Energy Agency, 2015

Rural and renewable energy have evolved in the last 10 years with the financial support and technical assistance of international organisations. The declining price of solar has also helped push the market forward: between 2000 and 2016, the price of a 50 watt solar home system went from approximately 250,000 CFA francs (FCFA) (or ~USD 400) to 40,000 FCFA (~USD 65).[21]

Institutional actors: AMADER and AER-Mali

The Rural Energy Agency of Mali (AMADER) is responsible for all rural electrification projects. It works closely with two professional associations: the Association of Rural Electrification Professionals and the Association of Renewable Energy Professionals. The Agence des Energies Renouvelables du Mali (AER-Mali), previously called the National Centre for Solar and Renewable Energy (CNESOLER), is the research arm of the AMADER and focuses on technical certifications to promote the use of renewable energies, particularly solar, across the country.

Institutional challenges

The government's rural energy regulations are out of date, unchanged for the last 15 years, resulting in underperforming rural energy projects. For example, government subsidies currently support the installation of mini-grid networks rather than operations and maintenance, which has incentivise certain private operators to deploy mini-grids without having the proper know-how to sustain it.

On the other hand, the AMADER and its partners are progressively moving towards a more efficient strategy for rural energy solutions. The agency is also in the process of converting diesel-powered mini-grids into hybrids, using renewable energy and diesel as a backup. As for AER-Mali, it is encouraging the use of solar home systems through a renewable energy loan to eligible communities, in partnership with 10 different banks.[22] Spread over three years, the project will cost around 2 billion CFA francs (~USD 3.2 million), with four types of system between 500 and 3,000 W.[23]

Educating customers and SSDs on efficient usage of rural energy solutions will be critical for the government to drive the market. Currently, solar panels are scattered throughout the country, and it is not uncommon to see large solar panels charging one mobile phone at a time. Also, rural communities expect to pay the same tariffs as on-grid customers (109 FCFA/kWh or USD 0.17/kWh) and are increasingly reluctant to pay for the higher off-grid tariff set by the AMADER (250 FCFA/kWh or USD 0.4/kWh).[24]

Decentralised energy providers

There are 60 decentralised energy providers (SSDs) and non-governmental organisations (NGOs) responsible for operating rural mini-grids in Mali. They vary in size and capacity, with some SSDs operating only one site and others operating several. To date, about 12,000 customers have been connected. A few providers are also deploying solar home systems as complementary solutions to mini-grids in areas with lower population density or fewer revenue-generating activities. This report will look at providers currently exploring mobile technologies to improve delivery of their rural energy services.

Donors and investors

International donors, mainly the World Bank and the Agence Française de Developpement (AFD), but also the German development agency, GIZ, and SNV Netherlands Development Organisation, are supporting the sector and investing heavily to deploy new sites and improve the maintenance of existing rural energy installations. Private local organisations and non-governmental organisations, such as the NGO Malifolke Center and its microfinance partner, Nyetaa Finance, are also playing an active role in strengthening the potential of Mali's rural energy sector.

21. Field meetings with decentralised energy provider Access
22. Banque Atlantique, BDM, BHM, BICIM, BIM, BMS, Bank of Africa, BISIC, BNDA, and ECOBANK: http://maliactu.net/mali-production-denergies-renouvelables-dix-banques-passent-au-vert/
23. Mali Actu, April 2016, http://maliactu.net/mali-electrification-rurale-des-equipements-solaires-pour-tlomadio/
24. Field-based research

Telecoms in Mali

While there are only two MNOs in Mali, Malitel, the state-owned operator, and Orange, the market leader, Mali's telecom sector is dynamic and growing, with a new operator entering the market soon. The GSMA estimates that in Q4 of 2016, mobile penetration by unique subscribers reached just over 60% (over 11 million people), while mobile penetration by connections rose to over 95%.[25] The difference is due to many customers owning more than one mobile phone (one connection).

Table 3

GSM coverage and mobile statistics[26]

MOBILE PENETRATION

BY SIM[27]

95.8% | 17.6M CONNECTIONS

BY UNIQUE SUBSCRIBERS[28]

60.4% | 11.1M UNIQUE SUBSCRIBERS

OPERATOR MARKET SHARE

M2M CONNECTIONS

14,205
M2M CONNECTIONS

25. GSMA Intelligence, Q4 2016
26. GSMA Intelligence, Q4 2016
27. Total connections in the market divided by the total population at the end of the period, expressed as a percentage.
28. Total subscribers in the market divided by the total population at the end of the period, expressed as a percentage.

Mobile money in Mali

After a slow start, mobile money in Mali has been expanding. Orange launched its mobile money service, Orange Money, in 2010, while Malitel launched MobiCash in 2014. Both MNOs offer similar services, with money withdrawal and peer-to-peer transfers being the most commonly used mobile money services, followed by bill and merchant payments.[29]

However, these services are mostly limited to urban areas, as rural mobile money penetration is only about 30 percent. Orange is currently a strong leader in Mali's mobile money market, while MobiCash has a more limited footprint. Lemonway, a mobile money provider operating in Mali since 2014, uses both Orange and Malitel's networks.

> Innovation takes a major place in our current strategy and we are awaiting 4G to provide further services to our clients. Mobile payment is currently one of our main growth boosters and we are exploring energy to be another one. There is a real synergy between these two domains as mobile payment solutions will be integrated to our rural electrification solutions to make payment fast and easy for those who live in rural areas.
>
> **Aicha Toure,** Director Strategie et des Grands Projets, Orange Mali

Machine-to-machine (M2M) technology

In Mali, machine-to-machine communication is in its infancy, with just over 14,000 connections (or 0.08% of total mobile connections)[30] and a focus on fleet tracking solutions. However, this technology has strong potential, offering the opportunity to improve remote monitoring and control of mini-grid infrastructure through mobile M2M SIMs, enabling the transfer of data to SSDs, the AMADER, and relevant stakeholders.

29. GSMA MMU Deployment Tracker, http://www.gsma.com/mobilefordevelopment/programmes/mobile-money-for-the-unbanked/insights/tracker
30. GSMA Intelligence, Q4 2016

The nexus of decentralised energy and mobile technology in Mali

Mali has a robust network of mini-grid installations across the country, but especially in the southern regions of Kayes, Sikasso, and Koulikouro, where there is high population density and communities have businesses that demand more energy. While mini-grids have been installed since the 1990s, in the last couple of years, a few decentralised energy providers have been exploring the deployment of solar home systems.

Mobile could play a major role in both the business model and development of technology for mini-grids and solar home systems. Leveraging mobile money and M2M platforms, as well as strong MNO brands and marketing expertise, are valuable assets providers could leverage to scale their services in Mali.

Mini-grids: A wide but unfit network

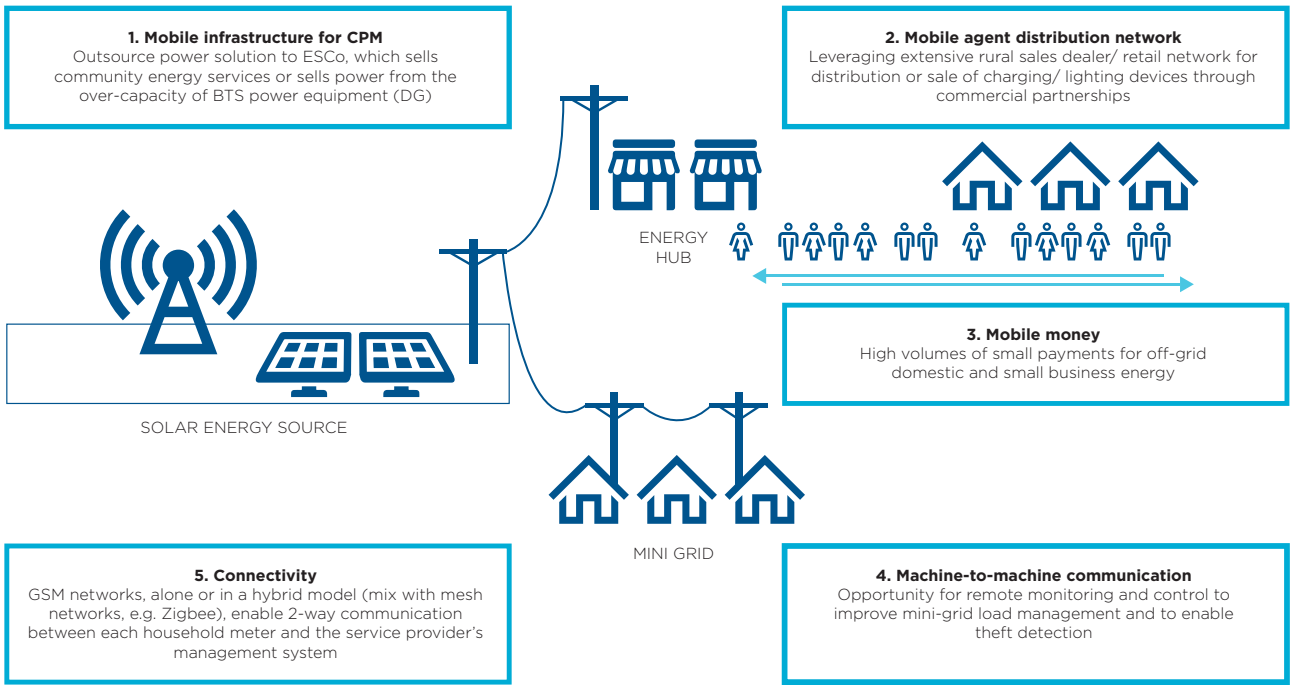
According to the AMADER, there are 200 mini-grids (mainly diesel-powered) installed in Mali, but only about 50% of them are functional. This is due to inefficient technology and lack of monitoring of SSDs' operations. The World Bank and AFD are currently planning to re-inject funding in the sector and subsidise new hybrid mini-grid deployments in around 160 villages.[31]

Five mobile channels for mini-grids

Both mobile technology and infrastructure (telecom towers) can be leveraged in the mini-grid model. Figure 2 below illustrates the five ways in which mobile can support this model, from using the telecom as an anchor tenant to mobile money and M2M connectivity.

Table 2

Mobile for mini-grids



31. Meetings with AFD

Solar home systems: A new decentralised solution for Mali

Individual solar home systems are less prevalent in Mali than mini-grids, but two of the biggest providers — Yeelen Kura and Access — are beginning to deploy them in certain regions of the country. Once mobile-enabled PAYG solar home system companies in East Africa had begun to reach scale, decentralised energy providers started developing their own systems and are now in the early stages of piloting them in Mali. Mobile money enables a PAYG model, making it more affordable as it allows customers to pay small, incremental amounts to either own the system or rent it indefinitely. While rent-to-own is the dominant model in East Africa,[32] SSDs have indicated they prefer energy-as-a-service to ensure sufficient, long-term usage by their customers.[33]

M2M technology can also be leveraged to transfer credit directly to the solar home system via the mobile network once a customer makes a mobile payment (Figure 3). This functionality is not necessary, however, and credit transfers can also be made manually, such as by the customer entering an code, sent via SMS, into the system keypad (Figure 4).

Figure 3

Mobisol pay-as-you go process

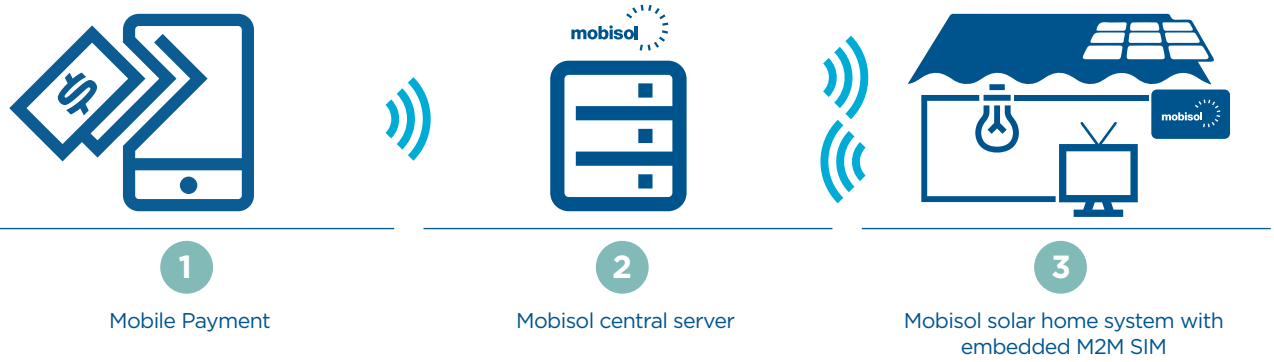
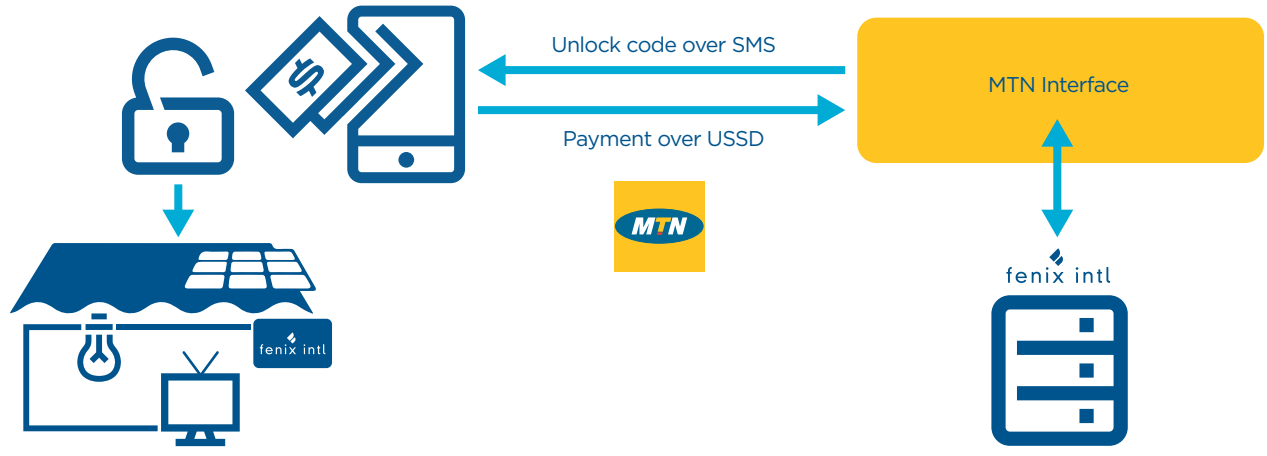


Figure 4

Fenix pay-as-you-go process



32. GSMA Mobile for Development Utilities Programme, January 2017, "Lessons from the use of mobile in utility PAYG models", http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/01/Lessons-from-the-use-of-mobile-in-utility-pay-as-you-go-models.pdf
33. Field meetings with Access and Yeelen Kura

Decentralised energy providers in Mali

Of the network of 60 decentralised energy providers in Mali, a few of those considered the most reliable were interviewed for this study.

Decentralised energy provider	Service
Yeelen Kura	Mini-grids and solar home systems
Access	Mini-grids and solar home systems
GERES	Energy hub for businesses
Sunna Design	Street lighting and mini-grid
Sinergie	On and off-grid projects

Yeelen Kura: Mini-grid and solar home systems

Launched in 2001, Yeelen Kura operates 15 mini-grids for over 7,000 households in southern Mali (Sikassou, Segou, and Koulikouro). The company's unique shareholder is the Dutch Foundation Rural Energy Services (FRES). Its grids vary in size from 30 kWp to 150 kWp. Yeelen Kura has also sold 3,500 solar home systems in the region and plans to double that amount in the next year. There are three sizes of solar home systems, ranging from 80 to 340 W. Yeelen Kura offers a rental model to ensure its service is properly maintained and sustainable, with customers primarily making their payments in cash to Yeelen's agent network.

Yeelen Kura is in internal discussion about the use of mobile for both payment and monitoring and control solutions. The company is about to pilot a small-scale project with mobile-enabled solar home systems and are identifying areas with stable coverage in the underserved areas they target.

Access: Mini-grid and solar home systems

Like Yeelen Kura, Access provides both mini-grid and solar home systems. Twelve mini-grids have already been installed and nine more are planned for 2017. At some sites, Access provides electricity to households, as well as street lighting, powered by solar. Its clients are mostly rural, but it is also working on an urban project, complementing the national grid with larger solar home systems (between 500 W and 5 kW, versus rural systems of 500 to 1,000 W).

Access is supported by donors such as KfW, as well as its partners Nyetaa Finance and the Malifolke Centre. The use of mobile payments is being discussed internally as an opportunity to improve customer repayment rates. Access has already begun testing smart metering for its mini-grid to collect data on the functionality of its infrastructure.

The mini-grid of Bancoumana is one of Access's newest sites. The mini-grid is powered by 144 solar panels and a battery back-up.

GERES

Operating in Mali since 2007, the French NGO, GERES, promotes renewable energy, especially solar, for rural electrification. It intends to expand support beyond household lighting to energy development for economic activities. For example, in a community of 30,000 people, there are typically around 200 artisans and shops, but the model would also apply to smaller communities of 5,000 people.

GERES energy projects in Koutiala and Konseguela follow an energy hub model, whereby a solar plant provides electricity to a cluster of small businesses (e.g. a barber, baker, welder) at the entrance of a rural community. This model is being replicated in areas where electricity is only available at certain hours of the day.

Village of Konseguela and its business hub

There is strong interest in using smart metering to transmit and receive information on the business hub's energy consumption to analyse the energy needs of the community. Currently, this data is locked in a meter and collected via USB sporadically. GERES is also exploring the possibility of installing internet hotspots at the hub. Mobile payments are also of interest, especially as a way of improving customer repayments and attracting more interest from investors. However, the areas where GERES operates are not well served by mobile money agents.

Sinergie

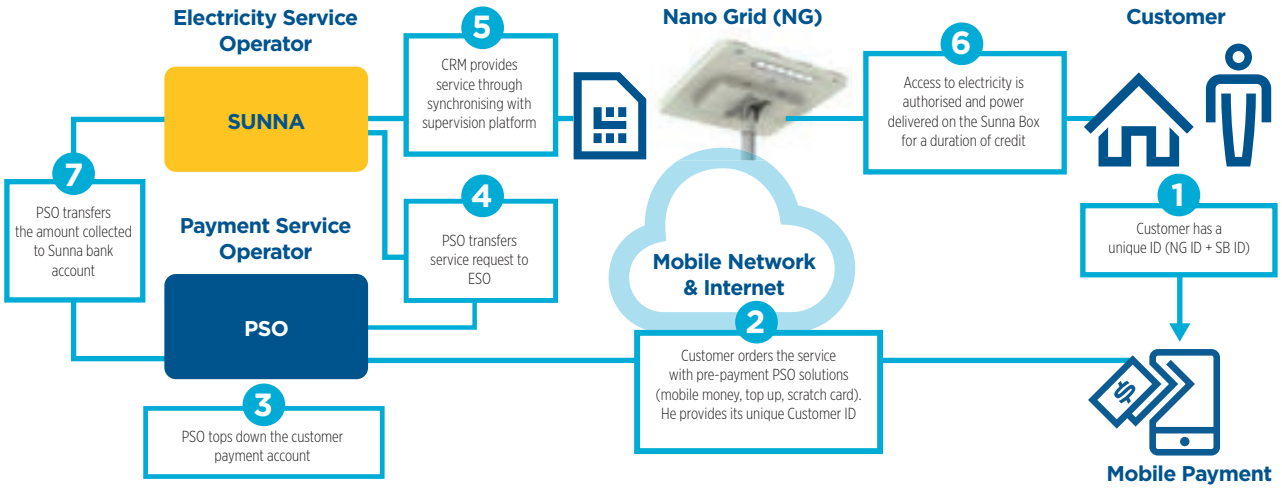
In operation since the late 1990s, Sinergie has worked on hundreds of off- and on-grid projects in over 520 villages. More recently, the company has been developing solar solutions, such as solar heating, street lighting, water pumps, and cooling, with the financial support of the World Bank. It is currently exploring options to adopt mobile-enabled PAYG technologies as well.

Sunna Design

Sunna Design installs street lights and mini-grids in rural villages of Mali, particularly in southern and central regions (Figure 5). Sunna's mini-grids have a PAYG business model whereby customers pay a daily fee for their energy consumption. The system checks the payment before granting access to energy. There are currently 250 street lights installed.

Figure 5

Sunna Design's nanogrid – How it works



How mobile can help tackle decentralised energy providers' biggest challenges

When applied to innovative energy solutions, mobile money and M2M communications can be strong levers for more efficient, scaled-up services.

Improved repayment rates through mobile money

Poor repayment rates are one of the biggest challenges for decentralised energy providers. Clients paying cash once a month for a post-paid electricity service is risky, especially given that customers in rural areas often earn low and irregular incomes. Yeelen Kura, for instance, reports a 95 percent payment rate for its mini-grid service, while others have lower rates at 70 percent. Yeelen Kura has an 85% repayment rate for solar home systems and other operators report similar rates. Automated billing and payment collection through mobile money could help eliminate defaults on payments, while in turn providing a more accessible service to customers. Strong mobile money agent networks also play a role in improving repayment rates.

Mobile money, combined with flexible payment structures, will also allow decentralised energy providers to extend their customer reach as services become more affordable, payable in regular small amounts.

Better asset management through remote and automated monitoring

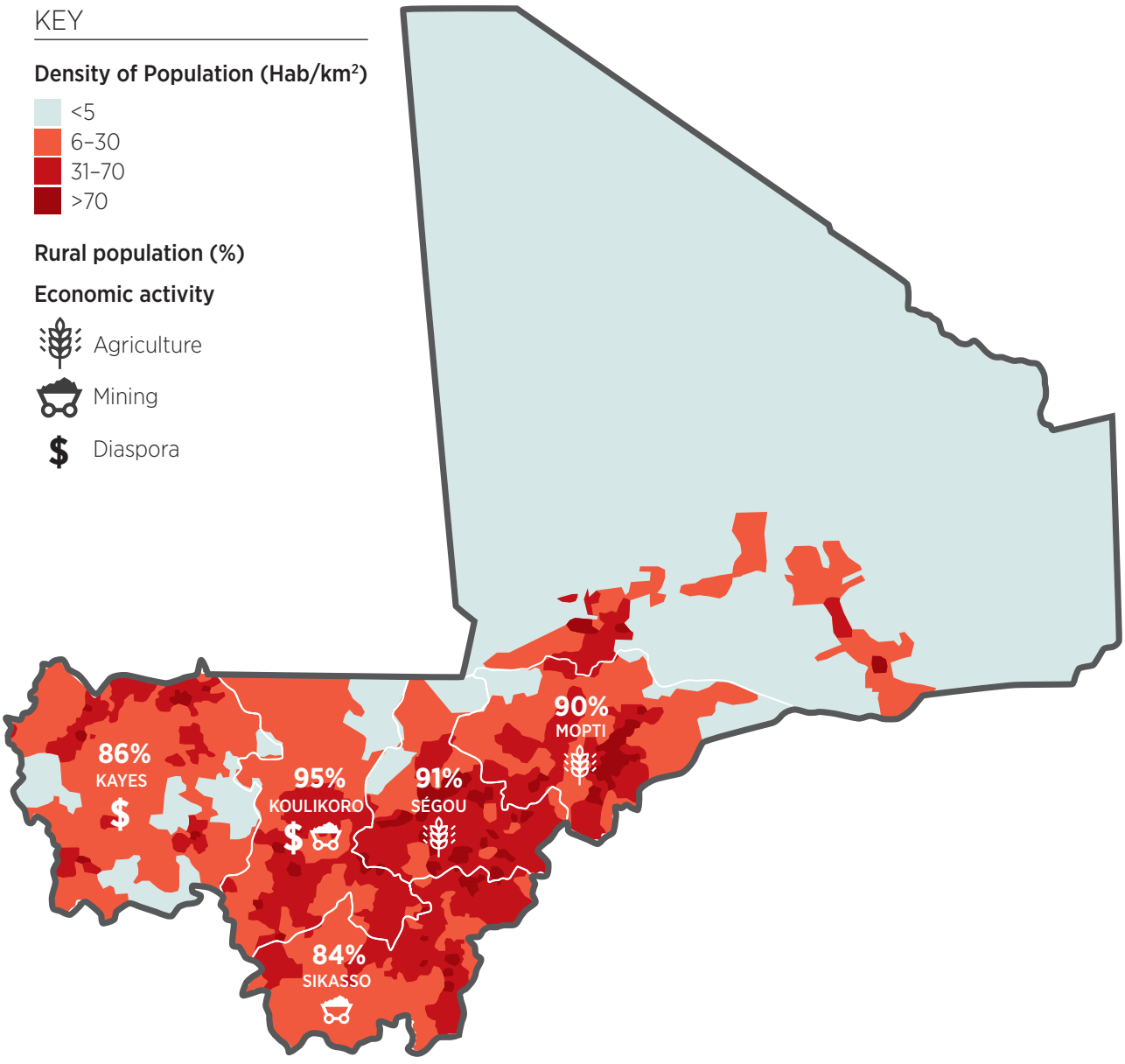
Remote monitoring and control of mini-grids and solar home systems allow providers to better manage their assets, which in turn benefits customers, decentralised energy providers, and the AMADER. Providers have expressed interest in the potential of smart metering — adding connectivity to mini-grid meters — to better measure and manage the energy consumption of the community being served. This data analysis helps strengthen the business case for decentralised energy solutions, notably through customer profiling (e.g. credit scoring) and monitoring of assets. For MNOs, this presents a major opportunity given that M2M services have only been available since 2016. MNOs could consider selling only the SIM to the SSDs, or provide a more comprehensive package with additional data and customer management services. This could also help them develop data services.

For both solar home systems and mini-grids, SSDs would benefit from enabling remote and automated payments to ensure payments are made on a pay-as-you-go basis. Established PAYG solar home system providers, such as Mobisol, have experienced up to 100% repayment rates in Rwanda.[34]

34. GSMA Mobile for Development Utilities programme, January 2016, "Mobisol: Pay-as-you-go Solar for Entrepreneurs in Rwanda" http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/01/Mobisol-Pay-as-you-go-Solar-for-Entrepreneurs-in-Rwanda.pdf

Key areas for rural energy projects

In this study, the GSMA focused on regions best suited to piloting a mobile-enabled decentralised energy solution. Given the lower population density and economic activity in the North, and the difficulty of reaching those regions, we focused on southern regions. Kayes, Koulikoro, Sikasso, Segou and Mopti, all have high population density and a stable socio-economic situation with regular economic activities, including mining, agriculture, transport, and commerce. These regions, especially Kayes, are also connected to the Malian diaspora living abroad, which brings wealth into the area.



In addition to population, data on energy,[35] mobile network coverage,[36] and revenue-generating activities will allow interested parties to identify the most appropriate areas to pilot these solutions.

35. This information was not available at the regional level.
36. Regions selected are all well covered.

Opportunities for MNOs

With a strong vision and the internal capability, MNOs can become long-term partners with local decentralised energy providers in Mali. Operators have already begun working with urban utilities on an ISAGO voucher card for pre-paid customers. Customers buy the card and enter the voucher code into the dedicated menu option of the mobile phone to top up their pre-paid meter.

There are various benefits that MNOs can realise from these partnerships, including increasing use of mobile services (notably mobile money) and Average Revenue Per User and improving brand recognition. The more engaged, the stronger the benefits for MNOs. Some of the benefits are highlighted below and GSMA's full spectrum of engagement is available in the Annex.

A boost to average revenue per user

Although 80% of Mali's population has access to a mobile network, less than 30% have access to electricity, limiting their ability to charge and use their phones. Unlocking this addressable market through decentralised energy solutions will increase customers' airtime usage and, in turn, increase MNOs' average revenue per user (ARPU). A GSMA study from 2012 estimated that ARPU went up by approximately 14 percent when mobile customers had access to a decentralised energy solution.

Developing mobile financial services

Enabling mobile money for decentralised energy solutions, either solar home systems or mini-grids, and partnering with SSDs can have various benefits, including:

- Acquiring new customers – Mobisol, a PAYG solar provider in Rwanda, estimates that 20 percent of its business customers are newly registered for MTN Rwanda's mobile money.[37]
- Generating frequent account activity – Mobisol users increased their airtime purchases via mobile money by 74% over time.[38]

In the long term, bundling innovative mobile money-based products, in addition to simple money transfers for utility services, can keep clients engaged and increase service uptake. For example, SSDs could work with MNOs to provide microinsurance or loans for customers with good repayment history.

Machine to machine: A gateway to connected houses and infrastructure

M2M-enabled products provide new revenue opportunities for MNOs, as they lead to greater mobile usage and can act as a gateway to more IoT and business-to-business services. As the market for data and M2M services grows in Mali, MNOs will have an opportunity to develop their offering, from simple connectivity to more comprehensive end-to-end solutions, including data and customer management. A few decentralised energy providers are already developing new data-driven products on top of existing solar home systems and mini-grids, such as weather sensors to collect climate-related data, which could further increase the demand for data from MNOs.

Brand equity and customer stickiness

Brand recognition is critical for MNOs, especially in a competitive market where customers are less likely to be loyal to just one MNO. A mobile operator lending its logo and brand to an innovative and local partner can bring significant brand value, and providing new and critical services, such as affordable household energy solutions, will encourage customer loyalty to its network and attract new customers, as well. For example, in Uganda, PAYG solar provider Fenix reported that 70% of customers surveyed had a better perception of MTN, a partner in Fenix's decentralised energy solution.

37. GSMA Mobile for Development Utilities Programme, January 2016, "Mobisol, PAYG solar for Entrepreneurs in Rwanda" http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/01/Mobisol-Pay-as-you-go-Solar-for-Entrepreneurs-in-Rwanda.pdf
38. Ibid.

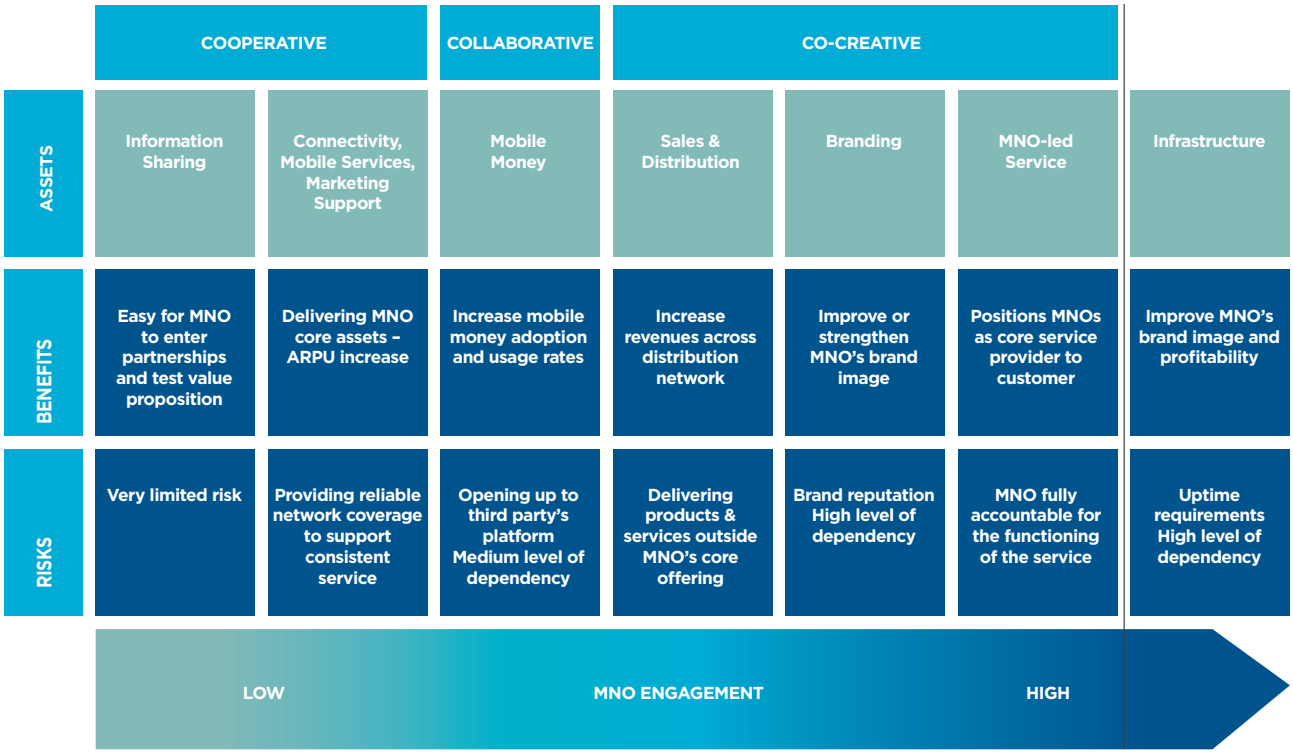
Conclusion

There is a major opportunity for Mali to grow its assets and reach the 12 million people who either have unreliable electricity or no access to electricity at all. A strong mobile market is growing, with providers moving aggressively to develop new services that respond to customer needs, and decentralised energy providers which have the experience and ability to expand their services, provided they have governmental and financial support. It will take the collaboration of all these actors to strengthen the rural energy market in Mali — a critical challenge in one of Africa's least developed countries.

Annex

The spectrum of engagement illustrated below is based on GSMA analysis and maps MNO assets against different partnership models, from cooperative to collaborative and co-creative, capturing increasing levels of engagement and associated benefits and risks.

Spectrum of engagement



Glossary

AER-Mali: The Renewable Energy Agency of Mali

AFD: Agence Française de Développement

AMADER: The Rural Energy Agency of Mali

ARPU: Average Revenue Per User

M2M: Machine-to-machine

MNO: Mobile network operator

PAYG: Pay-as-you-go

SHS: Solar home system

SSD: Société de Services Décentralisés, a term used for decentralised energy providers working under the AMADER mandate in Mali

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

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