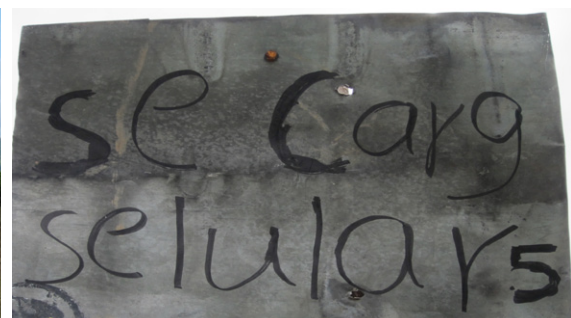




Mobile Enabled Community Services

Beyond Coverage: The opportunity for mobile operators to improve access to energy in Latin America

Movistar Nicaragua



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Executive summary

Access to modern energy services¹ and rural development in Latin America and the Caribbean are inextricably linked. Energy provides a key input for many rural economic activities and holds great influence over the ability of rural producers to improve their incomes. For example, electricity is used to pump irrigation water, power refrigeration systems, dry coffee beans, or provide lighting for children to do their homework at night.

In Latin America and the Caribbean, there are approximately 31 million people who live without access to the commercial electricity grid.¹ However, some 11 million people in the region live off-grid but have mobile phone subscriptions.² This means that many Latin Americans have a phone before they have a place to charge it.

The wide adoption of mobile services provides an opportunity to develop energy solutions for underserved populations at a scale never before seen by leveraging both human and physical infrastructure, as well as innovative payment technologies that are available through the mobile industry.

In 2012, the Multilateral Investment Fund (MIF), a member of the Inter-American Development Bank (IDB) Group, and the mobile operator association the GSMA have teamed up to explore examples of using innovative applications of mobile technology and infrastructure to deliver off-grid energy solutions. This report provides a case study of these opportunities, based on the network of Telefónica Movistar Nicaragua, a subsidiary of the Spanish-based global operator Telefónica.

The report finds that there is a potential business case for mobile operators to support access to energy and phone charging services in off-grid communities. The mobile network in Nicaragua has grown to the limits of the electricity grid: 25 percent of the population is without mobile coverage, and 28 percent of the population is not connected to the electricity grid. A total of 1.45 million people lack access to both electrical and mobile networks, representing a significant growth opportunity for mobile operators to promote decentralized energy solutions and phone charging services for off-grid communities.

¹ The International Energy Agency (IEA) defines access to modern energy services as access to electricity and clean cooking facilities (i.e. clean cooking fuels and stoves and biogas systems). Source: "Energy Poverty: How to Make Energy Access Universal." Special Early Excerpt of the World Energy Outlook 2010 for the UN General Assembly on the Millennium Development Goals. International Energy Agency, 2010

² GSMA MECS, "Sizing the Opportunity of Mobile to Support Energy and Water Access", December 2013

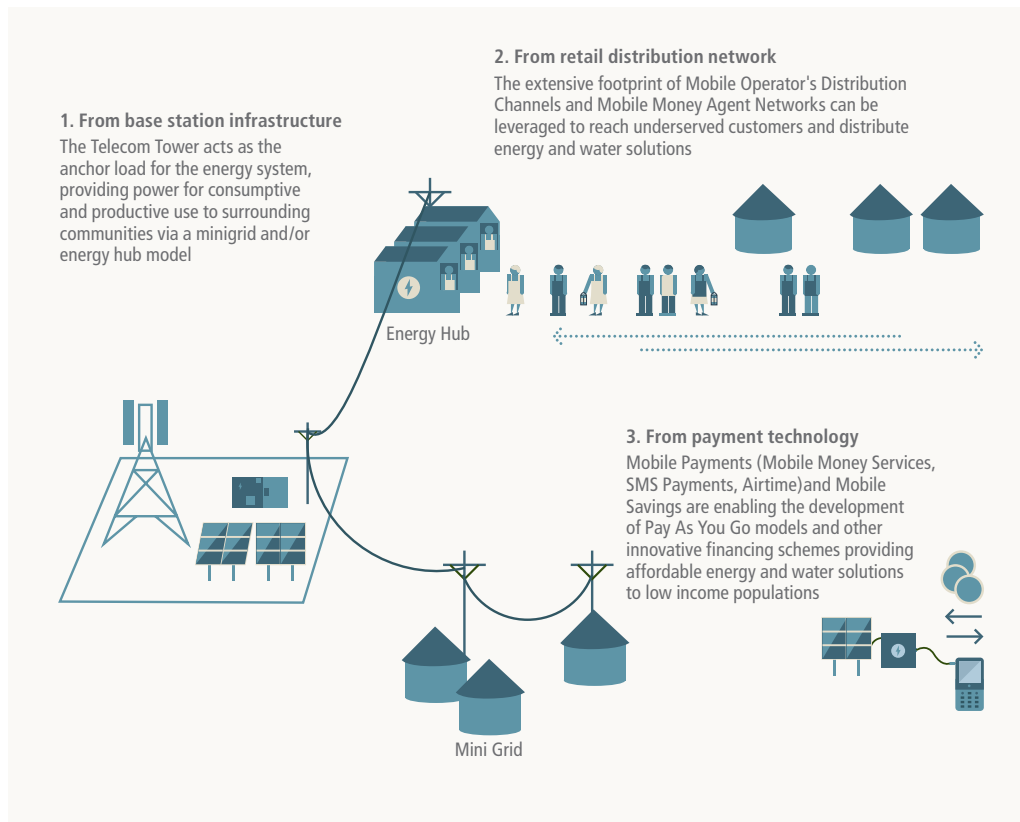
1. How the mobile industry can facilitate access to energy

In many emerging markets, mobile network operators have become adept at generating their own off-grid power as mobile penetration has outpaced the growth of the electricity grid. The mobile industry can become an agent for expanding access to energy in developing countries. There are currently as many as 259 million off-grid subscribers worldwide³ and the mobile industry can help expand this number while facilitating energy access for millions of poor and low income families.

The mobile industry can impact energy access through three main channels:

- i) **Infrastructure:** mobile towers, the backbone and infrastructure to the mobile network, are prevalent in off-grid areas
- ii) **Distribution Channels:** the mobile industry's product and airtime distribution channel reach remote rural communities
- iii) **Payment Technologies:** the development of scratch cards and mobile money provides an opportunity to extend consumer financing for energy assets.

Figure: Mobile can provide energy access through three channels



Source: GSMA

3 GSMA MECS, "Sizing the Opportunity of Mobile to Support Energy and Water Access", December 2013

1.1 From base station infrastructure

From urban to rural areas, mobile networks have become the predominant infrastructure in emerging markets. More people are now covered by mobile networks than have access to energy and water. As mobile network operators seek to grow their network beyond the limits of the electricity grid, they need to find ways to provide power to their towers by either working with the local utility to extend the grid or by providing decentralized energy solutions to each tower and Base Transceiver Station (BTS). In both cases, the presence of the mobile network can support the delivery of energy services to communities without electricity.

Mobile towers can act as an anchor customer to a third-party energy service company operating a decentralized power system. The reliable demand and revenues from the mobile tower improves the commercial viability of the decentralized system from which other services to the communities can be delivered.

Mobile towers can act like a central point from which other services can be delivered:

- If the grid is extended to the tower, an electrical connection could also be provided to a concentrated hub of buildings adjacent to the tower from which services are delivered.
- If the tower has its own autonomous power system excess power from the system can be used to provide basic services (such as phone charging services) to the surrounding communities.

In Haiti, the mobile operator Digicel installed phone charging boxes at their towers providing employment to a local operator and reducing the risk of vandalism to their towers.

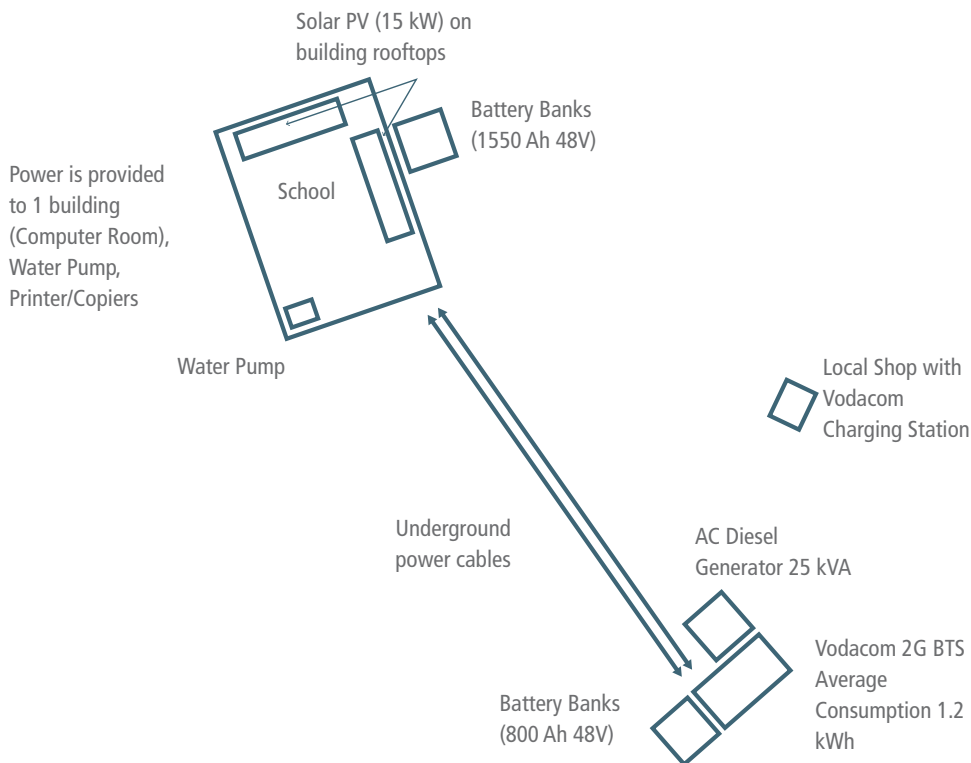
Phone charging offered outside of Digicel Haiti's mobile towers



Source: Digicel Haiti

In Elmfilhweni, South Africa, Vodacom has a live pilot whereby a base station, school, and water pump are powered using the infrastructure of a 14.4kW solar foil installation on the school's rooftop. While still in a pilot phase, the model has dramatically reduced the on-going operational costs for the mobile operator, while providing energy and water access to the community.

Figure: Schematic of Vodacom's community power pilot in South Africa



Source: Vodacom

In India, a country where there are over 70,000 off-grid towers and 400 million people without access to electricity, the mobile industry is actively working to outsource their energy needs. OMC Power, a third-party energy service company, is the first business of its kind that delivers 24/7 power to mobile towers while providing charged lanterns and battery boxes to the surrounding community on a subscription basis.

OMC Power Micropower plant powers towers in India & recharges battery boxes



Source: GSMA

1.2 From retail distribution networks

Globally in emerging markets, phone charging is shown to be one of the key energy services off-grid people request after lighting.

Off-grid mobile subscribers often place significant value on being connected to the mobile network. For example, research conducted in East Africa by GVEP International shows that off-grid mobile customers spend between US\$2-3 per month on phone charging⁴, which is equivalent to 50% of the recorded national average⁵ airtime expenditure (Average Revenue Per User) of all on and off-grid customers.

Commercial partnerships with local companies that sell portable solar products can enable mobile operators to leverage their retail and distribution networks to extend basic phone charging and lighting services to their customers. Enabling better phone charging services in off-grid communities with mobile coverage delivers the potential for enhanced revenue for mobile operators in communities where subscribers no longer need to keep their phones off to preserve battery.

In Uganda, for example, Fenix International is working with mobile operator MTN to provide their airtime vendors with a Fenix ReadySet solar powered battery kit to provide phone charging services.

In MTN-led pilots, ReadySet entrepreneurs demonstrated significant results: ⁶

- banking transactions
- US\$42/month increase in phone charging revenue
- US\$29/month increase in MTN MobileMoney agent commissions
- US\$10/month in savings from using the ReadySet light instead of dangerous and expensive lighting fuels like kerosene, paraffin, and candles

Since then MTN has sold over 2,000 ReadySet energy systems across East Africa, each empowering an entrepreneur to become a micro-utility to their communities. They are in turn powering 100,000 off-grid mobile subscribers, providing an estimated 5.2M phone charges, generating ReadySet entrepreneurs more than US\$1.5M in income and saving subscribers over US\$2M each year in charging expenses.

4 http://www.gvepinternational.org/sites/default/files/phone_charging_businesses_report_with_gsm_final_for_web_0.pdf

5 GSMA Wireless Intelligence for ARPU

6 <http://fenixintl.com/customers/mtn/>

MTN Uganda airtime agent uses the ReadySet to power a village phone and charge phones



Source: Fenix International and MTN Uganda

In Haiti, Digicel worked in partnership with Solengy to install phone charging and street lighting stations powered by solar PV panels. In this model, airtime vendors set up their kiosk under the street light and provide charging services to the community.

Street lighting and phone charging offered by Digicel and Solengy in Haiti



Source: Solengy and Digicel Haiti

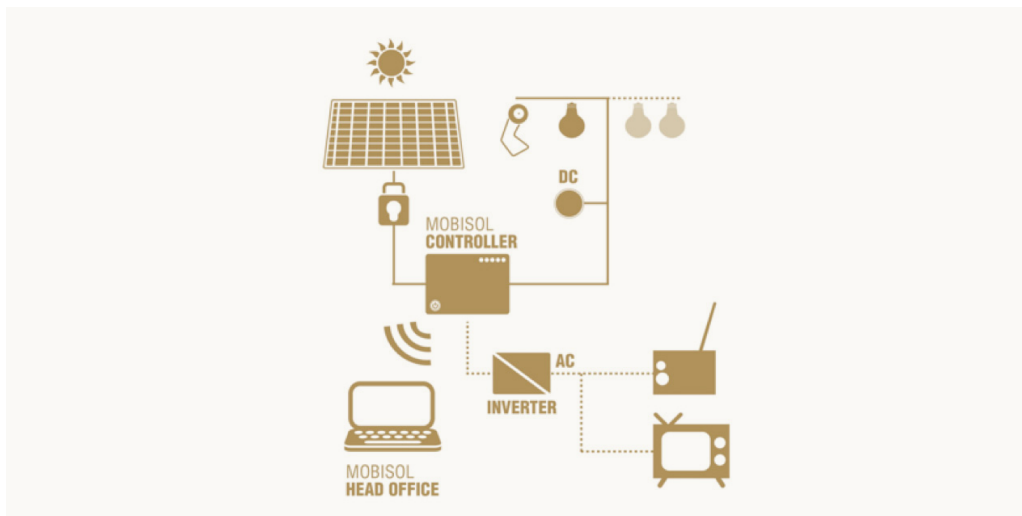
1.3 From mobile payment technology

One of the greatest challenges for off-grid households looking to buy a home solar system is the upfront costs associated with the purchase. People living off-grid must often pay a premium for energy products and services such as one day's worth of kerosene, one battery, or one phone charge as they are often unable to pay for economies of scale and live on day-by-day budget.

Although a household's energy expenditure is a relatively large part of their total budget, they have limited means of accessing the financing required to make an asset purchase. The prevalence of scratch cards and the growth of "mobile wallets" can be leveraged to deliver pay-as-you-go solutions for access to energy, providing financing for products to unbanked customers. Since 2011, there has been a significant growth in the number of enterprises that are using pay-as-you-go solutions for access to energy.

Vodacom's partnership with Mobisol in Tanzania provides a high quality solar home system for off-grid, low income customers with an integrated pay-as-you go system. The scheme utilizes M-PESA (Vodafone's mobile money product) and enables a user to pay US\$12/month for a home solar system allowing the customer to save an average of US\$3 per month and gain access to a better quality service.

Figure: Schematic of Mobisol's product



Source: Mobisol

In Kenya, Safaricom are in a commercial partnership with M-KOPA, which uses machine-to-machine technology, providing asset financing to customers via M-PESA for the purchase of a d.light home solar system. An initial deposit of US\$29, followed by daily installments of US\$0.47, allows a customer to own the system in one year.

M-KOPA's Pay-As-You-Go solar solution



Source: M-KOPA

In India, Simpa Networks use their core product, the Progressive Purchase Platform – an integrated set of hardware and software that work in conjunction – to allow consumers to purchase high-quality solar home systems and devices.

Simpa Networks employee with their Pay-As-You-Go solar solution



Source: Simpa Networks

2. The case of Nicaragua

2.1 Geography

Nicaragua is the largest of the Central American countries, bordered by Honduras to the north and Costa Rica to the south. The Pacific Ocean lies to the west and the Caribbean Sea to the east. Geographically, Nicaragua has three major areas: Pacific lowlands, the central highlands and the Caribbean lowlands. The country is divided into 17 Departments and a total of 153 Municipalities.

Figure: Nicaragua



Source: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0074-02762010000700008

2.2 Economic Background

Nicaragua currently has the second lowest GDP per capita in Latin America after Haiti and has a comparatively high percentage of the population living in extreme poverty.

Table: Socio economic indicators

Indicator	Nicaragua	Belize	Costa Rica	El Salvador	Honduras	Guatemala
Population ⁷	5,822,265	344,700	4,639,827	6,194,126	7,615,584	14,376,881
GDP per capita ⁸	2,484.75	5,934.15	10300.72	6,046.94	3,508.80	4,287.29
HDI ⁹	0.589	0.699	0.744	0.674	0.625	0.574
Population Rural % ¹⁰	43	47.8	36.22	39	51.66	51.00
% of population living in extreme poverty (2005) ¹¹	31.86	–	8.56	20.48	34.96	–

Within the country of Nicaragua the poorest areas are on the Atlantic coast of the country in departments of the Región Autónoma del Atlántico Norte (RAAN) and the Región Autónoma Atlántico Sur (RAAS). The RAAS and RAAN together “cover almost 50% of the country and are the source of the country’s largest diversity: ethnic, cultural, linguistic, geographic and biological diversity. Scattered communities along rivers and lakes in many cases are difficult to access. That raises the costs of transportation and communication, as well as facilitating access to basic services for its people”.¹²

2.3 Telecoms in Nicaragua

Population coverage has risen significantly in the last 5 to 10 years, driving up the number of GSM connections and market penetration.

Table: Telecom indicators in Central America

Indicator ¹³	Nicaragua	Belize	Costa Rica	El Salvador	Honduras	Guatemala
Population	5,822,265	344,700	4,639,827	6,194,126	7,615,584	14,376,881
GSM Connections	5,778,781	313,513	4,384,579	9,141,117	7,845,648	15,418,051
Unique Subscribers	3,066,014	174,395	2,507,209	4,173,233	4,320,816	8,343,206
Market Penetration	53%	51%	54%	67%	57%	55%
Population Coverage (2009)	75%	71%	78%	100%	78%	90%
Number of Operators	2	2	3	5	3	4

The Nicaraguan market is for the most part considered a two operator market with fierce competition existing between Claro (América Móvil) and Movistar (Telefónica).

Table: Telecom indicators in Nicaragua

Mobile Penetration % ¹³	71%
Mobile Coverage % (Population)	75%
Mobile Coverage % Country	21%
GSM Base (connections)	5,778,781
Number of Mobile Operators in the Market	2

Until 2012, Claro maintained market dominance due in large part to its broader mobile coverage. In 2011 Claro committed to expanding cellular coverage to reach 99% of all communities¹⁴ with a population greater than 1000 people, including those of the Atlantic Departments and Movistar committed to investing US\$100 million¹⁵ in mobile towers greatly expanding network coverage.

7 World Bank 1996-2010 <https://mobiledevelopmentintelligence.com/metrics/23>

8 GDP: World Bank 1996-2010 <https://mobiledevelopmentintelligence.com/metrics/53>

9 HDI: UNDP 2011 <http://hdr.undp.org/en/statistics/hdi/>

10 Population Rural: World Bank 1996-2010 <https://mobiledevelopmentintelligence.com/metrics/33>

11 Poverty: World Bank 1996-2009 <https://mobiledevelopmentintelligence.com/statistics/56-poverty-headcount-ratio-at-usd2-a-day-ppp-of-population>

12 <http://www.undp.org/tematicas/4>

13 GSMA & Wireless Intelligence

14 <http://revistaitnow.com/2011/01/convergencia/claro-nicaragua-amplia-cobertura-de-red-movil-a-zona-rural/>

15 <http://noticias.terra.es/2011/mundo/china/1104/actualidad/trasnacional-espanola-de-telefonía-anuncia-nueva-inversion-en-nicaragua.aspx>

2.4 Energy access

In Latin America, as of 2009, 93.2 % of the population has access to electricity.¹⁶ In comparison to other regions, Latin American countries have made significant strides in grid extension and developing base load capacity. But beyond urban centers, rural electrification rates are at 70.2%¹⁷ and 31 million Latin Americans still lack access to electricity with many of these populations living in hard to reach areas. The cost to extend and maintain the grid to cover 100% of the Latin American population remains a challenge and developing the business model for decentralized micro-generation systems and grids.

Table: Off-grid electrification rates in Latin America

	Electrification rate (%)	Population without electricity (millions)
Haiti	38.5	6.2
Peru	85.7	4.2
Brazil	98.3	3.3
Colombia	93.6	2.9
Guatemala	80.5	2.7
Bolivia	77.5	2.2
Honduras	70.3	2.2
Nicaragua	72.1	1.6
Argentina	97.2	1.1
Ecuador	92.2	1.1
El Salvador	86.4	0.8
Other Latin America		2.4
Latin America	93.2	30.7

Source: IEA World Energy Outlook 2011, Electricity Access in 2009 Latin America

Nicaragua has made great progress in the area of electrification. In 2001, one in five extremely poor rural households had access to electricity, and only half of Nicaraguans had access to electricity in rural areas.¹⁸ It is now estimated that 72% of Nicaragua's population has access to electricity.¹⁹

2.4.1 Prevalence of energy service companies (ESCOs)

In markets with country wide energy access, the term Energy Service Company (ESCO) is often reserved to companies that design, install and operate power generation and energy supply delivering energy in the form of kWhs to their customers. But in the case of emerging markets that have not reached 100% electricity coverage, the term ESCO is extended to organizations (for profit/not-for-profit) who work on improving energy access. Often times these organizations operate as traditional ESCOs but also support the distribution of portable energy products.

Despite the challenges of reaching the un-electrified, Nicaragua has a healthy ecosystem of ESCOs supporting renewable energy deployments with broad distribution networks. As part of the study, interviews were conducted with TECNOSOL, ECAMI, Suni Solar, Blue Energy, and Power to the People to better understand their reach and the challenges of reaching communities without access to electricity.

16 <http://www.worldenergyoutlook.org/resources/energydevelopment/accesstolectricity/>

17 http://siteresources.worldbank.org/EXTESC/Resources/Addressing_the_Electricity_Access_Gap.pdf

18 Nicaragua Poverty Assessment, World Bank <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/LACEXT/0,,contentMDK:20405857~pagePK:146736~piPK:146830~theSitePK:258554,00.html>

19 IEA WEO 2008-2009 <https://mobiledevelopmentintelligence.com/metrics/38#>

2.4.2 Energy and mobile: the opportunity

At the time of the study, 28% of the population of Nicaragua lacked access to electricity and 25% of the population lacked access to mobile coverage as the mobile network in Nicaragua is largely on-grid. As mobile operators seek to grow their customer base and increase coverage in increasingly rural areas, the opportunity and need exists to consider the way mobile towers will be powered and also how customers will keep their phones charged. The 1.45M people without access to both the electricity and mobile networks represent a significant opportunity that will require increasingly ingenious ways to serve.

The figure below illustrates the extensive mobile coverage in Nicaragua, the location of Movistar’s tower sites and the extensive network coverage, concentrated around the urban centers of the Pacific lowlands. This figure also illustrates the large expanses of land in the Atlantic lowlands that do not have mobile coverage.

Figure: Movistar Nicaragua 2G coverage map



Source: MDI

3. Opportunity in Nicaragua by business model

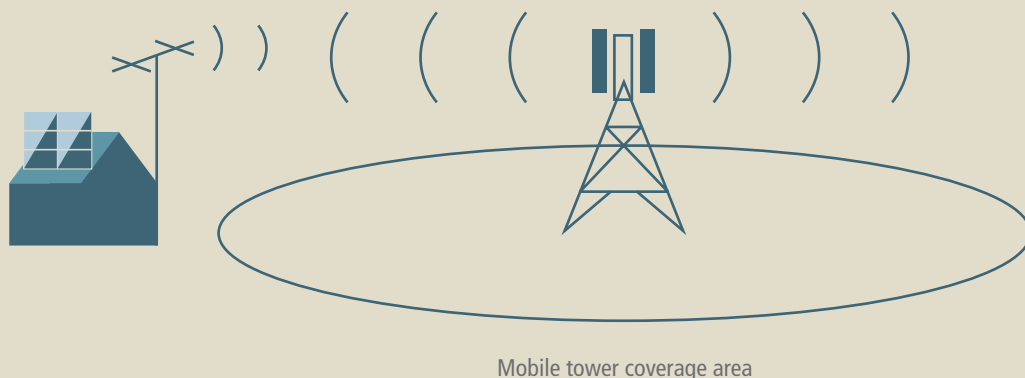
3.1 Mobile infrastructure

At the time of the study, there were approximately 1,500 mobile towers operated by Movistar Nicaragua and Claro, with both companies investing heavily in network expansion. Like many other Latin American countries, the vast majority of the mobile operator's towers are on grid and thus there is no immediate opportunity for Movistar to extend energy services from its physical infrastructure.

There is a need to integrate the provision of basic energy services in future rollouts as Movistar begins to consider serving increasingly smaller communities in more remote areas, like the interior of the RAAS and RAAN Departments. Through this study it was identified that over 700,000 people are currently not served by Movistar in their municipality and that over 90% of these unserved municipalities are in the Departments of Jinotega, Matagalpa, RAAS and RAAN (see map on page 10). Unserved municipalities were then ranked according to population size and population density. This study also found that several municipalities in the Departments of the RAAN and RAAS, which had some mobile coverage, were largely underserved and opportunities exist to increase coverage.

Case study 1: Using village phones and antenna's to extend mobile coverage

Communities at the border of the mobile network find ingenious ways to extend mobile coverage. In the Department of Rio San Juan several households in the community had not only set up a home solar system to provide access to lighting and electricity, but also to power a fixed line phone. Fixed line mobile phones (also known as village phones) provide the same user experience as a standard home phone that people have in urban centers. By placing the antenna on the top of a bamboo pole on the exterior of the house, households at the fringe of the mobile network can gain access to vital telecommunication services.



Home in Rio San Juan with an antenna to capture the mobile signal



Source: GSMA

3.2 Distribution networks

Most on-grid communities on the edge of the mobile and electricity grids serve as central points for customers to charge their phones. Depending on the proximity of the off-grid communities to these central points, mobile phone subscribers would visit the nearby town to charge their phone from one to three times per week.

3.2.1 Cost of phone charging

The cost of phone charging varies across Nicaragua depending on rural communities' access to the electricity grid. Unless a person is able to charge their phone at a family member's house that is connected to the grid, there is a cost associated to the phone charge. Through visits to different regions of the country, it was observed that the cost of phone charging ranged from US\$0.20 to US\$0.40 per charge. This means off-grid subscribers spend US\$0.90 to US\$5.20 per month on phone charging alone.

3.2.2 Size of the opportunity

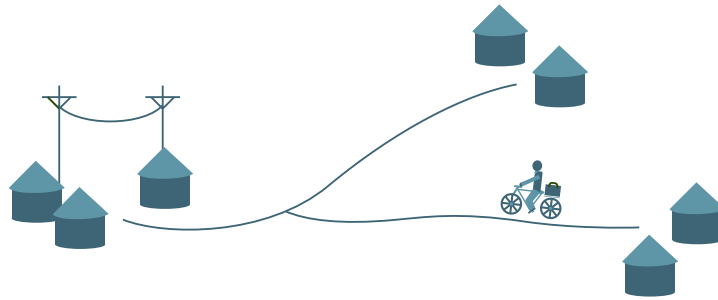
An analysis was conducted to evaluate the potential for Movistar to use its distribution channels to improve access to lighting and phone charging products for its off-grid customers. Over 290,000 people live in municipalities with mobile coverage but where electrification rates are below 50 percent.

3.2.3 Off-grid phone charging models

During field visits 3 phone charging models were observed for off-grid subscribers.

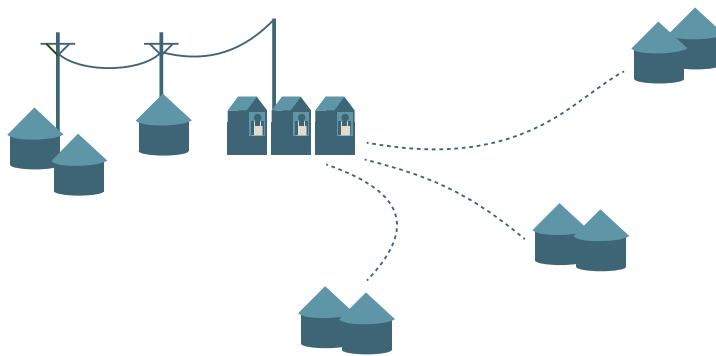
Small on-grid outpost serving off-grid communities with good road access

In a small town in the Department of Rio San Juan that is connected to the grid, there are several nearby communities without grid access. Two phone charging businesses have been established in these communities that each charging between 10 and 30 phones per day at US\$0.40 per charge. Using an average of 15 phones per day, each entrepreneur's monthly income from phone charging is estimated at US\$180.



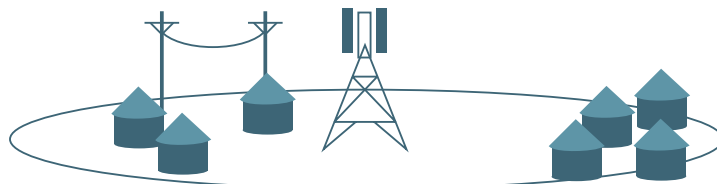
Larger on-grid community serving many remote off-grid communities

In a town in the Department of RAAS that acts as the commercial center for over 12 remote communities, there is a large presence of provision stores that provide phone charging services for free to their customers. Most people travel by horseback to reach the electrified town and have limited access to phone charging services during the week. Subscribers would turn-off their phone for the majority of the day to conserve battery.



Off-grid community with access to mobile network

In a community in the Department of Matagalpa, which recently received access to the mobile network, the local airtime vendor has set up a shop as an energy entrepreneur. The vendor charges in between 10 and 25 phones per day at a cost of US\$0.20 per phone charge.



Case study 2: The energy access entrepreneur

A coffee farmer in the Department of Matagalpa is diversifying his income by acting as the community's energy entrepreneur. With a 200W home solar system purchased by saving money from his 3.4 acre coffee farm, he provides his family with access to safe and clean energy but also a means to improve their income. Behind their home he has set up stadium seating so that his neighbors can come by in the evenings to watch the soap opera, movie or baseball match. He charges his neighbors US\$0.05 (1 COR) to watch the television. Since the community has gained access to mobile signal, his family also charges mobile phones at US\$0.20 (5 COR) and sells airtime. His family makes a minimum of US\$60/month on phone charging alone.



Source: GSMA

3.3 Mobile money and payment technology

Mobile operators across emerging markets are investing significantly to develop mobile money as a core product in the hopes of repeating the success of mobile operators Safaricom in Kenya and Smart in the Philippines. Mobile money platforms can serve as new platform to provide consumers pay-as-you-go solutions for the purchase energy products and services.

One of the greatest barriers for off-grid households to purchase home solar systems is the high up-front cost of the technologies. Off-grid households often spend relatively large amounts on kerosene, batteries for radios and paying others to charge their phones. The challenge is to provide appropriate financing to an off-grid customer that matches their access to cash and day-to-day spending habits. In East Africa and India, several companies are developing innovative payment mechanisms using scratch cards and existing mobile money deployments to overcome this hurdle.

Currently in Nicaragua only one mobile money product exists and is operated by an organization independent of a mobile operator, M-PESO. M-PESO customers can currently send person-to-person transfers, purchase airtime with Claro, pay bills and make merchant payments.

This opportunity is a longer term opportunity for Movistar in Nicaragua as the mobile money ecosystem develops and grows in the country and more start-ups trial this solution.



4. Concluding remarks

In Latin America, mobile broadband subscriptions have grown at 127% per year for the last five years and are predicted to continue growing at 50% per year for the next five years. By 2015, Latin America is expected to have almost a third of a billion mobile broadband connections. Mobile broadband technologies are connecting the many unconnected Latin Americans, and acting as a catalyst for further development and innovation across the continent.

Through their future network growth and existing sales and distribution channels, the mobile industry can play a critical role in bringing access to energy and other basic services to underserved communities. New business models will need to be developed and tried to road test both the technical solutions and the financial viability of the approach. Locally, there is already a rich ecosystem of energy product distribution companies in many Latin American and Caribbean countries that can be used to reach the far corners of the region and last mile customers.

International donors and funders can play critical roles in partnering with mobile operators to take this first step.

About the MIF

The Multilateral Investment Fund (MIF), a member of the Inter-American Development Bank Group, is funded by 39 donors and supports private sector-led development benefitting low-income populations and the poor - their businesses, their farms, and their households. The aim is to give them the tools to boost their incomes: access to markets and the skills to compete in those markets, access to finance, and access to basic services, including green technology. A core MIF mission is to act as a development laboratory - experimenting, pioneering, and taking risks in order to build and support successful micro and SME business models. More information at www.fomin.org.

About the GSMA

The GSMA represents the interests of mobile operators worldwide. Spanning 220 countries, the GSMA unites nearly 800 of the world's mobile operators, as well as more than 200 companies in the broader mobile ecosystem, including handset makers, software companies, equipment providers, Internet companies, and media and entertainment organizations. The GSMA also produces industry leading events such as the Mobile World Congress and Mobile Asia Congress. More information at www.gsma.com.

About GSMA's Mobile for Development Program

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

About GSMA's Mobile Enabled Community Services

The GSMA's Mobile Enabled Community Services program was launched in January 2013 with the support of the UK Government. The program builds on the foundation of the Community Power from Mobile Program, launched in 2010 with the support of the International Finance Corporation, and focuses on improving access to energy and water services in underserved communities by leveraging mobile technology and infrastructure.

About Telefónica

Telefónica is one of the largest telecommunications companies in the world in terms of market capitalisation and number of customers. From this outstanding position in the industry, and with its mobile, fixed and broadband businesses as the key drivers of its growth, Telefónica has focused its strategy on becoming a leading company in the digital world. The company has a significant presence in 24 countries and a customer base that amounts more than 317 million accesses around the world. Telefónica has a strong presence in Spain, Europe and Latin America, where the company focuses an important part of its growth strategy. Movistar is Telefonica's brand for all its services in Nicaragua, present in the country since 2005, offering communication services to more than 2 million individuals and business customers.

About Climate Change & Energy Efficiency in Telefónica

Telefónica has a Climate Change & Energy Efficiency Office in charge of the implementation of the corporate policy in energy & climate change. The Office develops global projects to promote the contribution of ICT Technology to a low carbon economy and promotes internal energy efficiency and CO2 emissions reduction. In addition, Telefónica fosters the development of competitive Green ICT solutions and services to improve customers efficiency in using scarce resources such as energy.



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