
IFC
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GSMA
Green Power for Mobile
In partnership with the Netherlands
GREEN POWER FOR MOBILE BI ANNUAL REPORT
2014

CONTENTS

Welcome Note

This, our tenth Bi-annual Report, comes at time when we are seeing many changes happening within the Green Power for Mobile programme.

It has been a very exciting start to the year, notably as we added Myanmar to the GPM focus countries, which presents a very interesting telecoms environment. With two new telecom licenses issued and several tower companies in place it poised for substantial growth. Moreover, due to the still low grid penetration, Green Power for Mobile is set to have a large impact in the area.

In addition one of the other major ongoing changes is a relook at the Green Power for Mobile programme and the power sector to see how the Green Power for programme can adapt to the market changes and growth and provide new types of support.

In addition to our deep dive into the Myanmar market there are several updates since the last Bi-annual report. Since January, jointly with our partner, the International Finance Corporation (IFC), the GPM team has hosted industry Working Groups in Myanmar and Nigeria, converted the existing Vendor Directory to be an online more interactive sector vendor listing and kicked off an ESCO discussion group at Mobile World Congress this year, which will be continued at our upcoming working groups.

As part of the GPM programme's efforts in market analysis, in this issue of the Bi-annual report we have included articles on the global size of the off-grid and unreliable grid market and a summary of the comprehensive report that was done looking at the Myanmar market with respect to green telecom. Click here to visit the full report.

In addition this Bi-annual report includes an article summarizing the findings and recommendations of a Feasibility Study that was done with IBS Towers in Indonesia earlier this year.

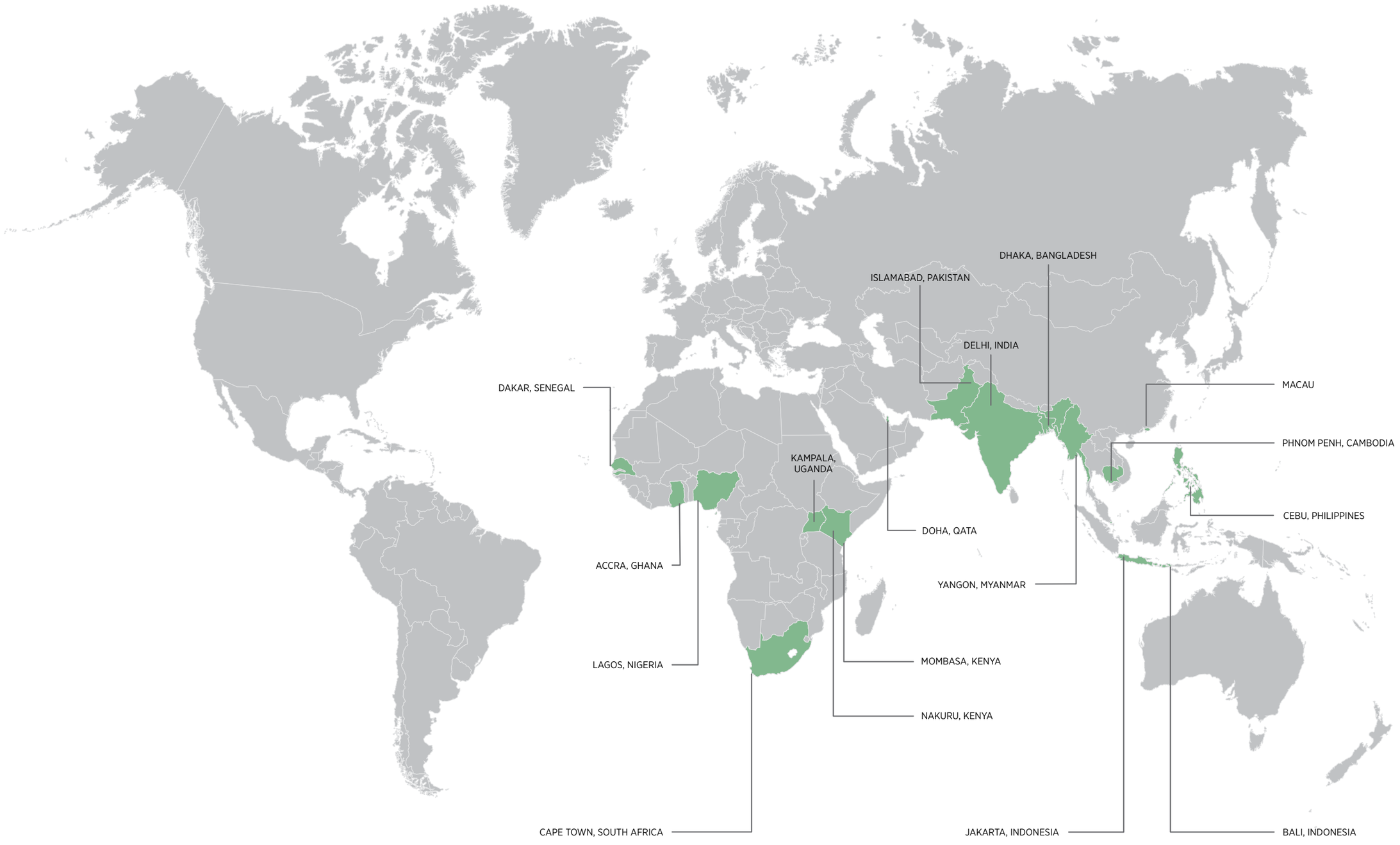
Externally we've had great industry contributions from MTN and Edotco Group. The MTN contribution takes a holistic look at sustainability and looks at Eco-responsibility and Business Sustainability. The Edotco contribution is a focused interview piece that answers specific questions on Edotco's approach to strategy and technology.

The final section of this report will look at the Mobile Enabled Community Services programme, focusing on how mobile communications can be applied to providing improved energy and water access. The first article looks at the synergies between mobile and energy and water and with a brief look at the size of the opportunity. In the final Mobile Enabled Community Services article, you will find a snapshot of the industry and synapsis of the response to the MECS Innovation Fund, as well as geographical representation of the awarded grants from the Fund.

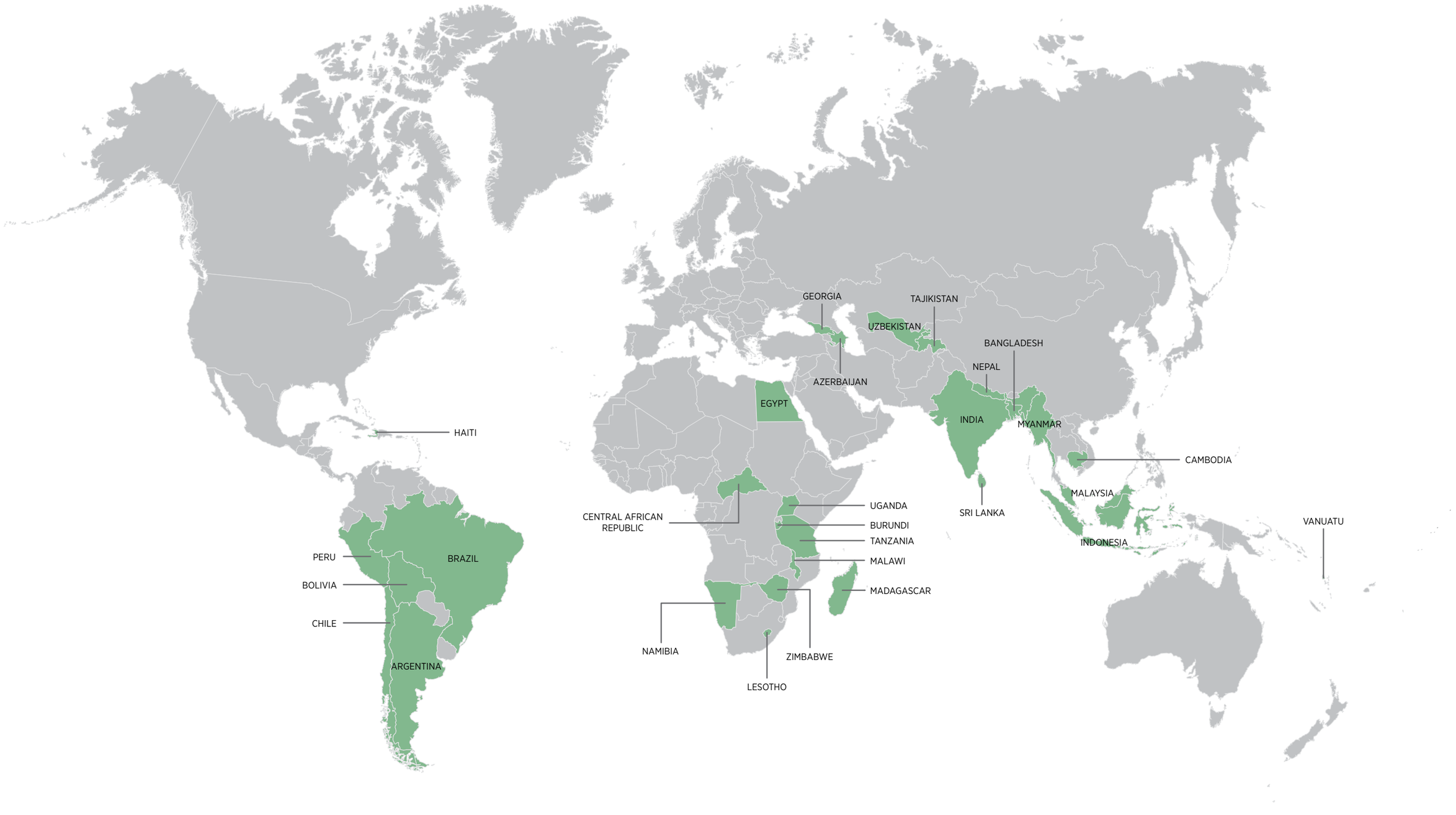
We hope you will find this edition of the Bi-annual Report useful and informative. We look forward to working and collaborating with you in the months to come and hope to see you at the GSMA Mobile 360 events.

Areef Kassam
GSMA Programme Director – Green Power for Mobile

GPM WORKING GROUPS: 2008-2014



GPM GLOBAL OUTREACH - GPM FEASIBILITY STUDIES



Meet the team

Who's who in GPM and MECS

Areef Kassam | GPM Programme Director

Areef is the Green Power for Mobile Programme Director. In this role he is responsible for development and delivery of the overall programme and the related mobile industry products and services. Areef also works directly with our vendor partners to understand their products, services and provide visibility to the mobile operators. He is responsible for managing the full scope of the programme, leading the international team located in London, Africa, and Asia.

Ferdous Mottakin | GPM Programme Manager

Ferdous is the Green Power for Mobile Programme Manager. Within GSMA Mobile for Development, he is responsible for leading and managing the programme globally. Additionally, his role involves creating industry collaborations and enhancing mobile for development outreach. Prior to his role as Programme Manager, Ferdous successful completed the India-specific GPM project for 18 months. Before joining the GSMA, Ferdous spent much of his career working across the globe in different areas of the telecom industry. Ferdous holds a Bachelor degree of Electronics Engineering from Simon Fraser University of British Columbia.

Satish Kumar | GPM Africa Project Manager

As the Africa Project Manager, Satish leads the focus and activities of the Green Power for Mobile (GPM) programme for the African region and is responsible for the overall programme focus and deliverables for Africa. Within GPM, he has previously conducted several Green Power Feasibility studies across countries in Africa and Asia, and contributed to the knowledge base through case studies and publications. Prior to GSMA, Satish has worked in various roles engaging with government bodies and organizations across telecoms, renewable energies and rural enterprises. He holds a Bachelor's degree in Electrical Engineering from IIT Kanpur and an MBA from IIM Bangalore.

Meet the team

Ali Imron | GPM Asia Project Manager

In his role, he is responsible for conduction Green Power market analysis, feasibility studies and vendor landscaping deliverable in Asia Region. Ali has varied experience working with operator on O&M field and vendor as well. Ali holds degree from STT Telkom Bandung.

Hélène Smertnik | Market Intelligence Analyst

Hélène supports the Green Power from Mobile Programme's marketing activities. She manages the organisation of both programmes' Working Groups. Hélène joined the GSMA following her master's dissertation on "The use of mobile as a tool for development in Kenya" during which she developed a strong interest in business-led development, using telecommunication technology and infrastructure to create socio-economic impact.

Michael Nique | MECS Innovation Manager

Michael joined GSMA Mobile for Development in June 2010 and now leads Innovation and Research Activities for the MECS programme. This includes monitoring and disseminating content related to technological and business model innovations affecting the energy, water and sanitation sectors; spending time on the field meeting innovators and communities to uncover insights on the usage and impact of mobile technologies. A strong focus of his work is related to the opportunity of using smart solutions, i.e. Machine to Machine modules, for decentralized access to energy & water services. Prior to the GSMA, Michael has been involved in various roles related to Innovation & Technology in France and the United States. Michael is originally from France and has a degree in Microelectronics from Université Joseph Fourier in Grenoble.

Meet the team

Mary Roach | MECS Operations Manager

Mary is the Programme Operations Manager for the MECS Programme. She is responsible for the overall management of the MECS Innovation Fund and leads the team delivering advisory services to mobile operators and support to the MECS ecosystem of organisations. Prior to joining the GSMA in 2011, she spent two years working on rural energy solutions in sub-Saharan Africa, including an early trial of pay-as-you-go access to energy using mobile money. Mary's interest in the role that energy can play in development emerged from the combined experiences of her 5 years working with GE Power Generation in project and operations management and decade of involvement with Engineers without Borders Canada at home and abroad . She holds a MBA from Oxford University and a Bachelors in Chemical Engineering from McGill University.

Rahul Shah | MECS Asia Project Manager

Rahul Shah is the Asia Project Manager for the MECS Programme. He is responsible for supporting the MECS Innovation Grant Fund in Asia through advisory to applicants and grantees, and for building relationships with the MECS ecosystem comprising MNOs, tower companies, ESCOs, WSPs, academics, NGOs, etc.; Rahul has a varied professional background ranging from engineering of wireless communications systems to general management in solar energy, media & entertainment and children's activities. He has an MSEE with a major in digital signal processing from the University of Missouri-Rolla and an MBA in general management from IIM-Ahmedabad.

Ilana Cohen | MECS Africa Project Manager

Ilana Cohen is the Africa Project Manager for the MECS Programme. She is responsible for supporting the MECS Innovation Grant Fund in Africa through advisory to applicants and grantees, and for building relationships with the MECS ecosystem comprising MNOs, tower companies, ESCOs, WSPs, academics, NGOs, etc. Prior to joining the GSMA she spent 2 years as a consultant in water and sanitation services, including the application of mobile tools. She was involved in research and organisation of the World Bank led Water and Sanitation Hackathons in London. Prior to this she worked as an environmental consultant carrying out environmental impact assessments. Ilana holds an MSc from Oxford University in Water Science, Policy and Management and a Bachelors in Biology from Brandeis University.

Overview of Green Power for Mobile Programme activities

HÉLÈNE SMERTNIK, GSMA

Following our welcome note, this chapter will provide an overview of GPM's programme activities for the last 6 months in both the Africa and Asia region. The programme's activities and tools include the Green Deployment Tracker, regional and country-focussed market analyses, feasibility studies, a vendor directory, best practice guides and working groups. All aim at demonstrating the potential of green power to reduce telecom operators and tower companies' dependency on diesel power.

The Green Deployment Tracker

Since its creation in 2010, the Green Deployment tracker figures – i.e. the number of green deployments installed – are constantly growing, illustrating the operators' willingness to invest in green power technologies.

Globally, green deployments have increased from 9000 in 2010 to just under 43,000 by mid-2014, in line with GPM's growth projection. The Green Deployment Tracker is publically accessible online through Mobile for Development Impact platform. The data driven portal for our member operators and wider vendor community is a fantastic resource providing information on organisations' energy portfolios (their green products or initiatives) as well as data analytics and metrics.

Market Analyses and Best Practice Guides

GPM's Market Analysis reports lay out the opportunity that powering telecom networks through green energy alternatives holds in any given country. After assessing the current state of telecom and power infrastructure, the regulatory environment and the current approach to powering telecoms in the selected country, the report evaluates the availability of green power resources and the opportunity for OPEX savings in that market.

GPM latest Market Analysis looks at the new market of Myanmar and is introduced in Chapter 3 of the report.

Two Best Practices guides were published in the last 6 months, providing guidelines on how to determine whether a base station site is a suitable candidate to convert into a green site and provide a best practice process for MNOs. This report focuses on the countries of Pakistan and Afghanistan. A revised version of GPM's Best Practice guide for Francophone Africa was also published, looking at alternatives sustainable energy sources for the mobile industry. The scope of the document is limited to the 'approach' rather than the technical solutions or technology details.

These reports are not included in this bi-annual report but are available for download here

Feasibility Studies

Up to now, GPM has successfully conducted more than 27 feasibility studies for mobile operators worldwide. Through data collection, model design, financial analysis and business case development among others, GPM Feasibility Studies explore and prove the viability of alternative energy options to power the network of telecom sites.

GPM's latest feasibility study which will be detailed in Chapter 4 analysed IBS Tower's entire network of sites in Indonesia.

Homer Software –Renewable Energy Design Tool

In the elaboration of a feasibility study, one of GPM's tools for designing and analysing the feasibility of renewable energy for telecom sites is the Homer Software. GPM has made a video training available on line to understand the key design elements to optimize green power and optimize CAPEX required for deploying green power on MNOs' networks.

The Vendor directory

Vendor landscapes are an important part of GPM's efforts to grow the Green Power community and aim at supporting mobile operators in their green power initiatives by providing them with a profile directory of green power vendors and service providers operating in or focusing on the targeted market.

In order to increase the visibility of Green Power vendors and improve the user-friendliness of this resource, we have now moved to an online platform on which vendors can register or update their profile directly. Click here to view the online vendor directory.

All GPM Resources are all available to download here.

Working Groups

In addition to publications, a significant part of the GPM team's activities is to convene the industry stakeholders across the Asia and Africa region, in partnership with the IFC.

Myanmar Working Group, May 2014

Green Power for Mobile hosted its first working group in Yangon, Myanmar on May 29, which was an great opportunity to reunite stakeholders from across the industry: MNOs, Vendors, Energy Service Companies (ESCO) and Investors. Ooredo co-hosted the event.

With more than 80 participants, this was a particularly important event for it created momentum in the green power market. Following this event, GPM is now working with the sector stakeholders to understand where the opportunity lays in this country were much is to build. The summary of the discussions and themes discussed are available here.

Nigeria & Ghana Working Group, January 2014

Following up on GPM's Working Group in Nigeria last year, Green Power for Mobile (GPM) successfully convened a joint Nigeria & Ghana Working Group in Lagos, Nigeria at the end of January. The Working Group was co-hosted by IHS Towers Nigeria, and 41 people from the industry attended.

The Working Group hosted discussions around Mobile operators and Tower Companies' strategies and approaches towards addressing the energy challenges across Nigeria and Ghana. They presented case studies around their current green power and OPEX saving initiatives and highlighted some of their learning experiences and challenges. Participants sparked a debate around the deployment of new technologies including fuel cell, wind power and complete DC systems, their feasibility in the region and the benefits they would bring to Mobile operators and Tower companies. The summary of the discussions and themes discussed are available here.

Mobile World Congress, February 2014

As every year, Mobile World Congress is an opportunity to reunite regional as well as European industry stakeholders to discuss the green power market and trends. At this year's Congress, the Green Power for Mobile team organised a session on the Energy Service Company (ESCO) business model and its adoption challenges for Mobile Operators and Tower Companies.

Participants raised a key question around the creation of an ESCO model, whether it is up to the technology provider, the investor or the company with a strong experience in telecom power management and operations to lead the effort. The summary and a full report of the event are available here.

To learn more about the Green Power for Mobile Programme's activities do not hesitate to contact us at greenpower@gsma.com

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Size of global off-grid and bad-grid telecom towers*

SATISH KUMAR, GPM AFRICA PROJECT MANAGER

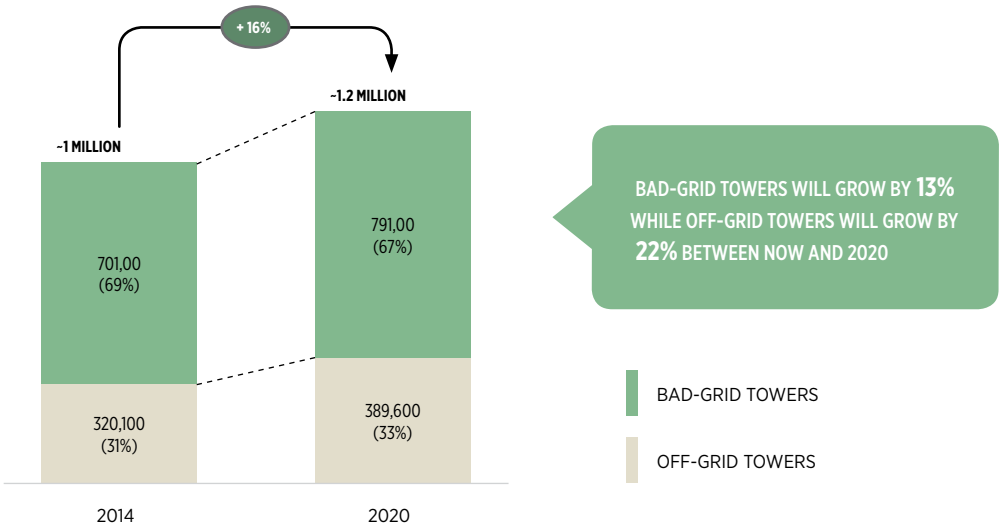
Growing size of global off-grid and bad-grid telecom network

Research from GSMA indicates that future mobile subscriber growth will be concentrated in developing countries of Africa and Asia, among populations who are currently 'unconnected' to mobile phone networks. These populations, which are estimated to grow to approximately 2 billion people by 2020, overwhelmingly inhabit rural areas where access to electricity is patchy and unreliable at best: 30-40% of rural populations in developing countries lack access to grid-based electricity. This represents almost 600 million people in Sub-Saharan Africa alone and another 600-625 million in Asia (about 300-350 million of whom are in India).

Therefore, over the next six years, as mobile network operators (MNOs) and tower companies (TowerCos) stretch networks into ever more remote locations to achieve universal coverage, the existing base of off-grid and bad-grid telecom towers is expected to grow substantially at about 16% annually. The off-grid and bad-grid network globally is estimated to reach a total of approximately 1.2 million tower sites by 2020 from the current size of 1 million off-grid and bad-grid towers in 2014. Therefore, the MNOs and TowerCos will deploy an additional 160,000 off-grid and bad-grid tower sites by 2020.

GLOBAL OFF-GRID AND BAD-GRID TOWERS: CURRENT SIZE AND GROWTH

TOTAL NUMBER OF OFF-GRID AND BAD GRID TOWERS
 # OF TOWERS



* Findings from our global research and estimation

The total number of off-grid towers is expected to reach 389,600 by 2020, a growth of approximately 22% from the current size of 320,100 off-grid towers in 2014. Similarly, the size of bad-grid network is expected to grow by 13% reaching a total of 791,000 bad-grid sites globally by 2020 from the current size of 701,000 sites in 2014.

Overall, an additional 70,000 off-grid and 90,000 bad-grid towers are expected to be deployed between 2014 and 2020.

The major driver of the estimated growth in off-grid and bad-grid towers is the expected expansion of mobile networks into rural regions in Africa and Asia, large parts of which face limited access to reliable electricity.

Major drivers for the growth in off-grid and bad-grid towers include:

- **Rural network expansion:** With the urban markets almost completely saturated, MNOs have been compelled to expand into semi-urban and rural areas to add new customers. In Sub-Saharan Africa, estimates indicate around 30% of the rural population is not covered by any mobile network. In India, rural penetration is estimated to be between 30-40% only, implying about 200 million people are without mobile phone access in one country alone.
- **Rural economy:** Rising rural incomes and increased rural demand for mobile phone services, especially as income-enhancement applications of mobile services continue to proliferate.
- **Universal coverage mandate:** In most developing countries, MNOs are required to fulfill universal coverage obligations meant specifically to ensure mobile-phone access even in those rural regions that have a limited commercial incentive.
- **Poor reach of grid power infrastructure:** Large parts of rural areas in the developing world do not have quality access to electricity. While most governments do have plans to expand their national electric grid over the next six years, the rate of grid expansion will be outpaced by the projected growth in mobile network coverage.
- **Unreliable grid power supply:** A grid connection does not automatically guarantee effective and consistent access to the grid. The situation is further exacerbated because most tower growth will be concentrated in underpenetrated rural and semi-urban regions that are usually severely electricity-deficient.

Africa and Asia to lead in off-grid and bad-grid network growth

The size of the off-grid and bad-grid network varies by region depending on the different operating conditions and infrastructure availability. The region-wide split of off-grid and bad-grid towers and their growth by 2020 is presented below.

OFF-GRID AND BAD-GRID TOWERS: REGION-WIDE GROWTH

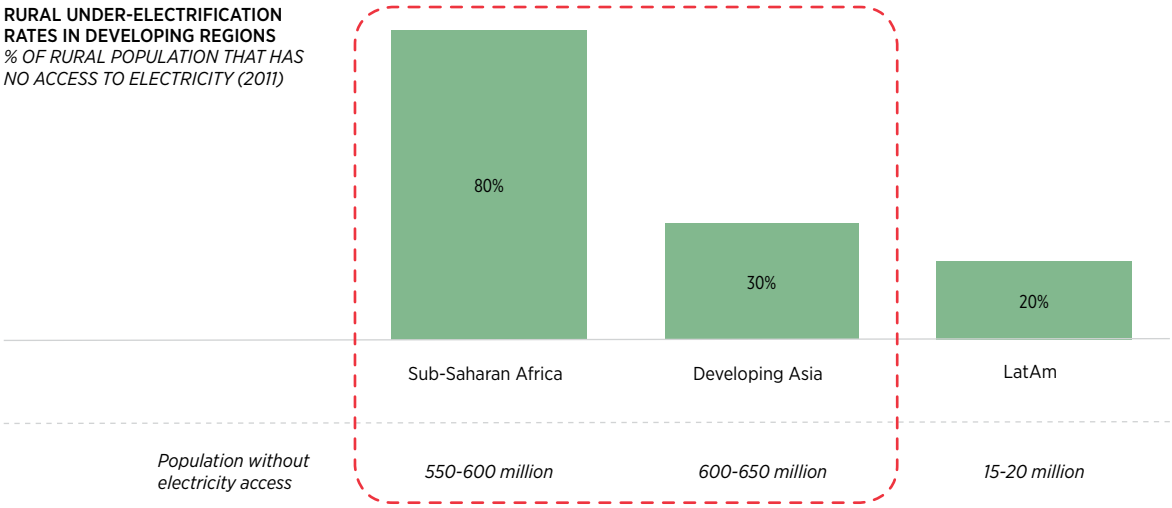
GLOBAL ESTIMATES BY REGION	2014			2020		
	OFF-GRID	BAD-GRID	TOTAL	OFF-GRID	BAD-GRID	TOTAL
South Asia	81,800	176,500	258,300	94,900	194,900	289,800
Sub-Saharan Africa	145,100	84,300	229,400	189,100	106,500	295,600
MENA	0	69,200	69,200	0	76,300	76,300
Latin America and Caribbean	58,400	265,600	324,000	62,500	288,400	350,900
East Asia and Pacific	34,800	105,400	140,200	43,300	125,000	168,300
TOTAL	320,100	701,000	1,021,100	389,800	791,100	1,180,900

As shown above, Sub-Saharan Africa has the highest number of off-grid towers followed by South Asia; whereas Asia (including South Asia as well as East Asia and Pacific) overall has the highest number of bad-grid tower sites, followed by Latin America and the Caribbean.

This is evident from the fact that the reach of grid electricity infrastructure in Sub-Saharan Africa is the least among the developing regions of the world followed by Asia and Latin America.

UNDER-ELECTRIFICATION IN DEVELOPING REGIONS

RURAL UNDER-ELECTRIFICATION RATES IN DEVELOPING REGIONS
% OF RURAL POPULATION THAT HAS NO ACCESS TO ELECTRICITY (2011)



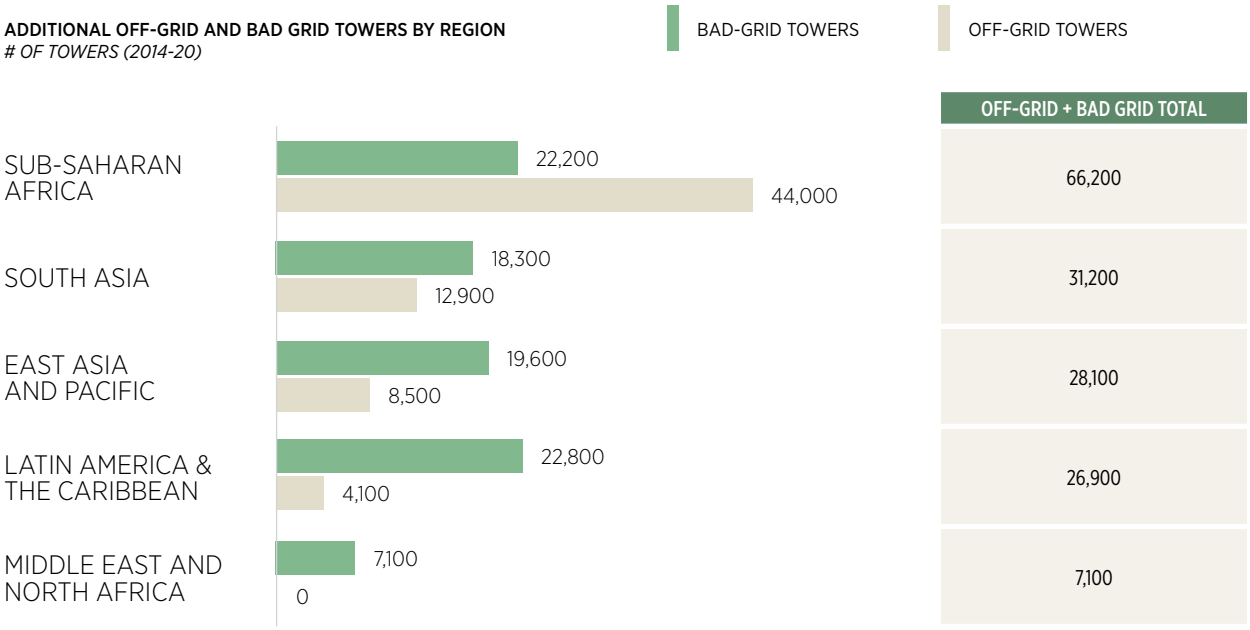
At the country level, India alone will be responsible for about 10% of the global off-grid and bad-grid towers and about 30% of the increase in Asia, with an estimated 16,500 deployments (in addition to its existing base of more than 230,000 off-grid and bad-grid towers) until 2020. Indonesia, Pakistan and Myanmar are other countries in Asia that are expected to add a substantial number of off-grid and bad-grid towers in the same period.

In Africa, Nigeria, the region's most populous country, tops the list, with an estimated 8,000 additional deployments in off-grid and bad-grid regions, independently accounting for about 12% of the continent's total growth. Tanzania and Kenya will be the other large growth markets in Africa while countries such as Mozambique, Botswana, South Africa, Namibia and Angola are also likely to see significant tower deployment by 2020. On-going conflicts and severe infrastructural challenges will limit the expansion of coverage in some countries such as Sudan and the Democratic Republic of Congo, although both countries have a large population not presently covered by a mobile network.

Africa and Asia will together account for almost 80% of the projected growth of 160,000 off-grid and bad-grid sites by 2020. Africa and Asia together will add another 125,500 off-grid and bad-grid sites by 2020. The growth will be majorly driven by universal coverage targets by MNOs in these regions.

OFF-GRID AND BAD-GRID TOWERS: REGION-WIDE GROWTH (ADDITIONAL BY 2020)

ADDITIONAL OFF-GRID AND BAD GRID TOWERS BY REGION
 # OF TOWERS (2014-20)



OFF-GRID + BAD GRID TOTAL
66,200
31,200
28,100
26,900
7,100

In conclusion

If the MNOs and TowerCos continue to use diesel, as is the case for more than 90% of all off-grid and bad-grid towers today:

- Diesel consumption for telecom towers will increase by 13-15% from today's levels, to over 150 million barrels per year. The resulting annual cost of diesel will be over US$19 billion in 2020, or US$5 per mobile-phone user per year.
- About 45 million tons of CO2 per year will be released, which is more than 5 million tons higher than current levels.

Conversion to more efficient, greener alternative power solutions, which include diesel generator-advanced battery and renewable energy hybrid systems, could save the industry US$13-14 billion annually. Adoption of these green technologies at scale also has the potential to generate approximately 40 million tons and US$100-500 million annually in carbon savings.

A crucial driver of the conversion to greener alternatives will be energy service companies (ESCOs) that provide energy to towers owned by MNOs and dedicated TowerCos:

- Many MNOs across the world, especially in Asia and Africa, are in the process of selling off their tower assets, including the energy infrastructure, to third-party structures. This trend, brought on by a strong imperative to cut network deployment and operating costs, is expected to intensify in the next six years.
- In a rapidly evolving tower energy landscape that requires a high degree of customisation across multiple tower sites and specific technical expertise, MNOs are not best-positioned to drive energy efficiency. Moreover, MNOs have an incentive to reduce the complexity of non-revenue generating operations like power, in order to focus on revenue-generating parts of their business
- MNOs place a priority on expanding networks and upgrading technology of active equipment. With finite funds for CAPEX, MNOs will always favour investments in active radio equipment over investments in energy solutions.

Sizing the opportunity: Green telecoms in Myanmar

ALI IMRON, GPM ASIA PROJECT MANAGER

THIS IS A SHORTENED VERSION OF A PUBLISHED DOCUMENT ABOUT GREEN POWER MARKET ASSESSMENT FOR MYANMAR. PLEASE CLICK HERE TO READ IN GREATER DETAIL.

About Myanmar

Myanmar has a total land area of 676,578 km^2 with a total population of about 60 million people. It is located between five countries (China, Laos, Thailand, Bangladesh and India). The country is rich in natural resources including arable land, forest, mineral, natural gas and marine resources and has a coastline measuring 2,800 km, which provides access to sea routes and deep-sea ports, offering the potential for international trade.

On the economic side, Myanmar is trying to accelerate its development among its neighboring countries. In 2012, GDP per capita stood at MMK 848,325 or around US$878.18. Mainly, it was driven by strong export activities in natural commodities. After decades of relative isolation, the government is in the process of liberalising the economy and implementing reforms to attract foreign investment.

About the telecom sector

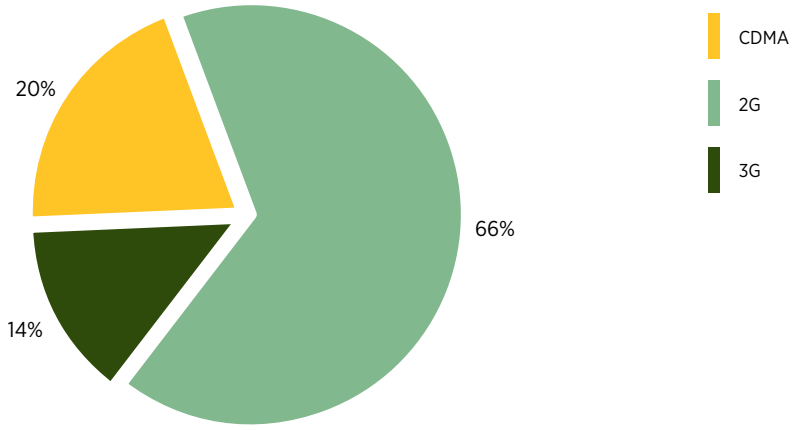
The Ministry of Communication and Information Technology (MCIT) has played an important role in managing and developing the telecom sector in Myanmar. Through its Post and Telecommunication Department (PTD), MCIT has instituted a telecom regulation body to manage all telecom players in the country. However, MCIT has, through Myanmar Post and Telecommunication (MPT), also operated as a mobile and fixed telecom network operator.

For many years, both GSM and CDMA technologies have been in operation in Myanmar but MPT is the only GSM mobile operator in the country. Mobile roaming services in Myanmar are very limited. MPT has a limited number of roaming partners and has no Short Message Service (SMS) Hub to connect MPT's customers with operators around the globe.

The government has awarded new licenses to private mobile operators Ooredoo and Telenor which will change the current situation and bring a new offer for the country on mobile communication.

Telecom sector: Current status and future growth

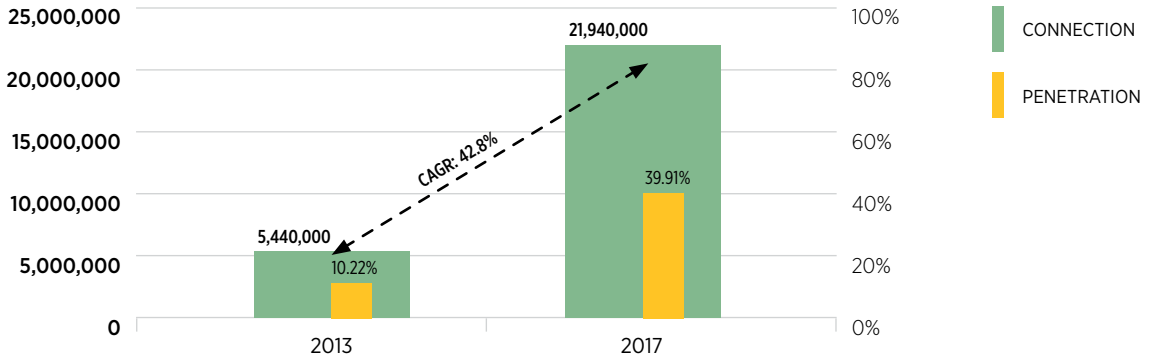
CURRENT MOBILE CONNECTION



As of 2014, the number of sites that has been deployed across the country stood at around 1,800 sites. It serves 5.44 million connections which represents a mobile network market penetration of 10.3%.[1] In terms of Myanmar's fixed network, it has about 6,045,000 lines (equal to a 1% penetration). With the new players that are going to launch this year, the market will be more competitive and there will be an increase in mobile penetration across the country.

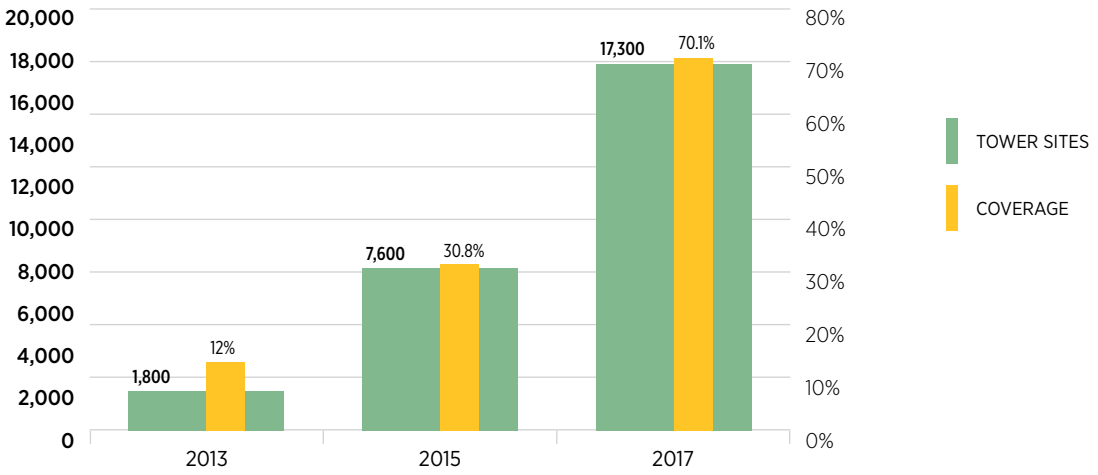
GPM estimates that by 2017 the number of mobile connections will reach 21.9 million, growing at a CAGR of 43%. The mobile penetration level will grow to approximately 40% from the current level of over 10%.[2]

FUTURE GROWTH: MOBILE CONNECTION AND PENETRATION



1. MCPT – www.mcpt.gov.mm
2. GPM Research and Analysis, GSMA Wireless Intelligence

FUTURE GROWTH: TOWER GROWTH

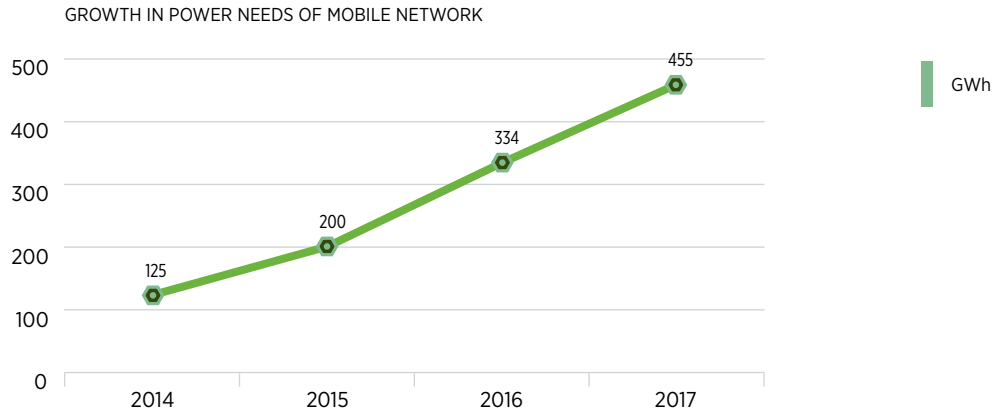


The number of sites will grow since mobile network operators (MNOs) have a target to provide coverage to more than 70% of the population in the country by 2017. GPM has estimated that around 17,300 tower sites would be deployed across the regions by that date.

Powering telecoms: Demand and current approach

The mobile industry in Myanmar is expected to become one of the country's key power consumers, with huge power requirements based on the current network rollout plans. The mobile industry requires an additional 159MW of power generation capacity on top of that which is already installed and planned for the power requirement from the mobile industry is expected to grow to more than 455GWh by 2017.[3]

POWER DEMAND FOR MOBILE NETWORKS



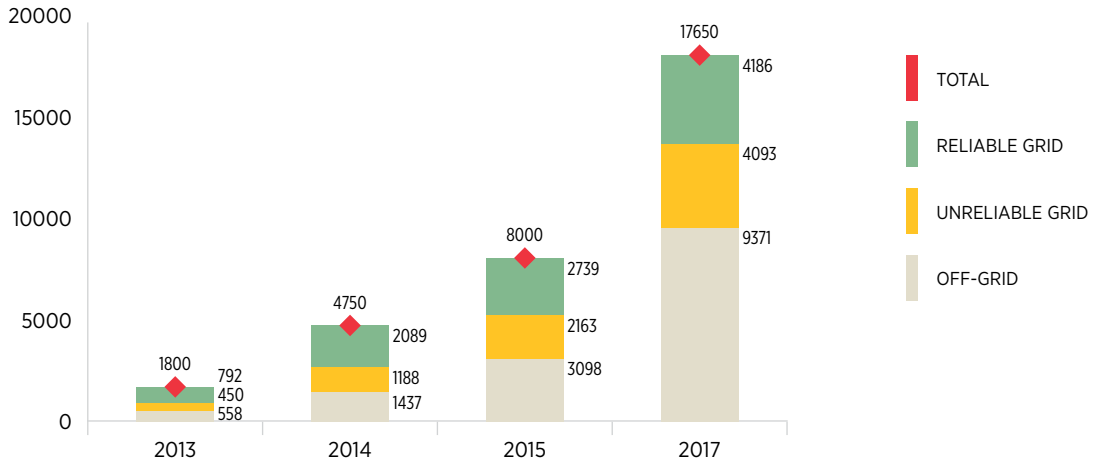
Based on Myanmar's current powering approach, GPM estimates that the annual diesel requirement would grow from 25 million litres in 2014 to 116 million litres by 2017 to power up the entire network of off-grid and unreliable grid sites. The corresponding CO2 emissions would be 67,370 tonnes and 310,676 tonnes in 2014 and 2017 respectively.

3. GPM Research and Analysis

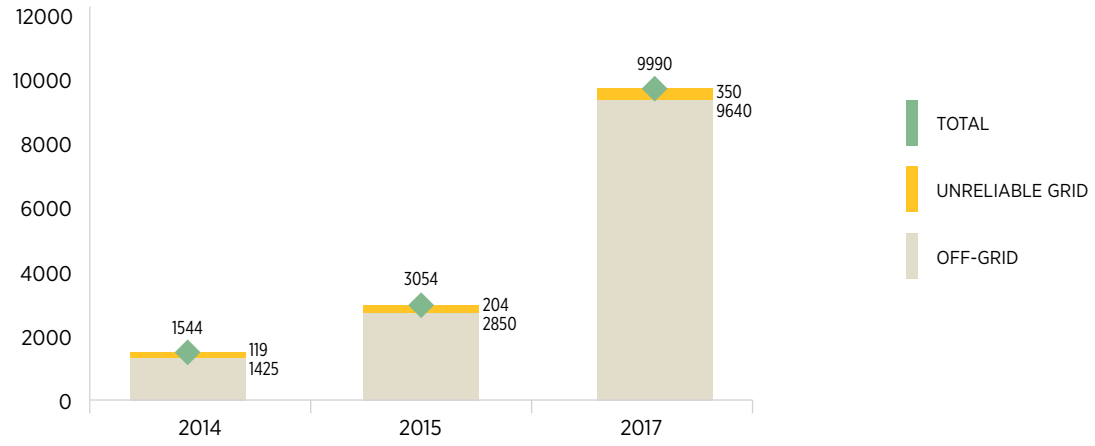
Powering telecoms: Market size and business models

MNOs would face some challenges to power up their base stations. They might heavily depend on diesel power or find an alternative energy solution. GPM has estimated the country's tower growth based on power characteristics, and this is shown in the charts below.

SIZE OF THE NETWORK: BASED ON POWER SITUATION



SIZE OF THE NETWORK: GREEN POWER OPPORTUNITY



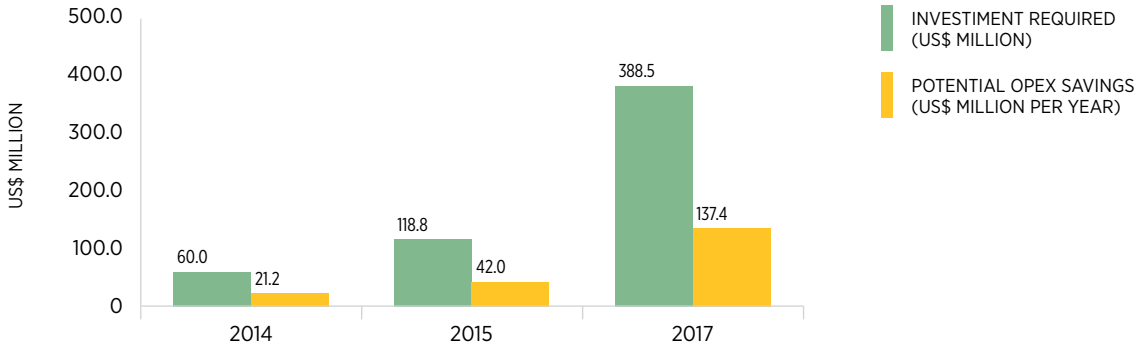
In order to save energy OPEX and reduce emissions, the MNOs or TowerCos would need to adopt alternative green power solutions to power up their networks. GPM has identified that a total of 1,544 sites can feasibly deploy alternative green power solutions, offering a potential opportunity for MNOs and TowerCos. Not only that but the potential opportunity would grow massively from 1,544 sites in 2014 to 9,990 sites in 2017.

Business model: CAPEX model

In this model, the MNO or tower company (TowerCo) needs to invest and operate the green power system and gain more benefit from OPEX savings. The potential opportunity for MNOs and TowerCos in the CAPEX based green power investment model is presented below.

	2014	2015	2017
Potential number of sites	1,544	3,054	9,990
Investment Required (US$ million)	60.0	118.8	388.5
Potential OPEX Savings (US$ million per year)	21.2	42.0	137.4
Savings in Diesel Consumption (million litres per year)	11.8	23.3	76,1
CO2 emission reduction (Tonnes per year)	31,527	62,359	203,985

CAPEX MODEL: INVESTMENT AND SAVING OPPORTUNITY

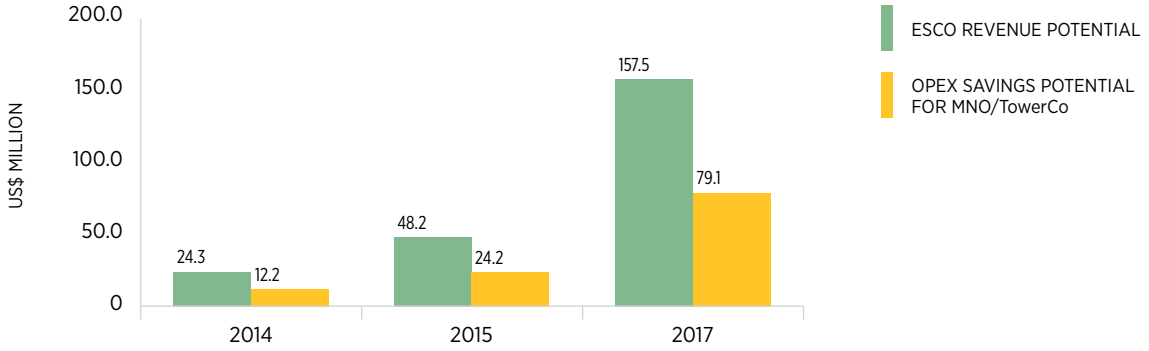


Business model: OPEX model

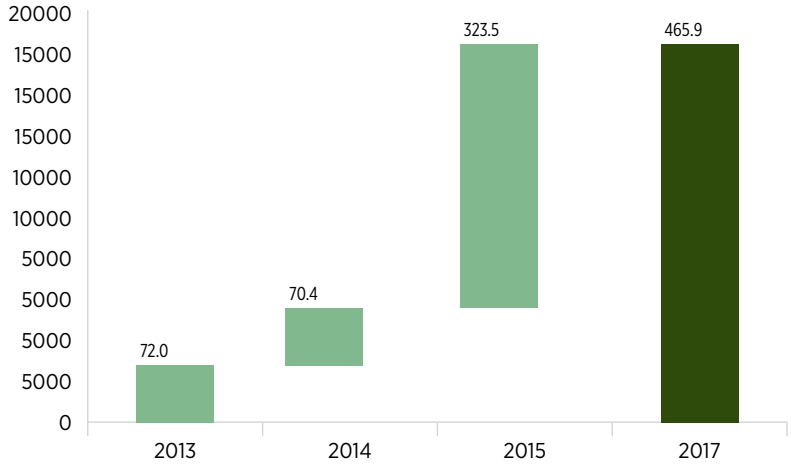
The OPEX, or energy outsourcing business, model is the other means of providing a green power solution by giving investment, maintenance and risk responsibilities to third parties who specialise in the energy business. There are three OPEX models: the Power purchase agreement (PPA), the Energy service agreement (ESA) and the fixed price model.

The MNOs or TowerCos would pay for the energy based on their consumption. The potential opportunity for the ESCO is shown below.

OPEX MODEL: ESCO POTENTIAL REVENUE AND MNO OPEX SAVING OPPORTUNITY



OPEX MODEL: INVESTMENT FOR AN ESCO



The ESCO could gain revenues of about US$157 million with an investment of US$465 million by 2017, given the above investments and returns which were based on the PPA model. As for MNOs, they would gain benefits of about US$12 million and climb up to US$79 million by 2017.

Conclusion

Myanmar, as the last "green field" telecom market, has attracted multiple stakeholders despite the country's infrastructure challenges. These challenges should not block the growth of the telecom market and the numbers of sites are expected to increase from 1,800 sites to more than 17,000 sites across the country by 2017. These developments will require a proper answer to provide power to the new telecom sites. GPM sees the current situation as an opportunity for green power providers to investigate both CAPEX and OPEX models in Myanmar.

For the CAPEX model, GPM has estimated an investment of not less than US$60 million in 2014, and this would climb up to US$388 million by 2017. The savings opportunity for MNOs would be US$21 million, and would rise to US$137 million by 2017.

For the OPEX model, GPM has calculated that the potential investment would be of US$72 million with a potential revenue of around US$24 million for an ESCO company. This would rise to US$157 million by 2017. The potential saving for MNOs would be US$12 million, and rise to US$79 million by 2017. To read the complete Myanmar report in detail, please click here.

Green Power Feasibility Study – IBS Tower, Indonesia

ALI IMRON, GPM ASIA PROJECT MANAGER

THIS ARTICLE IS A SUMMARY OF THE LATEST GPM FEASIBILITY STUDY IN INDONESIA DONE IN COLLABORATION WITH IBS TOWER. THE STUDY WAS PUBLISHED IN JUNE 2014 AND IS AVAILABLE ONLINE ON OUR WEBSITE. TO READ THE REPORT IN DETAIL, PLEASE CLICK HERE.

COUNTRY BACKGROUND

Indonesia has a population of around 250 million people, scattered across 17,000 islands extending 5,120 kilometres from west to east and 1,760 kilometres from north to south. The topography of Indonesia's islands varies but it consists mainly of coastal lowlands. Some of Indonesia's larger islands (Sumatra and Java, for example) have large mountains in their interiors.

The electrification rate is currently about 80%, according to the Ministry of Energy and Mineral Resources, and there is a target of 100% electrification by 2020. Indonesia's GDP per capita stands at around US$3,556[4] as per 2013. Indonesia's economy is driven by manufacturing and agriculture, which contributed more than 38% of national GDP in 2013.[5]

About IBS Tower

IBS was founded in 2006 as an in-building service provider and rapidly transformed itself into a prominent telecom tower company and an operator of shared network infrastructure in Indonesia. It made a major acquisition of towers in 2011, and it divested its in-building solution business to focus on the tower business. By end-August 2012, IBS had been successfully listed as a publicly traded company in Indonesia, known as IBS Tower (IBST). IBST's assets are strategically deployed across Indonesia, where operators need it most, with a focus across the islands of Sumatera and Java, and today is one of the "big four" publicly-listed tower companies in Indonesia.

IBST serves all the telecom operators on its network, and had a tenancy ratio of about 1.5 by December 2013.

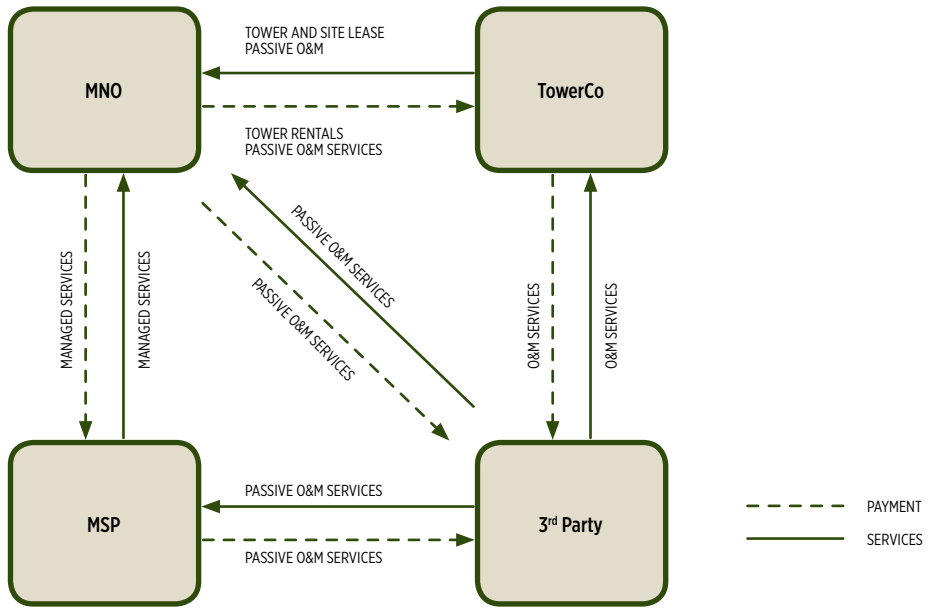
Telecom – Indonesia

Both GSM and CDMA technologies have been launched in the country, with four GSM operators and four CDMA operators. The telecom market penetration was about 40% in Q1 2014, with a total of more than 302 million connections in the network. The three biggest players, namely Telkomsel, XL and Indosat, dominate the telecoms market in the country, with a total share of about 76% of total connections.[6]

4. World Bank – www.worldbank.org
5. Bank Indonesia – www.bi.go.id
6. GSMA Wireless Intelligence

Operation Challenges – IBST

As a tower company (TowerCo), IBST provides infrastructure and maintenance for its clients. It is currently facing difficulties getting power connections to new green field projects. Moreover, power engineering and planning are still largely carried out by Mobile Network Operators (MNOs), which requires from IBST to coordinate with MNOs to solve power issues in the field. The diagram, below, shows the current business practice and relationships among stakeholders.



Based on the practice outlined in the chart, the TowerCo maintains the passive infrastructure only while the Managed Service Provider (MSP) maintains the active infrastructure/telecom equipment. The third party here plays an important role as a subcontractor for both TowerCo and MSP.

Objectives

The study aims to:

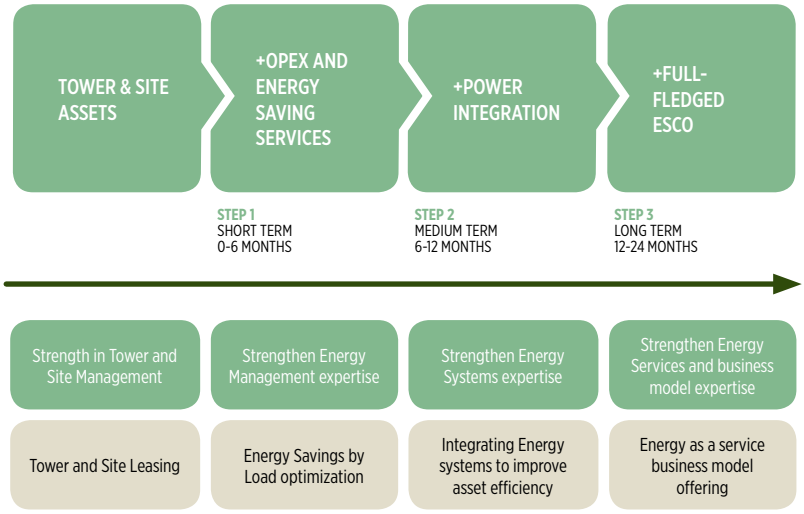
- Analyse the existing network and explore an alternative energy option for IBST's clients.
- Demonstrate the technical feasibility and financial viability of green power alternatives compared to existing power approaches and solutions.
- Identify a business opportunity for IBST in energy services leading to the Energy Service Company (ESCO) model.
- Identify energy efficiency and green power opportunities as part of the ESCO model
- Enable capacity building through training and knowledge transfer.

Feasibility Study and Approach

A feasibility study has been carried out according to GSMA's Green Power for Mobile (GPM) methodology, involving detailed data collection, data analysis, green power model design, business case development, site prioritisation and recommendations.

GPM recommended the following approach to IBST for leveraging the current business model and for IBST to consider future expansion to become an infrastructure end-to-end provider in Indonesia.

BUSINESS MODEL APPROACH

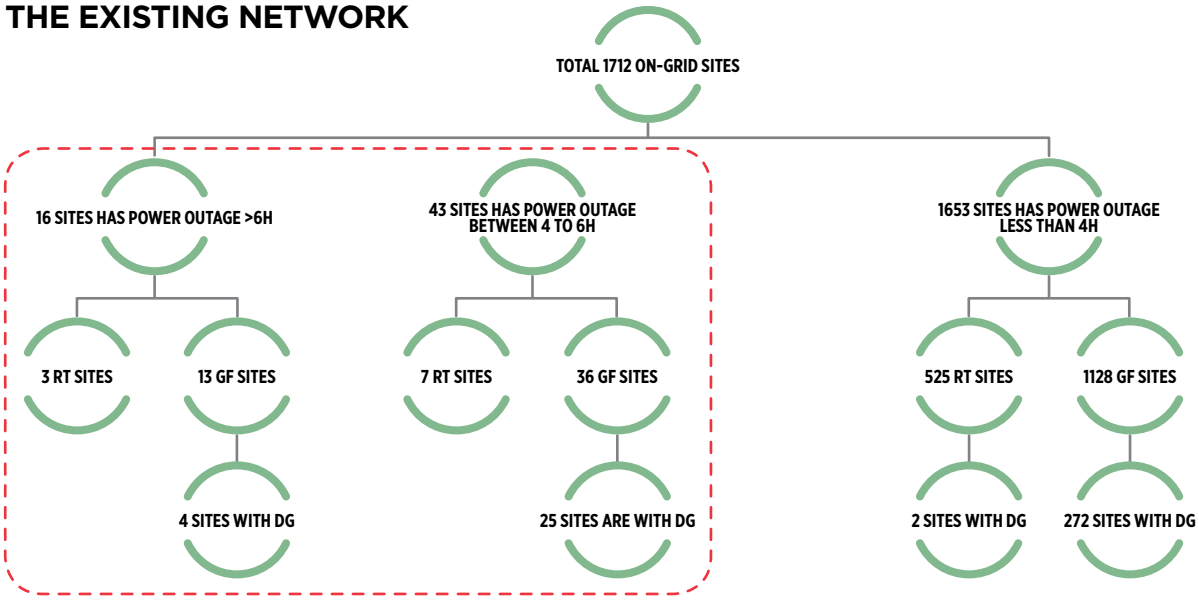


Facts and Findings

GPM identified 2,104 tower sites that have been deployed by IBST in 2013, with a tenancy ratio of about 1.5. For this study, 1,712 tower sites were analysed. The facts and findings of this feasibility study are:

- IBST has 3,178 tenants on IBST's network.
- All IBST sites are connected with commercial grid power.
- 303 sites have fixed Diesel Generators (DGs).
- There are 1,706 indoor sites that require an Air Conditioner within IBST's network.
- Most of sites have an outage less than four hours daily.

THE EXISTING NETWORK



GPM found that Air Conditioner consumption has contributed a significant amount of the total site load and there are only 16 sites with outages of more than six hours a day.

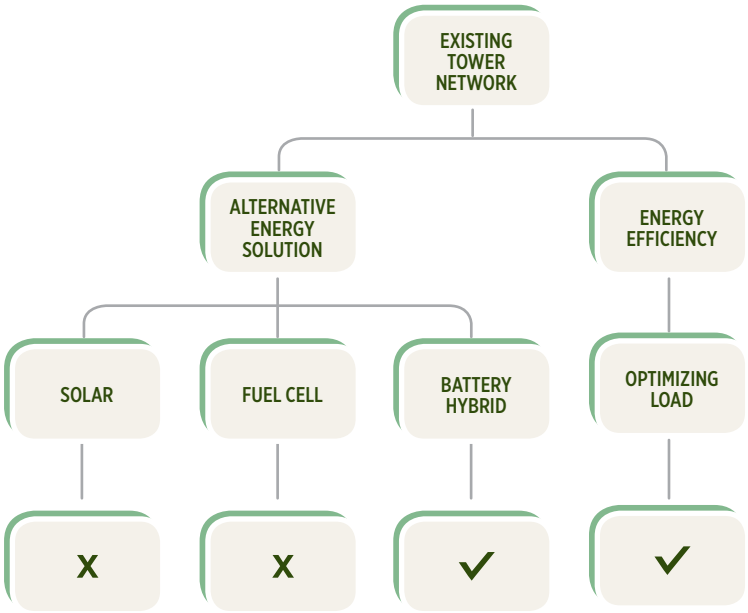
Solution design and approach

GPM analysed the existing network data in order to identify the possible design for green solutions: solar, fuel cell and battery hybrid solutions. The results of the analysis showed that:

- Grid battery hybrid solutions were more applicable for this existing network
- To improve energy efficiency, IBST needs to focus on optimizing the existing load to get more saving opportunity.

The load optimization approach looked into two aspects, the first was reducing Air Conditioning running hours and the second was integrating power system equipment to develop a better business model.

DESIGN AND ANALYSIS APPROACH



GPM considered that the better approach was to focus on optimising the existing load to make some saving opportunities. The load optimisation approach has two aspects:

1. Energy efficiency – reducing AirCon running hours
   The temperature in Indonesia would give an opportunity to reduce Air Conditioner usage on IBST's network. 1,706 indoor sites would give a saving opportunity if the running hours were reduced to 18 hours instead of 24 hours on a daily basis. Below is the proposed scheme for reducing AirCon running hours.

DESIGN PROPOSAL

DESIGN MODEL		PROPOSED SOLUTION	
NO. OF SITES	AICCON LOAD (KW)	DC FAN	AIRCON CONTROLLER
152	2-2.5	48V, 48W, 7.60m³/min	48VDC/220VAC Controller with Timer
980	1.25	48V, 48W, 7.60m³/min	48VDC/220VAC Controller with Timer
547	1-1.125	48V, 48W, 7.60m³/min	48VDC/220VAC Controller with Timer

IBST will have an opportunity to generate additional revenue of US$36,968.59 per month or US$443,623.08 per year based on this sharing of money from savings, with a total CAPEX investment of US$339,158.

2. Energy efficiency – power system integration
   The second approach would be to provide the passive infrastructure to IBST's tenants. IBST would take responsibility for a battery back-up solution for all tenants. It would give IBST's tenants a benefit in that they would have better battery autonomy to back up their telecom equipment.

DESIGN PROPOSAL

	LOAD	GRID STATUS	DG	BATTERY		CONTRIBUTION OF ENERGY	
				Capacity	Autonomy	Grid	DG
1 Tenant	1.7kW	Yes	15kVA	1x300Ah	6.4 hrs	100%	0%
2 Tenants	2.6kW	Yes	15kVA	2x300Ah	7.8 hrs	100%	0%
3 Tenants	3.8kW	Yes	15kVA	3x300Ah	7.9 hrs	100%	0%

Overall, IBST will be able to offer a better Service Level Agreement (SLA) if it also has greater control over power solutions of all tenant, in the same location as suggested in the business case described above.

Recommendations

The recommendations from GSMA Green Power for Mobile for IBST, after conducting an intensive feasibility study, are as follows:

For existing network

- Approach load saving sharing business model to MNO as the first step of transformation
- Acquire and share energy assets and offer more power operation and management SLA
- Implement Power Management System (PMS) to control the power system in a real time basis

For future network

Green power is a solution to consider in order to generate more revenue on untouchable commercial power connections or new off grid sites, where the connection from PLN will take time to implement. By implementing this solution IBST will shift to become a full-fledged ESCO.

Click here to read the detailed report.

Green Power Membership

AREEF KASSAM, GPM PROGRAMME DIRECTOR

Over the past 5 years we have seen tremendous growth in the Green Power for Mobile sector. In that span the number of deployed renewable energy base station sites has grown from 9,000 in 2010 to just fewer than 43,000 by mid-2014, with growth expected to continue in the upcoming years.

It's impossible to talk about the growth of the GPM sector and success of the programme without acknowledging the Green Power for Mobile Associate Members. Since the inception of the Green Power for Mobile programme in 2009, there are several organisations that have become GSMA Associate Members for GPM, and it is with their support that the programme has been able to have the success that it's had. Over the past five years the GPM associate members have grown in number, and include Energy Service Providers such as s have been: AEG Power Solutions, Ameresco Solar, Altobridge, Ballard, BP Solar, BYD Company Limited, Cascadian, Saft, Caterpillar, Electro Power Systems, Eltek Valere, Ennera, Ericsson, Heliocentris, IdaTech, Intelligent Energy, GE Energy, NorthStar, Power Oasis, Phaesun, PNN Group, Symantec, m-Field, VNL.

These organisations have supported the GPM programme by being active and regular participants in Working Groups, collaborating on articles in the GPM Bi-annual reports, providing transparent and firsthand information and data to be used in the Knowledge Sharing and Convening activities and being passionate advocates of the renewable energy sector.

As GSMA Associate Members these organisations receive discounted access to GSMA Intelligence, discounts on Mobile World Congress and Mobile Asia Expo delegate passes and exhibition space and full access to the GSMA web based company listing and to GSMA Infocentre, where an organization can network with more than 20,000 Industry experts and have access to a library of technical documents and whitepapers.

At time when the GPM programme is scaling down its industry efforts, it is a good opportunity to introduce a new related GSMA programme – Digital Inclusion. Digital Inclusion works towards expanding rural mobile Internet usage and as apparent through our experience in GPM one of the major obstacles to rural coverage is power availability and the cost of it.

Digital Inclusion

Currently, there are 4.3 billion people who are not connected to the internet, largely in underserved developing markets. This prevents the majority of the world's population from benefiting from the profound social and economic benefits provided by access to online digital services and content. The Digital Inclusion programme's overall aim is to expand connectivity by addressing the barriers to mobile internet adoption globally. This is aligned to the GSMA's goal of connecting another billion people to mobile networks by 2020.

The Digital Inclusion programme aims to break down the barriers to mobile internet access; a major focus of the programme is to work with other organisations that are dedicated to expanding mobile internet adoption to align our positions and messaging. This includes:

Network infrastructure & policy

The GSMA will produce a report on single wholesale networks (SWNs), which considers how SWNs might be expected to perform in practice. The report considers the economic principles underlying network competition and SWNs and evidence from mobile markets across the world and other industries to evaluate the claim that SWNs could be expected to outperform network competition. The report

achieves this by assessing the expected impact of introducing an SWN relative to the status quo of competing networks on network coverage, degree and speed of innovation and introduction of new technologies, costs, and ease of implementation.

In addition a Toolkit will be put together compiling the existing GSMA information and reports related to expansion of network infrastructure such as mobile energy efficiency and green power for mobile.

Taxation

This will focus on the impact government taxes and fees have on the ability of mobile operators' to offer, and end-users' ability to consume, mobile internet services.

Consumer Barriers

This work stream will target the consumer barriers to adoption such as awareness & digital literacy.

Locally relevant content

This work stream will drive awareness and development of the locally relevant content that encourages people to use the mobile internet.

The new GSMA Digital Inclusion programme is set to kickoff in 2014.

Integrating Eco-Responsibility and Business Sustainability in the MTN Group

ZAKHIYA REHMAN, MTN GROUP SUSTAINABILITY MANAGER

Introduction

For the past five years, MTN has strived to meet its sustainability vision of ensuring that we protect and create economic value for ourselves and our stakeholders through responsible environmental and social core business practices. Guided by macro-trends, materiality assessments and increasing stakeholder dialogue that is bilateral and ongoing, as well as a number of global sustainability codes and protocols such as the Forum for the Future's Five Capitals Model (now the International Integrated Reporting Councils' (IIRC) Six Capital's Model, we have prioritised the material areas, where we can most make a positive impact, or mitigate our negative impacts. These are indicated below.

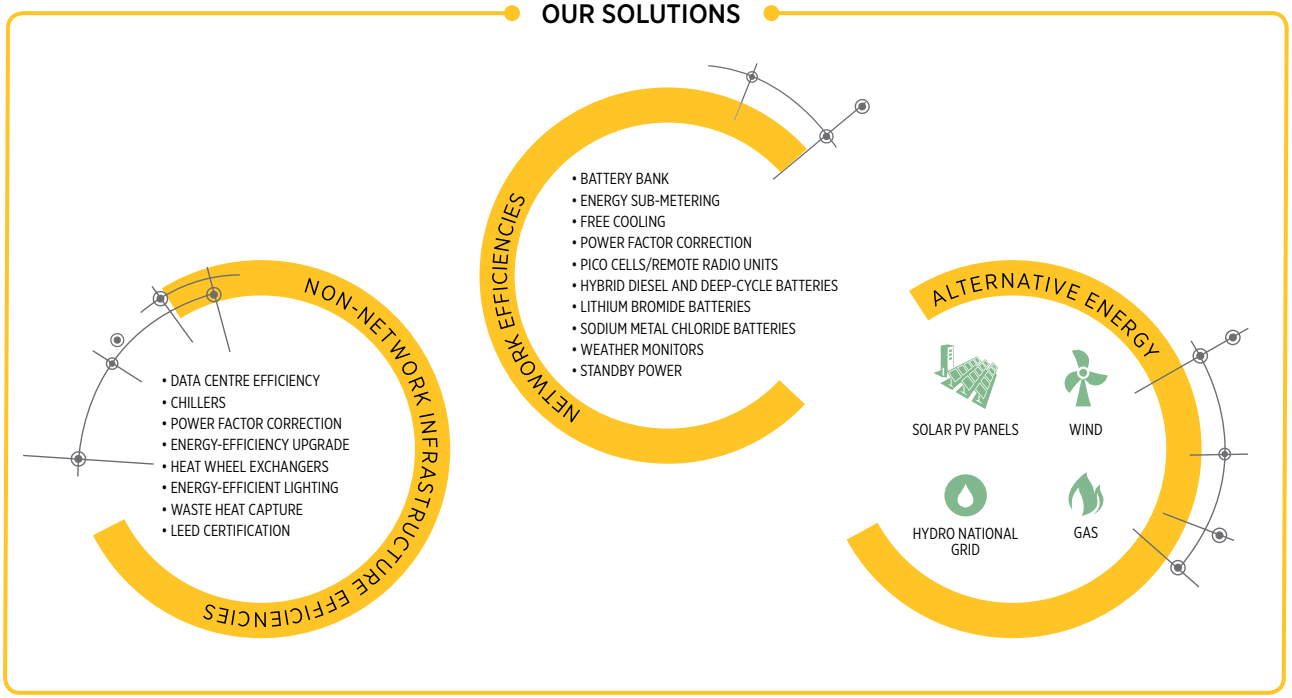
ECO-RESPONSIBILITY	SUSTAINABLE ECONOMIC VALUE	SUSTAINABLE SOCIETIES
		
• Energy cost, climate and carbon management • Network emvironmental impacts • Eletronic and eletrical waste (e-waste)	• Helping close Digital Divide (affordable digital inclusion) • Digital broadband, machine-to-machine, cloud and SMART solutions focused on sustainability-led innovation (e.g. air, weather, and water quality monitoring, disaster, mitigation, etc.)	• Ethics and Good Governance including Human Rights, Privace Security, Freedom of Expression, Responsable use if ICT (issues of cyber-bullying, marketing to children, etc.), Anti-Bribery and Corruption, etc. • Employee Health and Safety • Responsible Supply Chains

Eco-Responsibility focus area of MTN's Sustainability Framework

MTN's material areas of environmental impact relate to our use of energy for operations, and the waste results of electronic and electrical goods (e-waste) used by both ourselves and our customers. By focusing on these matters, we can most meaningfully reduce our environmental impact, improve our energy security position responsibly, ensure that our ICT products can help other companies and industry sectors to do the same, and help in a small way to tackle the broader social, health and environmental implications of e-waste generated by both MTN and by consumers in many other countries whose e-waste is often shipped to Africa for "processing". On a smaller scale, greening MTN's offices across all resource areas from water, paper, waste and healthy buildings to cleaning products is an ongoing effort in a number of countries, and in South Africa, silver level Leadership in Energy Efficiency and Environmental Design (LEED) certification was achieved in December 2012.

Meeting the Energy needs of MTN's Operations: An Environment-friendly, Sustainable Approach

To address the greenhouse gas impact of our energy consumption, we invested extensively in network and non-network infrastructure energy efficiencies, and in alternative energy solutions as indicated below.



Network Efficiencies and Alternative Energy

Solar-powered (and some wind-powered) network sites have been implemented in 22 locations across South Africa, and in some cases such as in Riemvasmaak, ensure that communities have enjoyed mobile ICT access for the first time. In Nigeria, where the national grid meets only 30% of the country's energy requirements, and even base power requirements are largely met through the use of diesel generators (with the associated cost and environmental implications), MTN has installed over 2,660 hybrid battery sites, and seven solar-powered network sites. Hybrid sites have reduced diesel consumption by 20%, while solar sites have helped increase this saving to 80%. An additional 250 hybrid solar sites, deployed through a partnership, now also provides connectivity to 308 rural communities. Using fully meshed satellite network technology helped reduce call costs and improving voice quality, which at the time, was a world-first innovation. It also created new enterprises in these villages.

Similar grid energy challenges are a feature in all countries where we operate, and solar solutions have been deployed in Zambia, Swaziland, Ghana, Cameroon, Rwanda and South Sudan, amongst others. In Cameroon, the installation of 70 solar-powered sites since 2011 has seen MTN's Scope 1 greenhouse gas (GHG) emissions decline by 11%. In Cyprus, the installation of 15 solar hybrid systems has helped MTN save 370 tonnes of GHG in 2013 alone. In Iran, a set of energy efficiency measured ranging from the use of solar power-diesel hybrid solutions, deep cycle batteries, reduced cooling and review of equipment power saving features saw energy consumption reduce by just under 17%, and complements the Group wide energy efficiency drive implemented in all our countries.

We extended this to ensure our alternative powered technology solutions can also be used to directly also transform lives, such as in the case of Ghana, where MTN and Itel Ltd have developed 150 of customised, solar-powered, motorised tricycles to support physically-challenged new entrepreneurs. These tricycles serve as the point-of-sale centres, offering a much-needed and highly accessible community service, while facilitating financial independence for people with greater challenges than others. Power for charging of phones is supplied by solar panels fitted to the roofs of tricycles, and night lighting facilities guarantee entrepreneurs can trade for longer.

Outcome and Achievements

POSITIVE IMPACTS

139	3,055	46,736,712	54,587
SITES	KI DIESEL SAVED	KWH GENERATED	TONNES AVOIDED/ REDUCED

The result of these efforts over 2013 include the generation of just under 46,736,712 million kWh of 'clean' power, and the avoidance of 54,587 tonnes of GHG emissions. These results are the outcomes of many years of work effort, lessons learnt, and leadership commitment, but we are conscious of how much more should still be done to improve efficiencies and reduce impact. MTN is one of Newsweek's 500 Green Global Companies for 2014 (one of only three South African listed companies to be included), and has attracted partnership funding for a number of its environmental projects as a result of its willingness to invest in complex, multi-year projects that can make a lasting difference.

Non-network environmental efficiencies

The Global e-Sustainability Initiative has assessed that ICT-enabled solutions can help the world achieve carbon abatements in the region of 9.6 GtCO2e or 16.5% of global outputs by 2020. MTN's offers cloud-computing for virtualisation and other efficiencies, machine-to-machine products to address water leakage and air quality requirements, encourage energy efficient driving by fleet drivers, and its advanced monitoring infrastructure, which is an energy smart metering solution is used by the City of Johannesburg to mitigate some of the impacts of the national energy shortage.

Recognising the global growth in e-waste, MTN partnered to with Deutsche Gesellschaft fűr Internationale Zusammenarbeit (GIZ) to ultimately hand over approximately 469 tonnes of electronic waste and electrical equipment (e-waste) handed to four SME waste handlers and recyclers after ISO14001 and regulation training, etc. to create a holistic solution to management of the highly fragmented, regulated but hard-to-govern e-waste landscape of collection, management, disposal and job creation. The aim of this guaranteed flow of e-waste from MTN is to support the financial sustainability and ability of SMEs to employ more people, while addressing a critical ICT environmental matter.

Conclusion

We operate in some of the most environmentally-vulnerable parts of the world, and those with the fewest economic resources to cope with the effects of climate change. By ensuring we take our environmental responsibilities seriously, we hope to mitigate our impact on our customers' environments. By overlaying our focus areas qualitatively and quantitatively against our corporate strategy, we remain focused on meeting our vision of making strides in the digital world responsibly and meaningfully.

Interview with Sairam Prasad, CTO of edotco Group

GPM interviewed M. Sairam Prasad, CTO of edotco Group, a brand new tower company operating in South Asia, to understand a tower company's operational challenges and how green power can answer some of these challenges and support the business development strategy.

edotco Group is an integrated telecommunications infrastructure services company providing end-to-end solutions that includes towers, energy, transmission, operations and maintenance in the region of South East Asia.

Today, edotco Group operations have a network of over 12,000 sites in Malaysia, Sri Lanka, Bangladesh, Pakistan and Cambodia. This represents edotco's commitment to expand possibilities with cost-efficient telecommunications infrastructure that is built around growing competitiveness and connectivity for businesses.

Strategy and challenges

1. **What is you company strategy in-term of infrastructure for telecom?**
   We aim to provide cost-efficient telecommunications infrastructure built around the specific needs of our customers and the markets they operate in. For us, cost of delivery and operations, as well as assuring uptime across a range of structures (ground based, roof tops, etc.) are critical factors in becoming the preferred brand in infrastructure services

2. **What is your main challenge in infrastructure and providing your service to your customer?**
   The challenges in providing telecommunications infrastructure services varies in different markets and countries; from site acquisition to grid power shortages and even to non-existence of central grids. Another major challenge is having to significantly balance the antennae load & tower height requirements and tower type to match the maturity level of wireless network in areas of 2G, 3G and 4G evolution. We operate in markets that are very different to each other, and our ability to adapt to these contrasting demands is key to our success.

3. **Do you think power has become a major problem for your new site? What will you do to deal with that?**
   Power supply remains a challenge within the tower industry across the globe. Off grid, availability of 24x7 grid power, inconsistent quality of grid power and the recent rise in electricity tariff and diesel costs are some of the issues that we face with different markets. Today, we are driving innovations to reduce power usage through simple means (e.g. large scale adoption of free cooling boxes) as well as more cutting edge ideas.

4. **How many green powered sites you have so far in your network? And what's your plan for further deployment in next few years?**
   At edotco Group, energy management plays a significant role in areas of demand side management, energy efficiency, alternate energy sources and optimum load factor coupled with remote monitoring. This approach allows us to maximize our network sites in phases with one or alternative energy initiatives that is suitable for all sites. Our green energy program also aims at reducing baseline carbon footprint by 40% come 2018.

Business Model and Technology

5. **There is a lot of discussion around energy outsourcing through independent energy service companies (ESCOs) in the Asian market? How do you see that as a possible opportunity to scale green power adoption in the mobile telecom industry?**
   It is definitely crucial for a green power adoption in Asian markets, similar to other markets around the world. In Myanmar where the grid availability is poor, it is highly recommended to outsource as this allows the combination of operators' requirements to maximize the benefits of scale and service. In Cambodia there are currently multiple micro grids powering the country's networks, while the energy services in India is progressing well at present.

6. **Commercial grid has become difficult and more difficult to connect now. Will your company shift to new paradigm of end-to-end infrastructure provider by providing power to your customer? What is the reason?**
   Unlike the traditional tower companies, edotco Group offers end-to-end telecommunications infrastructure service solutions ranging from tower space, energy management and O&M services – to ensure optimum efficiencies – to every aspect of infrastructure provisioning for the benefit of all operators sharing our towers.

7. **Do you think to be an ESCO company will give more benefit from your current business? What is the ROI that you are looking at?**
   Guided by practical optimism to make a difference in the business we are in, edotco Group is determined to drive our aspiration – "Enabling Connectivity" by transforming businesses in a way that makes a positive impact on the society we live in. Focused on providing innovative and environmentally conscious energy solutions, edotco Group continues to deliver world class products and services in line with its vision to make a difference today for tomorrow by enabling and empowering communications in the region.

Technology

8. **If you are an ESCO what kind of a green power technology will you use for your customer? Why?**
   edotco Group will implement various new technology solutions i.e. renewable energy DC Micro Grids using solar, wind, new storage and cooling solutions. We believe this approach will help to provide the optimum energy cost at the same time low carbon network.

9. **How will you determine customer's needs with a green power technology solution that you will use?**
   The indicators for selecting green power technology solution depends on grid availability, quality, carbon foot print, costs and conventional backup solution reliability. With the new alternative energy technologies, we can mitigate all the above challenges.

10. **Do you think by providing a power as a total end-to-end solution for your customer will give you more control on your SLA and KPI?**
    We believe we can do so, customers are seeking good network uptime, faster site delivery and optimum operating costs. By providing an integrated telecommunications infrastructure solutions that includes energy in the delivery mix, edotco Group can deliver these three important value proposition to its customers in the region.

The Synergies between access to Mobile, Energy and Water

MICHAEL NIQUE, MECS INNOVATION MANAGER

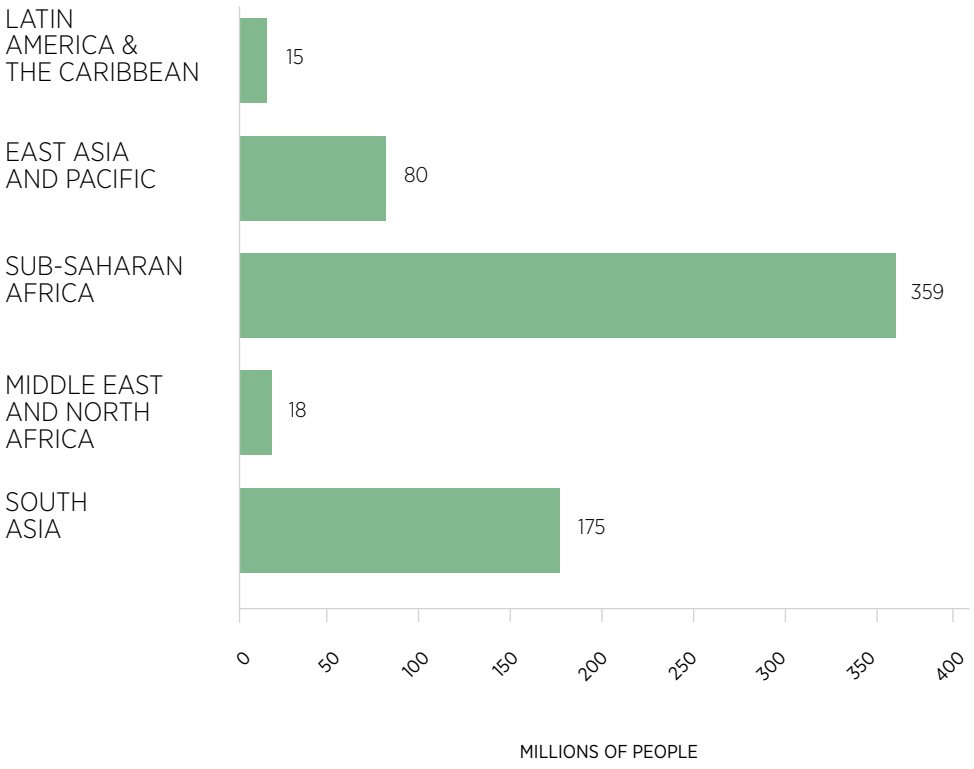
SNAPSHOT OF THE GSMA MOBILE ENABLED COMMUNITY SERVICES LATEST REPORTS ON "SIZING THE OPPORTUNITY OF MOBILE TO SUPPORT ENERGY AND WATER ACCESS" REPORT AND THE REGIONAL SPECIFIC REPORTS "SYNERGIES BETWEEN MOBILE, ENERGY AND WATER IN AFRICA AND ASIA".

Mobile connectivity has grown beyond the limits of urban centres to cover more than 84% of the population living in developing countries, meaning that, in many places, people have access to mobile first before other basic services such as access to electricity and access to clean water or sanitation.

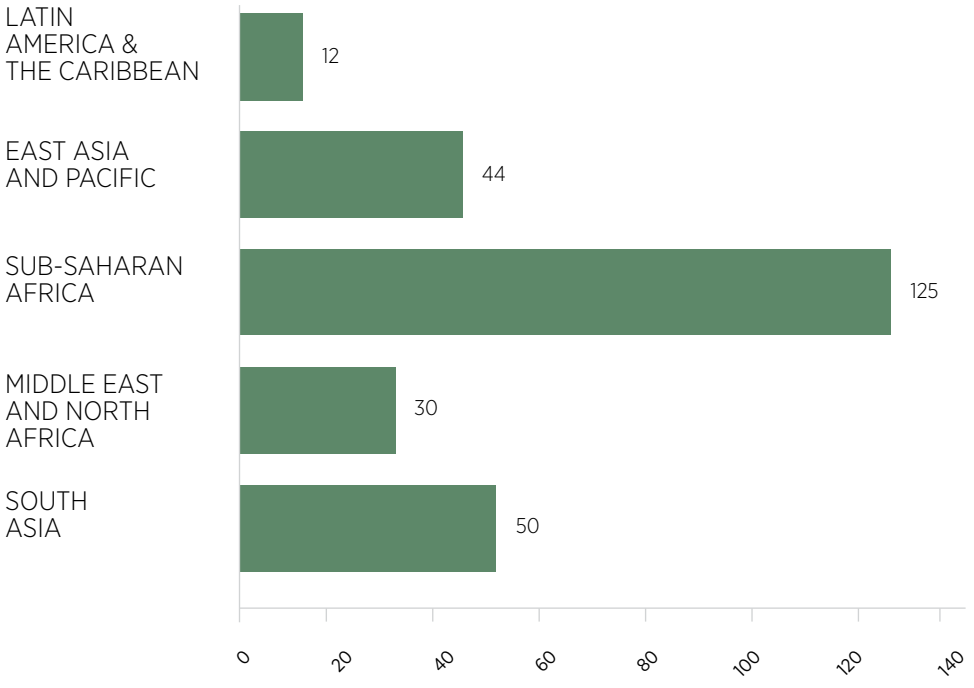
This gap between access to mobile and access to utility services has widened in recent years. According to our recent report "Sizing the Opportunity of Mobile to Support Energy and Water Access", we estimate that hundreds of millions of people living in emerging markets are currently covered by mobile networks but without access to electricity and/or improved water. A few key findings are listed below

- The total addressable market1 for mobile-enabled energy access is more than 643 million people in 2013 or 53% of the global population without access to electricity (approximately 1.2 billion people).
- The largest addressable market is Sub Saharan Africa, where the reach of electricity networks remains limited (approx. 32% of the population2) but where GSM networks cover more than 74% of the population.
- Leveraging this increased mobile coverage and mobile penetration, innovative mobile-enabled energy services, such as Pay-As-You-Go, enable low income customers to afford solar home systems, reducing their reliance on kerosene fuel.
- The total addressable market for mobile-enabled water access is estimated at approximately 262 million people in 2013 or 34% of the global population without access to improved water sources (approximately 780 million people).
- Mobile could also have an important role to improve current water infrastructure and services in rural environments (for example, it is estimated that only 70% of hand pumps are working at any given time in Africa3) and in cities, where ageing infrastructure, leakage problems and poor payments collection reduce the quality of the service to customers.
- Mobile monitoring of remote hand-pumps and mobile financial services for water payments or savings are some of the models currently tested to better understand the impact of mobile for water sustainability.

ENERGY ADDRESSABLE MARKET (MILLIONS OF PEOPLE)[7]



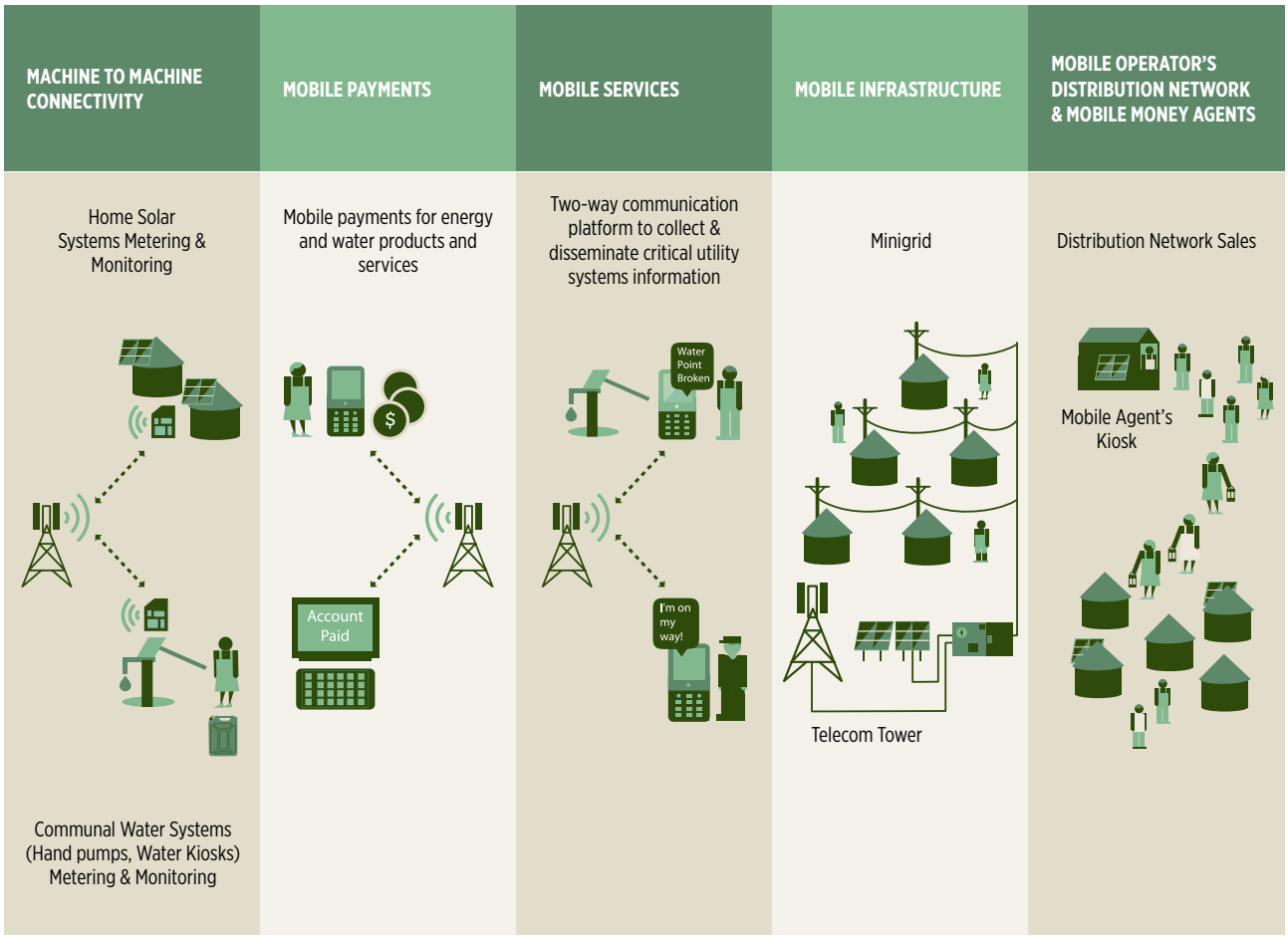
WATER ADDRESSABLE MARKET (MILLIONS OF PEOPLE)[7]



7. Source GSMA

The GSMA believes the size and the reach of the mobile industry's infrastructure, mobile operators' distribution channels, M2M connectivity, mobile payments and services offer innovative pathways to achieve reliable energy access and improved water access for underserved communities. These innovative pathways are presented as the five mobile channels in the diagram below:

FIVE CHANNELS TO ENHANCE ACCESS TO ENERGY AND WATER[8]



Our two other recent reports on the "Synergies between mobile, energy and water in Africa and Asia" provide more details on the mobile innovation, either from a product, service or business model perspective, to improve access to these basic services. Below are some of the key regional trends we have identified in the growing energy and water sectors:

- The number of mini-grids and/or energy hubs where a telecom tower serves as an anchor customer (the Community Power from Mobile model or CPM) is still limited, due to the high capital needed to build sites and the long cost recovery. However, thanks to energy service companies developing smart solutions to increase payment collection and load management for mini-grid operators, as well as appealing value propositions to outsource energy provision for tower companies under mid- to long-term partnerships, more learnings become available to support the CPM model growth;
- The mobile-enabled Pay-As-You-Go model for solar has already gained traction in Africa with more than 60,000 units sold in 2013 mainly in East Africa, under a financed purchase or 'energy as a service' scheme. Some of the drivers for adoption of these innovative solar solutions are: deep level of partnerships between mobile operators and Energy Service Companies and the maturity of mobile money services.
- This PAYG model is still nascent in Asia, here partnerships and mobile money are still developing.
- The development of innovative mobile financial services targeting improved payment collection and new financing options for water or energy customers also have the potential to disrupt these sectors.

8. Source GSMA

- Companies and institutions are starting to leverage mobile solutions as part of their water service delivery, although these are still early days for both continents. Mobile impact could however be important and the mobile-enabled water services and solutions have the potential to reach millions of people currently relying on ageing and/or unreliable water infrastructure.
- Trials of mobile monitoring tools to improve the collection of data at the end-user level, either through smart meters or mobile phone-based solutions, are showing promising results and, in the near future, it will be critical to implement open data platforms in order to optimize access and usage of such data at the institutional level.

Building on this early analysis and landscaping exercise of the mobile-enabled energy and water sectors, the MECS programme will continue to gather information on the value and impact of mobile in the sector in the coming months, through the analysis of the results from MECS grantees' pilots and added research in this nascent domain. For more questions, please contact Michael Nique mnique@gsma.com

3.2

MECS Annual Report "Predicting the future of Mobile-Enabled Community Services" – A Snapshot

MARY ROACH, MECS PROGRAMME OPERATIONS MANAGER

EXTRACT FROM THE MECS ANNUAL REPORT 2013, THE FULL REPORT CAN BE FOUND HERE

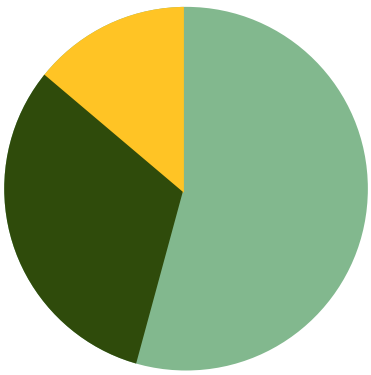
In 2013, we launched the Mobile Enabled Community Services (MECS) Programme with the support of the UK Government. The purpose of the programme is to accelerate the efforts that use mobile technology and infrastructure to support increased and improved access to energy and water services in emerging markets.

Our 2013 Annual Report shares key insights and themes drawing upon a year of work, research and convening. This year's report focusses on the wealth of information and insights about the growth of the sector that was derived through the launch of the MECS Innovation Grant Fund. While the 13 grants awarded will result in learnings we will be able to present next year, the insights derived from analysing the pipeline of Concept Notes and Applications provide us with a look into the future of mobile-enabled energy and water services.

THE MECS INNOVATION GRANT FUND FUNNEL

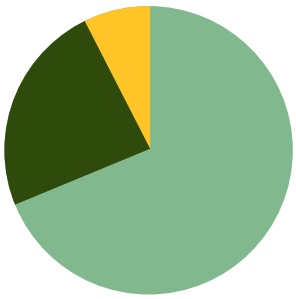
167 CONCEPT NOTES

ASIA 65
AFRICA 89
LATIN AMERICA 7
OTHER 6



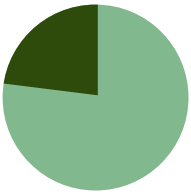
46 APPLICATIONS

ASIA 19
AFRICA 24
LATIN AMERICA 3



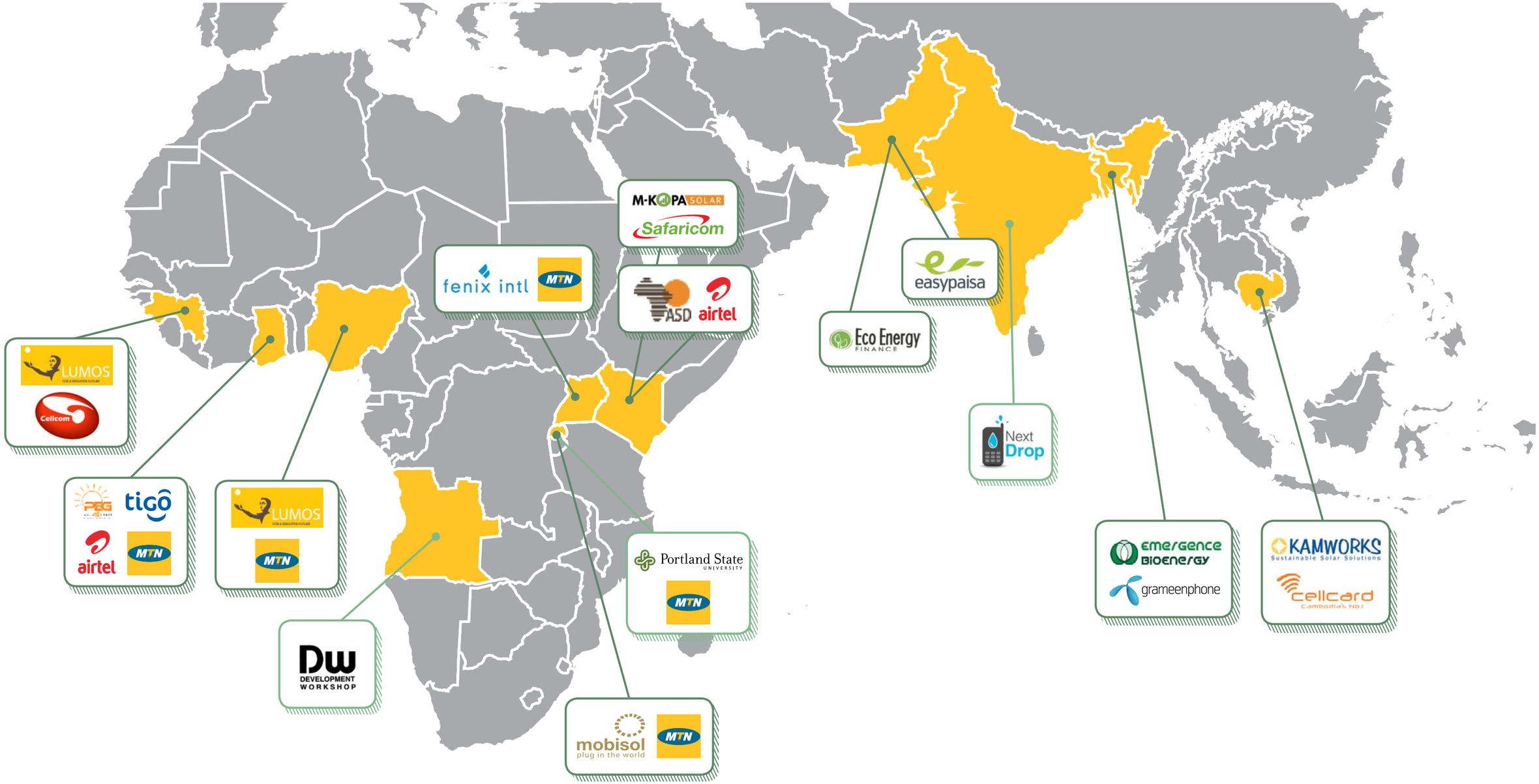
13 GRANTS

ASIA 5
AFRICA 8



WATER
ENERGY
ENERGY + WATER

THE GEOGRAPHICAL DISTRIBUTION OF MECS GRANTEES



Water becomes part of our scope

With our funding support, we have been able to include water as a sector focus of the Programme. While the use of mobile to support services is similar for both energy and water, the nature of the challenges are different. Our experience in 2013 has emphasised the need to think differently about the water sector and has reminded us of the need to adapt our support and efforts to the maturity of the sector.

The Market is growing

In December 2013, we published "Sizing the Opportunity of Mobile to Support Energy and Water Access",[9] a detailed report presenting our methodology and results to calculating the market size for mobile-enabled water and energy services. Compared to our previous estimates on addressable markets (2011-12), this new data shows that the slow growth of energy and water access (between 1% and 2% per year for energy)[10] compared to the rapid expansion of GSM mobile networks (approx. 11% per year) mainly in rural locations, has widened the existing gap between access to mobile and access to utility services.

We also expect to see other drivers increase the market for mobile enabled community services in both rural an urban settings, with increased adaptation of solutions across these settings. Such drivers include continuing urbanisation alongside rapid economic growth in emerging markets, as well as decreasing technology costs.

Interest in the sector is global

We were surprised that in the short six months since the launch of the MECS Innovation Grant Fund, we received a total of 187 Concept Notes from 35 countries. Our £2.4M fund was 12 times oversubscribed with applicants requesting a total of £29M in grants.

This demand highlights the strong interest in leveraging mobile technology to support basic infrastructure service delivery to underserved communities.

Partnerships with Mobile Operators are evolving

Beyond general sector trends, the analysis of Concept Notes also provides us with a look at the evolving nature of partnerships between service providers and mobile operators. Mobile operators are engaging in different types of partnerships which provide them the opportunity to develop light touch engagements with new partners as well as develop more integrated partnerships when the mobile operator has established trust with their partners.

Service over technology still prevails

In our 2012 report we presented the notion that service prevails over technology: while technology underpins the business models we see, ultimately it is the quality of the service to the customer that creates successful business models. This theme is still consistent in 2013 with the models and ideas that were presented as part of the MECS Innovation Grant Fund.

Funding Gaps remain

While the MECS Innovation Grants help to fill a funding void, there are still significant funding gaps for many worthwhile business models and innovations that did not match the specific criteria for the Seed or Market Validation grants. For example, many Concept Notes did not have a strong enough mobile channel to meet the objectives of the Fund. Others proposed pre-Seed stage ideas or requested funding to support scaling of existing mobile-enabled business models, yet without the required partnership with mobile operators for Market Validation grants.

9. http://www.gsma.com/mobilefordevelopment/sizing-the-opportunity-of-mobile-to-support-energy-and-water-access
10. International Energy Agency (IEA) 2012

Looking ahead...

2014 will largely be spent focussed on supporting our grantees and working with them to extract and share learnings that can help shape and drive the mobile-enabled energy and water sectors. Our research and advisory work will continue to focus on quantifying the opportunity for mobile operators and other stakeholders to participate in mobile-enabled energy and water services. We look forward to continuing our role as market facilitators, working with our mobile operator members, tower companies, entrepreneurs, NGOs, academics, donors and investors to support our work.

TO LEARN MORE PLEASE DOWNLOAD OUR ANNUAL REPORT HERE
OR CONTACT US AT MECS@GSMA.COM

Glossary

2G/3G
Second-generation and third-generation mobile telephone technology

AC/Alternating Current
An electrical current or voltage with a changeable direction (polarity) with respect to a fixed reference

Ah/Ampere-hour
Unit of electric charge, the electric charge transferred by a steady current of one ampere for one hour

ARPU
Average Revenue per User

AVR
Automatic Voltage Regulator

BoP
Base of Pyramid

BOS
balance of system

BTS/Base Transceiver Station
The name for the antenna and radio equipment necessary to provide mobile service in an area

CAPEX
Capital Expenditure

CO2e/Carbon dioxide equivalency
A quantity that describes, for a given mixture and amount of greenhouse gas, the amount of CO2 that would have the same global warming potential when measured over a specified timescale.

COAI
Cellular Operators Association of India

CPM
Community Power from Mobile, GPM project

DC/Direct Current
An electrical current or voltage with a constant direction (polarity) with respect to a fixed reference

eTom
enhanced Telecom Operations Map

GHG
Green House Gases

IDB the Inter-American Development Bank

IFC
International Finance Corporation – a member of the World Bank Group

IPCC
the International Panel on Climate Change

IRR
Internal Rate of Return

kg/kilogram
A kilogram is a unit of mass

km/kilometre
A kilometre is a measure of distance

KPI
Key Performance Indicator

kVA/Kilovolt-Ampere
The unit of apparent power. KVA is used for measuring the power consumption of non-resistive equipments such as generators

kW/kilowatt
A kilowatt is a unit of power (see watt)

GDP
Gross Domestic Product

GPM
Green Power for Mobile Programme

GPRS
General Packet Radio Service

GSM
Global System for Mobile communications

GSMA
GSM Association

M2M
Machine to Machine

MECS
Mobile Enabled Community Services

MEE
Mobile Energy Efficiency, GSMA Initiative

MHz/megahertz
The hertz is a unit of frequency. It is defined as the number of complete cycles per second.

MIF
the Multilateral Investment Fund

MSC/Mobile Switching Centre
Interface between the base station system, ie the BTS and the switching subsystem of the mobile phone network

Operator
Mobile Network Operator

NGO
Non Governmental Organisation

NPV
Net Present Value

OPEX Operating Expenditure

PMU
Power Management Unit

PV/Photovoltaic
In this instance refers to PV cells which convert visible light into direct current

ROI
Return on Investment

TCO
Total Cost of Ownership

V/volt
The value of the voltage equal to one ampere at one watt of power

W/watt
A unit of electrical power equal to one ampere under a pressure of one volt

Resources

Bi-annual Reports

BI-ANNUAL REPORT JANUARY 2014

BI-ANNUAL REPORT JULY 2013

BI-ANNUAL REPORT JANUARY 2013

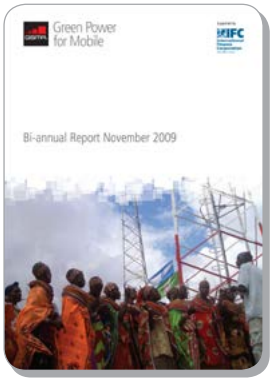
BI-ANNUAL REPORT JULY 2012

BI-ANNUAL REPORT DECEMBER 2011

BI-ANNUAL REPORT JULY 2011

BI-ANNUAL REPORT NOVEMBER 2010

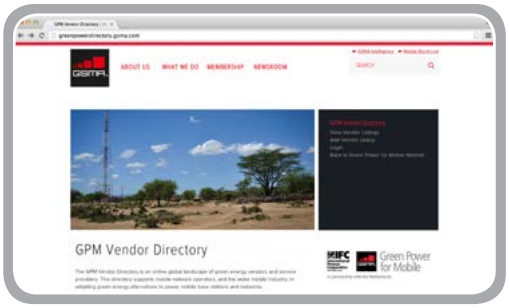
BI-ANNUAL REPORT JUNE 2010



BI-ANNUAL REPORT NOVEMBER 2009

Resources

Vendor directory



Online Vendor Directory

Past vendor Directories and Landscapes

GPM VENDOR LANDSCAPE
AFGHANISTAN & PAKISTAN
OCTOBER 2013

GPM VENDOR LANDSCAPE
WEST AND FRANCOPHONE AFRICA
JUNE 2013

TELECOM RENEWABLE ENERGY VENDOR/
ESCOS LANDSCAPE IN INDONESIA
MAY 2013

GPM VENDOR LANDSCAPE
EAST AFRICA
MAY 2013

TELECOMS RENEWABLE ENERGY
VENDORS/ESCOS LANDSCAPE IN
BANGLADESH
APRIL 2013

GREEN POWER FOR MOBILE VENDOR
DIRECTORY
FEBRUARY 2013

TELECOMS RENEWABLE ENERGY VENDORS/
ESCOS LANDSCAPE IN INDIA
APRIL 2012

Resources

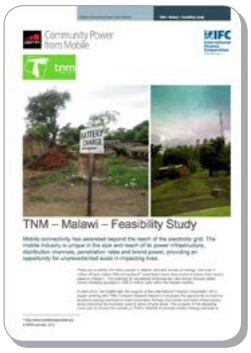
Feasibility Studies

IBS TOWER
INDONESIA
FEASIBILITY STUDY

AIRTEL
MADAGASCAR
FEASIBILITY STUDY

UCELL
UZBEKISTAN
FEASIBILITY STUDY

GEOCELL
GEORGIA
FEASIBILITY STUDY



TNM
MALAWI
FEASIBILITY
STUDY

LEO
BURUNDI
FEASIBILITY STUDY

BANGLALINK
BANGLADESH
FEASIBILITY STUDY

TELECEL
ZIMBABWE
FEASIBILITY STUDY

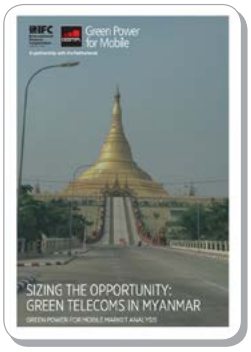
AZERCELL
AZERBAIJAN
FEASIBILITY STUDY

NCELL
NEPAL
FEASIBILITY STUDY

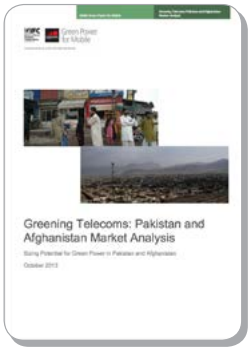
TCELL
TAJIKISTAN
FEASIBILITY STUDY

Resources

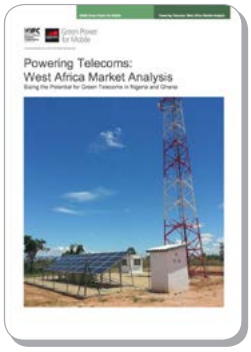
Market Analyses



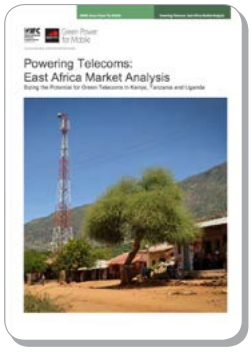
SIZING THE OPPORTUNITY: GREEN TELECOMS IN MYANMAR



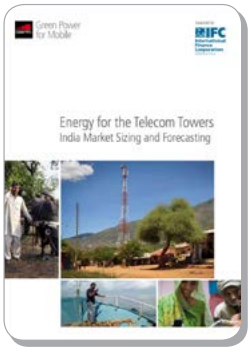
GREENING TELECOMS: PAKISTAN AND AFGHANISTAN MARKET ANALYSIS



POWERING TELECOMS: WEST AFRICA MARKET ANALYSIS



POWERING TELECOMS: EAST AFRICA MARKET ANALYSIS



INDIAN MARKET SIZING FORECAST

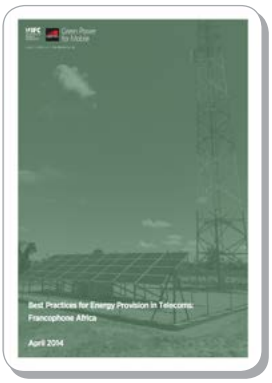
GREENING THE NETWORK: INDONESIA MARKET ANALYSIS

POWERING TELECOMS: FRANCOPHONE AFRICA MARKET ANALYSIS

EXTENDING THE GRID: BANGLADESH MARKET ANALYSIS

Resources

Others



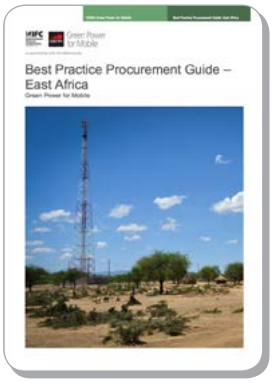
BEST PRACTICE FOR ENERGY PROVISION IN TELECOMS FRANCOPHONE AFRICA

BEST PRACTICE GREEN SITE SELECTION PAKISTAN AND AFGHANISTAN

BEST PROCUREMENT AND MAINTENANCE PRACTICE INDONESIA

BEST PRACTICE OPERATIONS GUIDE WEST AFRICA

BEST PRACTICE PROCUREMENT GUIDE BANGLADESH



BEST PRACTICE PROCUREMENT GUIDE EAST AFRICA

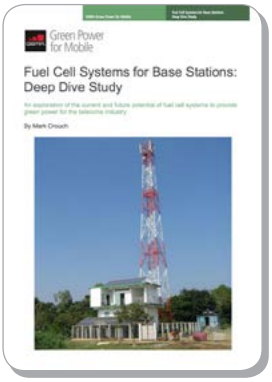
PROCUREMENT MODEL ANALYSIS CAPEX VS OPEX

BEST PRACTICE ROCUREMENT GUIDE FOR GREEN ENERGY IN INDIA

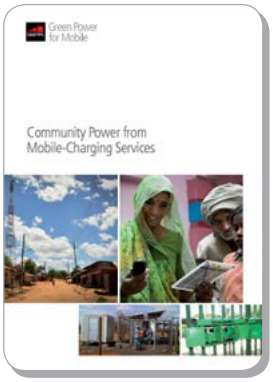
INTERACTIVE REPLICATION GUIDE INDIA MARKET SPECIFIC

Resources

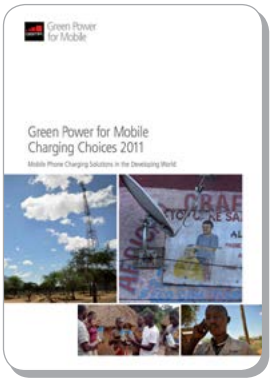
Others



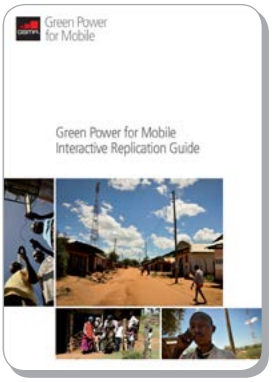
FUEL CELL SYSTEMS FOR BASESTATIONS DEEP DIVE STUDY



COMMUNITY POWER FROM MOBILE CHARGING SERVICES



CHARGING CHOICES 2011 MOBILE PHONE CHARGING SOLUTIONS IN THE DEVELOPING WORLD

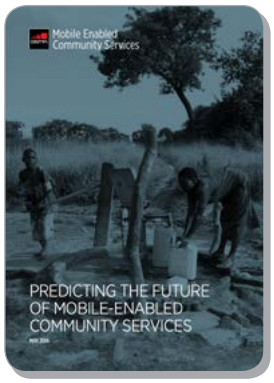


GREEN POWER FOR MOBILE INTERACTIVE REPLICATION GUIDE

HOMER SOFTWARE TRAINING GUIDE FOR RENEWABLE ENERGY BASE STATION DESIGN

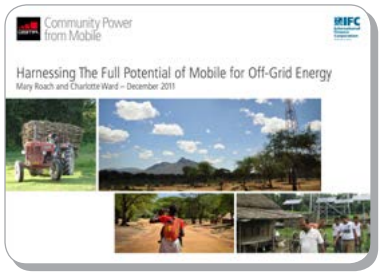
Resources

MECS Annual Reports

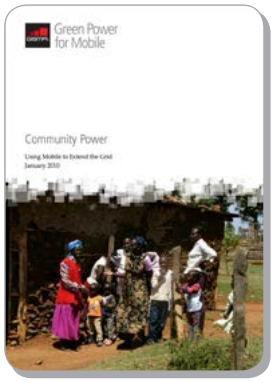


MOBILE ENABLED COMMUNITY SERVICES ANNUAL REPORT (JANUARY 2014)

MOBILE ENABLED COMMUNITY SERVICES WHITE PAPER (JANUARY 2013)



COMMUNITY POWER FROM MOBILE WHITE PAPER (JANUARY 2012)



COMMUNITY POWER FROM MOBILE WHITE PAPER (JANUARY 2011)

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