IFC International Finance Corporation World Bank Group

GSMA Green Power for Mobile

In partnership with the Netherlands

Assessing the potential for Green Power for Mobile: Telenor Myanmar

October 2014

Case study background

Green Power for Mobile (GPM) completed a joint case study with Telenor Myanmar to investigate the possibility of green power deployments. During this four-week engagement GPM analysed multiple business models for various base station loads and compared it with the current power model in place.

The engagement aimed to:

- Demonstrate the commercial feasibility of green power by identifying the opportunity for community inclusion, through a community power from mobile model
- Share Knowledge on case studies and best practices for each green power business model
- Develop a green power business case for Telenor Myanmar
- Demonstrate the pain points of a green power energy outsourcing business model and its operational process

About Telenor Myanmar[1]

Telenor Group is one of the world's major mobile operators with more than 160 million mobile subscriptions; the company has been established in Asia for more than 15 years. Telenor Group runs mobile operations in 12 markets (and in a further 17 markets through its ownership of VimpelCom Ltd). In Asia, Telenor operates in six different markets, and the number of subscriber there has reached 143 million.

In 2014, Telenor obtained a licence in Myanmar and plans to launch mobile voice and Internet services using 2G and 3G GSM technologies during 2014. Telenor Myanmar aims to provide accessible and affordable mobile communications to people across Myanmar and plans to cover 90% of the population within five years.

Case study

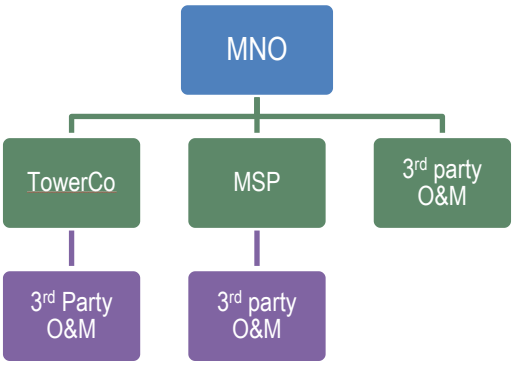
Industry structure

The telecommunication market in Myanmar is growing after the government awarded two licences to Telenor and Ooredoo to operate nationwide. With this breakthrough, the government expects to increase mobile penetration from its current 10% to 75% by 2017.

To achieve this target, mobile network operators (MNOs) need to work together with multiple stakeholders to extend their geographical coverage target to reach out to different rural area locations. Below is the current state of the structure of the telecom industry in Myanmar.

[1] Telenor Myanmar – www.telenor.com.mm

Figure 1: The current industry structure



At the current stage, the new MNOs have outsourced their passive infrastructure to TowerCos, whereas the incumbent MNO has built its own infrastructure. The MNOs have either outsourced the operation and maintenance (O&M) to a manage serviced provider (MSP) (e.g. Huawei, Ericsson, NSN) or directly to a local third party.

For power management, MNOs such as Ooredoo and MPT have installed their own system on the network whereas Telenor has given the responsibility toTowerCos to provide power solutions for Telenor's network. However, in the next phase, both Telenor and Ooredoo are exploring other operating models; such as an ESCO model, whereby the ESCO can provide and manage the energy to power up their base stations.

Methodology and approach

The joint GPM – Telenor Myanmar study was based on desk research of Telenor Myanmar's initial rollout plan. The overall characteristics of the network, including power infrastructure, geography, accessibility infrastructure, environment, logistic and operational parameters, were taken into consideration for this analysis.

The analysis also considered relevant local contextual elements to give a better understanding of renewable energy design and the operational context. The methodology and approach are as follows:

Figure 2: Methodology and approach

Initial planning

In the initial planning phase, GPM looked at Telenor's network planning and network deployment strategy. Based on the planning, Telenor has estimated a potential number of off-grid and unreliable grid sites for the upcoming ten years forecast.

Market data validation

During the validation of market data, GPM and Telenor Myanmar collected all required prices for power equipment, maintenance cost, land leases as well as any incorporated costs for design and analysis. The activities have overseen financial aspects as well.

The initial planning and market data will be used in the design and modelling of a green power solution for technical analysis and business case development.

Green power assessment

The first step, before conducting the site design and modelling, is conducting research on renewable resources that are available in the country and their compatibility with the telecom sector. Below is the renewable resources assessment specific to the Myanmar market.

Table 1: Renewable assessment for Myanmar

	Solar	Wind	Biomass	Fuel cell	Micro-hydro
Resource potential	High	Low	High	Medium	Low to medium
Technology availability	High	Medium	Medium	Medium	Low to medium
Market acceptance and commercial viability	High	Low	Low	Low	Low
Supply chain readiness	High	Low	High	Low	Low
Stage of adoption	Commercial	Evaluation	Evaluation	Evaluation	Evaluation

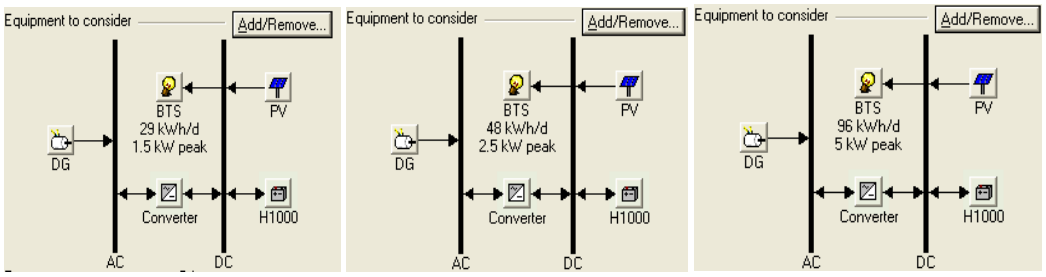
At the current stage, solar is the most recognised green technology option for the telecom sector, followed by biomass. Biomass will be more efficient in a large-scale implementation (and will be able to provide power to surrounding communities). Wind technology poses its own challenges as the average wind speed in the country is only between 3-4 m/s.

Other green technology options are fuel cell - this solution relies on a hydrogen or methanol supply – and .micro hydro, which involves using a river's velocity to generate the power. For the implementation of the latter green technology solution, it may only relevant for sites built along the river .Trials are needed for both fuel cell and micro hydro solutions.

Technical analysis

In this study, GPM used a solar technology solution and the HOMER software from the National Renewable Energy Laboratory (NREL) to design the site. The design has been built using three categories of different loads. The HOMER software provides technical and financial results for the site analysis. Here is a snapshot of the HOMER software system:

Figure 3: Site design and modelling with HOMER

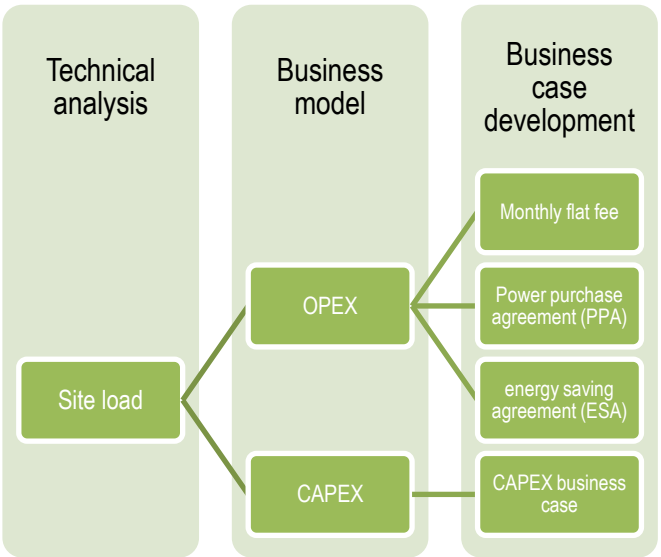


Based on the site modelling, GPM and Telenor Myanmar have chosen the best result using criteria such as battery autonomy, initial CAPEX, diesel consumption and excess of energy from the solar system.

Business case development

Once the best solutions for each criteria are selected, the next step is developing a business case. The business case focuses on the payback period and is built for both the CAPEX and OPEX models to see the best-fit scenario for Telenor. Regarding the OPEX model, GPM and Telenor Myanmar analysed three models: the monthly flat fee, the power purchase agreement (PPA) and the energy saving agreement (ESA).

Figure 4: Business case developments



During the study, GPM and Telenor explored and analysed a community power from mobile model as well, in order to identify the opportunity for both ESCO and Telenor.

Conclusion

As part of the objectives of the joint study, Telenor is looking for both a short-term and a long-term strategy to tackle power issues at their mobile sites in Myanmar. At present, TowerCos provide power to Telenor Myanmar as part of their contractual commitment, under a service level agreement. TowerCos will also maintain the power equipment on the site. However this agreement was still in the early stages of implementation when the study was concluded, and there was no firm data at that time.

Telenor is continuously evaluating the sustainability of its current operating model with the TowerCo as well as exploring other avenues, such as the ESCO model, which can provide green power for Telenor's network and allow the MNO to tackle the poor grid situation in rural areas of the country.

Findings

After the four–week study, GPM came up with the following conclusions and findings for Telenor Myanmar:

- In general, Telenor Myanmar's network will have three kinds of type load characteristics (1.2/2/4 kW).
- At the moment, TowerCos will provide the power to Telenor's network and its maintenance.
- The current power model with TowerCos is a good model to start in a new Greenfield environment.
- Moving forward, Telenor Myanmar is continuously jointly develop a win-win model with TowerCo and the industry to ensure the power system deployed are efficiently managed and minimizes environmental impact.

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

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

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

For more information, please visit the Mobile for Development website at http://www.gsma.com/mobilefordevelopment/. Connect with us on Twitter @GSMAM4D

About the GSMA Green Power for Mobile Programme
Green Power for Mobile works to extend the coverage, reduce the cost and minimise the environmental impact of mobile networks by championing renewable energy.

Whilst it continues to serve mobile network operators globally, the programme will place key focus on a number of target markets in Africa and Asia including Indonesia, Bangladesh, Pakistan, Afghanistan, Nigeria, Ghana, Kenya, Tanzania, Uganda, Senegal and Cameroon. With Project Managers based in each of these regions, GPM is well positioned to engage with the industry and address the requirements of these markets.

For more information on the GSMA's Green Power for Mobile Programme, please contact us on greenpower@gsma.com

http://www.gsma.com/mobilefordevelopment/programmes/green-power-for-mobile