

Off-grid Solar Market: Trends, Challenges, Success Stories and Future Outlook, Part 2

In partnership with the Clean Energy Solutions Center

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- Worked in over 40 countries worldwide on solar policy and strategy

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+ 40 countries

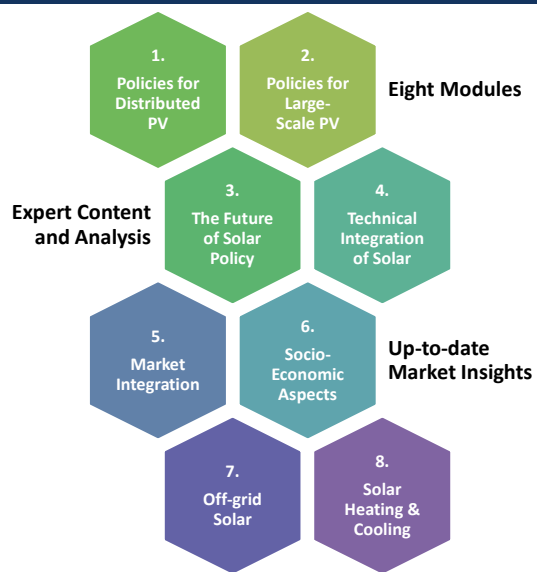
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Training Course Material

This Training is part of Module 7, and focuses on the issue of Off-grid Solar Markets - *Part 2*



Overview of the Training

1. Introduction: Learning Objective
2. Understanding Off-grid Solar Markets
3. Main body of presentation
4. Concluding Remarks
5. Further Reading
6. Knowledge Check: Multiple-Choice Questions

The module will in the beginning provide clear outline of the learning objectives, as well as a short recap on the off grid sector in general. The main body will be divided into a success story analysis and the future market outlook part. The module will close with some final remarks.

1. Introduction: Learning Objective

Learning Objective

This module provides:

1. A selection of **noteworthy success stories** from different parts of the sector
2. An tentative evaluation of necessary **steps to reach profitability** in the industry
3. A general **market outlook** for the off-grid RE sector

The learning objectives which this module, on off-grid solar markets, aims to provide, focus on factors of success. They include company examples and success stories from the industry, while at the same time the profitability of business models in the sector is scrutinized. Major determinants of sustained profits are evaluated, and a general market outlook, taking into consideration game changers and likely developments, is provided.

A vital starting point is the understanding of Off-grid solar as a technology for improving access to electrification, in conjunction with a reconsideration of how access should be defined.

The second main take away constitutes an appraisal of the crosscutting benefits and spill over effects a off-grid solar electrification strategy can bring for rural communities, beyond simply lighting.

In front of this background, one can continue to conceptualize off-grid solar in its private market context, together with its opportunities and remaining challenges.

2. Understanding Off-grid Solar Markets

Understanding Off-grid Solar Markets

In **2017**, the global **off-grid solar** sector is providing improved electricity access to an estimated **73 million households**, or over **360 million people**.

Despite these strong advances in energy access, the **size of the potential market**, in terms of people to be served, has remained **largely unchanged**.

This is by virtue of a **complex set of dynamics** that will maintain a substantial potential market for at least a decade.

Source: GOGLA, 2018



Source: businessgreen.com

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9

The off-grid solar sector has evolved and expanded substantially since 2010. At that time the market was characterized by low awareness and a limited geographical presence (mainly in Sub-Saharan Africa and India). In 2017, the sector by no means can be regarded as marginal anymore, with over 360 million people benefitting from off-grid solar technologies.

However, the market remains highly dynamic, and it has to be understood as such. It is therefore important to take into consideration the complexity of factors and drivers that continue to shape it.

This module explores this complex set of dynamics, analyses current and likely future market developments, and investigates some of the remarkable success stories the sector has seen.

3. Main Body of Presentation

Main Body of Presentation

3.1 Success Stories

3.2 Market Outlook

Success Stories – Solar Home Systems

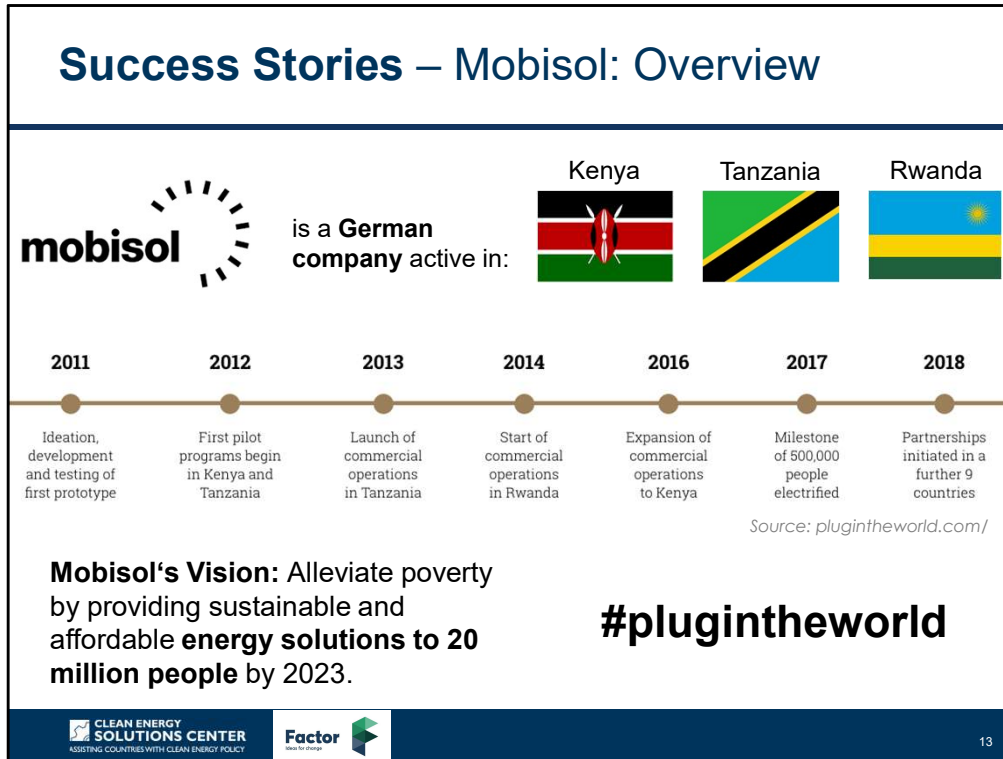


In the first Part of this module, we have touched on the promising growth trends of the Solar Home System Sector. A concerning issue that had been raised in the previous section is the high geographical concentration of off-grid service providers and the exhaustion of low hanging fruits – one of the reasons for the recent slow down in sales growth.

A selection of some of the most successful solution providers in the solar off grid sector are presented on this slide. East Africa is a main geographical hot spot of the industry, with Mobisol, M-Kopa, Offgrid electric, and Fenix International being among the leading companies in this region. Especially Kenya, Uganda and Tanzania feature highly competitive markets. In Asia, the largest market for SHS is found in India, mostly serviced by Simpa networks and SELCO.

Nevertheless, other markets are continuously being explored, Lumos for example is active in Nigeria, Mobisol has pushed operations into Rwanda and Fenix International is active in Zambia, just to name a few. BBOXX, a company that we will learn a bit more later on in this module, has also recently started to explore the democratic republic of Congo – where they aim to provide 2.5 million people with electricity by 2020.

The formation of geographical hotspots is the result of differences in the enabling environment on which the solar home systems sector depends, and which can differ greatly from one country to another. The following slides will explore some of the success stories of different companies, with the objective to get a feeling for the determinants of their success.



The first success story featured in this module is that of the German company mobisol.

Mobisol is selling solar systems to off-grid households and small enterprises in rural Africa. The company was founded in Berlin in 2010, and launched its first pilot in Tanzania and Kenya in 2012. In 2014, commercial operations were extended into Rwanda. By the end of 2017, the company has grown to be the largest off-grid solar provider in east africa with more than 10MW of installed capacity and more than 500 000 people electrified. As part of its commercial strategy, Mobisol has recently grown its workforce to develop a number of Business to 2 Business partnerships and support solar providers in an additional nine countries.

The company strives to alleviate poverty by providing sustainable and affordable energy solutions to 20 million people by 2023. Mobisol wants to plug-in the world.

Success Stories – Mobisol: Products

Source: plugintheworld.com/



The Best Seller:

- 80W SHS
- 4 lights
- Solar lantern
- Radio
- 19 inch TV



The MobiCharger:

The perfect solution for those who not only want to charge their own mobile, but also those of their neighbours, friends and family.

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14

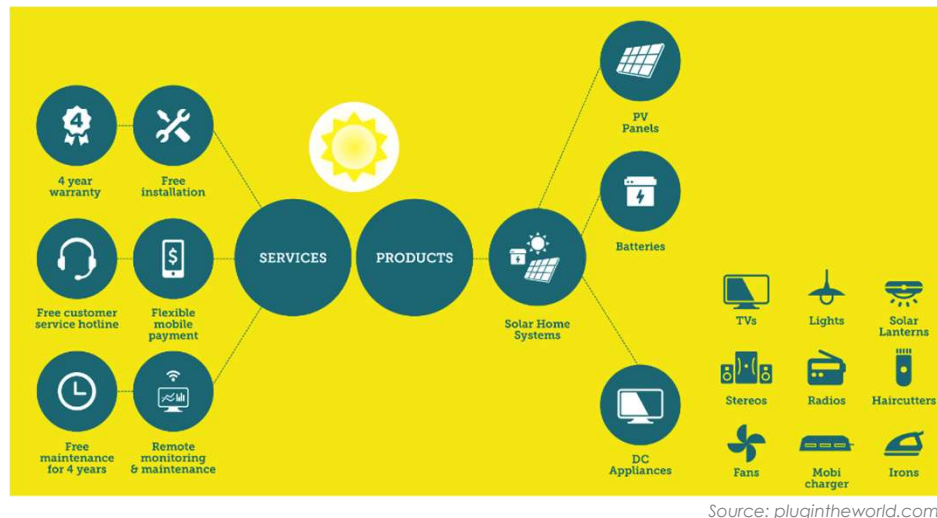
Mobisol's service offering includes SHSs, Home and Productive Use Appliances, as well as an in-house Pay-As-You-Go Software.

Mobisol targets the emerging middle class in African villages. The plug and play SHSs they provide range from 80 to 200 Watt and are bundled with DC appliances. Customer research has shown that the entry level and best selling package includes an 80W SHS (which consists of a panel, a battery and a controller), four lights, a phone charger, a solar lantern, a radio, and a 19 inch TV, which are displayed in the left picture. Recently, Mobisol has even partnered with the company StarTimes making pay-TV entertainment accessible to the East African off-grid population.

Mobisol claims that nearly a third of their customers generate incremental income with their solar system. A prominent example of an entry level productive use appliance is the so called MobiCharger. Other appliances such as hair cutters or bar entertainment systems are also offered. The productive use appliance sector is one that Mobisol actively aims to extend operations in.

The following slides will highlight specific aspects of Mobisol's Story that have contributed to the company's success.

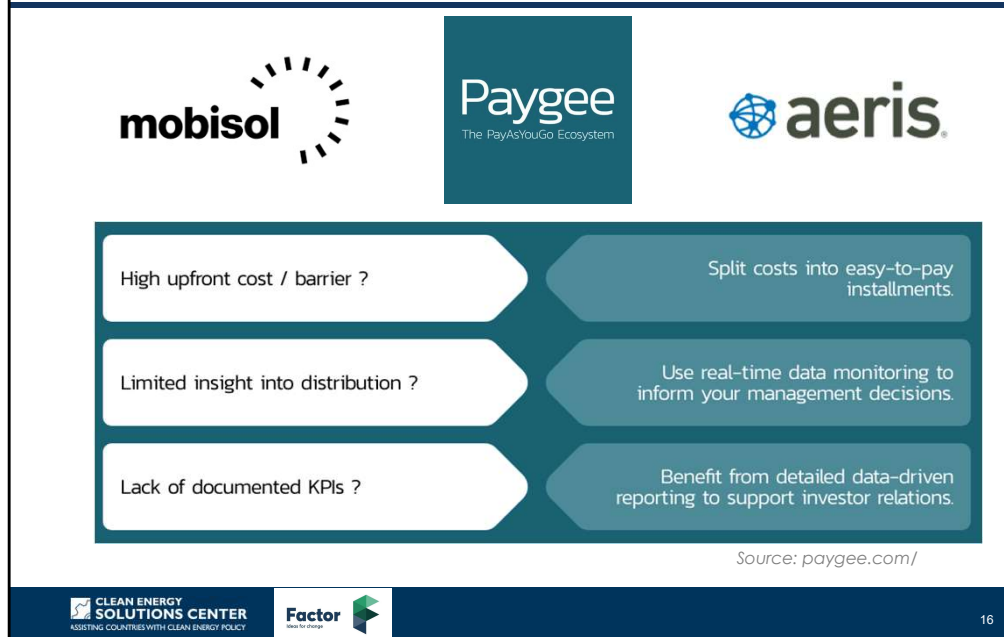
Success Stories – Mobisol: Vertical Integration



Source: plugintheworld.com/

Mobisol is more than a solar product provider. Mobisol works on a highly integrated value chain. This is mainly driven by the need to control customer experience across the value chain, given that quality long term customer relationships, which drive payment recovery and upscaling, are crucial to the business model. Besides the SHSs, the design and provision of DC appliances is one example of such integration, but also the services Mobisol offers over its PAYGO platform are unique features of their business model.

Success Stories – Mobisol: PAYGEE



Mobisol has started as one of the PAY AS YOU GO Pioneers, and has become one of the PAY AS YOU GO Market Leaders, with their own hardware agnostic Paygee software.

Paygee aims to provide households at the Base of the Pyramid with easier and more affordable access to a large range of solar products and associated productive use appliances. PAYGEE offers cost effective solutions for the most common last mile distribution challenges:

Typically high up front cost of SHSs can be split into easy to pay instalments. A “pay-as-you-go” financing plan makes the systems affordable, with entry-level systems costing a similar amount per day to what the typical customer would otherwise spend on kerosene, candles, batteries, and mobile phone charging. These small payments for energy service also add up towards the total purchase price and, once fully paid, the customer owns the system, enjoying clean, reliable, electricity for free.

Further, the company can utilize real time data analysis for distribution monitoring; and data-driven reporting offers KPIs that can help to attract investors.

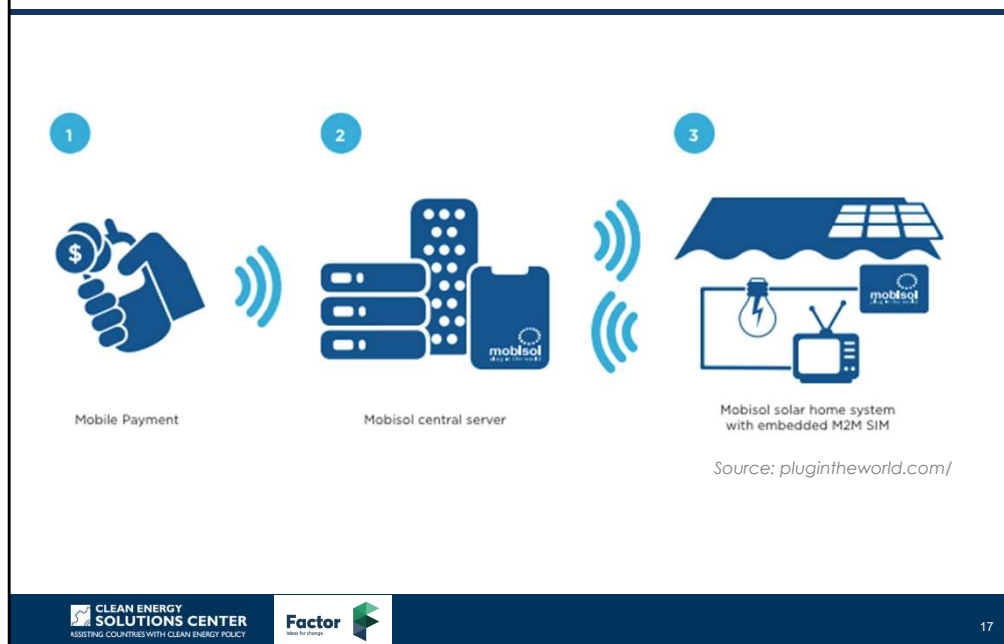
Given that the PAYGEE ecosystem is hardware agnostic, Mobisol can licence its software to enable up selling of other consumer electronics and products sold with consumer financing.

Mobisol has partnered with AERIS, a Internet of Things solutions and platform provider, to

further improve its hardware and software offering for customers and business partners.

The following will dig a little deeper into the specifics of this highly sophisticated framework.

Success Stories – Mobisol: Pay-As-You-Go



At the core of Mobisol’s pay-as-you-go service is machine-to-machine (M2M) connectivity and mobile money: a SIM card embedded in the solar home system enables two-way communication via the GSM network between the system and Mobisol’s central server, which holds customer account and payment information.

Customers pay by dialling a short code for mobile money services and select a bill payment option. They enter Mobisol’s bill pay number, their customer account number and the amount.

The payment is sent to Mobisol’s merchant account through the communication provider Mobile telephone networks, and through integration with Mobisol’s central server, record of the payment is immediately updated in Mobisol’s accounts.

Mobisol’s central server calculates the days of credit to be added to the account based on the payment amount and switches the unit on and off according to the balance.

Customers receive power for the number of days credited to the solar home systems. The embedded SIM card sends information back to Mobisol’s central server hourly about customers’ powering habits and the solar system functionality to inform maintenance and future design.

This highly automated state of the art system drives costs down and facilitates operations. It is a huge contribution to the success of the company.

Success Stories – Mobisol: Funding

Early Funding:



Large Equity Investments:



Investec



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18

Where does the company come from, and how does it finance its operation expansion into untapped markets?

A professional in the German solar industry, financed Mobisol's initial product development and first employees. After successfully completing the pilot phase, the company was able to attract further investors and development banks such as the German DEG. Grants from international donors were particularly relevant for project scaling and early project development phases.

Investec made an initial equity investment into Mobisol in late 2016, leading a consortium that included the International Finance Corporation (IFC) and the Dutch development bank (FMO). Since then this consortium has supported Mobisol's continued growth in its existing markets and those it aims to expand in.

A follow-on growth equity investment by Investec in late 2017, combined with previously concluded debt-financing deals, means that Mobisol has secured over US\$25 million funding in the second half of 2017. This equity finance is highly important especially for the geographical expansion of services into harder to reach regions, but also for the continuous development of newer and better products.

Success Stories – Mobisol: Operations

Sales and Marketing:

- National promotion efforts, **door-to-door** activities
- Large network of specially trained sales agents, paid on commission (“**Mobisol Akademie**”)
- Customer **referral programme**

Customer Acquisition:

- Customer **credit assessment**
- Pick up SHS at one of the “**Mobishops**”
- Certified technician to complete installation **within 48h**
- **Maintenance** and service is **free of charge** for 3 years
- Customer finance team deals with **late payers** through visits

Operational excellence and innovativeness is crucial in difficult ecosystems.

For Mobisol, Sales and marketing activities combine national promotion efforts, local market demonstrations, and door-to-door activities. Mobisol works with a large network of sales agents, paid on commission. These agents are being trained during two weeks in the field and at the in-house training center, called “Mobisol Akademie”. In order to encourage word-of-mouth, Mobisol has set up a customer referral program. And, Technicians and other field staff also earn a commission when they identify new customers.

Once a customer is interested in Mobisol’s products, he or she must go through a credit assessment process before signing up. The individual then picks up his SHS at one of the Mobisol stores, called “Mobishops”, spread all over the country. Customers bring their SHS home, and call a certified technician who comes and completes the installation within the next 48 hours. The actual installation takes about one hour.

After this, maintenance and service is provided free of charge during the initial 3 years. Lastly, the customer finance team deals with late payers, calling or visiting them to maintain a low default rate for the initial instalments.

Success Stories – Mobisol: Operations



Source: Hugo Lucas

Mobisol is a highly dynamic, fast growing, and innovative company. They manage all their operations from their headquarters in Berlin. Here you can have some first hand private insights into the epicentre of rural electrification efforts – and yes, sometimes it gets a little chaotic.

Success Stories – BBOXX: Overview



BBOXX
the solar revolution

BBOXX designs, manufactures, distributes and finances innovative **plug & play solar systems** to improve access to energy across **Africa and the developing world**.

<150,000 BBOXX products have been sold in more than **35** countries.



Vision: provision of **20 million** people with electricity **by 2020**



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21

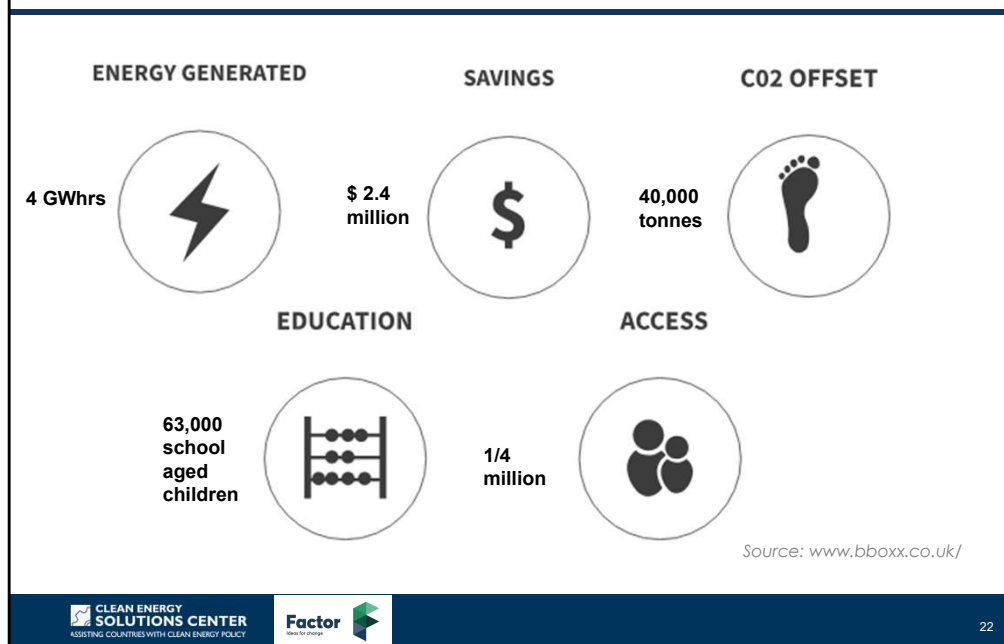
The second successful company we are having a look at as part of this module is BBOXX.

Three students at Imperial college London while studying Electrical and Electronics Engineering founded a successful student charity, which exposed the potential for off-grid solar solutions in the developing world. BBOXX is the resulting for-profit venture and started in March 2010.

Since then, more than 150,000 BBOXX products have been sold in more than 35 countries, improving the lives of more than 675,000 people.

BBOXX has the Vision to provide 20 million people with electricity by 2020.

Success Stories – BBOXX: Impressive Impact



These efforts do not stay without impact.

As a result of the total operations of BBOXX around the world, almost 4 GWhrs of energy have been generated.

2.4 million dollar have been saved by their customers on energy expenses and over 40 000 tonnes of CO2 have been offset.

Over 63 000 school aged children can study comfortably without straining their eyes in bad lighting conditions.

And finally, over a quarter of a million people have access to electricity, thanks to BBOXX efforts.

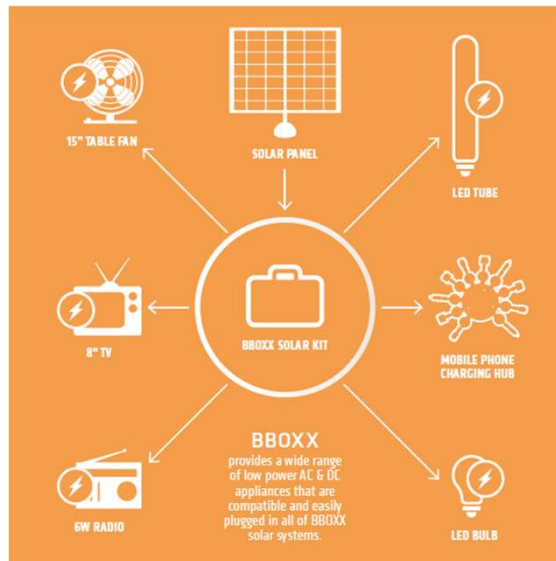
Success Stories – BBOXX: Products



BBOXX Home:

- 50W roof mounted solar panel
- 3 year payment plan

Source: www.bbox.co.uk/



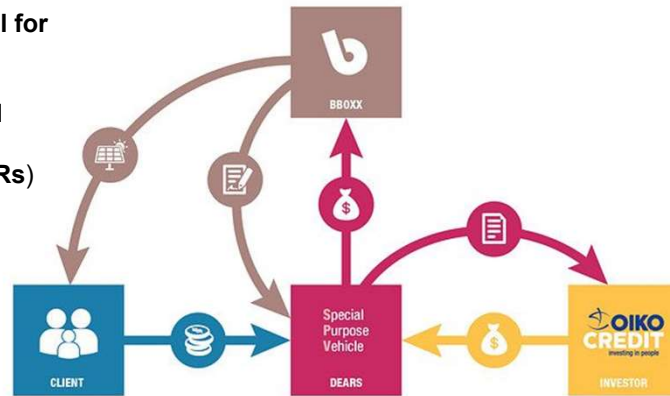
BBOXX also has a fully vertically integrated business model. They have their own design, manufacturing and distribution networks.

BBOXX Home comes with a 50W roof mounted solar panel, and can be purchased on a 3 year payment plan. BBOXX offers a range of energy efficient, DC powered appliances to be used in conjunction with their 'plug and play' BBOXX Home system.

Success Stories – BBOXX: DEARS

Africa's first securitization deal for off-grid solar:

BBOXX Distributed Energy Asset Receivables (DEARs)



Source: oikocredit.coop

In late 2015, BBOXX had been in the news for announcing Africa's first securitization deal for off-grid solar.

Innovation in funding Africa's solar evolution has always likely been the key to unlocking the continent's vast PV potential, and a new investment model that seeks to bring securitization to the off-grid sector.

Oikocredit International, an investment firm headquartered in the Netherlands, together with BBOXX replicated the U.S. model of securitizing residential solar installations across Africa's off-grid solar market. The securitization structure was created by setting up a special purpose vehicle: a company called [BBOXX DEARs](#). It bundles the contracts of BBOXX customers who have bought solar home systems which are paid off in instalments. BBOXX DEARs then issues notes and sells them to Oikocredit. The value of the notes is based on future receivables on the customers' contracts.

The sale of these contracts provides BBOXX with capital to supply new solar home systems to households. Clearly, innovative funding strategies can pave the way for more investments in the sector.

Success Stories – BBOXX: Crowdfunding

The infographic features the logos for Lendahand (Powered By ethex) and TRINE. It is divided into three columns, each with an icon and a heading:

- ACCESS TO CLEAN ELECTRICITY**: Accompanied by a lightbulb icon. Text: Families have convenient access to affordable, cleaner and better quality light - reducing exposure to toxic kerosene fumes.
- INCREASED OPPORTUNITIES FOR FAMILIES**: Accompanied by a house and people icon. Text: Improved livelihoods as parents have improved income generating opportunities and children can further their education.
- UP TO 6% RETURN ON YOUR INVESTMENT**: Accompanied by a bar chart icon. Text: Your investment generates a financial return, whilst creating a positive social and environmental impact.

Source: lendahand.co.uk

At the bottom, there are logos for the Clean Energy Solutions Center (Assisting Countries with Clean Energy Policy) and Factor (Africa Energy), along with the page number 25.

But innovative funding does not stop here:

Recently, BBOXX has partnered with the online positive impact investment platform Lendahand Ethex to launch a new campaign that aims to raise £2.5 million a year through retail-focused investments that will deliver up to 6% annual return for participants and contributors. The partnership is part of the Energise Africa scheme that was first launched in 2017. Notably, this is the first Energise Africa scheme that will directly seek to tap into the active U.K. crowdfunding space.

In early 2018 BBOXX had also partnered with TRINE and launched the first of six crowdfunding rounds. The 1 million euro target had been reached already within a months time through the crowdfunding platform. This loan is meant to bring **10,300 solar systems** and appliances to people in rural Kenya. The expected return for this funding round is 6.75% and the estimated Co2 offset is almost 15000 tons.

Success Stories – BBOXX: Next Generation Utility

BBOXX pilots the provision of **Internet Access** in Rwanda

Internet is the **logical next step** in the service offering

At present, **75% of people across Africa cannot access the internet**, which is a significant impediment to economic development.

BBOXX's pilot focuses on tackling the **three major barriers** to internet access:

- Availability
- Affordability
- Awareness



Last but not least, BBOXX is striving to become a **next generation utility** and has launched a pilot to provide internet access for communities in Rwanda

Internet is the **logical next step** in the service offering, with other utilities such as water and gas likely to follow.

This effort is likely to have powerful impacts on the lives of many, since only 25% of people across Africa have access to the web. Availability, affordability and awareness are major barriers to the rapid expansion of internet usage, which significantly slows economic and social development.

Success Stories – ME SOLshare: Overview



SOLshare has developed a **smart grid concept**

- SOLshare village grids can **unlock at least up to 30% excess** generation capacity of existing solar home systems
- The SOLshare **electricity trading platform** turns the purchase of a solar home system into an **investment with a return**, enabling users to leverage excess generation

Vision: SOLshare expects to **operate more than 20,000 nanogrids** by the end of **2030**



27

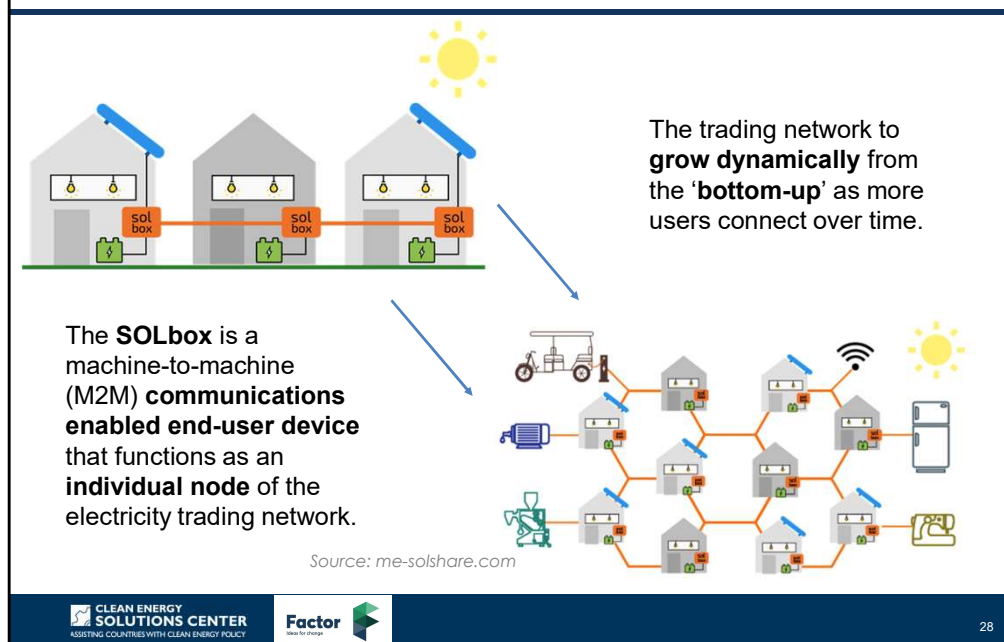
The third and last company success story we will explore is that of the very young, innovative and award winning SOLshare, an enterprise that has successfully piloted the world's first peer-to-peer electricity trading network for rural households with and without solar home systems in Shariatpur, Bangladesh.

Along with its implementation partner, the NGO UBOMUS, its financing partner IDCOL and research partner the United International University, SOLshare combines solar home systems and centralized mini-grids to enable more rural households to access renewable electricity at a lower cost.

Trading renewable electricity through a SOLshare village grid can unlock at least up to 30% excess generation capacity of existing solar home systems. Through usage of the full power generation capacity, more people benefit from a clean, reliable source of electricity at a low cost. Further, the Solshare trading platform can turn excess generation of households SHSs into financial returns.

SOLshare expects to **operate more than 20,000 nanogrids** by the end of **2030** which are expected to supply more than 1million customers in Bangladesh

Success Stories – ME SOLshare: How does it work?



How do these village grids work?

It all starts with the SOLbox, which is the product SOLshare is producing and selling.

The SOLbox is a direct-current bi-directional power meter, solar charge controller and machine-to-machine communications enabled end-user device that functions as an individual node of the electricity trading network.

The plug-and-play nature of the SOLbox allows the trading network to grow dynamically from the 'bottom-up' as more users connect over time. The ICT back-end facilitates secure peer-to-peer electricity trading between users; integrating mobile money payment, data analytics and grid management services.

As a SOLshare network grows, it can connect with the national grid, operating in island mode when the grid is unavailable, and drawing power from the grid when it is available; metered at a single, central location.

This solution creates last-mile power distribution infrastructure and demonstrates the ability for this technology to integrate with the expanding rural electricity grid.

Success Stories – ME SOLshare: Social Impact and Future Outlook

Smart Villages:

- SOLshare's technology is designed to **share extra power** on the grid
- More households enjoy a more **flexible, reliable** and **cheaper** electricity service than before
- More households can earn **direct income** from their SHS by cashing-in what they have fed into the grid, or indirectly through the use of productive use appliances



Solar Rickshaw Charging Station

Source: me-solshare.com

The vision behind the smart village concept is to enable improved energy services and technologies, deliver smarter, inclusive financial services, foster existing entrepreneurial capacity and encourage development through education.

This system offers several benefits to the village inhabitants:

They have a inexpensive and reliable energy source and are not dependant on the central energy system

They can develop economic activities that consume energy, notably of agricultural nature

Their life quality improves through better connectivity

And, by selling their excess energy, homes equipped with SHS have a new income source

Success Stories – An Industry Success: Employment

Company Name	Full-time Employees	Countries / Regions of Operation	Number of Customers (Last 12 months / Cumulative)
Azuri Technologies	480	United Republic of Tanzania, Kenya, Uganda, Rwanda, Sierra Leone, Zambia	N.A. / 75,000
BBOX	168	Rwanda, Kenya, Uganda	23,105 / 250,000
D. Light	>400	Uganda, Kenya, China, India	N.A. / 10 million
Fenix International	120	Uganda, Kenya	115,000 / 165,000
Foundation Rural Energy Services	342	Mali, South Africa, Burkina Faso, Uganda, Guinea Bissau	30,000 / 330,000
Grameen Shakti	6,550	Bangladesh	52,000 / 1.7 million
Mera Gao Power	125	India	8,000 / 22,000
M-KOPA	>700	Kenya, Uganda, United Republic of Tanzania	1.1 million / 3.75 million
Mobisol	>500	United Republic of Tanzania, Rwanda	70,000 / 110,000
Off Grid Electric	>800	United Republic of Tanzania, Rwanda	10,000 per month / N.A.
Renewable Energy Foundation	>400	Sub Saharan Africa	N.A. / >93,000
Simpa Networks	300	India	55,000 / 75,350
Solaraid	130	Kenya, Malawi, United Republic of Tanzania, Uganda, Zambia	519,212 / 10 million
Solar Kiosk	70	Ethiopia, Kenya, United Republic of Tanzania, Rwanda, Botswana, Ghana, Vietnam	802,500 / 1 million
Solar Now	194	Uganda	3,114 / 8,476
Solar Sister	58	Nigeria, United Republic of Tanzania, Uganda	152,000 / 281,000
Sunlabob	42	Lao People's Democratic Republic, Cambodia, Uganda, Afghanistan, Sierra Leone, Mozambique and Liberia	N.A. / > 25,000
Tessa Power	300	Niger, Nigeria, Mali	2,000 / 5,000

Source: IRENA, 2016

One final success story that should be mentioned can only be attributed to the industry as a whole:

Companies that build, install and maintain stand-alone systems are rapidly scaling up operations and creating jobs along the value chain. For example: D.Light, which manufactures and retails solar lanterns and SHSs, has sold over 10 million solar products, employing over 400 staff. MKOPA has sold over 300,000 SHSs in Kenya, Uganda, and Tanzania and created more than 700 full-time jobs along with 1,500 sales representatives. Similarly, several other companies are serving vast populations and creating jobs in Sub-Saharan Africa and South East Asia.

Success Stories - Winning in the Off-grid Solar Market

Where is the success?

- **Few** Off-grid solar companies are **declaring profits** today
- Price **competitiveness** is only going to escalate

What are likely features that may turn these **businesses profitable**:

- A reach across **multiple countries**
- A **broad product portfolio** that **lowers the per-unit** customer acquisition cost
- Products sourced from **low-cost manufacturing bases**
- Access to **low-cost capital** that enables companies to move faster and further than competitors

Of the three companies that have been exemplified as success stories, Mobisol and BBOXX certainly had already great impact in the lives of many and in the off-grid solar sector in general. SOLshare is innovative and promising, but it is too early to evaluate its likely impact. Nevertheless, a recent report by the global offgrid lighting association has found only very few off-grid solar companies to be declaring profits today, exacerbated by the rising price competitiveness in hotspot regions.

There are features, that can render the profitability of off grid companies more likely.

A reach across multiple countries, as opposed to a narrow geographic focus, is one option. Both BBOXX and Mobisol follow this strategy, by continuously pushing to extend their operations.

Extending product portfolios in order to become a larger part of consumers life, and consequently tap into a larger share of peoples disposable income, is also helpful, and further brings down the per unit customer acquisition costs. We have for example seen that mobisol is trying to extend their product offering in both consumer and business directions. BBOXX, on the other hand, is turning itself into a next generation utility, striving to extend their service to also include internet access provision.

Low-cost manufacturing will continue to be highly decisive for the profitability of off grid solar services, because ultimately the price of the products remains a major determinant for the demand of those targeted.

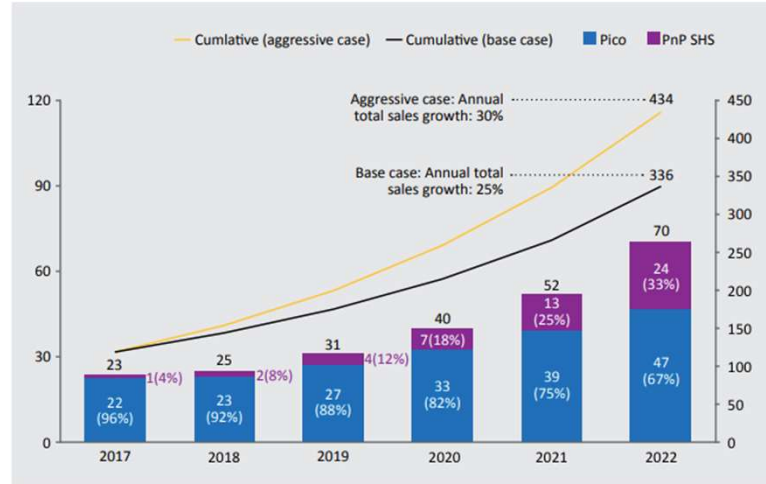
The final point, access to low-cost capital, is a difficult one. Naturally, the recency of the sector and the business models, together with the high risk of default of the consumer base of the companies, does not make the sector highly attractive to large scale and foreign investors. Innovative strategies and instruments are needed, potentially facilitated by data driven risk analysis and KPIs, in order to leverage needed investments.

Taking these aspects into account, and after having seen how some of the highly valued representatives of the sector are managing to cope with the challenging off-grid environments, we will now turn to a more global appraisal of the potential future outlook of the market.

2. Market Outlook

Market Outlook - Scenarios

Million units; left axis: annual unit sales; right axis: cumulative unit sales (2017-22)



Source: GOGLA, 2018

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33

In part one of this module, we have seen the impressive growth of the sector, albeit with some slowdowns in sales growth in recent years.

Projections for the two most important product categories in the off grid solar sector forecast continuously growing markets. By 2022, the SHS sector is estimated to have grown to a third of the total off grid solar sector, with annual unit sales of 24 million.

These estimates are depending on assumptions of the state of a wide range of factors that will determine the development of the the off-grid RE markets world wide.

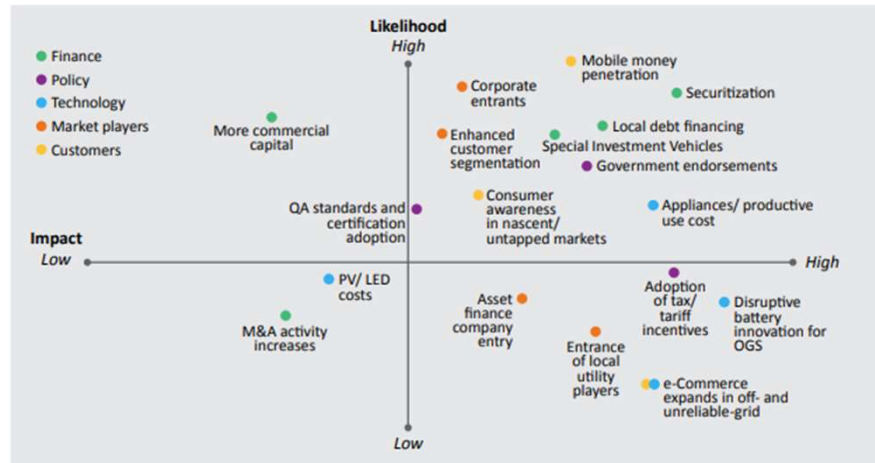
Developments will depend on the ability of service providers to penetrate untapped, but potentially less lucrative, markets, as well as on the willingness of major cooperations to enter the segment.

Further, Mobile money penetration increases in key off grid solar markets such as India, Nigeria, and Ethiopia will be a decisive factor.

Also playing a substantial role are ongoing efforts to revise potential ways to increase financing and funding. Also policy support and the development of quality standards will be influential.

Last but not least, it is certainly the growing demand for productive use appliances that will manifest as a game changer.

Market Outlook - Likely Game Changers



Source: GOGLA, 2018

It is difficult to assess the likelihood and the impact of these determinants and game changers, however tentative rankings such as this can give a taste of how markets may evolve. Notable is for instance the weight given to appliance and productive use costs, on the far right of the impact axis, and towards the middle of the likelihood axis. This may be indicative of the huge potential impact this development is already having and hence likely to continue to have in the future.

It has to be kept in mind that this is a rather subjective ranking of potential factors compiled by the global off grid lighting association, and very little is certain with respect to these game changers. Nevertheless, what the industry tends to agree on is that the overall off grid solar market will remain to grow dynamically. The following slides will provide several reasons as to why this assumption is very likely to hold.

Market Outlook - The Market will Remain Buoyant

Sound growth in macro-drivers is likely to last:

- Large **potential** market
- Ongoing **real income growth**
- Improvements in distribution infrastructure and **ease-of-doing business** within countries
- A **policy environment** that increasingly offers at least a basic license to operate
- Improving **technology trends** (albeit slower)
- A **maturing private sector** that continues to be hungry to expand

Source: GOGLA, 2018

Market forecasts for the off grid solar continue to paint a buoyant future. Most importantly, this will be due to the large remaining potential market of households with unreliable or no access to the grid.

But also the real income growth of many affected households drives the expansion, although past projections had been too optimistic in this context. Infrastructure and policy environments tend to develop into an enabling environment, and technology innovation has the potential to further decrease transaction costs and facilitate the utilization of the natural resource. Ergo, while the off grid solar sector is maturing, it has not lost its hunger for further expansion.

Market Outlook - The Market will Remain Buoyant

- A growing market for **replacements and upgrades** for current off-grid RE consumers will contribute to the return to solid sales growth.
- The lower cost of **customer acquisition** in an increasingly price-sensitive market is also an additional factor.

Source: GOGLA, 2018

Additional factors keeping the off grid solar market buoyant are for example the fact that maintenance, replacement and upgrade cycles are starting to set in. This means that current off grid consumers represent a promising source of sales growth, because they are for example willing to reinvest generated incomes into higher capacity or new appliances.

At the same time, customer acquisition costs are falling in established and hence price sensitive markets, making it more likely that for example previous PICO customers expand their set up and move to SHSs.

4. Concluding Remarks

Concluding Remarks

1. The industry has seen **significant success stories**
2. Companies need to **continuously adapt** their business models to the demanding needs of the environments they are active in or want to expand to
3. The projections indicate that while past growth rates will not be repeated, the **rapid slowdowns in 2016- 2017 are expected to be temporary**
4. Forecasts depend on **critical factors** and **unforeseeable game changers**

The cases of BBOXX, Mobisol and SOLshare exemplify to some extent the overall success that the sector can be proud of, but these companies also feature distinctive characteristics that explain why they are potentially more successful than others. The ecosystems in which these companies try to gain profitability is challenging and demands the continuous evolution of business models, in order to stay profitable, in order to reach new markets, or for example in order to service changing consumer demands.

While these challenges remain, and initial growth trends are unlikely to be repeated, the sector is likely to continue to manifest as a vibrant and dynamically growing market. Certainly, the large remaining potential is carrying this optimistic stance to a large extent, nevertheless, the market outlook depends on a rich set of interdependent factors and game changers.

At this point we come to the end of the second part of this module on off grid solar market trends. I would like to thank you for your attention. As before, you are invited to test your understanding of the concepts in the following small quiz.

Thank you for your time!



ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY



5. Further Reading

IRENA, 2016, Renewable Energy and Jobs. http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_RE_Jobs_Annual_Review_2016.pdf

GOGLA, 2018, Off-Grid Solar Market Trend Report 2018. https://www.sun-connect-news.org/fileadmin/DATEIEN/Dateien/New/2018_Off_Grid_Solar_Market_Trends_Report_Full.pdf

Hystra, 2017, Reaching Scale in Energy Access. https://static1.squarespace.com/static/51bef39fe4b010d205f84a92/t/594a8a4f86e6c05c7d651eb1/1498057514242/Energy_Report+%28ADB+excluded+++license%29.pdf

ESMAP, 2015, Beyond Connections: Energy Access Redefined. <https://openknowledge.worldbank.org/bitstream/handle/10986/24368/Beyond0connect0d000technical0report.pdf?sequence=1&isAllowed=y>

6. Knowledge Checkpoint: Multiple Choice Questions