Report

Accelerating access to electricity in Africa with off-grid solar

Policies to expand the market for solar household solutions

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Introduction

Rapid expansion of the market for solar household systems requires an appropriate policy and regulatory framework. Companies operating in the market have identified policy barriers as a critical area for change, to accelerate the market diffusion of solar household systems (Lighting Africa, 2011; UNEP, 2015).

The market is at different stages of development in different African countries, each of which has its own characteristics and market conditions. This means that there is no policy blueprint that can be applied in all countries. Analysis of the existing market in each country will be necessary to determine which specific policy measures are necessary to provide the appropriate enabling environment there (UNEP, 2015). However, some general policy principles for solar household system market can be identified.

Lighting Africa (2011), for example, concluded that it would be important to:

- Incorporate modern lighting strategies into overall government development and poverty reduction strategy.
- Adjust regulatory environments to favour modern lighting solutions.
- Support a market transition to high-quality products.
- Facilitate a competitively priced supply chain that delivers lighting products to all segments of the market.
- Ensure that the widest possible access to modern lighting is achieved, particularly among the poor.

This study consulted with companies operating in the sector, policy-makers and other stakeholders for their views of the priorities for a policy framework and the current policy environment in the countries selected for the study.[1]

'Based on evidence from countries which have demonstrated success in scaling household solar, like Kenya and Bangladesh, and through consultation with the industry through the Global Off-Grid Lighting Association (GOGLA), Energy Africa has identified the following (DRAFT) list of key policy measures to assist with creating a supportive enabling environment for solar solutions. Each country will consider and implement the set of policy measures that can unlock the household solar market.'

Policy Measures

All points listed in the compact contribute to an enabling environment with the aim of accelerating the transition to clean and sustainable forms of lighting and providing millions of households with basic access to electricity. However, policy and regulatory changes should always be calibrated carefully and should be closely coordinated with all stakeholders and the private sector in particular. The enabling environment can grow in natural conjunction with the market. While there is no blue print for consecutive steps, a careful analysis of the current market situation will allow policy makers to assess which of the examples for implementation listed below could be applied in the local context.

At different stages of market development each policy will have a different impact. Removing policy uncertainties and including market-based off-grid electrification into national plans and action plans lays the solid foundation for market expansion. Helping to mobilize access to finance, the facilitation of the import of household solar related equipment, and the creation of a level playing field will help to kick-start a market in a situation where penetration is still very low. Consumer protection, effective quality assurance, consumer awareness creation, consumer finance, and building a qualified work force are all important elements to scale the market and therefore impact.

Policy uncertainty

Policy uncertainty can be removed by including market-based off-grid electrification as an integral part in national electrification strategies, policies, regulations, and action plans. This would help accelerate the replacement of inefficient lighting and electrification products.

A policy vacuum, or mixed messages from governments on the household solar market, can make it very difficult for firms to attract customers and raise capital. To reduce the risks faced by entrepreneurs, investors and customers, and encourage market growth, governments should ensure that relevant strategies, policies, regulation and action plans are aligned, and recognise the legitimacy of the off-grid energy market, and incorporate it where appropriate.

Policy uncertainty is produced if responsibilities and objectives are not clearly set out at a national level, and therefore not streamlined across different administrative districts, or where provisions leave room for interpretation. When, for example, solar off-grid household products are not sufficiently specified in regulations companies' activities are subject to the judgement call of individual officials, creating insecurity. In countries where districts apply different regulations companies cannot easily expand their reach to provide services to more households.

1 The countries were selected by the Department for International Development. They are: Ethiopia, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Sierra Leone, Somalia, Tanzania, Uganda, Zambia and Zimbabwe.

Implementation options and examples:

- Creating an energy access map that assesses the economic costs associated with the provision of different forms of access (e.g. grid, macro/mini-grid, and solar off-grid household systems) allows governments to develop geospatial roll-out of an efficient electrification programme. The government of Tanzania has used this approach in its national electrification programme and allowed the private sector to align to government plans.[2]
- Acknowledge the role of off-grid electrification in national growth and development plans. If governments commit to quantifiable targets for products to be delivered through market mechanisms, coupled with a clear timeline, the private sector is incentivised to move into the local market faster, and it allows the government and other stakeholders to measure progress. In Ethiopia, for instance, off-grid energy access will be part of the new national growth and transformation plan.
- Review and benchmark the enabling environment for investment in clean energy access using the ClimateScope Tool and target annual improvements in scoring and relative ranking, as Mexico has done.[3]
- Highlight energy access as a national development goal to secure increased support from international donors to overcome energy poverty.
- Include off-grid solar household systems as an integral part in the SE4All Action Agenda and Investment Prospectus.

Access to finance for solar product suppliers

Access to finance for companies is currently the number one barrier for market development. The huge unmet demand for electricity access can only be met if the investment gap can be bridged, in terms of seed funding, equity as well as debt. In particular a lack of working capital is limiting companies that provide end-user financing, and are therefore dealing with long financing cycles themselves. Companies need access to finance in both international as well as local currencies as products are usually bought on the international market but sold in a local currency. This leaves them vulnerable to currency fluctuation risks. Access to capital in local currencies helps companies to mitigate these risks. In order to support scale up, the key contribution of governments is a positive investment climate (see point 1 above). However, there are also international funds and development bank credit lines which require more direct government involvement to enable access for firms in a given country.

Due to an enabling environment, 50% of the overall investment into the off-grid lighting sector was attracted by four leading companies which all operate in Kenya and/ or Tanzania. This coincides with the two countries having the strongest absolutes sales rates in Africa for solar household systems. Good access to financing allows these companies to extend credit to customers (see point eight on consumer financing).

Implementation options and examples:

- With the support from the UNEP en.lighten programme the governments of Niger and Nigeria recently submitted successful proposals to the GEF to secure funding for a faster transition to clean and sustainable off-grid lighting technologies. Programmes will embrace market based solutions and include a financing element for companies to help them reach scale.
- The government of Gambia taps into climate funding through the development of a National Appropriate Mitigation Action (NAMA) that has the objective of decreasing greenhouse gas emissions in the country by increasing the rural population's access to renewable energy.[4]
- With support from the World Bank, the Ethiopian Development Bank has set up a fund for solar off-grid products. The fund lends against collateral to companies and facilitates access to finance in USD currency. This has allowed companies to expand their activities in the country. In the first 18 months of operation, this facility enabled over 300,000 quality verified solar lights to be imported (UNEP, 2015).
- Through an Environment and Climate Change Fund (FONERWA) the government of Rwanda has established a vehicle to finance enterprises that have an impact on the environment. Funding can take the modality of a grant or credit line. The fund is capitalized from domestic sources, including different ministries, and external sources such as bilateral or multilateral development partners and international climate funds.
- Accrediting with the Green Climate Fund and mobilizing funding for small and medium energy enterprise (SME) development. The Government of Rwanda has become one of the first to be accredited to access Green Climate Fund (GCF) resources.[5]
- Relaxing any barriers that limit exchange into international currencies, the influx of international currencies, as well as the expatriation of revenues and dividends.

2 United Republic of Tanzania: National Electrification Program Prospectus http://www.ied-sa.fr/index.php/en/documents-and-links/publications/send/3-reports/33-national-electrification-program-prospectus.html Accessed: 10/09/2015.

3 Programa Especial para el Aprovechamiento de Energías Renovables: www.dof.gob.mx/nota_detalle.php?codigo=5342501&fecha=28/04/2014 Accessed: 10/09/2015.

4 Government of the Gambia: Nationally Appropriate Mitigation Actions http://unfccc.int/files/focus/application/pdf/nama_foc_prop_gambia.pdf Accessed: 10/09/2015.

5 http://www.fonerwa.org/news/2015/7/9/minirena-accreditation-announcement Accessed: 10/09/2015.

- Providing government guarantees or first loss capital to local banks to de-risk commercial investment in companies. Often local financial institutions are not yet familiar with the sector and need to be introduced to this new market. Loan and credit guarantees can be a helpful tool to engage local commercial lenders.

Facilitating imports of solar products and equipment

Imports of household solar-related equipment could be facilitated by the removal of fiscal and import barriers, as appropriate, to ease product introduction and market development.

Speeding up the import process and removing fiscal barriers allows the industry to set up an efficient supply chain to deliver products to the end-user swiftly at the lowest possible cost. Complex and slow import processes unnecessarily lengthen the supply chain and increase the costs for companies and consumers. High import tariffs and VAT on solar products further drive up end-user costs. While the industry gets off the ground, VAT and import tariff exemptions have proven themselves to reduce product costs for the end-user and make a purchase more attractive and affordable for low income households, leading to a faster uptake of products and an accelerated adoption of clean off-grid lighting technologies. With households consuming lower levels of kerosene, spending of governments where kerosene subsidies are in place can be expected to decrease overall.

To promote the local assembly and repair of products, VAT and import tariff exemptions should also include spare parts, product components, and energy efficient appliances. VAT and import tariff holidays can also be introduced on a temporary basis and re-introduced progressively as the market develops and products are available to increasing numbers of households. Early communication to the market and public well ahead of any changes can help avoid any policy and therefore planning insecurities.

The region enjoying the highest market penetration in Africa is East Africa where most countries introduced import tariff holidays as well as VAT exemptions for solar products. These countries benefit from strong market growth leading to an increased number of households gaining access to off-grid electricity. Kenya, Uganda, Tanzania, and Rwanda together represent more than a quarter of the worldwide market share.

Implementation options and examples:

- Introduce joint import tariff holidays for solar products via economic communities. For example. To harmonize tariff settings within the region, the East African Community implemented import tariff holidays for electricity generation products and light emitting diodes for all member countries.[6]
- The unconditional removal of VAT has helped to promote the market in Kenya, Tanzania, and Uganda. These countries benefit from strong market growth leading to an increased number of households gaining access to off-grid electricity.
- In Rwanda VAT exemptions are coupled to a quality assurance programme, i.e. only quality verified products enjoy VAT exemptions. This gives quality products a competitive advantage in the market. However, this approach is also more complex in its execution and requires increased enforcement and market surveillance capacity.
- The Environmental Goods Agreement is planned to be signed by 16 states and the European Union to liberalize trade in products with a positive impact on the environment, including solar products. Signing parties will apply a zero import tariff policy for listed products.[7]
- Take measures to speed up clearing process at customs in general and for solar products in particular. By increasing the capacity of authorities and providing appropriate training, the process could often be organized more efficiently.

A level playing field

Kerosene and diesel subsidies make such products appear cheaper than they are and decrease the value proposition of household solar technology, and therefore slow down market development. This market distortion encourages users to continue to have inferior energy access which threatens their health (through air pollution) and safety (through risk of burns). As clean technologies become available in the market, kerosene and diesel subsidies should therefore gradually be phased out to incentivize end-users to buy clean products. Any kind of fuel subsidy reforms is a sensitive issue and needs to be communicated extremely well to win the support of the population.

Subsidies are a relatively expensive tool to achieve the intended goal as they often fail to reach the poorest communities: the 20% richest households in low- and middle income countries capture six times more in total fuel product subsidies than the poorest 20% of households (IMF, 2013). Nevertheless, the difference in a payback period for a solar lighting product in a country with high kerosene subsidies, such as India, can be up to 22 months – more than four times the period of Tanzania where no kerosene subsidies are in place.[8]

6 EAC Common External Tariffs Handbook: http://www.eac.int/customs/index.php?option=com_content&id=41:common-external-tariff-handbook&Itemid=141 Accessed: 10/09/2015.

7 http://www.ictsd.org/bridges-news/biores/news/environmental-goods-agreement-trade-talks-look-to-hone-product-list Accessed: 10/09/15.

8 http://map.enlighten-initiative.org/ Accessed: 10/09/2015.

Where subsidies are provided to reduce the cost of solar household systems for low-income consumers, the different approaches used by different organisations and programmes can affect the market. In particular, when giveaway schemes, usually donor-supported, are used to distribute solar lights these can affect the sales of solar household systems of commercial distributors.

Implementation options and examples:

- To smooth the transition, India has introduced a direct benefit transfer system in which poor segments of the population receive cash transfers from the government. It is now up to the individual households to decide whether to purchase kerosene at normal market prices or opt for clean alternatives. This programme comes with the dual benefit of banking the unbanked, e.g. giving every poor household access to the financial system by making use of branchless mobile money banking.
- Kerosene subsidies could be decreased step by step. Instead of ending subsidy schemes abruptly, the level of subsidies could be reduced on year by year basis with a clear time frame. To ensure the continued support of the population, the amount of spending saved by governments could be re-invested into programmes that benefit low income segments, for instance in the fields of health, education and job creation.
- Another option with regards to levelling the playing field, and in some cases tipping it towards poorer consumer groups, is the use of Results-Based Financing (RBF) to provide subsidies which taper off over time to encourage investment in the market for improved solar products and/or make products accessible to poorer groups.[9]
- Greater harmonisation of donor support for solar off-grid solutions in a country would help reduce the favouring of particular market actors and disruption to the market from differential subsidy levels.

Product standards

Low quality products, and particularly counterfeits and products which falsely claim a level of quality they do not achieve, defraud consumers and undermine consumer trust in the technology, spoiling the market. As markets mature they become increasingly attractive to such products. These products imitate the look and feel of renowned brands but use inferior technology, often leading to early product failure. Adopting and enforcing minimum standards is key to maintaining consumer confidence and supporting market growth. By adopting internationally harmonized standards, governments can avoid raising unnecessary barriers and imposing additional costs on good quality products.

In countries where the market has picked up but is missing adequate regulations to promote quality assurance, an increased number of low-quality products entering the market can be observed. They benefit from the awareness raising and distribution chain development promoted by companies manufacturing and dealing with verified products. As a result they take away a significant proportion of the market share and contribute to market spoilage. Analysis by the Global Leap program shows that a missing quality assurance framework has a significant negative impact on market growth and therefore uptake of solar household technologies (Navigant, 2015). Strong growth can only be sustainable if coupled with an equally strong quality assurance framework.

Implementation options and examples:

- The bureau of standards in Kenya, Uganda, and Bangladesh adopted International Electrotechnical Commission (IEC) technical specifications for solar portable products as mandatory minimum quality standards. Ethiopia and Rwanda are working with the standards on a voluntary basis, granting quality verified products competitive advantages in the market. The IEC technical specifications are based on the work of the World Bank / IFC Lighting Global programme's quality assurance framework.
- The ECOWAS region is about to adopt the IEC technical specifications as mandatory minimum quality standards, as a community of states. They further plan to cooperate through joint test laboratories and accepting test results from laboratories within the region, which will help best available technologies spread between countries without new testing barriers and costs.
- In Kenya a law was enacted requiring a minimum qualification for electrical technicians to install solar home systems to increase quality assurance. The Kenya Renewable Energy Association (KEREA) has developed training for solar technicians and equipped training institutions with necessary materials to provide proper training. In a second step they seek to work with training institutions to ensure their curriculum reflects the provision of the government regulation.
- For Solar Home Systems of bigger size the adoption of IEC standards and specifications for individual components used for installation on-site can enhance quality assurance.
-

9 See for example the use of RBF for solar programmes in Tanzania at http://www.snvworld.org/en/regions/africa/news/how-results-based-financing-is-spurring-solar-market-development-in-tanzania Accessed: 10/09/15.

- Combat the emergence of counterfeit products that are increasingly challenging a sustainable market development by abusing consumer trust. Governments could provide a legal framework that allows companies and state authorities to take action against any manufacturer or distributor of fake products. This framework could include fast filing of patents for solar products and mechanisms for the private sector and the government to cooperate.

Consumer protection

Consumers can be protected from mis-selling and poor quality goods and services and solar system providers held accountable, through the adoption of legal provisions that set out consumer rights and protections.

As the solar off-grid household system market grows, many companies will come into the market. If market growth is to be sustainable it is important that consumer rights are protected and an appropriate level of service and protections are provided. Alongside adoption and enforcement of minimum standards, governments can act to promote consumer protection through a number of measures that increase consumer confidence to purchase.

Especially the strong consumer protection in Bangladesh has helped the IDCOL solar home system programme to become a success, with more than 3 million systems sold to date.

Implementation options and examples:

- In Bangladesh the fund put in place by IDCOL includes a provision guaranteeing to customers of solar home systems that if the grid arrives within 3 years they will receive compensation proportionate to the duration they have had the system.[10]
- A minimum period for warranties on any kind of solar products allows consumers to return faulty products within a certain period. The Lighting Global Minimum Quality Standards that have already been adopted by countries including Uganda and Kenya, call for a minimum warranty of one year on solar portable lanterns. To ensure warranties are effective in rural areas, the supplier should have the clear obligation to satisfy consumer rights.
- In Kenya the Renewable Energy Association (KEREA) is piloting a vendor accreditation system, which ensures the provision of information about vendors, advice to consumers and a complaints system. To incentivize vendors to participate, the programme is linked to marketing and awareness raising activities.
- In conjunction with enforcement of minimum quality standards, the Lighting Africa programme is working with clear 'truth in advertisement' provisions. To maintain the Lighting Africa product verification, manufacturers may only advertise product performance and features that are supported by test results.

Raising consumer awareness

Consumers are often not aware of the electricity access solutions now available. Where a market is in the early stages of development, individual solar product companies rarely have the resources to create this awareness, and those who do attempt to do so risk losing the commercial benefits of this "public good" to other market participants. Government support can ensure consumers are educated about the benefits of solar, how to use it, and where to buy quality products.

Especially in the early phases of market development, consumer awareness campaigns have proven to be catalytic by explaining the economic benefits. The markets with the highest penetration today have below the line marketing activities that allow consumers to see and touch a solar light before making a purchasing decision. These campaigns were first implemented in Kenya by Lighting Africa and SunnyMoney. Today, Kenya is the strongest market in Africa for solar products.

Implementation options and examples:

- Through public announcements via TV, radio, or newspapers Lighting Africa increased the general level of awareness and knowledge for solar off-grid household products in Kenya, Ethiopia, Nigeria, and Uganda. As part of a behavioural change campaign in Kenya the topic was also discussed as part of the script in popular soap operas to reach the target audiences (above the line marketing). Furthermore the programme gave rural communities the opportunity to experience solar products first hand through road shows (below the line marketing).[11] Public Private Partnerships can be leveraged to realize the joint goal of increased awareness.
- In Malawi, Zambia, Kenya, and Tanzania SunnyMoney, a distributor owned by the charity SolarAid, is leveraging education networks to increase awareness: via school campaigns they engage head teachers as early adopters and ambassadors and sales agents for solar lighting

10 https://energypedia.info/images/6/6b/Bangladesh_Rural_Electrification_and_Renewable_Energy_Development_Project_(RERED_II)_E%26FA.pdf Accessed: 10/09/15.

11 https://www.lightingafrica.org/what-we-do/consumer-education/

products. In Senegal a "light libraries" project allows children to rent out solar lights at a small cost and to share the experience with their parents back home. By exposing students and parents to solar technologies awareness for and trust in solar products is increased.[12]

- Through "Village Solar Days" the Tanzania Renewable Energy Association (TAREA) is educating rural populations about solar and how to recognize sub-standard products. To attract large audiences, the events are accompanied by a social function, such as traditional dance or football matches.[13]

Access to finance for consumers

Solar household systems represent a major up-front cost to most potential users. To enable users to spread this cost over time they need easy access to microfinance, either directly from financial institutions or through the solar product provider by means of "Pay-As-You-Go" mechanisms.

While there are a variety of ways of collecting and processing payments, the option of mobile payments has demonstrated particular benefits in East Africa where use of M-Pesa, or similar mobile banking systems, is reducing transaction costs. Based on mobile payments, innovative business have developed models that allow consumers to overcome high upfront costs by making small but regular payments via mobile money. In Kenya for example M-Kopa has connected more than 225,000 households. In Tanzania companies like Off Grid Electric and Mobisol are benefitting from the enabling environment for mobile money. 43% of the adult population in the country are using mobile money today (GSMA, 2014). In Bangladesh the use of consumer finance in the IDCOL programme leads to more than 65,000 solar home systems being installed every month.[14]

Implementation options and examples:

- With IDCOL the government of Bangladesh created a financial institution which receives credit and grant support from diverse development banks to implement a solar home system programme. IDCOL in turn provides refinancing and grant support, as well as necessary technical assistance, to partner organisations, including microfinance institutions, that install solar home systems, extend credit to end users, and provide after sales service. More than 65,000 SHSs are now being installed every month.
- Public banks and national development banks can ensure micro finance institutions (MFI) are well capitalized by lending money to these institutions at favourable conditions as the United Bank of India does.[15] MFI are a helpful vehicle which enables end-users to overcome high up-front costs when pay as you go solutions are not available. For MFI to take on that critical role they need access to capital themselves.
- To provide an enabling environment for mobile money use, governments in Ghana, Kenya and Tanzania have created a policy framework that creates a level playing field between existing banks and mobile money providers, allowing non-bank financial providers to offer mobile money services alongside existing players (GSMA, 2014).
- Support to the establishment of credit facilities accessible to SACCOs and other micro-finance institutions, to enable them to provide micro-finance loans and provision of technical assistance for their development of appropriate financial products for off-grid energy product purchasers.

Skills for the solar market

For expansion of the market and its longer-term sustainability, it will be necessary to build a qualified workforce for the sector and increase in-country value creation, by co-operating with trade associations to develop vocational and university-level training to promote regulatory capacity, local business, technical skills, and innovation.

A healthy off-grid solar market can be expected to generate a large number of jobs, requiring people with a range of skills – from product and business development, to retailing, installation and maintenance. As with any new industry, these skills need to be created to enable the market to grow and support creation of local employment. With local skills developed, the possibility of shifting value creation to a higher proportion into the country increases. For instance the professional assembly of products requires the availability of a skilled workforce.

The progress and development of the solar market creates jobs and income-generation opportunities throughout the supply chain. In Bangladesh, the Africa Progress Panel (2015) found 114,000 jobs in solar panel assembly were created in the last 10 years. Up to 15,000 new jobs have been created in sub-Saharan Africa through the distribution of off-grid lighting with the potential of 500,000 additional jobs only in the ECOWAS region (UNEP, 2014).

12 http://www.solar-aid.org/assets/Uploads/Publications/SolarAid-Light-Library-project-report-external-version-KH-18.09.13.pdf

13 http://www.tarea-tz.org/index.php/blog/80-solar-village-day-at-malinyi

14 http://idcol.org/home/solar

15 http://www.themix.org/publications/microbanking-bulletin/2011/11/microfinance-funding-microfinance-debt-financing

Implementation options and examples:

- In Kenya a law was enacted requiring a minimum qualification for electrical technicians to install solar home systems to increase quality assurance. The Kenya Renewable Energy Association (KEREA) has developed training for solar technicians and equipped training institutions with necessary materials to provide proper training. In a second step they seek to work with training institutions to ensure their curriculum reflects the provision of the government regulation.
- Building this capacity is a central theme of ECOWAS' new Programme on Access to Sustainable Energy Services (EPASES), and ECREEE is supporting training institutions (such as 2ie in Burkina Faso), providing direct training events and programmes on renewable energy technologies, including off-grid solar.
- The Strathmore Energy Research Center (SERC) in Kenya has launched the East Africa SMA Training Academy sponsored by SMA (System, Mess and Anlagentechnik), and KAM (Kenya Association of Manufacturers). The academy will train the engineers on fuel saving technology, providing expertise and advanced training tailored to participants on SMA products and photovoltaics.

Country assessments /readiness

The current status of key policy areas relevant to the expansion of the solar household market in the 13 countries selected for the study, were assessed for this study. This was based on literature and interviews with stakeholders. The results are summarised in Table 1 at the end.[16]

Conclusions – the compact

The key policy barriers discussed above were identified from the experience of countries which successfully developed a solar household system market and from consultation with key stakeholders, GOGLA members. This list of key policy measures to assist with creating a supportive enabling environment for solar solutions provides the basis for the proposed compact of the Energy Africa campaign. This provides the basis for consideration of the specific policy measures that will be required in each country to unlock the household solar market. The draft compact is set out below.

Energy Africa – Policy Compact

1. Remove policy uncertainty by including market-based off-grid electrification as an integral part in any national electrification strategy, policy, regulation, or action plan to accelerate the replacement of inefficient lighting and electrification products.
2. **Help to mobilize access to finance** across the value chain in cooperation with financial institutions and other relevant funding bodies.
3. **Facilitate the import of household solar related equipment** by removing fiscal and import barriers as appropriate to ease product introduction.
4. **Provide a level playing field** for the household solar sector and review any kerosene and diesel subsidies as solar alternatives become available in the market.
5. **Protect consumers and hold solar system providers accountable** by adopting legal provisions setting out household solar consumer rights and protections
6. **Keep sub-standard products out and prevent market spoilage** by adopting, raising awareness about, and enforcing internationally harmonized quality standards.
7. **Promote consumer awareness** for clean and high-quality energy access and challenge any existing prejudices against solar through educational campaigns, including face to face product demonstrations.
8. **Ease access to end user and consumer-finance,** in particular mobile payment mechanisms and micro finance institutions and remove any legal obstacles for these.
9. **Build a qualified workforce for the sector and increase in-country value creation** by co-operating with trade associations to develop vocational and university-level training to promote regulatory capacity, local business, technical skills, and innovation.

16 See the briefings on each country that accompany this paper for more details.

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Annex: Policy assessments across thirteen countries

Table 1: Policy assessments – current situation by country

	Policy Framework	Access to Finance	Fiscal Barriers	Consumer Protection and Quality Assurance	Level Playing Field	Consumer Awareness	Consumer Financing	Level of Local Skills
Ethiopia	Off-grid solutions are part of energy access policies and strategies. Their implementation is not harmonised.	Access to foreign capital and for international investors is limited and a high degree of uncertainty prevails	Solar products are in theory exempt of VAT and tariffs. There is lack of clarity about the status of spare parts.	Low quality products are already starting to spoil the market, reinforced by counterfeit products. The level of consumer protection is low.		The level of consumer awareness can be improved.	Consumer financing is important because of low income levels.	The level of skills is currently insufficient.
Ghana	Though there is strong rhetoric around off-grid solar and a good policy framework, more can be done to clarify VAT exemptions and provide practical support for the market.	High interest rates are prohibitive and private companies have to have a strong track record to benefit from international finance. The volatility of the Cedi remains a concern.	18% VAT is applicable, at least to some actors. Import duties are currently 0%, but there has been a lot of volatility around duty rates in recent years.	There is a little knowledge of consumer protection and quality assurance measures. Low-quality products have reduced trust in the technology.	Government aim is to eliminate kerosene subsidies. SHS suppliers are more concerned about giveaways and promises of future grid connections.	A high percentage of people in some regions have an awareness of solar. This is not uniform across the country, and where there is awareness many have a negative perception of solar.	PAYG and mobile enabled systems are available in Ghana but a relatively low number of consumers use mobile money.	While there are high levels of education and literacy, there is a lack of the skills needed to underpin the off-grid sector.
Kenya	The regulatory framework is broadly supportive, including VAT and tariff exemptions. More could be done to integrate off-grid targets and supportive measures into national planning.	The off-grid market is relatively well-established. Credit Reference Bureaus are in place and there is a strong banking sector. However, capital finance is still a challenge.	Certification by the Energy Regulatory Commission allowed exemption from VAT. Exemptions were repealed in 2014, increasing uncertainty.	Although standards are in place, they are not implemented effectively. In some areas consumers may not be able to get hold of quality products.	Although kerosene is not subsidied, subsidies for connnections to the national grid and the potential for large-scale giveaways may impact solar-market growth.	There is high awareness of solar products in many regions. However, lack of supply may make it difficult to buy good quality products.	Interest rates are quite high. 70% of Kenyans are involved in Credit Cooperatives. 15 million people already have mobile money accounts.	There is a good level of skills and human capital. Skilled workers are also in demand in neighbouring countries.
Malawi	Several policy uncertainties exist in registering a solar business, importing products, certifying products, and the level of kerosene and diesel subsidies.	Access to finance is quite limited. Currency fluctuations pose a high risk for companies. High interest rates at commercial banks prohibit access to local finance.	High VAT rates and tariffs on solar products drive up the costs for end-users in a very price sensitive market.	Standards for pico-PV products are lacking. High influx of low quality products and counterfeits puts consumer protection and market development at risk.		Awareness of solar portable lighting products and home systems is low. Reputation of solar is not good.	MFIs are operating in the country. Good regulation for mobile money is in place, but mobile money market is still in very early phase.	Level of local skills is low. Companies are training their own staff.

Table 1: Policy assessments – current situation by country (continued)

	Policy Framework	Access to Finance	Fiscal Barriers	Consumer Protection and Quality Assurance	Level Playing Field	Consumer Awareness	Consumer Financing	Level of Local Skills
Mozambique	Government is committed to provide energy access and acknowledges on paper the role of the private sector; the government owned FUNAE is however competing with the private sector and creates uncertainty for companies	Access to finance is difficult, foreign investment possible but high administrative burdens	High VAT and tariffs make products expensive and do not incentivize product import	Low market penetration and number of products in the market	Kerosene for the domestic use is currently subsidised	A good general level of awareness for solar	Is not available	Level of skills is low / demand for skills also low due to limited private sector activities.
Nigeria	Government is committed to increasing solar power generation, both on and off grid. It is dedicated to ensuring a private sector solution to fulfil this ambition.	High interest and very low level of access to banks among population, especially for SMEs and consumers in rural areas. Solar sector seen as high-risk.	High cost tariffs for import of solar systems. Higher cost solar products reduces their competitiveness and attractiveness to customers especially lower income customers.	Non-existent consumer protection or quality assurance for solar products. This may already have caused poor reputation and market spoilage.	Very high subsidies on kerosene and petrol. This is seen as welfare measure and is highly supported by Nigerians.	Low levels of awareness of solar power, up to 40% of population never heard of solar. Poor existing reputation due to previous failed solar programmes.	Very low access to finance for SMEs and rural population. Only 0.1% of Nigerians have access to mobile financing.	Skilled solar technicians are rare due to low national experience in solar PV systems.
Rwanda	There is political ambition to support growth of off-grid solar. An off-grid strategy is being developed. Support has been organic, leading to some policy uncertainty and a focus on specific companies. Stakeholder coordination is also absent.	Although current operators can access donor and private sector funds, this is not enough to reach target of 22% of the population by 2018. High interest rates and lending restrictions make it difficult for Rwandan SMEs to enter the market.	There is uncertainty around fiscal measures and exemptions from VAT and tariffs. Some products and equipment may fall outside current exemptions.	There is lack of clarity on standards, and a lack of capacity at the Rwanda Standards Board. This could increase the risk of low quality products entering the market. Regulations to protect customers are also lacking.	Giveaways and subsidies have led to some market distortion, and customer confusion about the real cost of products. Government support has been directed to individual companies rather than the market as a whole.	Awareness is not extensive. Customers with experience of solar may not have had access to a wide range of products or may not know how or where to purchase them. As a result of previous free distribution, customers may not wholly understand the true cost of the product or role they must play in respect of basic maintenance.	While there are some strong PAYG enterprises and local agricultural or community loan schemes, much focus is on the provision of larger solar systems. The purchase of large solar systems may be prohibitive for families living under the poverty line.	Given the aim to grow the market by 15 times in three years, there is a shortage of business, management, technical and 'soft' skill capacity. More capacity will also be needed in associated sectors such as finance, IT and regulation.

Table 1: Policy assessments – current situation by country (continued)

	Policy Framework	Access to Finance	Fiscal Barriers	Consumer Protection and Quality Assurance	Level Playing Field	Consumer Awareness	Consumer Financing	Level of Local Skills
Sierra Leone	Current policies both for suppliers and consumers are absent.	Access to finance is critical but very limited; currency fluctuations pose a high risk for companies; high interest rates at commercial banks prohibit access to local finance	High VAT rates and tariffs on solar products drive up the costs for end-users in a very price sensitive market.	Sierra Leone is not in a position to enforce such policies.		Awareness for solar portable lighting products and home systems is fair; technology reputation of solar is not good	Finance specifically was not recognize as a significant barrier particularly with PAYG propositions	Level of local skills is low, companies are training their own staff
Somalia	Although there is a focus on renewable energies in national energy policy, as well as that of some states, there is no regulation specific to off-grid. Significant challenges are also presented by the political economy.	Given the long history of instability in the country, a high premium is added to the cost of finance.	Tariffs of around 15% apply on imports, though exemptions appear to be possible.	There are no consumer protection or quality assurance measures in place.	Kerosene is not subsidised but some market distortion has occurred due to giveaways of solar products.	There is very little consumer awareness of off-grid solar products. Where people know of solar it is largely via NGOs, where organisations are operating in Somaliland and in urban areas in which there are solar street lamps	Microfinance is not recommended as it is not thought highly of locally. PAYG solar products purchased with mobile money are now available in Somaliland.	There is a huge lack of education and formal skills within the country - however there are high levels of entrepreneurship and a large, more educated, diaspora
Tanzania	Strong foundations are in place with specific plans for rural areas. These do not include off-grid targets, and most of the focus is on on-grid and mini-grids solutions which, even before anticipated population growth, will not reach all un-electrified Tanzanians.	Although relatively well established, the market is still undercapitalised and vulnerable to exchange rate volatility. Finance for established players is slowly beginning to flow, but there is a “missing middle” in available support.	Quality solar products are largely exempt from VAT and tariffs, but batteries are not.	A huge challenge has been created by a large influx of low quality and fake solar products into the market	Kerosene is not directly. Subsidisation of grid access and giveaways may affect the solar market.	Consumer awareness in the Northern Crescent and Coastal areas is very high. There is low awareness of solar products in some other areas of the country.	Pay-as-you-go financing for solar home systems is now common in many regions but	There is a relatively high level of human capital and some training has been undertaken by TAREA as well training by market actors.
Uganda	Good policy framework with ambitious targets	Good framework conditions	VAT & tariff exemptions on solar in place	Provisions are weak in terms of standard setting, enforcement, and ensuring consumer protection	No kerosene or diesel subsidies	Is good on average	Good mobile money infrastructure; MFI and SACCOs operating actively	Good in the cities

Table 1: Policy assessments – current situation by country (continued)

	Policy Framework	Access to Finance	Fiscal Barriers	Consumer Protection and Quality Assurance	Level Playing Field	Consumer Awareness	Consumer Financing	Level of Local Skills
Zambia	The government has voiced a clear agenda for increasing energy access and has focused recently on diversifying the energy mix due to the energy crisis. Solar is seen as a rapid way to increase energy for both domestic and productive purposes but the current focus seems more directed to on-grid solar and there is no clear direction of tariff structures.	Access to finance is critical but limited. Currency fluctuations, a lack of track record in respect of PAYG and the length of the sales cycle create investor risk.	A lack of clarity around VAT and tariffs creates confusion around imports and can lengthen the sales cycle.	Standards for pico-solar products are missing to serve as a benchmark. The potential for large numbers of low quality products to come over the border puts consumer protection and sustainable market development at risk.	Fuel subsidies were removed in 2013, and kerosene is now relatively expensive. Changes in fuel prices led to some unintentional subsidisation during 2015.	Awareness for solar portable lighting products and home systems is variable across the country. Some areas have been reached by 'below the line' marketing, but the large distances to be covered across the country mean that in others there is a low awareness of solar.	The relatively strong prevalence of mobile phone use and the growing uptake of mobile money suggest that these might help support consumer financing. This is at an early stage, however.	The general level of skills is considered good. Companies are able to provide core training to employees and there are a few institutions which focus on delivering training in renewable technologies.
Zimbabwe	While there is a tariff exemption for solar products there is little other policy support for the off-grid sector. Due to the energy crisis, and through examples such as the ban on electric geysers, greater political focus is likely to be given to solar energy solutions.	Access to finance is a significant issue in Zimbabwe due to the wide and ranging economic crisis. International finance is needed to underpin the sector. Use of the US$ mitigates the forex risk prevalent in other countries	Tariff exemptions apply to solar products but exemptions in respect of VAT appear to be made for some companies but not all.	A huge influx of cheap products and giveaways has significantly impacted the market. Though some quality assurance measures are in place these appear ineffective. The use of the $US in the country has led to even more 'dumping' of products	There are no kerosene subsidies. Giveaways and the subsidisation of solar products have affected market dynamics.	Cheap imports and Econet's scheme led to hundreds of thousands of poorer quality lights reaching consumers. While nearly everyone in the country is aware of solar solutions, trust in the technology is low.	Loans via microfinance institutions are largely cost prohibitive. Mobile enabled payments are increasingly used - with millions using, or aware, of mobile money. Internet enabled PAYG schemes may also make it easier for the diaspora to help finance solar home systems.	Despite relatively high literacy rates, technical and soft skills needed to support the sector are lacking. This lack of technical installation and maintenance skills has already led to the breakdown of a significant amount of solar hardware in the country.

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