

## Country briefing



# Accelerating access to electricity in Africa with off-grid solar

## Off-grid solar country briefing: Rwanda

This country briefing is one of 13 prepared as part of a background study for the Energy Africa campaign launched by the Department for International Development (DFID) on 22 October 2015. The study was undertaken by the Overseas Development Institute (ODI), the Global Off-Grid Lighting Association (GOGLA) with SolarAid, and Practical Action.

The analysis and conclusions in this briefing, and other reports from study, are those of the authors and do not necessarily reflect the views of their organisations, ODI, GOGLA, Practical Action and SolarAid, nor those of DFID.

All project reports are available at: [www.odi.org/publications/10200-accelerating-access-electricity-off-grid-solar](http://www.odi.org/publications/10200-accelerating-access-electricity-off-grid-solar)



## Background

Rwanda has a population of 11.6 million,<sup>1</sup> and a high population density of 460 people per square kilometre.<sup>2</sup> In 2012, only 17% had access to electricity, with a marked difference between urban and rural households.<sup>3</sup> According to one interviewee 24.5% of the population now have access to electricity, 23% through on grid solutions and 1.5% using off-grid alternatives.

The government has a strong focus on energy access. This commitment is demonstrated by its goal to double access to on-grid electricity by June 2018, to 48%, and to reach 22% of the population with off-grid solutions. This off-grid target is 15 times higher than the current population reached. One interviewee said the government has recently brought forward its ambition to achieve universal access to electricity from 2025 to 2020.

With this high level of government engagement, off-grid practitioners and policymakers interviewed were positive that a significant change could take place, and provided an optimistic view of future progress. The high population density, relative ease of importing goods and support for the private sector has created a strong enabling environment. An informal self-organised Solar Association market practitioner group, led by Great Lakes Energy, has also created a high level of collaboration amongst private sector actors.<sup>4</sup>

Several practical issues for the expansion of off-grid were raised by interviewees. Not least are those of customer care, capital financing and market distortion. In addition, 45% of the Rwandan population lives under the poverty line,<sup>5</sup> spending on average only \$1.65 each per week according to one informant. Foreign exchange fluctuations and other market operating risks are still high. The government focus on larger solar home systems, instead of solar lights and home kits, though desirable due to greater grid equivalency, may limit the number of solutions fully supported by political efforts to eliminate energy poverty.

<sup>1</sup> UN World Population Division (2015) Available from: <http://esa.un.org/unpd/wpp/DataQuery/>

<sup>2</sup> World Bank (2014) Available from: <http://data.worldbank.org/indicator/EN.POP.DNST/countries?>

<sup>3</sup> IEA (2014) Africa Energy Outlook, International Energy Agency.

<sup>4</sup> Stakeholder interview

<sup>5</sup> World Bank (2010) Available from: <http://data.worldbank.org/country/rwanda>

## Policy Environment

There is strong and explicit support by the Government of Rwanda for the off-grid sector. As well as off-grid solar being noted in the Economic Development and Poverty Reduction Strategy II, the Government is currently developing an off-grid strategy for parliamentary approval. All interviewees agreed that the remarkable political focus on energy access goals, and clear drive of Rwandan officials to improve the lives of the population, provides the sector with a very real, and rapid, potential for impact.

There are, however, diverging views on the government's practical implementation of its support. One interviewee noted that transparency by decision makers about objectives, from the President and Minister of Infrastructure to local officials in all 30 districts, made understanding political processes extremely easy. Each decision maker has clear energy access performance indicators. Another suggested that the centralised planning system can also lead to opaque understanding of the policy implementation process for actors who are not so close to policy makers.

This could lead to decisions that would limit, rather than enable, solar markets and innovation. For example, when proposals for the eradication of kerosene use were under discussion by government officials, a proposal to limit the products that can be used to eradicate kerosene to 'fixed solar systems above 3W' was put forward, rather than enabling customer choice on alternative products. One interviewee, the only market actor invited to these discussions, raised concerns that the government's focus on larger systems may not match the ability to pay of poorer sections of society, and could limit both uptake of solar and the potential for innovation in solutions under 3W.

Interviewees' comments suggested a lack of communication between different stakeholder groups. Development of the off-grid sector was seen by all interviewees to be directed in large part by donor agencies and consultants, rather than through engagement with the private sector on practical opportunities and challenges. Given the strength of the political infrastructure and the clear support for off-grid solutions by both policy makers and donor agencies, interviewees felt strongly that

---

better coordination between stakeholders (private sector companies, local and global financial institutions, government agencies, NGOs, donors and the development community) could significantly accelerate the off grid market.

### Access to Finance for the Private Sector

Although there are a lot of local banks and microfinance institutions, interest rates are prohibitive. Rates from micro-finance lenders are around 2.5% per calendar month, while rates at commercial bank are around 22% per annum. As due diligence by commercial banks is more extensive, small enterprise loans may not be easily available. In addition, one interviewee advised, people who have a mortgage for a house are unable to take out another loan, potentially restricting the ability of local entrepreneurs to take out small business loans.

A number of donor agencies are actively providing finance to companies operating in Rwanda, and the focus of international organisations on the sector is seen as a critical enabler of growth. The capital needs of the off-grid market were estimated by one interviewee to be at least \$ 250 million, to meet the political ambition to reach 22% of the population within three years. The sector needs to bear the significant upfront cost of product purchases, pre-financing requirements of pay-as-you-go schemes and the high cost of international loans, which are particularly expensive given the young age of the market, potential for payment default and volatility of the local currency.

Where finance has already been made available, stakeholders also advised that this has often been extended to individual organisations, for instance a large European Union grant to the company Mobisol. This has led to concerns about market distortion. One interviewee noted that the application for financial support is far easier for international organisations with experience of filling out proposal forms. This may help their projects to secure support, even where comparative benefits are lower.

Some funds, including FONERWA,<sup>6</sup> were seen by some stakeholders as difficult and time consuming to access, putting them out of sync with the rapidly

evolving needs of the market. Further concerns were also raised that restrictions on the type of programmes able to receive finance might unintentionally direct practitioners to fit their operations to the funds available, rather than towards the needs of consumers.

Mechanisms suggested to accelerate market growth included:

- Support for local financial institutions so that they can provide better loan mechanisms for local entrepreneurs
- More streamlined funding and support mechanisms, allowing greater innovation and flexibility
- Working capital facilities for local SMEs
- A 'first loss' facility to help cover the cost of pay-as-you-go default (helping both with direct finance and enabling actors to access lower cost loan facilities)
- Government or donor guarantees to help mitigate currency exchange risk
- Investment in 'preparing the market,' i.e. education and distribution infrastructure to lower overall costs for the sector.

### Import of solar household related equipment and fiscal barriers

There is a lack of clarity around exemptions on VAT and tariffs, illustrated by the diverging views of stakeholders. While the general ethos of regulation is to exempt products from VAT and tariffs there is regulatory uncertainty, which affects business and investor confidence. For example, one interviewee advised that although initially there was no taxation on solar products coming into the country, the ministry then amended the regulation to exempt only 25W+ panels and above. Under another regulation, however, solar lights and smaller systems are exempt from taxation. More clarity was hoped for in the government's upcoming off-grid energy plans.

In respect of customs, views again differed. It was not clear whether or not all products relating to solar lights and home systems are exempt from import charges. One stakeholder suggested that a

---

<sup>6</sup> <http://www.fonerwa.org/about/>

---

good clearing agent is needed to ensure that customs officials understand that lights and batteries are exempt from duties. While another suggested that the customs and tax revenue authority is now well versed on which products should, or should not, be exempt. Greater clarity around, and training on, VAT and tariff exemptions would help ensure that policy is better understood by customs agents and officials, who were generally noted as being well organised. All those interviewed agreed that exemptions should include all types and sizes of good quality solar systems and associated equipment.

### Consumer Protection and Quality Assurance

Although the Rwanda Standards Board has a focus on standards and quality assurance,<sup>7</sup> it reportedly lacks the capacity to implement regulations and there is ambiguity and inconsistency around the checking of imported products. However, the quality across the market was felt to be relatively high, as many products have entered the market via donor-backed companies and NGOs. One interviewee expressed concern that even lights which had achieved a Lighting Global standard did not, in some cases, perform to specifications, damaging consumer expectations and undermining trust in the technology. Additionally, a lack of expertise by the Standards Board to regulate the broad range of solar products was indicated.

Schemes that gave away, or significantly subsidised, solar lights were cited as having a negative impact on quality. This was because families which assume that lights and home systems should be free, or sold for a low price, may choose to purchase cheaper, lower quality products, at the 'expected price', rather than longer lasting quality products.

Interviewees also indicated that 'give away' schemes may not involve strong customer care service or fulfilment of warranties. According to one interviewee, following one programme to distribute lights, in which several companies had been involved, there was little to no after care service. Warranties were not honoured for months (often due to the cost of exchanging products in rural areas), and that there were gaps in long-term planning for sustainability. They suggested that 50%

of the units provided during the scheme were performing below specifications.

All interviewees saw the need for companies to stay in the market long term in order to service customers, provide technical support and to ensure that customer care is an integral part of quality provision. None were aware of any regulations around customer care at this time but one stakeholder noted that government programmes are helping to put maintenance strategies in place for solar systems.

### Consumer Awareness

Despite campaigns to raise awareness of solar solutions, awareness was not reported to be extensive. Even where consumers do know about solar products, they may not know where they can purchase them, the broad range of products available (where awareness and marketing campaigns have been led by individual companies) or how to ensure that they are purchasing a quality product. As noted above, concerns were raised by interviewees that some consumers may have a negative view due to programmes distributing low quality products with inadequate customer care provision. Concerns were also raised that consumers might have unrealistic expectations of the true cost of solar where this has been given away or subsidised, undermining efforts to build the market.

Interviewees noted that consumers may also lack a strong understanding of how to use and look after solar lanterns and home systems, as well as of their financial obligations in relation to products purchased with a consumer financing component. One advised that they were aware of several instances where customers had tampered with products and/or failed to understand the importance of making, and sticking to, a payment plan for a pay-as-you-go system. Advocacy by the government, at national and district level, that customers must honour contracts could help to instil a good attitude towards repayments and help ensure the long term health of the sector.

Greater promotion of a broad range of off grid energy solutions, government endorsement and a coordinated programme of well planned community-led awareness raising and consumer education activities were cited as valuable ways to

---

<sup>7</sup> SE4All (2014) *Rapid Assessment Gap Analysis: Rwanda*. Available from: <http://bit.ly/21aptg3>

---

accelerate the growth of a strong, stable off grid market.

### Providing a Level Playing Field

The removal of kerosene subsidies a few years ago was noted by interviewees as a critical factor for the success of the off-grid solar market. The majority of households use kerosene for lighting, and 40% use it as their main source of lighting.<sup>8</sup> However, interviewees noted market distortion due to a variety of different donor and government-backed schemes for off-grid solar. One suggested that of the 1.5% population benefitting from off-grid solar, 90% will have got their product via a giveaway or a scheme that would have been in some way subsidised.<sup>9</sup> This puts other private sector players at a disadvantage.

### Availability of Consumer Financing

Solar is still expensive in relation to the extremely low income level of much of the population. Though pay-as-you-go technology reduces the upfront cost of household systems, initial down payments and repayment plans are out of the reach of many consumers. To address this issue, some consumer financing schemes have been established. For example, Urwego Opportunity Bank and other local banks working with the government help farmers acquire solar products, and organisations like the One Acre Fund. These kinds of channel may provide a useful mechanism for more consumer finance schemes, as 100% of farmers belong to cooperatives and 30-50% of potential customers are involved with some type of Savings and Credit Cooperative.

Azuri, with support from USAID, also introduced a programme involving the use of scratch cards to enable payment by instalments.

However, one interviewee noted that some consumers were unable to access the scratch cards, as distribution networks were not large enough and cards were only sold in relatively large one-month denominations.

Some practitioners have adopted the sale of pay-as-you-go solar home systems enabled by mobile money to address the challenge of consumer financing. Mobile money is relatively well-used in Rwanda, with its penetration estimated to be around 60% of the population. As well as increasing affordability, by enabling families to spread payments, mobile-enabled systems add an additional level of transparency in revenue collection and enable data to be captured in real time. Pay-as-you-go solar systems are also increasing the uptake and use of mobile money systems.

### Level of Local Skills

Some solar technicians are trained and there are a number of skilled workers in the industry, but not enough to support the growing sector. One interviewee, whose organisation has been engaged in training, did not have enough funds to provide in-depth sessions, only one-day, quick immersion courses. They did not feel this was enough to provide a decent level of knowledge. There is a capacity gap both in technical skills relating to the installation and maintenance of equipment and a wide range of other skills, such as logistics, marketing and sales. Stakeholders advised that significant levels of capacity building, in rural areas as well as urban centres, is needed to ensure the market can develop at the pace required to hit energy access targets and drive rapid development.

### Summary and Recommendations

There is support from the Government of Rwanda and international donors for the off-grid solar sector.<sup>10</sup> There is a good enabling environment for private entities and supportive fiscal measures, such

---

<sup>8</sup> Fourth Population and Housing Census, Rwanda (2012); Disch & Bronckaers (2012) *An analysis of the off-grid lighting market in Rwanda: sales, distribution and marketing*, GVEP International.

<sup>9</sup> Examples include World Vision's donation of lights to health workers and the EU grant to Mobisol, which enabled subsidies for larger solar systems.

<sup>10</sup> New support from donors through the Scaling-up Renewable Energy Programme (SREP) will include investment in solar home systems (Aide Memoire, 22-25 June 2015, World Bank).

---

as the removal of kerosene subsidies and import tariffs. However, improved stakeholder coordination and greater awareness of a broad range of off grid solutions is needed to ensure that interventions do not unintentionally limit the business models

needed to address energy poverty. A significant injection of capital and extensive capacity building will also be critical for accelerating the market at the rate needed to reach 22% of the population by 2018.

Area	Situation	Opportunities
Policy framework	There is political ambition to support growth of the off-grid solar market. An off-grid strategy is being developed. However, support has been organic, leading to some policy uncertainty and a focus on specific companies, rather than on mechanisms that support the market as a whole. Stakeholder coordination is also lacking.	<ul style="list-style-type: none"> <li>- Ensure that tax exemptions and government support are not limited to sections of the market.</li> <li>- Ensure all new government and donor sponsored market development initiatives apply to all companies.</li> <li>- Create a strong policy framework which supports the off-grid sector from the national to the district level</li> <li>- Facilitate stakeholder coordination.</li> </ul>
Access to finance	Although some current operators can access donor and private sector funds, this is not enough to propel the market at the rate needed to reach 22% of the population by 2018. High interest rates and lending restrictions make it difficult for Rwandan SMEs to enter the market.	<ul style="list-style-type: none"> <li>- Increase the number of public finance solutions available to de-risk the market, and to provide facilities that support new entrants and local actors.</li> <li>- Create an enabling environment for local and private sector investment.</li> <li>- Minimise distortion by supporting awareness, availability and affordability measures which support the whole market.</li> </ul>
Fiscal barriers	There is uncertainty around fiscal measures and exemptions from VAT and tariffs. Some products and equipment may fall outside current exemptions.	<ul style="list-style-type: none"> <li>- Clarify and streamline VAT and tariff exemptions.</li> <li>- Ensure that exemptions apply to quality solar products of all sizes and for all related equipment.</li> </ul>
Consumer protection and quality assurance	There is a lack of clarity on standards and a lack of capacity at the Rwanda Standards Board (RSB). This could increase the risk of low quality products entering the market. Regulations to protect customers are also lacking.	<ul style="list-style-type: none"> <li>- Set minimum customer care and quality standards for the solar market.</li> <li>- Mandate minimum “free repair or replace” company warranties.</li> <li>- Increase the capacity of the RSB to ensure regulatory compliance.</li> <li>- Create efficiency standards for electric appliances to maximize off-grid generation potential.</li> </ul>
Consumer awareness	Awareness is not extensive. Where customers have experience of solar, they 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 programmes’ free distribution, customers may not wholly understand the true cost of the product or role they must play in respect of basic maintenance.	<ul style="list-style-type: none"> <li>- Conduct solar awareness campaigns which also provide information on efficient energy usage, appliance options, quality, customer care and customer’s own responsibilities.</li> <li>- Engage government and district officials to endorse solar, and create local “Solar Leaders.”</li> <li>- Build on knowledge from previous campaigns, such as Education for All.</li> </ul>
Level playing field	Giveaways and subsidisation of some solar products has led to some market distortion, and customer confusion about the real cost of products. Government	<ul style="list-style-type: none"> <li>- Create a clear and consistent way for government support to build the market, not individual companies.</li> <li>- Ensure that all new government and donor</li> </ul>

	support has been directed to individual companies rather than the market as a whole.	sponsored market development initiatives apply to all competitors.
Consumer financing	While there are some strong PAYG enterprises and local agricultural or community loan schemes, much focus is on the provision of larger solar systems. Given the high poverty rate in the country, the purchase of large solar systems may be prohibitive for families living under the poverty line.	<ul style="list-style-type: none"> <li>- Put more focus on solutions that address the needs of the lowest income consumers, including not imposing minimum (3W) power levels for government support.</li> <li>- Explore and develop programmes to catalyse uptake, making purchase and loan costs affordable for all off-grid customers.</li> </ul>
Level of local skills	Given the aim for the market to grow 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.	<ul style="list-style-type: none"> <li>- Build a centrally led programme for off- grid skills training in rural and urban areas.</li> <li>- Training should include business, management, sales, marketing, logistics, accountancy and technical skills, as well those skills needed in supporting industries such as finance, telecoms and compliance.</li> </ul>



ODI is the UK's leading independent think tank on international development and humanitarian issues.

Our mission is to inspire and inform policy and practice which lead to the reduction of poverty, the alleviation of suffering and the achievement of sustainable livelihoods.

We do this by locking together high-quality applied research, practical policy advice and policy-focused dissemination and debate.

We work with partners in the public and private sectors, in both developing and developed countries.

---

Readers are encouraged to reproduce material from ODI Reports for their own publications, as long as they are not being sold commercially. As copyright holder, ODI requests due acknowledgement and a copy of the publication. For online use, we ask readers to link to the original resource on the ODI website. The views presented in this paper are those of the author(s) and do not necessarily represent the views of ODI.

© Overseas Development Institute 2015. This work is licensed under a Creative Commons Attribution-NonCommercial Licence (CC BY-NC 4.0).

ISSN: 2052-7209

**Overseas Development Institute**  
**203 Blackfriars Road**  
**London SE1 8NJ**  
**Tel +44 (0)20 7922 0300**  
**Fax +44 (0)20 7922 0399**



This material has been funded by UK aid from the UK Government, however the views expressed do not necessarily reflect the UK Government's official policies.