

## Country briefing



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

## Off-grid solar country briefing: Ghana

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

Ghana has a population of 27.4 million.<sup>1</sup> In 2012, 72% of the population had access to electricity, a high proportion compared with other sub-Saharan countries.<sup>2</sup> In urban settlements, 90% have access to electricity, while in rural areas 52% have access. Over the last three years Ghana's economic growth rate has halved<sup>3</sup> and the country has been locked in an energy crisis dubbed 'DUMSOR', meaning 'off and on'.<sup>4</sup> This refers to the erratic nature of the electricity supply due to drops in production from hydroelectric resources, failing infrastructure and low tariffs that do not cover costs. The resultant power outages, normally 12-24 hours in duration, have led to high profile protests,<sup>5</sup> and a situation where many Ghanaians who once had full energy services are newly off-grid. In the words of one interviewee, energy has become a "political football".

Expensive solutions to the crisis have been adopted, such as the use of power ships (emergency diesel generators moored off the coast). The President announced in February 2015 that 3,665 MW of power generation capacity would be added to the grid over the next five years by independent power producers and the state energy company, Volta River Authority.<sup>6</sup> This is an ambitious target, more than double the current capacity, 50% of which is reported to be offline,<sup>7</sup> and it will result in increased electricity costs. With 2 million households lacking access to electricity and concerns that plans for grid extension may not meet the energy challenge, there is a huge market opportunity for solar household solutions and demand currently outstrips supply.

Under its renewable energy plans, the government aims to deploy around 30,000 solar home systems

and two million solar lanterns by 2020.<sup>8</sup> The government has also added its voice to an ambitious scheme by Azuri Technologies to install 100,000 off-grid solar home systems within the next two years. Significant other challenges remain, not least those regarding the expectations of consumers, practical implementation of political support, trust in technology and capital for private companies.

## Policy environment

The Government of Ghana was the first to opt in to the Sustainable Energy for All initiative. It aims to achieve universal access to electricity by 2016 and 10% renewables (in addition to hydropower) by 2020.<sup>9</sup> In the National Energy Policy (2010) Renewable Energy Sub Sector section, support for "the use of decentralised off-grid alternative technologies (such as solar PV and wind) where they are competitive with conventional electricity supply" is specifically mentioned.<sup>10</sup> The Renewable Energy Act (2011) further provides a framework for the sector and makes the Energy Commission, amongst other things, responsible for collaboration between public and private sectors, education on renewable energy and the ability to recommend exemption from levies.<sup>11</sup> The Act also supports relatively generous feed-in-tariffs for larger renewable energy infrastructure, and established a Renewable Energy Fund. The Government has previously championed initiatives that provide off-grid electrification for public institutions, commercial and rural homes.

According to interviewees, the government's focus is still predominantly on providing on-grid energy solutions. They raised concerns that it was potentially "politically untenable" for politicians, national or local, to suggest that certain regions might only get off-grid solutions. One interviewee advised that in the case of a previous mini-grid project, even when they had actively sought regions far from the grid, local politicians had told

<sup>1</sup> United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision.

<sup>2</sup> IEA (2014) *Africa Energy Outlook*, International Energy Agency.

<sup>3</sup> Smith, P. (2015) *The Africa Report* Available from:

<http://bit.ly/1NvnE1i>

<sup>4</sup> Mellersch, N. (2015) Shining a light on Ghana's energy crisis Available from: <http://bit.ly/1MxWRAi>

<sup>5</sup> Guardian (2015) Ghana's celebrities lead protest marches against ongoing energy crisis Available from: <http://bit.ly/1Ezi9zZ>

<sup>6</sup> Government of Ghana (2015) Ghana to get additional 3665MW of power in five years Available from:

<http://allafrica.com/stories/201503030365.html>

<sup>7</sup> Starr Online (2015) *Of 'Dumsor' and Ghana's Energy Sector Challenge* Available here: <http://www.starrfonline.com/1.2002945>

<sup>8</sup> PV Magazine, 18 May 2015. [http://www.pv-magazine.com/news/details/beitrag/solar-to-play-key-role-in-ghanas-us230-million-renewable-energy-program\\_100019480/#axzz3t4P3LF1D](http://www.pv-magazine.com/news/details/beitrag/solar-to-play-key-role-in-ghanas-us230-million-renewable-energy-program_100019480/#axzz3t4P3LF1D)

<sup>9</sup> Sustainable Energy for All, *Ghana Leads on Sustainable Energy for All*, (accessed October 2015) Available from <http://www.se4all.org/countrylevelactions/ghana-leads-on-sustainable-energy-for-all/>

<sup>10</sup> Ministry of Energy (2010) *National Energy Policy*

<sup>11</sup> Parliament of the Republic of Ghana (2011) *Renewable Energy Act 2011*

---

constituents not to connect to the mini-grid as the national grid would reach them soon. Another highlighted that although there is a lot of rhetoric regarding support for the off-grid sector, other than reducing import duties, nothing more structural has yet been done. Politicians are seen to be measured by their success in providing megawatts of power, not on providing energy services for households.

### Access to finance for the private sector

Interviewees highlighted access to finance as one of the biggest hurdles to the success of the off-grid solar market. The volatility of the Cedi, most recently hit by falling oil and commodity prices, was cited as a major problem for cash flow and attracting working capital. The preference for government to borrow domestically has led to a reluctance on the part of banks to lend to business and SMEs in particular. The practical issue of off-grid companies having a lack of track record in Ghana was also profiled as another barrier to financing. Local interest rates are around 42%, higher than any off-grid lighting company can afford.

Currently the off-grid market is relatively small compared with those in East Africa. The industry practitioners interviewed had received international financing and noted that this was relatively easy to find once a company has \$ 1 million booked revenue, but that reaching this stage entails getting past a “valley of death”. Mechanisms to provide early stage debt financing were cited as having the potential to significantly accelerate market growth in Ghana, such as:

- Targeted loan guarantees to access local currency debt for receivables financing.
- Long term currency debt, or US dollar debt, for inventory financing in order to get products into the country.
- Mechanisms to support the building of cross-sector industry standards and data collection to help access to longer-term capital.

Ghana’s ambitious investment plan to transform and promote its renewable energy sector, has recently been endorsed for support from the Scaling-Up Renewable Energy in Low Income Countries (SREP) fund. A total of \$ 230 million,

including \$ 40 million from SREP, will be used for four key projects: renewable energy mini-grids and stand-alone solar PV systems; solar PV-based net metering storage; utility-scale solar PV/wind power generation; and a technical assistance project (supported by the Sustainable Energy for All Fund – SEFA).<sup>12</sup> This infusion funding will help scale up and leverage private and public financial resources to build the country’s solar sector.

Fears about giveaways or subsidised solar lights and home systems by NGOs and infrastructure developers were also raised. There were concerns that ‘quick wins’ might be seen as politically desirable in the run up to the 2016 elections in Ghana, but could ultimately undermine investor confidence in the private sector.

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

There is currently no duty on the import of solar household systems, but there is a lack of clarity over exemptions. Over the past few years the duty charges on imports of solar systems have been anywhere between 0% and 20%. In respect of tax, one interviewee advised that there is still 18% VAT on the freighted cost of solar components coming into the country, while another advised that their organisation had a specific exemption. It was felt that a sector-wide exemption from VAT for quality products and less volatile policy around duty exemptions would be beneficial.

Importing products was otherwise noted as relatively straightforward but with some inefficiencies around the customs process.

### Consumer protection and quality assurance

The Ghana Standards Authority lists several international standards for solar and solar devices.<sup>13</sup> Interviewees were not aware of any official quality assurance or pre-verification processes in Ghana, or any consumer protection regulations in relation to solar.<sup>14</sup> The Ghana Association of Solar Industries

---

<sup>12</sup> Climate Investment Funds, SREP Investment for Ghana, SREP/SC.13/4, 29 April 2015.

<sup>13</sup> Ghana Standards Authority (Accessed October 2015) Available from: <http://www.gsa.gov.gh/home/>

<sup>14</sup> Stakeholder interviews

---

(AGSI), however, has introduced a certification system for solar equipment and service providers.<sup>15</sup>

Significant issues were also raised in relation to the quality of some solar products in the market and the ability of some organisations to provide good customer care and after sales services. Additional concerns were raised in relation to greater regulation on consumer protection if only responsible firms complied but others did not, without penalty.

### Consumer awareness

There is a high level of awareness of solar products in some regions as a result of various NGO programmes, and the high profile announcement by Azuri Technologies around their ambitions to create 100,000 solar homes, profiled by the Minister for Energy. The project-based nature of awareness raising to date, has meant that this has been focused in certain regions rather than extending across the country. Moreover, some of those who do know about solar have a negative attitude towards the technology as a result of being sold, or given, a poor quality product, or having bought a bigger system and had no assistance with maintenance.

The Ghana Energy Development and Access Project (GEDAP) in the North of the country, for example, was cited as leading to the disbursement of subsidised low-quality products and/or providing a lack of consumer care following the sale of solar products, reducing trust in the technology. In the 2011 World Bank report on the GEDAP programme, the sale of solar PV systems was noted briefly as being “far below expectations”.<sup>16</sup> A later academic review of the programme advised that “Bottlenecks were identified, including limited system wattage capacity, slight dysfunction of some balance of components, higher interest rates, low technical know-how and inadequate monitoring”.<sup>17</sup> One stakeholder advised that this lack of trust and market interference was one of the factors they considered when they set up their operations in a different part of the country.

### Providing a level playing field

The government has made several attempts to reduce fuel subsidies over the past three years, with the latest efforts announced in June 2015.<sup>18</sup> Interviewees did not indicate that they were significantly affected by any remaining kerosene subsidies.

Concerns about market distortions were cited in relation to subsidised solar projects, solar giveaways and grid access schemes. One interviewee advised that a scheme which had subsidised solar home systems by 50% had “led to market dumping, destroyed commercial efforts and left a field of broken systems”. This was noted as one of the main reasons for them to focus efforts on Southern areas of the country where less activity around solar home systems has taken place.

### Availability of consumer financing

To address issues of consumer financing, companies such as Persistent Energy Ghana (PEG) use pay-as-you-go mobile phone technology for payments for their installed solar home systems, as well as other financing models. Azuri Technologies use a mobile phone-enabled scratch card method. The onus is thus on the company to get working capital finance so it can enable more families to utilise the service, as well as make sure that systems are operating and thus able to provide revenue.

One interviewee advised that ensuring that a customer is able to pay an upfront down payment is a useful way to ensure that they are less likely to default on payments and therefore create a strong, sustainable revenue stream. Another advised that they work with local agricultural cooperatives to create payment plans more aligned to customer income streams, making their systems more affordable to customers and limiting the potential for default.

Dependence on mobile phone payments and technology presents another challenge. Although there are more mobile phones (30.1m) than people (27m),<sup>19</sup> Ghana is a low mobile money environment.

---

<sup>15</sup> [www.ghanasolarindustries.com](http://www.ghanasolarindustries.com)

<sup>16</sup> World Bank (2011) Available from: <http://bit.ly/1PgFEtR>

<sup>17</sup> Nahh, J & Hamhaber, J., (2015) *Lighting up the Villages: livelihood impacts of decentralised standalone solar photovoltaic electrification in Northern Ghana*

<sup>18</sup> Reuters (2015) Ghana to scrap fuel subsidies by Sept Available from: <http://reut.rs/1Hv02DH>

<sup>19</sup> GSMA (2014)

---

PEG, for example, is already the third largest business on the local platform. Reliance on mobile phone networks for repayments can, therefore, limit the number of people who can adopt the technology and also create a single point of failure. One interviewee noted that it could be difficult to get payments through the system a couple of times a month.

The solar home market is itself driving an uptake in mobile money and despite a few operational issues, mobile phone networks extend across the country.

### Level of local skills

The average literacy rate in Ghana is 88% for young men and 83% for young women. There are high education levels throughout the country. Interview partners advised that though specific skills were lacking given the low penetration of the off-grid solar market to date, by using pre-existing

organisational infrastructure and providing training it had been relatively simple to build strong teams.

Reports on the GEDAP project in the North highlighted a lack of technical skills for solar home systems. As the sector grows, specific training programmes will be needed to drive the market and build strong sustainable foundations.

### Summary and recommendations

There is an understanding of solar technology, and good human capital. The operating environment in Ghana is deteriorating, but well run businesses with good local knowledge can succeed. Moreover, the government is searching for quick solutions to a critical energy crisis. Greater political and financial support for off-grid practitioners in a way that creates meaningful action and does not distort the market, clarity around duties and tax exemptions, and working capital solutions could help to accelerate market growth.

Area	Situation	Opportunities
Policy Framework	Though there is strong rhetoric around off-grid solar and a good political framework, more can be done to clarify VAT and import duty exemptions and provide practical support for the market.	<p>A strong policy framework - at local and national level - will enhance the sector.</p> <p>Policy makers should endorse off-grid solutions as a complement to on-grid energy in the run up to the 2016 election, positioning them as positive 'quick wins' in the energy crisis.</p>
Access to Finance	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 creates greater uncertainty for investors.	Work with other bilateral and multilateral actors to provide support capital finance mechanisms such as a loan guarantee facility and low-interest debt finance.
Fiscal Barriers	18% VAT is still applicable, at least to some actors. Rates relating to duties are currently 0% but there has been a lot of volatility around duty charges in recent years.	<p>Advocate for all good quality solar products to be exempt from VAT.</p> <p>Ensure that all component parts are included in exemptions.</p> <p>Support policy measures that provide greater clarity around tariff exemptions.</p>
Consumer Protection and Quality Assurance	There is a little knowledge of consumer protection and quality assurance measures. Low-quality products have reduced trust in technology.	<p>Support preferential tax / duty treatment for quality products.</p> <p>Consider well-planned awareness campaigns which educate consumers on quality and warranties (without further undermining confidence).</p> <p>Support companies selling high quality products so these are available to consumers once demand has been catalysed.</p>
Consumer Awareness	As a result of previous programmes, such as that run by GEDAP, a high percentage of people in some regions have an awareness of solar. This knowledge is not uniform across the country, and where there is awareness many do not have a good perception of solar.	<p>Use awareness campaigns to help rebuild public trust in solar technology</p> <p>Create communications which present off-grid solar solutions as an opportunity so that support for them is politically viable for decision makers.</p> <p>In Bangladesh, a fund has been put in place that compensates those who purchase a SHS if the grid reaches them within 3 years. Due to the high rate of grid connection in Ghana and higher</p>

		expectation of connectivity - a similar approach may help drive individual and political support of off-grid solar.
Providing a Level Playing Field	The Government aims to eliminate kerosene subsidies but some remain. SHS practitioners are more concerned about giveaways and the promise of future grid connections (whether real or not) to deter customers.	Drive greater cooperation and communication between different stakeholders, to create an environment in which complementary activities can be developed by the public and private sectors
Consumer Financing	PAYG and mobile enabled systems are available in the Ghanaian market but a relatively low number of consumers use mobile money.	Capital finance for companies offering PAYG solar products would help boost the market (and help drive the uptake of mobile money services).
Level of Local Skills	While there are high levels of education and literacy, there is a lack of skills needed to underpin the off-grid sector.	Technical and sector specific training programmes and capacity building would help build foundations for the market.



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.