

Employment opportunities in an evolving market

GOGLA

The Voice of the Off-Grid Solar Energy Industry

Off-grid solar: creating high-value employment in key markets



Executive Summary

The off-grid solar sector has spurred a range of new employment opportunities in key markets. Sales of off-grid solar products, such as solar lanterns and home systems, have grown rapidly in emerging markets over the last decade, from under 1 million in 2010 to 26 million in 2017¹, generating employment across a range of key sectors and for different types and profiles of employment. As the off-grid solar market matures, the scale and nature of these jobs will continue to evolve.

This briefing note provides indicative results of research into direct employment in the off-grid solar sector, both now and in 2022. It draws on recent market research carried out by GOGLA, gathering data from close to 40 off-grid solar companies, including market leaders, on the types and level of employment in different types of positions. This data has been used to estimate industry-wide employment, building on current industry sales data, and projections of future sales. Jobs numbers are based on full-time-equivalency (FTE).

This note is the first in a series of three briefing notes to be released over the coming months, focussing on the potential employment and income effects of the off-grid solar sector. The second briefing note (to be released late 2018) will focus on the 'nature' of jobs created, including analysis of the role of high-skilled

workers. The third briefing note (to be released early 2019) will focus on the impact of off-grid solar products on recipients' productivity and income. A complete report bringing together all three notes and a detailed description of the methodology used will be released in early 2019.

In the emerging markets with significant energy deficits included in this study, the off-grid solar value chain could support up to 1.5 million FTE jobs by 2022, excluding manufacturing. Accounting for around 970,000 of these jobs, South Asia represents the largest market for employment, driven by a large volume of sales and strong existing employment opportunities which are expected to grow further.

The off-grid solar value chain will continue to create a range of opportunities, including for high-skilled, high value-add labour. In particular, the off-grid market creates jobs in over-the-counter cash sales, and for systems bought on credit under the pay-as-you-go (PAYG) business model. Particularly for PAYG, this involves skilled positions for sales and after-sale services, and for technicians and engineers for installation and maintenance of the products over their lifetime². For companies selling products via cash or PAYG, management and finance roles are also created.

¹ Sales data used in this note is from GOGLA/Lighting Global's semi-annual market data collection. Latest used is *Global Off-Grid Solar Market Report Semi-Annual Sales and Impact Data*, GOGLA, 2018. 26 million refers to affiliate and non-affiliates sales, sourced from *Off-Grid Market Trends Report*, Dalberg and Lighting Global, 2018.

² This will be covered in more detail in the second briefing note in this series to be released in late-2018.

Introduction to the off-grid solar value chain

There are four main parts of the off-grid solar (OGS) value chain, from initial technology acquisition and manufacturing, to sales and distributing of products, to technical installation, through to customer support and after sales services. Depending on the sales model and the chosen distribution channel, the proportional number of jobs within each category will change in line with the requirements of service delivery. Figure 2 provides an illustrative example of the value chain for the OGS sector, displaying the different types of jobs generated along the OGS products' journey to the customer, and after sale services.

The total employment generated by sales, and where this employment sits on the value chain, is highly dependent on the business model through which the technology is sold. This study differentiates between two business models: cash sales, which are over-the-counter purchases of an OGS system, and PAYG, where a product is bought on purchase using a consumer loan, paid over the life of the product.

As shown by Figure 1, the PAYG model has relatively more people employed to provide technical assistance and installation, manufacturing and acquisition as well as customer support. Cash sales on the other hand employ a larger proportion of employees under the sales and retail portion of the supply chain. Regions with relatively more sales under the PAYG model will typically see larger employment effects directly within the solar value chain, and arguably a higher concentration of skilled work given the higher proportion of jobs in after sales services.

To date, the services shown in the value chain have often been delivered, by a single, vertically integrated business. However, alternative delivery models are already developing, with businesses providing only part of the services in the value chain while forming partnerships and links to other companies who provide services at other points in the value chain.

Figure 1: The OGS product journey creates different types of employment across the whole value chain – Source: Vivid Economics

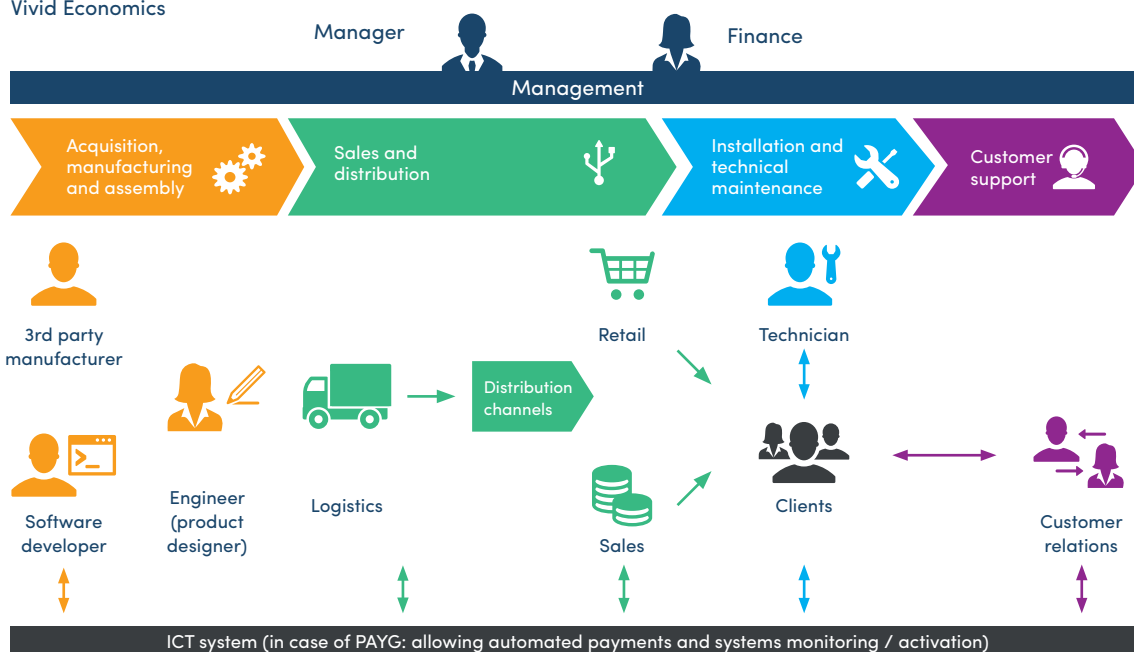
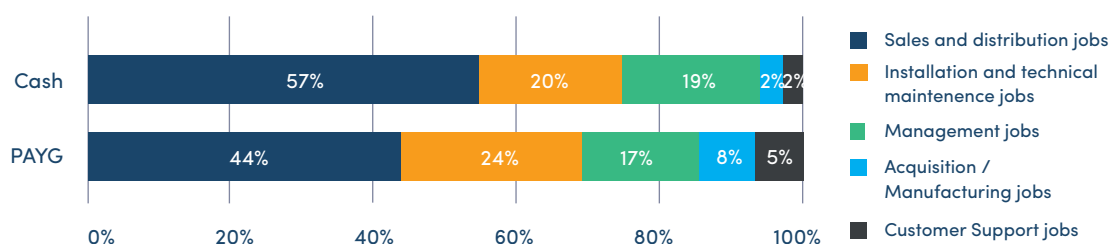


Figure 2: The split of employment across total jobs in the supply chain will differ according to the PAYG and over the counter cash sales – Source: Vivid Economics



NOTE Percentages represent the estimates of the proportion job-types in the value chain of the PAYG and cash sales for emerging regions as a whole

The off-grid solar value chain and job creation

This briefing note uses **direct employment and sales data for solar lanterns, multi-light kits and solar home systems, sold either over-the-counter or under a pay-as-you go model**. It does not include systems sold for productive use, such as solar irrigation pumps, captive power for agriculture or industry, or the future employment that would be created in associated sectors as the sales of off-grid solar grow, for example, jobs catalysed through the sale of appliances, increased use of mobile money or in a range of supporting industries. Nor does it consider the impact on the employment opportunities of recipients of an off-grid solar product. If productive use products, and the impacts on recipients were included, the employment impacts would of course be larger.

The value chain for off-grid solar products is international – sales in one region will generate employment both in the region and in other regions. In particular, manufacturing of components often takes place in a different location, for example panels produced in China or batteries in Germany. The data available for this study does not allow us to unpick this global value chain – indeed it can only link sales in a particular region to employment in that region. As noted above, the estimates do not include employment opportunities created by manufacturing³.

Employment opportunities are created and will evolve as the market develops in four key ways:

First, as markets grow and sales volumes increase, employment will generally increase. As new sales are generated, more employment will be needed to provide the products, and for before- and after-sale services.

Second, as the business models evolve, employment opportunities will also change in scale and in nature. In particular, as described above, an increasing share of PAYG sales will both generate more jobs per sale, and affect where these jobs are located in the value chain. The PAYG model employs more people related to after sales customer relations, as well as technical jobs such as software design and logistics. Part of the value offering of the PAYG model is an ongoing client provider relationship which includes a heavier focus on skilled jobs like software development and technical and customer support. In contrast, cash-based models will invest in effective and extensive sales networks, translating in a higher proportion of sales jobs across emerging regions.

Third, as the industry matures, the types of jobs associated with each business model (i.e. PAYG and cash) may evolve. The size and type of employment generated by sales will evolve as the market matures, and consumers begin to demand different types of products and services. Customers are increasingly purchasing larger multi-light systems and SHSs, a trend which is likely to continue. PAYG companies will need to provide innovative, high quality services to remain competitive. Similarly, cash sales-based business models may also need to innovate to compete against attractive PAYG financing models. They may need to improve their technical and customer support, as well as provide a better energy service. This may translate into more jobs in technology developments, as well as customer and technical support⁴.

Fourth, some off-grid energy solutions will enable increased access to employment and income opportunities. This is described in the recent Powering Opportunity report, and will be the focus of a third briefing note in this series⁵.

In addition to these direct impacts on the value chain, the evolution of the OGS sector will also respond to and trigger employment effects in related sectors. The projections presented in this note do not consider how related sectors, such as mobile money, tech sectors, or appliances and services enabled by access to an off-grid solar product, will grow in response to increasing demand from the OGS sector. Typically, growth in one sector will generate 'direct' employment (that is considered here), 'indirect' employment in sectors linked to the value chain through 'forward' (up the supply chain) and 'backward' linkages (down the supply chain)⁶. Finally, there may be an 'induced' employment effect, as the income generated by new jobs is spent elsewhere in the economy, generating a multiplier effect on employment in other sectors⁷.



3 A 2018 study by Economic Consulting Associates Limited/DFID, *Analysing the Feasibility of Local Manufacturing and Assembly within the Off-Grid Solar Lighting and Electrification Value Chain*, indicates that the volume of employment creation through off-grid solar in manufacturing is not substantial.

4 This effect has not been modelled because of lack of data. However insight from Lighting Global and Dalberg (2018) leads to that qualitative conclusion.

5 *Powering Opportunity: the Economic Impact of Off-Grid Solar*, GOGLA, 2018

6 Indirect employment generated by the OGS value chain will be examined further in the final report in this series to be released in early 2019.

7 *Powering Opportunity: the Economic Impact of Off-Grid Solar*, GOGLA, 2018

Disaggregated results

In East Africa, employment across the value chain is estimated to rise from 77,000 in 2018 to 350,000 in 2022⁸. East Africa is already a large market, with a relatively large proportion of PAYG sales. PAYG sales are expected to make up 62% of sales in the market by 2022, with cash sales comprising only 38%. This large proportion of PAYG sales in the market is expected to grow given trends in recent years, driving an increase in employment opportunities.

In South Asia, relative growth in employment is expected to be somewhat slower. However, absolute jobs numbers in this region will be the largest due to the high levels of product sales, rising from 340,000 in 2018

to 970,000 in 2030. The majority of sales have been cash based, which generates relatively fewer jobs. However, by 2022 the share of PAYG sales in the market are estimated to increase to 17%, from 2% in 2018, boosting employment in the PAYG sector.

West Africa and Central Africa show a smaller number of jobs in the market in 2022 as off-grid solar markets are less mature than those in East Africa and South Asia. However, similar to East Africa, the relative number of PAYG sales is higher which leads to a growth from 26,000 and 7,000 jobs to 150,000 and 70,000 in West and Central Africa respectively.

Table 1. South Asia represents the largest job market for the OGS sector in 2022, followed by East Africa – Source: Vivid Economics analysis of GOGLA employment data.

Region	East Africa	West Africa	Central Africa	South Asia
Gross jobs	350,000	150,000	70,000	970,000
Management	25%	25%	25%	32%
Acquisition / manufacturing	10%	10%	9%	9%
Sales and distribution	14%	14%	14%	14%
Installation and maintenance	37%	37%	36%	42%
Customer support	13%	14%	15%	2%

NOTE Jobs are shown in full-time equivalency (FTE). The total number of jobs created is therefore much larger than this.

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⁸ All job figures are given in full time equivalency (FTE) units.