Global Off-Grid Solar Market Report

Semi-Annual Sales and Impact Data

January - June 2016

PUBLIC REPORT

GOGLA Global Off-Grid Lighting Association

LIGHTING GLOBAL Catalyzing markets for modern off-grid energy

AN INNOVATION OF WORLD BANK GROUP THE WORLD BANK IBRD • IDA IFC International Finance Corporation

Berenschot

Authors' Note

Welcome to the latest Global Off-Grid Solar Semi-Annual Market Report. This report reflects sales results for the period of January 1 to June 30 2016, and the performance of 50 companies which have shared data with us.

The report represents the continued expansion of the Market Trends partnership between Lighting Global and GOGLA, linking to the biennial Off-Grid Solar Market Trends Report released earlier this year. Together, this series provides industry members, investors and other stakeholders with the definitive snapshot of progress across the dynamic global solar off-grid market, and with it, the most comprehensive overview of the sector available anywhere.

Our sector is characterized by continuous and rapid change. An ever-expanding array of products and a diverse range of business models continue to reach multiple market segments. The Lighting Global/ GOGLA Market Survey has kept pace with these changes, as participation in the survey continues to grow, providing an even more robust and inclusive picture of the sector.

As the market landscape shifts, this semi-annual report will continue to deploy its growing data set to highlight key trends and changes underlying the market's development. We hope this market intelligence will inform key players in the sector: distributors, manufacturers, investors, as well as the development institutions who seek to support the industry. The analytical insights are designed to assist these stakeholders in making more informed decisions.

It is widely accepted in the development community that universal energy access can only be achieved through a vibrant, commercial market. The data highlighted in this report supports this thesis. In addition to tracking sales and revenues, the report also quantifies key social impacts of the sector – vital for ensuring ongoing engagement with governments and donor agencies.

Koen Peters, *Executive Director, GOGLA*

Russell Sturm, *Global Head, Energy Access, International Finance Corporation*

Content Team

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About the Authors

This report is produced by Lighting Global and GOGLA, with the support of UNCDF and the assistance of Berenschot.

Lighting Global

Lighting Global is the World Bank Group's platform to support sustainable growth of the international off-grid solar market as a means of rapidly increasing energy access to people without grid electricity. Through Lighting Global, the International Finance Corporation (IFC) and the World Bank work with the Global Off-Grid Lighting Association (GOGLA), manufacturers, distributors, and other development partners to develop the modern off-grid energy market. The Lighting Global program — in partnership with industry — provides market insights, steers development of quality assurance frameworks for modern, off-grid lighting devices and systems, and promotes sustainability.

Global Off-Grid Lighting Association

The Global Off-Grid Lighting Association (GOGLA) is a neutral, independent, not-for-profit association created to promote lighting solutions that benefit society and businesses in developing and emerging markets. GOGLA acts as the industry advocate and supports the industry in growing and strengthening the market for clean, quality off-grid lighting and electrical systems. Its main objective is to support industry in scaling the sector based on principles of the triple bottom line, thus contributing to the objectives of Sustainable Energy for All (SE4All) and the Sustainable Development Goals (SDGs).

United Nations Capital Development Fund

The United Nations Capital Development Fund (UNCDF) is the UN's capital investment agency for the world's 48 least developed countries. With its capital mandate and instruments, UNCDF offers "last mile" finance models that unlock public and private resources, especially at the domestic level, to reduce poverty and support local economic development.

Berenschot

Berenschot is a leading Dutch management consultancy firm with an extensive track record in supporting industry associations, including on market data collection. Berenschot has recently been elected by clients as the best management consultancy firm of the Netherlands. As member of the Dutch Council for Management Consultants (ROA) Berenschot is committed to ROA terms and conditions which require them to maintain a high standard of confidentiality.

Front cover © **Little Sun/Aminata Nimaga**

Table Of Contents

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Overview

There are 1.2 billion people without access to the power grid, and they spend about US$ 27 billion every year on lighting and mobile phone charging with kerosene, candles, battery torches or other fossil fuel-powered stopgap technologies. Solar-powered portable lights and home kits offer a better, cleaner service at a lower cost. Nuanced, high quality data is key to better understanding the maturation and development of this fast-growing market as well as its social impact.

In response to demand from investors, manufacturers, distributors and other players in the off grid solar industry, the Global Off-Grid Lighting Association (GOGLA) and the Lighting Global Program have combined forces to gather semi-annual product sales and impact data that will allow for systematic identification of key trends, analytical insights and other valuable market intelligence for the sector.

Presented in this report are the aggregated results of the fourth joint sales data collection round and the second social impact data collection, covering the period of January 1 to June 30, 2016. This public report is provided to share aggregate non-confidential data with stakeholders in the off-grid solar industry.

All providers of sales data receive their own individual tailored report that indicates their share of all relevant markets.

This ongoing market intelligence not only helps industry members and financiers to make informed decisions, it also strengthens the case for the developmental impact made by the sector.

Report Highlights

World

4.3 million

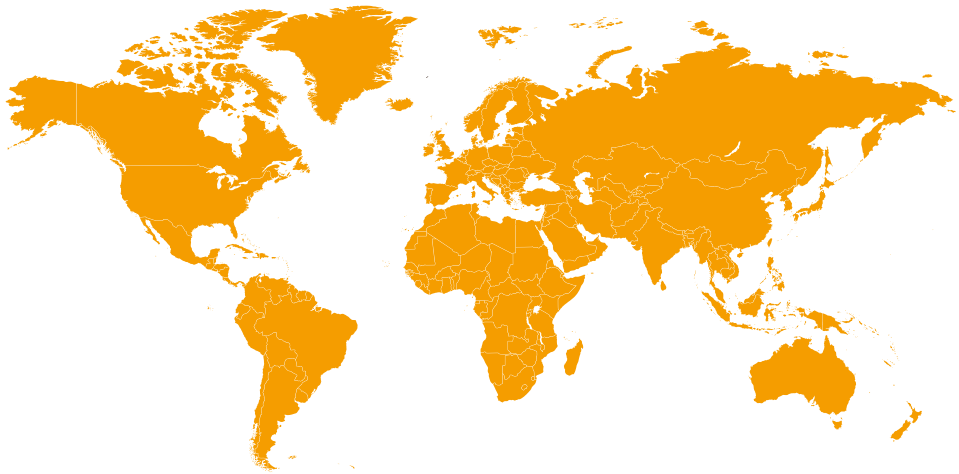
Products sold
globally in H1 2016

Quality verified products

Represent almost **80%**
of all sales & over
75% of all revenues from
cash sales in H1 2016

US$ 139 million

Cash sales revenues in H1 2016
(excluding PAYGO revenues
due to incomplete data)



23.5 million

Cumulative product sales
since July 2010, **20.5 million**
of these being quality
verified

Over 18% increase in revenues while unit volume remains largely the same

Reported sales between H2 2015 & H1 2016
increased by about 210,000, while cash sales
revenues increased by over $ 21 million

Product Categories

Table 1 - Report Highlights. Product Categories

	0-1.5 Wp	1.5-3Wp	3-10Wp	11-100+Wp
Volume of products sold (units)	>1.83 million (42%)	>1.48 million (34%)	>0.74 million (17%)	>0.20 million (including PAYGO unit sales) (5%)
Cash sales revenues (in million US$)	$ 21.4 (15%)	$ 62.4 (45%)	$ 39.4 (28%)	$ 13.4 (excl. PAYGO revenues) (10%)

Products in the 0-3Wp range now represent about 76% of all reported sales while in H2 2015 they represented 93%. They now amount to about 60% of cash sales revenues globally while in H2 2015 they represented about 80%.

The volume of 11-100+Wp products sold increased from 132,000 in H2 2015 to about 204,000 in H1 2016 - a 55% increase.

The volume of 3-10 Wp multi-light solar systems sold increased nearly five-fold from over 150,000 units in H2 2015 to just under 750,000 units in H1 2016.

Regions

Sales have been highly concentrated in East Africa and India.

Sub-Saharan Africa

1.96 million
Units sold

US$ 56 million
Cash sales revenues

East Africa represents about **70%** of total sales volume in the region and **77%** of revenues.

South Asia

1.76 million
Units sold

US$ 48.2 million
Cash sales revenues

The vast majority of these sales are concentrated in **India**, with **1.72 million** units sold, and **$ 47.51 million** in cash sales revenues.

Social Impact Metrics

100.45 million
People with Improved Energy Access, historically

2.08 million
Livelihoods Supported, currently

93.58 million
People with Improved Energy Access, currently

36.52 million
People with Tier 1 Energy Needs Met, currently

$ 4.33 billion
Savings on Energy-related Spending, total over product-lifetime

$ 198
Savings on Energy-related Spending, per household

20.8 million

Number of status quo Lighting Sources no longer in use

177%

Change in Available Hours of Light, per household

133%

Change in Available Light Output

NOTE

For more details on the social impact metrics presented above, please refer to the Social Impact section of this report (see page 38).

Further information on the multi-tier framework and the measurement of off-grid electrification can be found in Beyond Connections: Energy Access Redefined [1]

[1] https://www.esmap.org/node/55526

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Market Dynamics

Understanding this report requires looking beyond the numbers and into the range of market drivers, including:

- Policy change affecting duties, taxes, government stance on standards and importation;
- The role of development finance institutions, donor agencies and government market interventions;
- Technology development: decreasing prices, improved performance and introduction of new functionality;
- Availability of finance, in particular working capital and FOREX;
- Macro-economic factors, in particular exchange rate fluctuations;
- Seasonal trends, the first half of a year typically yields slower sales than the second half and rural people's purchasing power being linked to seasonal fluctuation in agricultural incomes;
- Competitive dynamics, especially in relation to competition from generic, counterfeit and look-a-like products.

For the H1 2016 period, significant points of influence included:

Working capital: Several companies in various markets, most notably Tanzania, reported this being a major factor in declining sales, partially due to stock-outs caused by supply chains running dry. The highly impactful World Bank/Development Bank of Ethiopia working capital facility has been exhausted, although replenishment and expansion funds have now been released. Meanwhile, lack of both hard currency and working capital has led to a reduction in product supply needed to satisfy demand.

Counterfeits: Market reports indicate a precipitous and growing presence of counterfeits and copycat products, especially in the Ethiopian and Tanzanian markets. This trend seems to have been exacerbated by the above mentioned constraints on working capital finance, resulting in stock-outs creating an opening for shipments of cheap alternatives.

Customs and policy: One example of the immediate impact of a policy change on the market is visible in Ethiopia, where in H1 2016, the national quality standards were changed to require local testing for each product (whether quality verified or not) by the Ethiopian Bureau of Standards. This has led to large volumes of products being impounded on entry, causing manufacturers to decrease shipments or send them elsewhere until the situation changes. Meanwhile, positive government and DFI initiatives have driven sales in Benin, Nigeria and Rwanda.

Market Insights

Global Changes

The total volume of product sales reported worldwide has increased by 5% from 4.1 million to 4.3 million. Meanwhile, aggregate revenues generated through cash sales alone have increased by 18% in that same period, from US$ 118 million to US$ 139 million. This reflects the greater number of reported sales of larger and more expensive products (> 3 Wp).

At the global level, reported sales of 0-3 Wp products have decreased (~13%). They now represent about 77% of all reported sales globally (60% of corresponding cash sales revenues) while in H2 2015 they represented 93% of reported unit sales (80% of all cash sales revenues). In contrast, reported sales of 3-10 Wp multi-light solar systems experienced nearly a 5-fold increase (from over 150,000 to just under 750,000 units).
The global unit sales volume of 21-100+ Wp SHS increased by 149% from around 52,500 to about 131,000 units.

Sub-Saharan African Markets

Between H2 2015 and H1 2016, overall pico-PV/SHS unit sales volumes dropped by almost 12% in Sub-Saharan Africa. This reflected a drop in sales in the core-market East African countries.
In Ethiopia, overall sales have seen a 37% decrease (363,950 to 231,097 units) although categories of larger pico-PV products have actually increased over the same period. The 60% overall decrease in unit sales in Tanzania is mainly concentrated in lower sales of the smallest category of pico-PV products in comparison to H2 2015 (80% decrease). Although less pronounced, a similar trend is visible in Kenya. However, in Kenya the sales of larger products have increased enough to result in an overall increase of 19% in the reported volume of products sold.

Significant increases are to be seen in sales in Benin (+515%), Nigeria (+73%), and Rwanda (+53%), with continued growth in Uganda (+28%).This is the first time that countries outside of Ethiopia, Kenya, Tanzania and Uganda are reporting sales of more than 125,000 units.

South Asian Markets

Sales have gone up by 12% in South Asia between H2 2015 and H1 2016. Sales of 0-1.5 Wp single light products have notably increased by about 10% in the region and sales of 3-10 Wp products have gone up from about 35,000 to about 227,000 in that period – a 547% increase. India accounts for nearly all reported sales in this market, representing 98% of reported sales volumes and 99% of reported sales revenues.

Pay-As-You-Go Reporting

For the first time, this report features sales volume data from all the major players in the off-grid solar pay-as-you-go (PAYGO) sector. However, the majority of these companies have declined to disclose revenue data for this period as it was generally felt to be too sensitive. The aggregate PAYGO revenues that were reported (by the minority of companies) have therefore not been included in this report, as they do not adequately capture the revenue generated in this period by the overall PAYGO sector. GOGLA and IFC will conduct a consultation with PAYGO companies prior to the next round of data collection to satisfy confidentiality concerns whilst enabling reporting of aggregate revenues from PAYGO sales in future rounds, at least at the global and regional levels.

Social Impact Metrics

Compared to the last reporting period, we observe a strong increase in the number of people accessing clean energy. 22 million more people can now enjoy improved energy access, including over 9 million more people meeting basic Tier 1 energy access requirements, as defined by the SE4All tracking framework. This can, however, not be fully attributed to sales in the first half of 2016, as many companies shared their sales information for the first time for this report. To calculate the installed base (i.e. all products sold by a company that are currently in use), companies were requested to report their sales over the last three years. The installed base is the basis for many of the social impact metrics; therefore, sales reported beyond H1 2016 also explain a portion of the increase in the number of people with improved access.

In terms of services, the increased sales in the categories beyond 3 Wp, coupled with advancements in technology, have led to an improved light output of 23 percentage points as well as an increase of 7 percentage points in available hours of light, on average, when compared to the last reporting period. As these systems are more expensive than 0-3 Wp products, the average household savings over the lifetime of a product decreased slightly, from US$ 205 to US$ 198.

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Research Methodology

Introduction

The data in this report is limited to that provided by GOGLA member companies and Lighting Global Quality Verified companies using an online questionnaire.

Companies are classified either as distributors of other companies' branded products or as manufacturers of their own branded products. Only aggregate data is presented here, and it is only included when it has satisfied our 'three data point rule', meaning that at least three separate product manufacturers have reported data for any single data point. When we have less than three respondents' answers, no results are shown. This protects the proprietary interests of the companies who have supplied data in support of this industry report.

All data is self-reported by the companies, and while it is cross-checked for consistency, the companies are responsible for accurate reporting of product specifications, pricing information, sales volumes and locations of sales. Companies may also choose to report sales volumes but not revenues. If not all information needed to calculate the impact of a product was provided, the product was not included in the impact data calculation.

As in the previous three collection rounds, this data collection and reporting process was overseen by Dutch management consultancy firm Berenschot. Besides adding management capacity and expertise, they provide the safeguard that all company-specific data remains confidential and undisclosed to the industry association GOGLA. Lighting Global provided specialist industry knowledge within the research team and the market research firm Research 2Evolve (R2E) collected and processed the data. GOGLA advised the team, but had no access to company specific data beyond product specifications.

Table 2 - List of Respondents

Respondents		
All Solar Lights	Mobisol	Schneider Electric
Azuri	Nadji-Bi	Simpa Networks
Barefoot Power	NewLight Africa (Heya!)	Sinoware
BBOXX	Niwa	Smarter Grid International
Bright Products AS	Nizam Energy	Solar Sister
BrighterLite	Nokero International Ltd.	Solarkiosk
d.light	Nova-Lumos	Solarland
Fenix International	Nuru Energy	SolarWorks!
Flexiway Solar Solutions	Off-Grid: Electric	Sunlite (India Impex)
Fosera	OmniVoltaic Energy Solutions	Sunny Money (Solar Aid)
Futura Sun	One Degree Solar	Total
Greenlight Planet	Orb Energy	Videre Global
Jua Energy	OvSolar	Village Boom
Little Sun	Panasonic	Village Power
M-KOPA	Philips Lighting	Waka-Waka (Off-Grid Solutions)
Mibawa Suppliers	RAL Consumer Products Limited	Zimpertec
Micart (Micro-Mark)	Renewit	

The data presented here was provided by a total of 50 companies. This represents a 60% increase in the number of respondents from the previous round (31).

Of the respondents, 44 are manufacturers / producers of branded off-grid solar products and 6 are non-manufacturing distributors of products branded by others. The 44 manufacturers reported 167 unique products. To prevent double counting, only the sales of manufacturers are reported in this aggregated report. The data for non-manufacturing distributors helps to validate this data and will inform the companies of their individual market shares.

Among the respondents, there are 20 companies that sell or lease products on a "pay-as-you-go" basis. Of these, 11 companies are organized solely around the PAYGO model of delivering energy services and receiving payments.

Along with collection of sales for the period being reported here, companies were also asked to report annual aggregate global sales per product since 2012. This longitudinal (historical) data was used to identify trends over time and to calculate the installed base (the number of products globally that are still working). This, in turn, was used to calculate social impact metrics.

Data Processing

Quality Verified Versus Non-Quality Verified

In this report the terms 'Quality verified' and 'Non-quality verified' are used. Quality verified means that the product or kit has met the IFC Lighting Global Quality Standards (using the IEC Technical Specification 62257-9-5) during the current reporting period. These quality standards have been widely adopted as the third party verifiable measure of quality for off-grid lighting products and SHS kits across the world. For example, twenty national governments, three of them in Asia (Bangladesh, Cambodia, Nepal) and seventeen in Africa (Ethiopia and Kenya, plus the ECOWAS group of countries – Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo) have adopted favorable policies to benefit quality verified off-grid lighting products that have passed IEC Technical Specification 62257-9-5. Donor programs targeting support to products in the sector routinely use meeting the quality standards as eligibility criteria for receiving support.

Non-quality verified means that technical performance and quality of the product is not verified as meeting the quality standards during the reporting period. It is important to note that the absence of quality verification does not imply that products are of lower quality and there are a variety of legitimate reasons for products not being quality verified.

Data Checks

The research team checked the entered data for consistency and logic in relation to previously collected data by Berenschot or IFC. Based on these checks, some small adjustments have been made to the data, mainly concerning panel wattage and the status of products being 'quality verified' or not.

Missing Data

Where meaningful data was missing, we tried to address this by consulting our existing data sets, or by contacting respondents. Unfortunately, even after these actions, some data was still missing.

Market Share Represented

Based on previous analysis by Bloomberg New Energy Finance for the Off-Grid Solar Market Trends Report 2016, we estimate that the data reported here represents about 50% of all sales of off-grid solar products in the markets relevant to this report, when also considering non-branded generic products on offer.

Product Categories

Data has been grouped into product categories in order to segment sales in a way that provides the most value and information to the market. From a market perspective, the most meaningful segmentation is based on functionality and capacity. Panel wattage (in watt-peak) was used as a proxy for both criteria. In a very limited number of cases, products were manually categorized to fit them in the right functionality category. The definitions of these categories are presented in the table.

The level of energy access enabled through use of these pico-PV products and solar home system kits is indicated below using the terminology of the global tracking framework for measuring energy access developed by Sustainable Energy for All.

Table 3 - Product Categories

Overall Category	Pv Panel Capacity	Categorization By Services	Corresponding Level Of Mtf Energy Access
Pico PV (10Wp or less)	0 – 1.5 Wp	Single Light only	Systems can provide a person with basic lighting access and contribute to meeting a households Tier 1 Electricity Access needs
	1.5 – 3 Wp	Single Light & Mobile Charging	More powerful systems provide Tier 1 Electricity Access to at least one person and contribute to meeting a household needs
	3 – 10 Wp	Multiple Lights & Mobile Charging	Systems provide Tier 1 Electricity Access to more than one person, up to a household
SHS (11-100Wp)	11 – 20 Wp	SHS, Entry Level (3-4 lights, mobile charging, powering radio, fan, etc.)	Systems provide Tier 1 Electricity Access to more than one person, up to a household
	21 – 49 Wp	SHS, Basic capacity (above plus power for TV & extended capacity)	More powerful systems can provide Tier 2 Electricity Access to a household when coupled with high-efficiency appliances
	50 – 100 Wp	SHS, Medium capacity (above but with extended capacities)	Systems provide Tier 2 Electricity Access to a household
	100+ Wp	SHS, Higher capacity (above but with extended capacities)	Systems provide Tier 2 Electricity Access to a household

NOTE

Further information on the multi-tier framework and the measurement of off-grid electrification can be found in Beyond Connections: Energy Access Redefined[1]

[1] https://www.esmap.org/node/55526

Market Overview: Off-Grid Solar

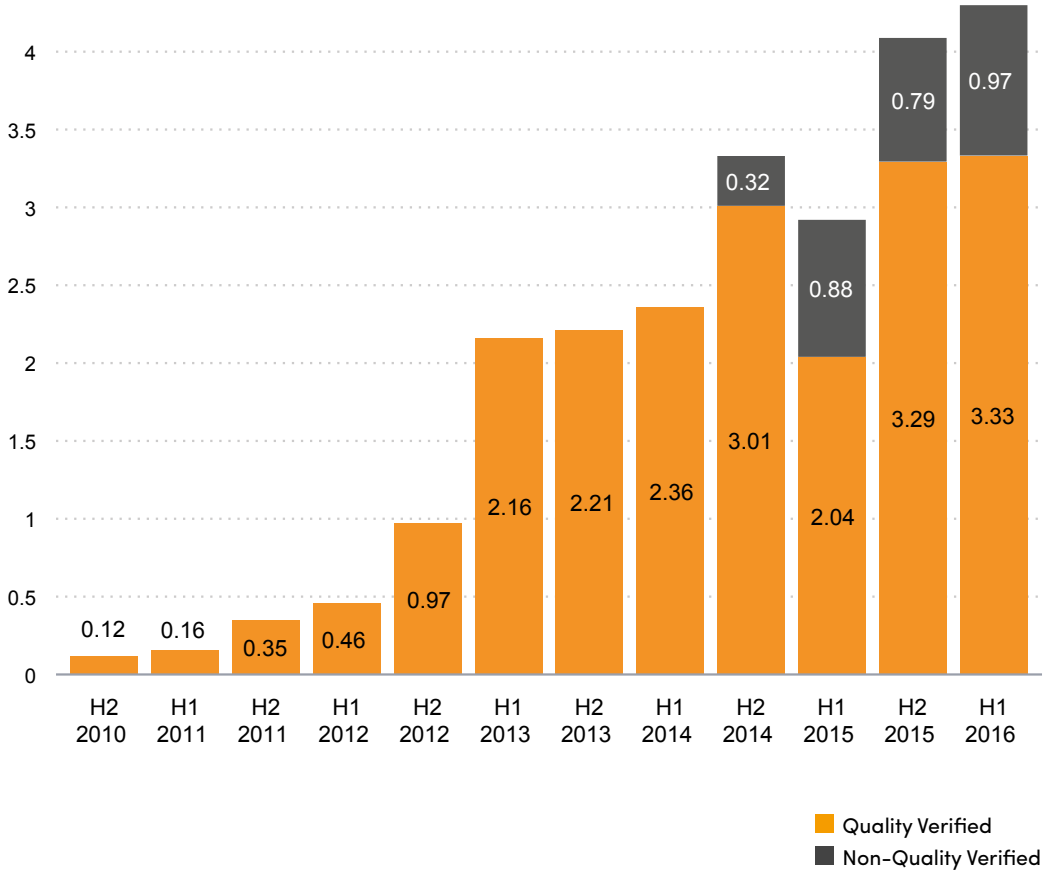
Historical Product Sales - **World**

The following graphs compare the current sales count with previous counts, highlighting the development of the off-grid solar industry. Globally, reported sales volumes grew by 5.1% between H2 2015 (4.09 million units) and H1 2016 (4.30 million units). However, there has been a decline in reported sales volumes in Sub-Saharan Africa by about 12% from 2.22 million units sold in H2 2015 to 1.96 million in H1 2016.

When looking at cumulative data since sales reporting began in July 2010 (see Figure 3), 20.5 million quality-verified product sales have been reported by the end of H1 2016. Taking non-verified products into account adds 3 million more product sales to the final result.

Figure 1 - Volume of Products Sold (Quality & Non-Quality Verified) in millions

SOURCE – LIGHTING GLOBAL, GOGLA, BERENSCHOT



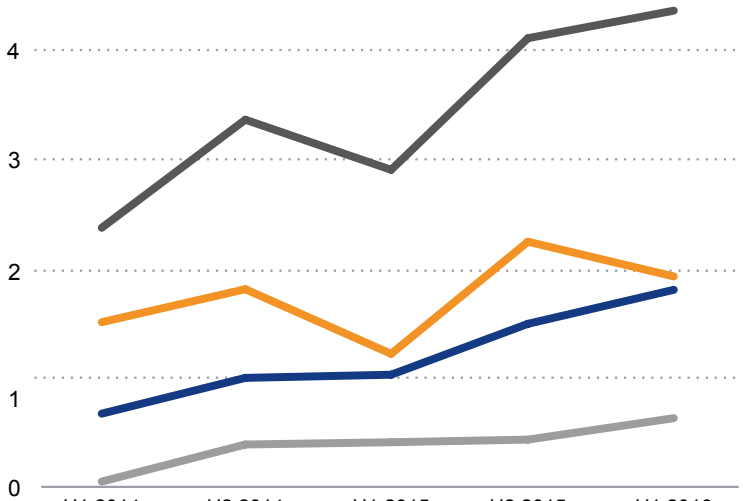
NOTES

1. The data presented in this chart has been compiled from various sources: The data from H2 2010 to H1 2014 originates from Lighting Global's own data collection, while the data from H2 2014 to H1 2016 comes from the joint Lighting Global / GOGLA / Berenschot data collection process. The methodology and the questions used have evolved over time and the number of respondents has increased with each round of data collection. Therefore, the data presented above does not constitute the basis for in depth statistically correct analysis. However, it does indicate market trends at a superficial level and it is likely to reflect the actual evolution of the market since it encompasses data from most of the industry leaders. The increasing number of respondents also reflects the increasing number of players that enter this space every year. As the data collection process is improved with every round, with companies submitting their data on a consistent basis, we will be be able to paint an evermore accurate picture of the market.
2. Based on previous analysis by Bloomberg New Energy Finance for the Off-Grid Solar Market Trends Report 2016, we estimate that the data reported here represents about 50% of all sales of off-grid solar products in the markets relevant to this report, when also considering non-branded generic products on offer.

Historical Product sales - **Regions**

Figure 2 - Volume of Products Sold in millions

SOURCE – LIGHTING GLOBAL, GOGLA, BERENSCHOT



	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016
Sub-Saharan Africa	1.61	1.86	1.37	2.22	1.96
India	0.71	1.05	1.16	1.46	1.72
Rest of World	0.04	0.39	0.39	0.41	0.62
Total	2.36	3.3	2.92	4.09	4.30

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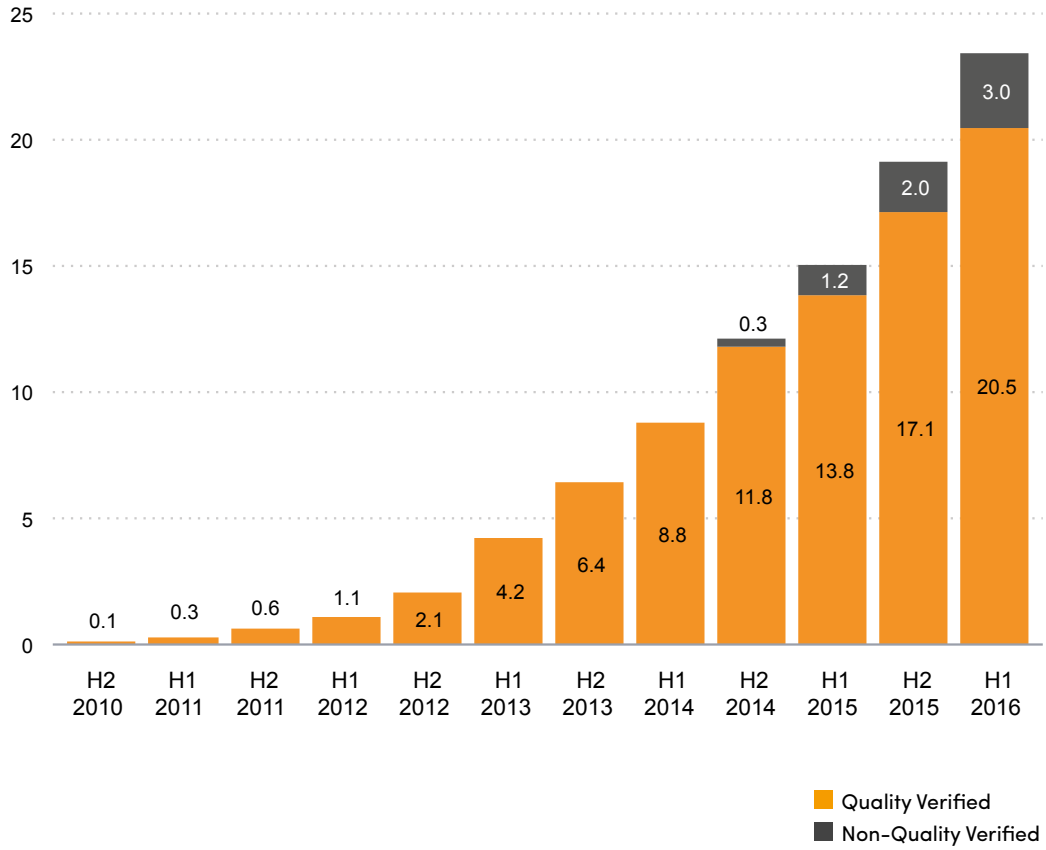
Cumulative Product Sales - **World**

Figure 3 - Cumulative Product Sales (Quality & Non-Quality Verified) In Millions, World

SOURCE – LIGHTING GLOBAL, GOGLA, BERENSCHOT



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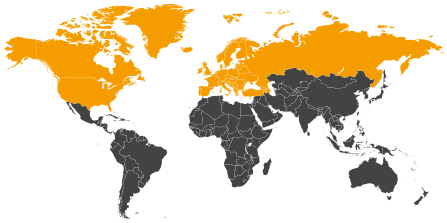
2. Based on previous analysis by Bloomberg New Energy Finance for the Off-Grid Solar Market Trends Report 2016, we estimate that the data reported here represents about 50% of all sales of off-grid solar products, when also considering non-branded generic products on offer.

Volume of Products Sold & Cash Sales Revenues in US$ -

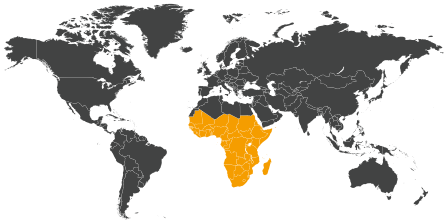
World & Regions



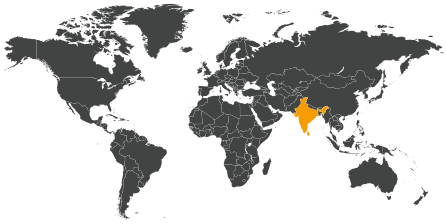
West Africa
386,458
$ 8,225,194

East Africa
1,388,531
$ 43,271,928

Rest of World
105,904
$ 3,600,113



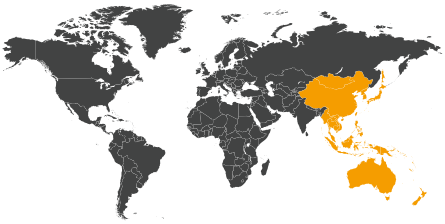
Sub-Saharan Africa
1,956,810
$ 55,990,030



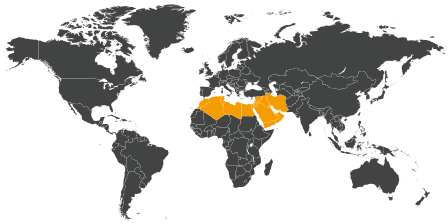
South Asia
1,758,239
$ 48,202,810

World
4,298,655
$ 138,962,442

Latin America & Caribbean
27,643
$ 1,339,654



East Asia & Pacific
112,268
$ 9,501,250



Middle East & N. Africa
337,791
$ 20,328,585

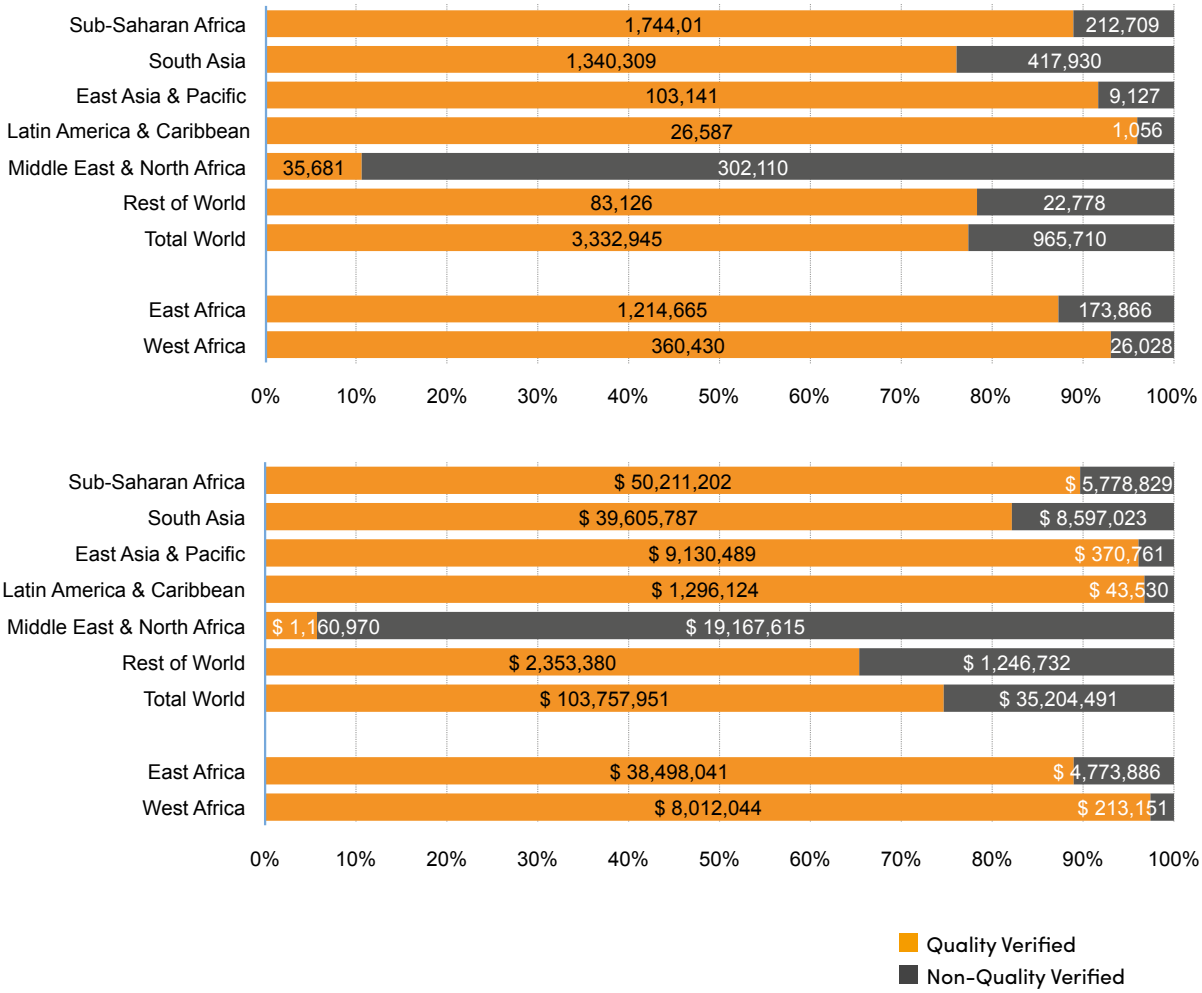
At the global level, about 4.3 million products have been sold in the first half of 2016. Sub-Saharan Africa and South Asia account for approximately 1.96 million (45.5%) and 1.76 million (40.9%) respectively. The Middle East & North Africa region was third with a significantly lower reported number of products sold – 337,791 (7.9%). The combined sales of all other regions amounts to about 245,815 products.

The combined cash sales revenues in H1 2016 amount to about US$ 139 million globally. Most of the revenues in H1 2016 were generated in Africa (US$ 56 million) and South Asia (US$ 48 million). Another 14.6% (US$ 20 million) of all cash sales revenues come from the Middle East and North Africa region.

Quality-verified product sales represent approximately 77.5% of all reported sales worldwide in H1 2016 (Figure 5) as measured by volume. In Sub-Saharan Africa, quality-verified products constitute over 89.1% of all reported sales. In East Asia & Pacific and South Asia, the sales of quality-verified products account for 91.9% and 76.2% respectively of all reported sales. In contrast, non-quality verified products represent the bulk of sales in the Middle East and North Africa with an 89.4% share of reported sales by volume.

Reported cash sales revenues follow a similar breakdown in terms of quality-verified vs. non-quality verified products. Globally, revenues from the sale of quality-verified products represent about 74.7% of all revenues from cash sales. In Sub-Saharan Africa, South Asia and East Asia & Pacific, the revenues of quality-verified products account for 89.7%, 82.2% and 96.1% of all regional revenues, respectively. Only in the Middle East and North Africa region do revenues from non-quality verified products surpass those of quality-verified ones with 94.3%.

Figure 4 - Volume of Products Sold & Cash Sales Revenues in US$
Quality Verified Vs. Non-Quality Verified - World & Regions



NOTES
1. The list of countries per region for which data was collected is provided in Annex 1.
2. Only cash sales revenues are presented at the regional level – this excludes PAYGO revenues.
3. Cash sales revenues for a given product are estimated by multiplying the volume of products sold by the reported FOB price and a factor to approximate the retail price. This is only possible when all data is available and it satisfies our 'three data point rule'. Dividing the presented sales revenues by the volume of products sold does not equate to the average product retail price.

NOTES (FIGURE 4)
1. The list of countries per region for which data was collected is provided in Annex 1.
2. Data is not reported in the categories for which insufficient data points were provided.
3. The absence of a bar means that either no data was available or that not enough data points were available to report.
4. Quality verified means that the product or kit has met the IFC Lighting Global Quality Standards during the current reporting period.
5. Only cash sales revenues are presented – this excludes PAYGO revenues.
6. Dividing the presented sales revenues by the volume of products sold does not equate to the average product retail price.

Volume of Products Solar & Cash Sales Revenues in US$ -

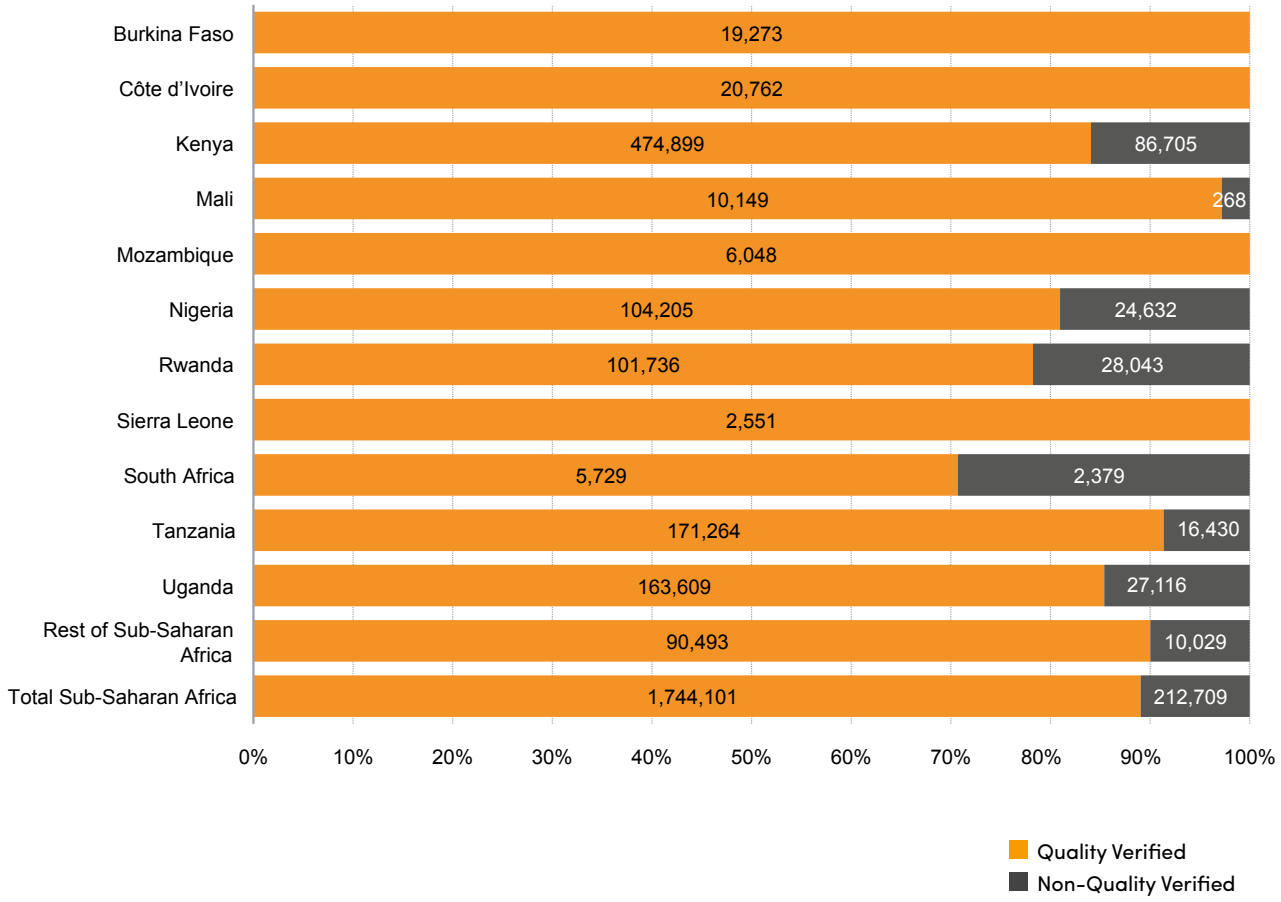
Quality-Verified vs. Non-Quality Verified by Region

At the country level, Burkina Faso (19,273 products sold), Côte d'Ivoire (20,762 products sold), Mozambique (6,048 products sold) and Sierra Leone (2,551 products sold) reported a 100% market share for quality-verified products, as seen in Figure 6. In South Africa, on the other hand, non-quality verified sales account for over 29% of all reported sales by volume, and for 51.8% of reported revenues.

All reported sales by volume and cash sales revenues stem from quality-verified products in Bangladesh, as depicted in Figure 7, while over 50% of reported sales in Pakistan and nearly 80% of sales in Nepal consist of non-quality verified products.

In India, reported sales volumes and cash sales revenues of quality-verified products account for 76.9% and 82.6% of total reported sales, respectively.

Figure 5 - Volume of Products Sold
Quality Verified Vs. Non-Quality Verified - Sub-Saharan Africa



NOTES
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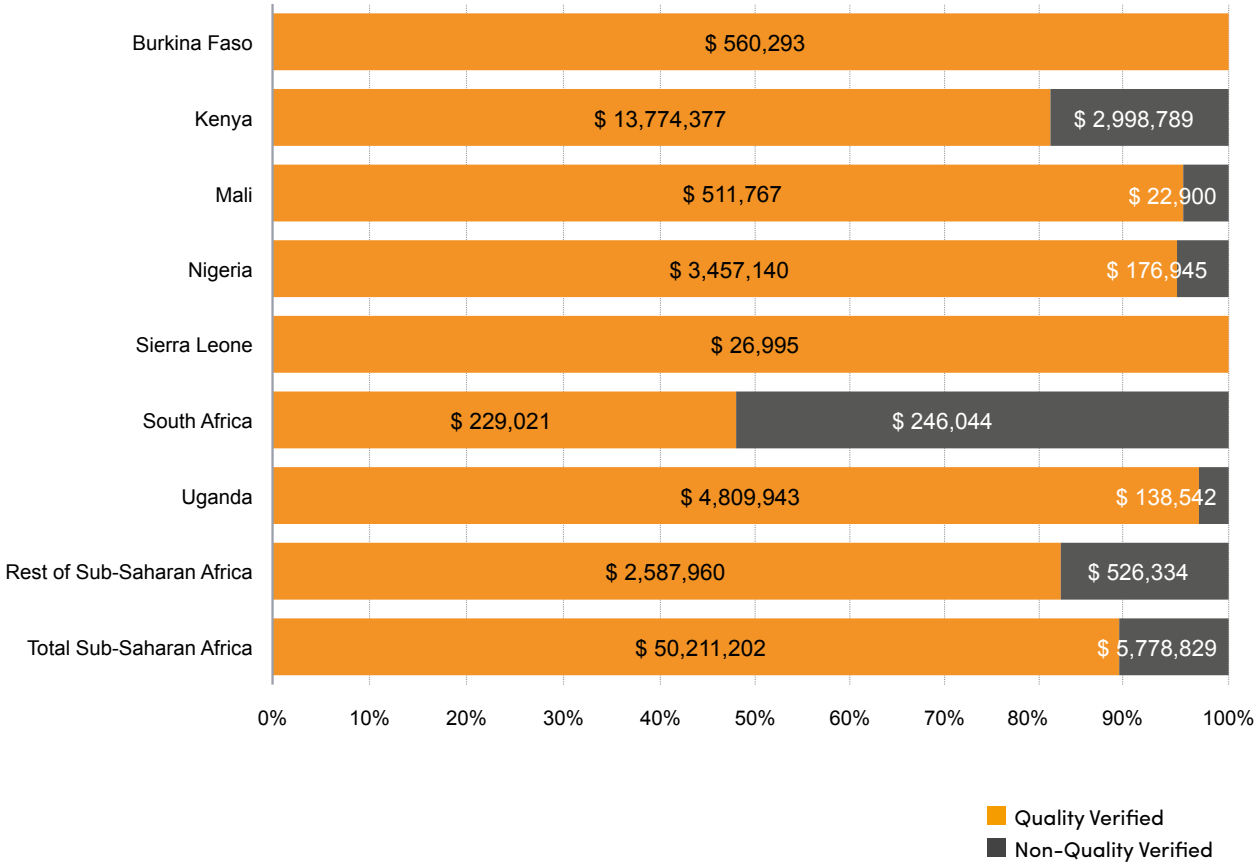
2. Data is not reported in the categories for which insufficient data points were provided.
3. The absence of a bar means that either no data was available or that not enough data points were available to report.
4. Quality verified means that the product or kit has met the IFC Lighting Global Quality Standards during the current reporting period.

Figure 6 - Cash Sales Revenues in US$
Quality Verified Vs. Non-Quality Verified - Sub-Saharan Africa



NOTES

1. The list of countries per region for which data was collected is provided in Annex 1.
2. Data is not reported in the categories for which insufficient data points were provided.
3. The absence of a bar means that either no data was available or that not enough data points were available to report.
4. Quality verified means that the product or kit has met the IFC Lighting Global Quality Standards during the current reporting period.
5. Only cash sales revenues are presented – this excludes PAYGO revenues.
6. Dividing the presented sales revenues by the volume of products sold does not equate to the average product retail price.

Figure 7 - Volume of Products sold
Quality Verified Vs. Non-Quality Verified - South Asia

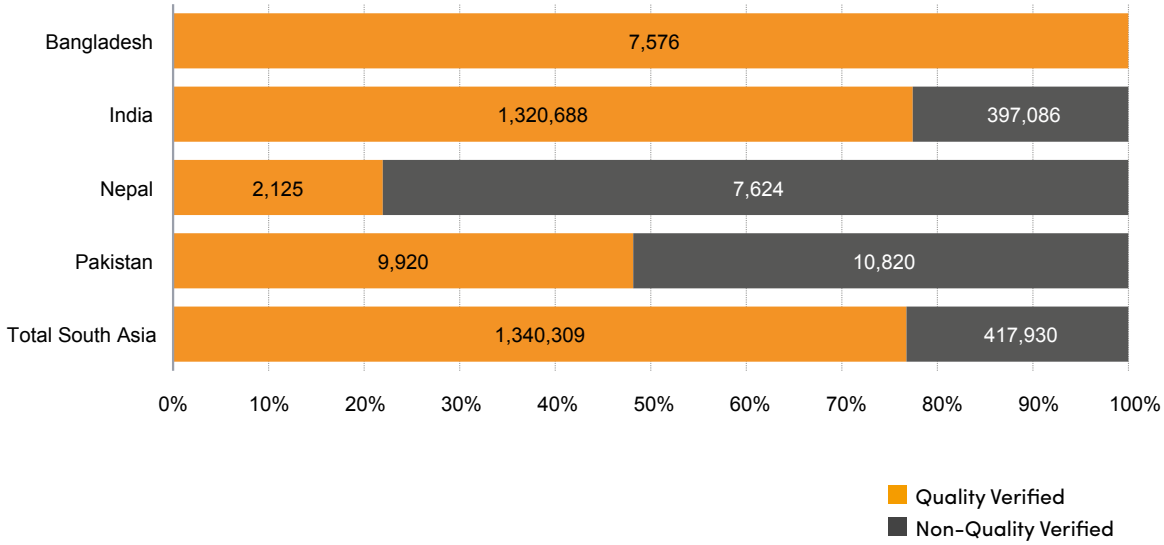


Figure 8 - Cash Sales Revenues in US$
Quality Verified Vs. Non-Quality Verified - South Asia

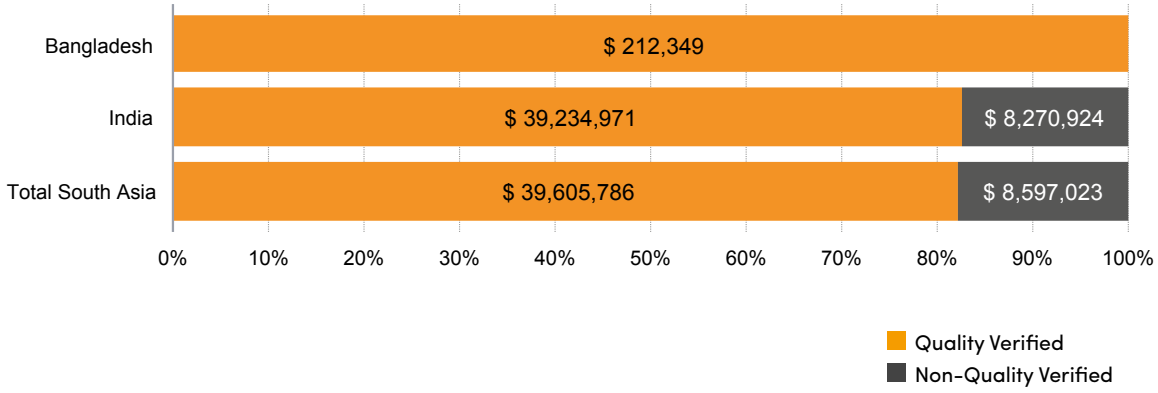


Figure 9 - Volume of Products sold
Quality Verified Vs. Non-Quality Verified - East Asia & Pacific

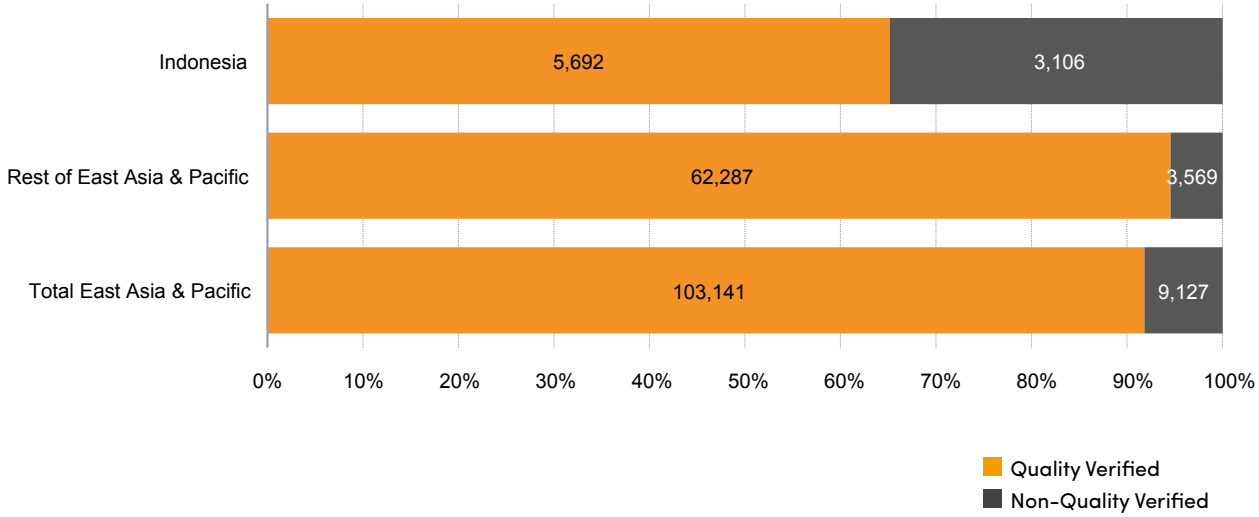
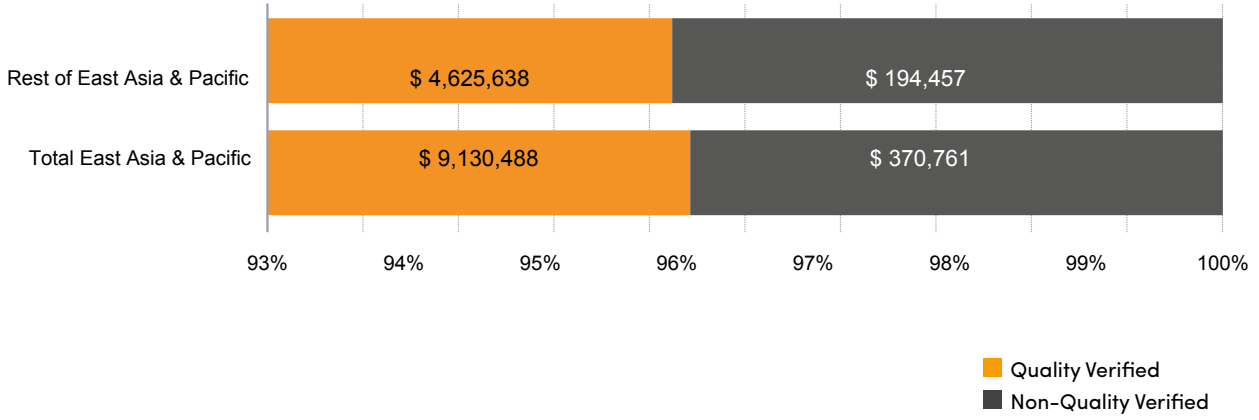


Figure 10 - Cash Sales Revenues in US$
Quality Verified Vs. Non-Quality Verified - East Asia & Pacific



NOTES
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2. Data is not reported in the categories for which insufficient data points were provided.
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5. Only cash sales revenues are presented – this excludes PAYGO revenues.
6. Dividing the presented sales revenues by the volume of products sold does not equate to the average product retail price.

Volume of Products Sold & Cash Sales Revenues in US$ by Country

In Sub-Saharan Africa (Figure 11), most of the sales have been recorded in East African countries with Kenya, Ethiopia, Uganda and Tanzania representing 59.8% of all sales in the region.

In Africa, most cash sales revenues (see Figure 12) came from East Africa, with US$ 16.8 million in Kenya and US$ 11.1 million in Ethiopia alone. Despite ranking sixth among African nations in terms of the number of products sold with 129,779, Rwanda sits third in terms of cash sales revenues with US$ 6.7 million. The bulk of these revenues come from the sale of products larger than 3 Wp.

In South Asia, it is India where most sales were recorded with about 1.72 million products sold, or 97.7% of sales in the region (see Figure 13). Worldwide, India is by far the country with the most recorded sales.

Cash sales revenues in India alone amounted to almost US$ 47.5 million in H1 2016. This translates to 98.6% of all cash sales revenues in South Asia or more than one-third (34.2%) of global cash sales revenues.

In East Asia & Pacific, Papua New Guinea accounts for 22.5% (25,277 products) of all regional sales and for 43.1% (US$ 4.1 million) of all cash sales revenues, as depicted in Figure 14.

Figure 11 - Volume of Products Sold Sub-Saharan Africa

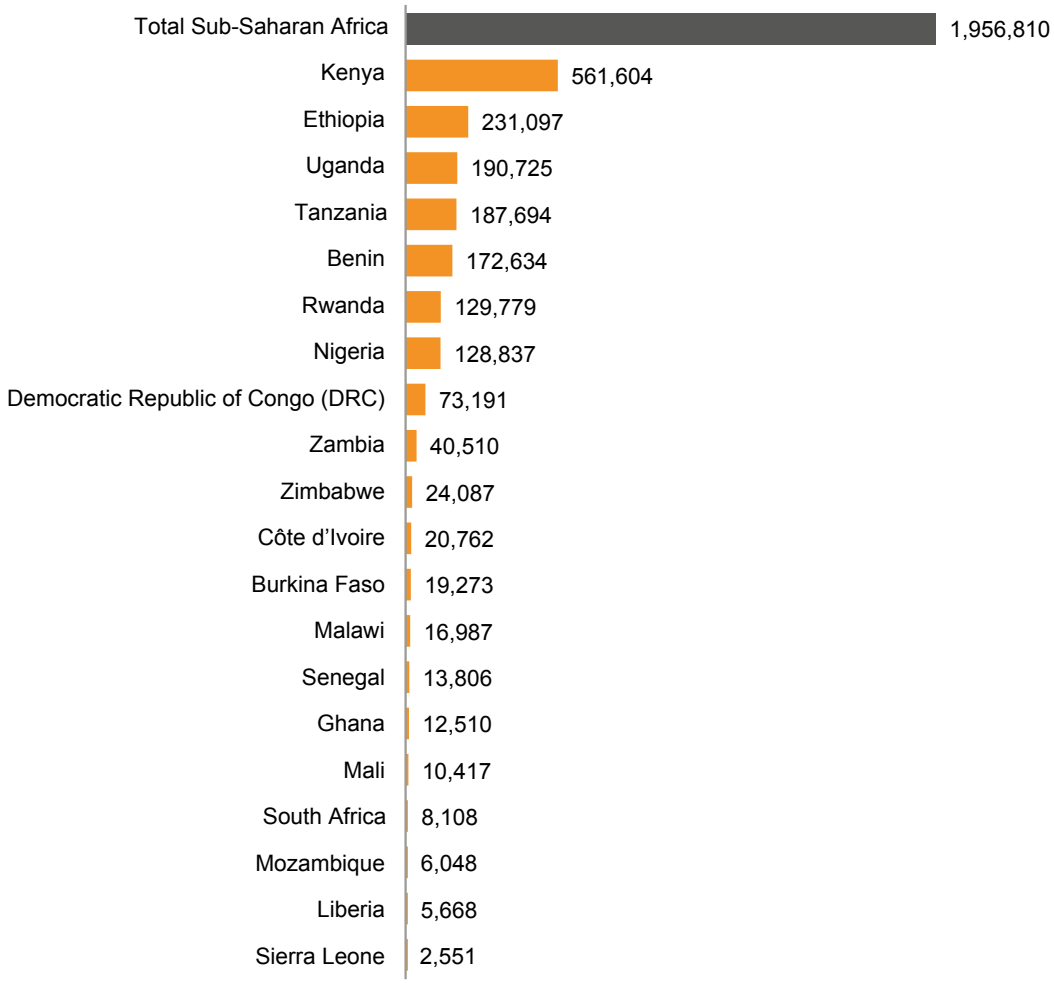


Figure 12 - Cash Sales Revenues in US$ - Sub-Saharan Africa

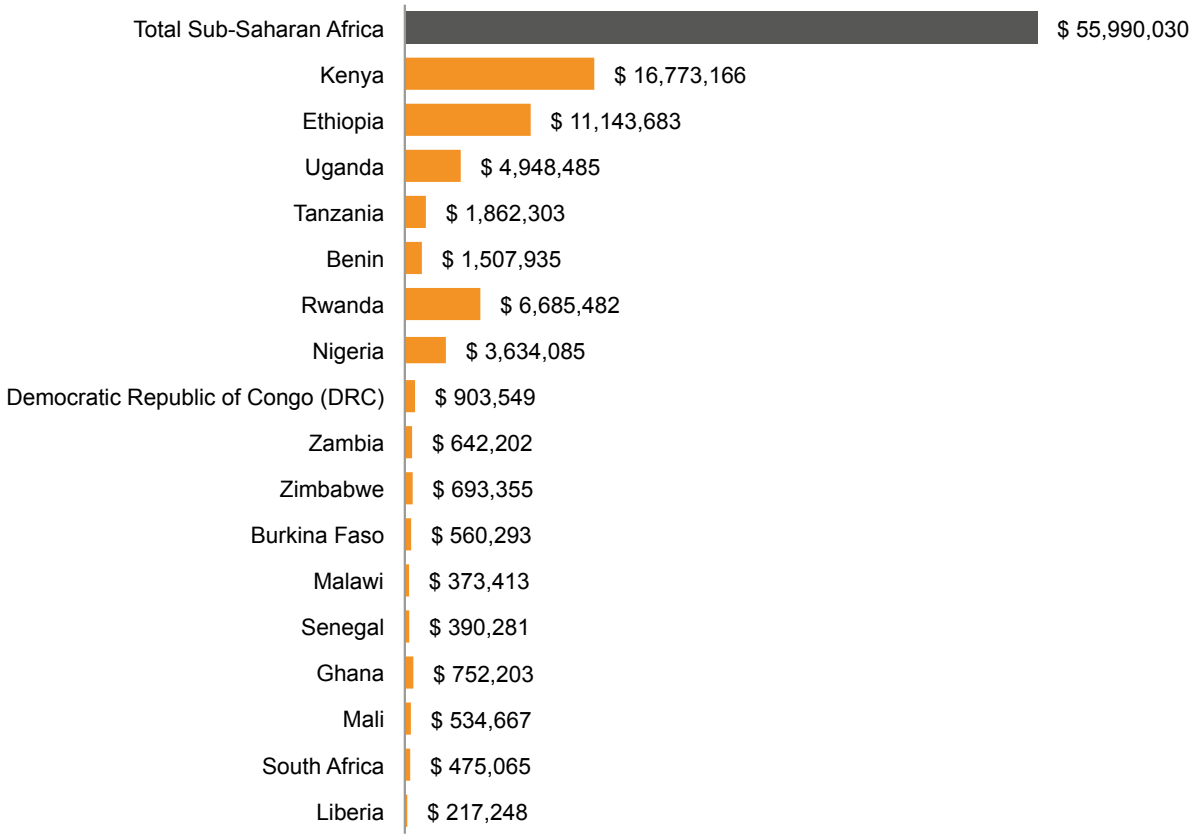


Figure 13 - Volume of Products Sold & Cash Sales Revenues in US$ - South Asia

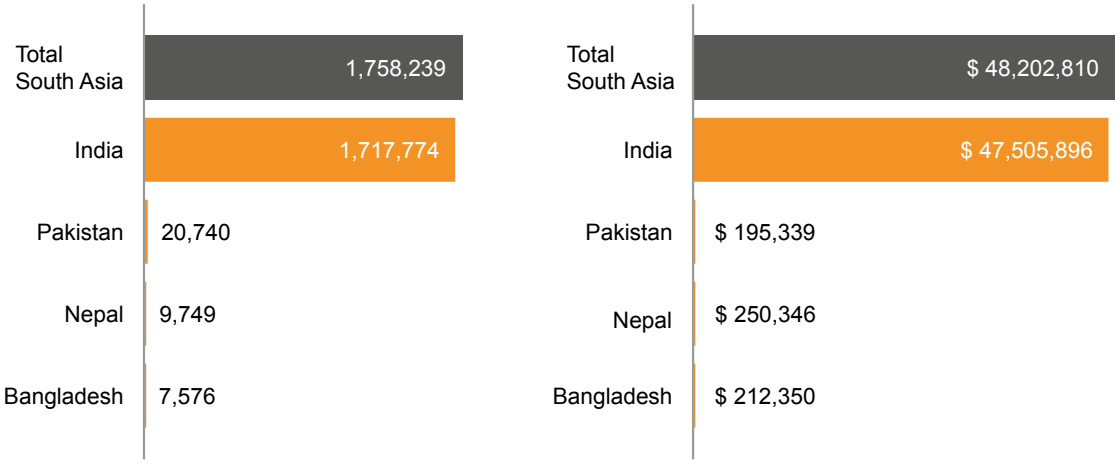
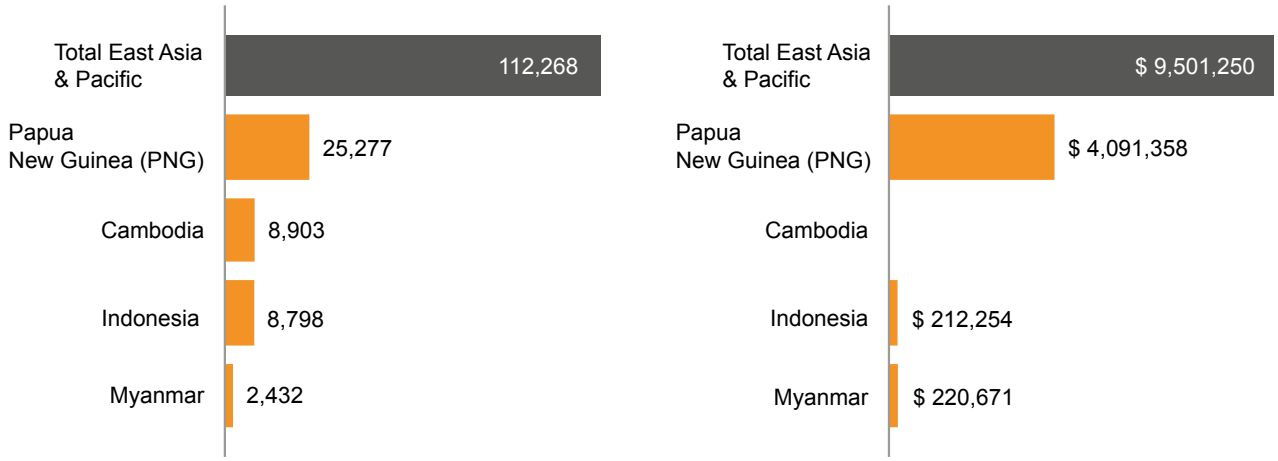


Figure 14 - Volume of Products Sold & Cash Sales Revenues in US$ - East Asia & Pacific



Methodology: Product Categories

Data has been grouped into product categories in order to segment sales in a way that provides the most value and information to the market. From a market perspective, the most meaningful segmentation is based on functionality and capacity. Panel wattage (in watt-peak) was used as a proxy for both criteria. In a very limited number of cases, products were manually categorized to fit them in the right functionality category. The definitions of these categories are presented in the table.

Table 4 - Methodology: Product Categories

Pv Panel Capacity	Pv Panel Capacity	Categorization By Services	Corresponding Level Of Mtf Energy Access
Pico PV (10Wp or less)	0 – 1.5 Wp	Single Light only	Systems can provide a person with basic lighting access and contribute to meeting a households Tier 1 Electricity Access needs
	1.5 – 3 Wp	Single Light & Mobile Charging	More powerful systems provide Tier 1 Electricity Access to at least one person and contribute to meeting a household needs
	3 – 10 Wp	Multiple Lights & Mobile Charging	Systems provide Tier 1 Electricity Access to more than one person, up to a household
SHS (11-100Wp)	11 – 20 Wp	SHS, Entry Level (3-4 lights, mobile charging, powering radio, fan, etc.)	Systems provide Tier 1 Electricity Access to more than one person, up to a household
	21 – 49 Wp	SHS, Basic capacity (above plus power for TV & extended capacity)	More powerful systems can provide Tier 2 Electricity Access to a household when coupled with high-efficiency appliances
	50 – 100 Wp	SHS, Medium capacity (above but with extended capacities)	Systems provide Tier 2 Electricity Access to a household
	100+ Wp	SHS, Higher capacity (above but with extended capacities)	Systems provide Tier 2 Electricity Access to a household

As shown in Figure 15, about 42.5% of total reported products sold worldwide (1,825,642) were single light products in the range of 0-1.5 Wp. The next category, products with a single light and mobile phone charging capability in the 1.5-3 Wp range, accounts for approximately 34% of all reported sales, or 1,476,453 units. As observed in previous reporting cycles, the number of products sold is lower in the more expensive product categories. However, as mentioned in the report highlights, sales of products larger than 3 Wp have increased since H2 2015; they now represent about 22% of all reported sales compared to 7% in H2 2015.

Revenues from cash sales of products in the 0-1.5 Wp range represent only 15.4% of the total cash sales revenues or US$ 21.4 million (see Figure 16). This is due to the lower retail price of such products. Products with a single light and mobile phone charging capability in the 1.5-3 Wp range generate 44.9% of the total cash sales revenues or US$ 62.5 million. Cash sales of larger products with a capacity ranging from 3 Wp to 10 Wp generate US$ 39.5 million in revenues and those with a capacity of 11-20 Wp generate US$ 4.4 million. Note that revenues from PAYG sales are not accounted for in these numbers – if such revenues were included, they would likely increase the reported revenues for the larger product categories.

Figure 15 - Volume of Products Sold By Product Category - World

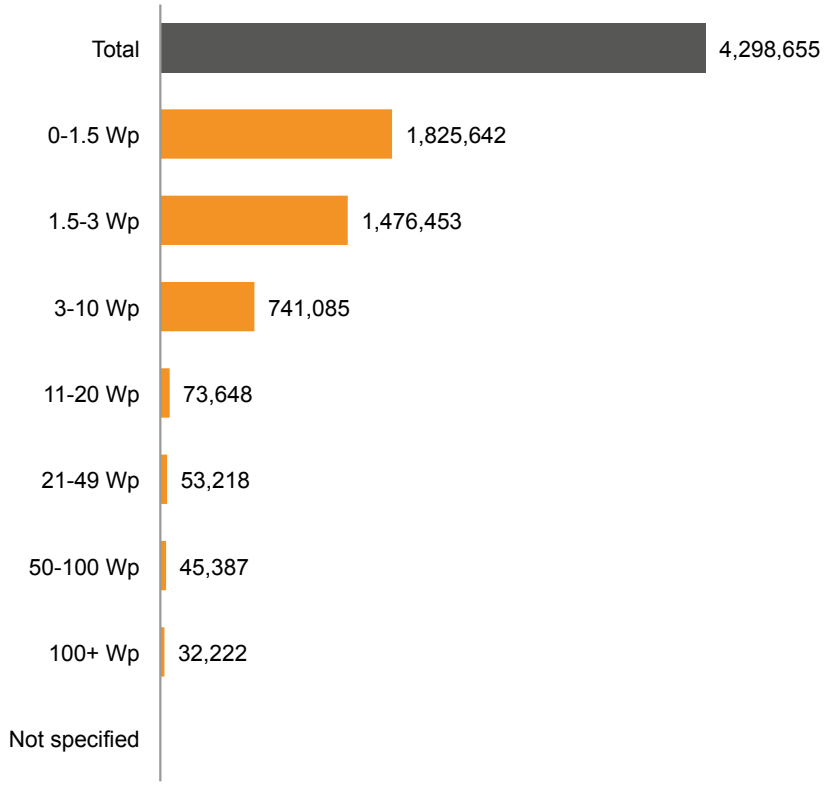
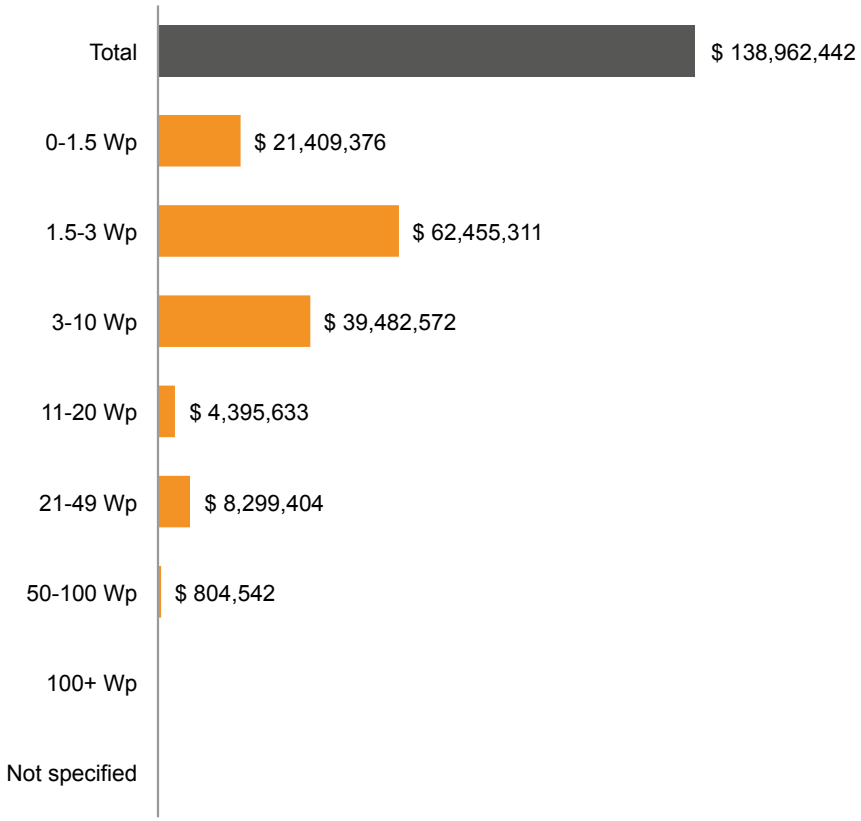


Figure 16 - Cash Sales Revenues in US$ by Product Category - World



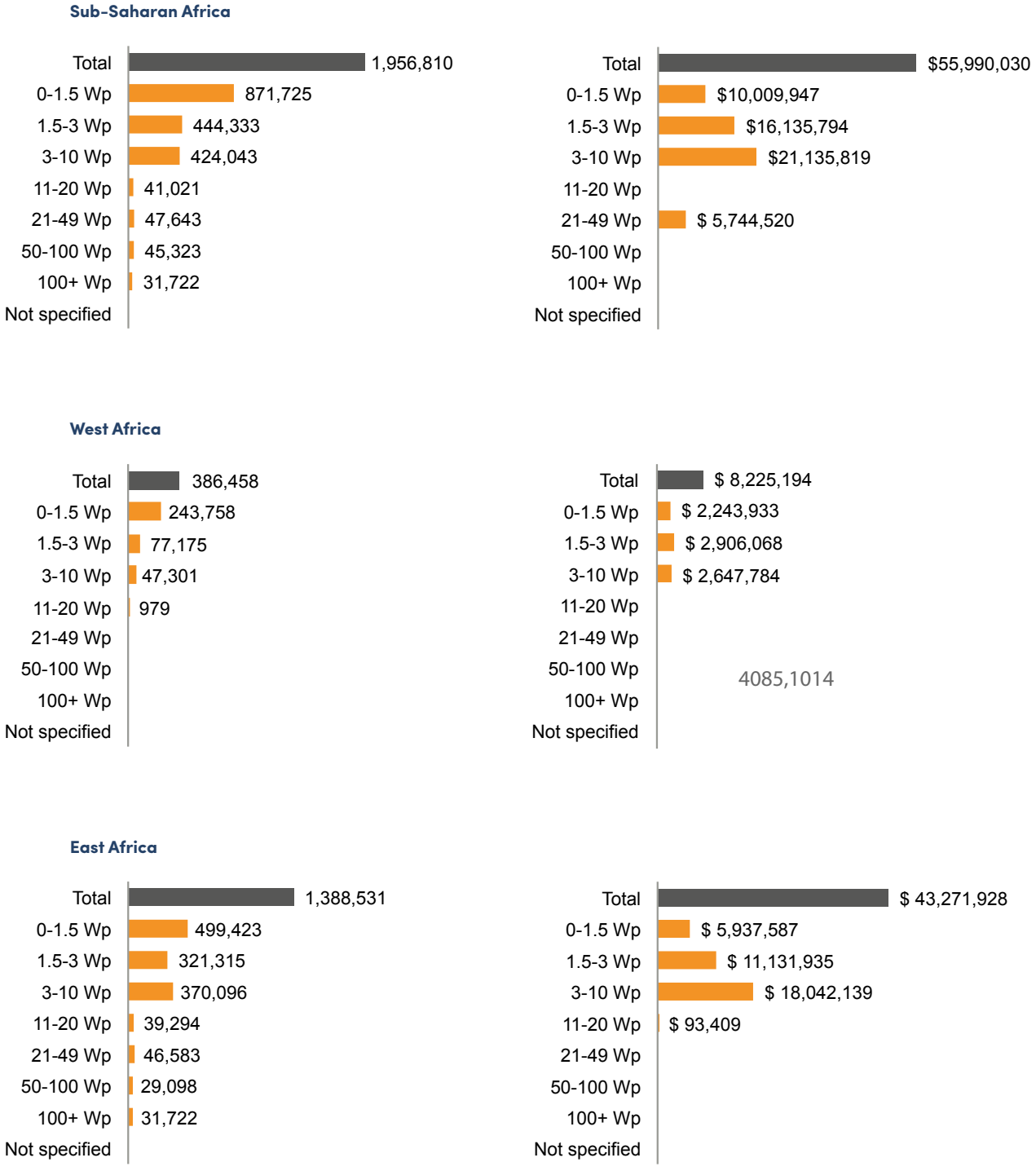
NOTE
The absence of a bar means that either no data was available or that not enough data points were available to report.

In Sub-Saharan Africa, entry-level products (0-1.5 Wp) represent 45% of products sold with 871,725 units out of 1,956,810. Another 444,333 (23%) and 424,043 (22%) products with a capacity of 1.5-3 Wp and 3-10 Wp respectively were sold (see Figure 17). In addition, 124,688 (6%) products in the 21 Wp to 100+ Wp categories were sold in the first half of 2016. Still, 37.7% (US$ 21.1 million) of all reported cash sales revenues in the region stem from 3-10 Wp products, making it the single largest category in cash sales revenues in Sub-Saharan Africa.

While 0-1.5 Wp products amount to almost half (47.5%) of all regional sales in South Asia, most products sold in the East Asia & Pacific region are in the 3-10 Wp range, representing about 60% of reported sales revenues (around US$ 5.7 million out of US$ 9.5 million).

In the Middle East and North Africa region, products in the range of 1.5 Wp to 3 Wp represented 94.2% of all sales and accounted for US$ 20.1 million, or 99% of cash sales revenues.

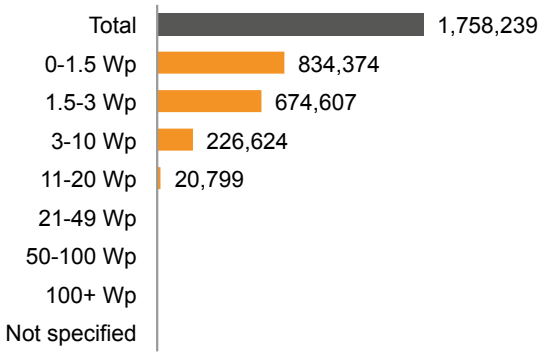
Figure 17 - Volume of Products Sold & Cash Sales Revenues in US$ by Product Category Sub-Saharan Africa

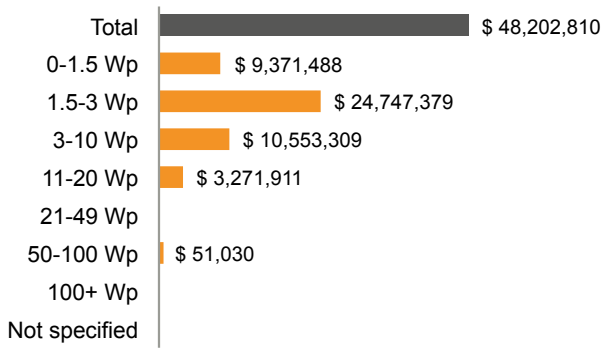


NOTE
The absence of a bar means that either no data was available or that not enough data points were available to report.

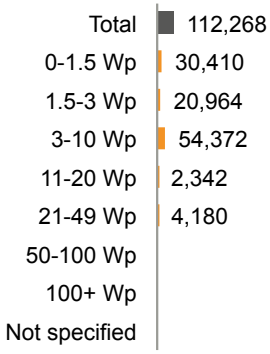
Figure 18 - Volume of Products & Cash Sales Revenues in US$ by Product Category - Asia

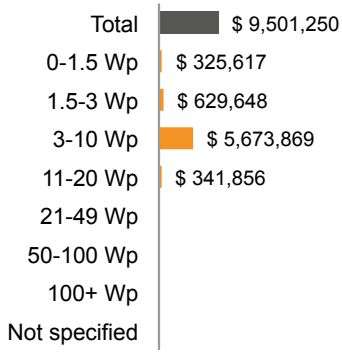
South Asia





East Asia and Pacific





NOTE
The absence of a bar means that either no data was available or that not enough data points were available to report.

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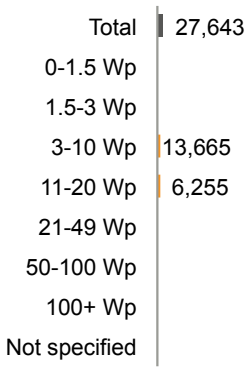
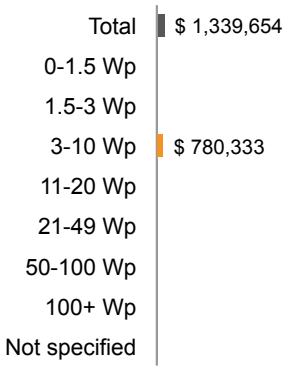
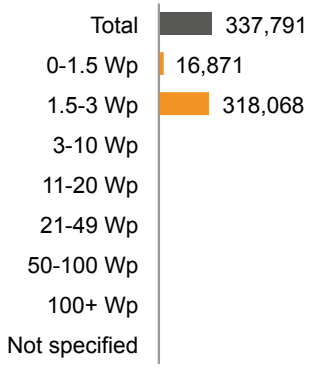
Figure 19 - Volume of Products & Cash Sales Revenues in US$ by Product Category - Asia

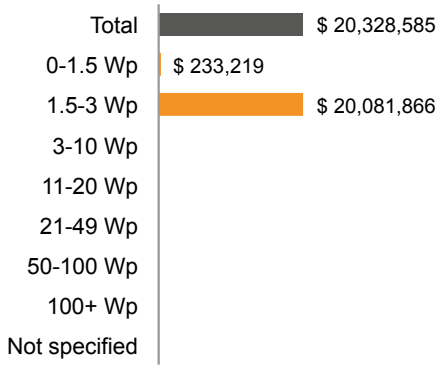
Latin America & Caribbean



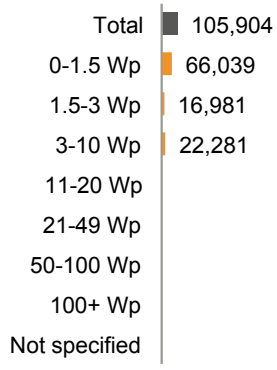


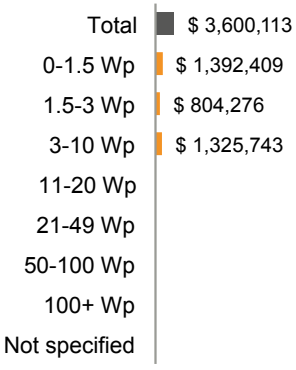
Middle East & North Africa





Rest of World





NOTE
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Social Impact Metrics Report

Introduction

Since 2013, GOGLA has had an Impact Working Group focused on looking at the social impact of the sector. Together with external experts, this working group has developed a set of 6 metrics that help the sector to collectively report its social impact in a consistent way.

Having a clear set of metrics enables the sector to measure and describe the impact it is having on a purely social level, in a harmonized and easily comparable way. The goal is to help attract investment, working capital and regulatory support for the off-grid lighting industry, and thus make the sector grow further.

The following pages present the aggregated data of the 50 participating companies. As outlined in the report introduction, this is the second time GOGLA has reported these social impact key numbers.

The underlying metrics will continue to be refined and expanded as GOGLA develops and improves the way it collects data and learns from that data. Therefore, the impact data collection is very much a work in progress.

Methodology

The six metrics reported on in this paper were developed by the GOGLA Impact Working Group. Each of them is a combination of company data (such as sales, product characteristics, and other company information) and coefficients with default values. The default values of the coefficients were determined based on data publicly available or made available by participating GOGLA members, as well as some assumptions and calculations.

All metrics have been reviewed by external experts and are aligned with the IRIS impact metrics[1]. The table on the next slide gives an overview of all the metrics for which the estimated aggregate results are presented in the following.

All metrics as well as the default values, their definitions and rationale (incl. the methodology and sources) can be found in the GOGLA Standardized Impact Metrics[2] for the Off-Grid Energy Sector document.

[1] https://iris.thegiin.org/off-grid-energy-metrics
[2] http://www.gogla.org/sites/www.gogla.org/files/recource_docs/gogla-standardised-impact-metrics-for-the-off-grid-energy-sector1_1.pdf

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Table 5 - List of Social Impact Metrics

List of Social Impact Metrics	
1ai.	**Improved energy access, historically** Shows the impact at the household level by showing that energy access has improved for x people historically.
1aii.	**Improved energy access, currently** Shows the impact at the household level by showing that energy access has improved for x people currently using pico-solar products.
1b.	**Energy needs met (based on SE4All methodology)** Presents the number of people with Tier 1 and Tier 2 energy access currently, based on the Sustainable Energy for All Tracking Framework.
2.	**Livelihoods supported** Shows the number of people whose livelihoods are supported by the solar light market, including a) customers using products for their business, and b) distribution chain employees.
3.	**Status quo lighting sources no longer in use** Informs about the number of status quo lighting sources, such as kerosene lanterns, candles, battery torches, no longer in use because customers have replaced them with solar lighting.
4a.	**Household change in available hours of light (%)** dicates the change in available hours of light per day from solar product, as compared to typical usage time for status quo lighting, for an average household.
4b.	**Household change in available light output (%)** Shows the change in available light output (lumens) from solar product, as compared to typical output for status quo lighting, for an average household.
5a.	**Savings on energy-related expenditure, per household** Represents the amount of money a household saves on lighting and phone charging after the purchase of a solar product.
5b.	**Savings on energy-related expenditure, in aggregate** Shows the amount of money all households save on lighting and phone charging after the purchase of a solar product.
6.	**Greenhouse gas emissions offset through reduced use of status quo lighting** Indicates the volume of greenhouse gas emissions, including black carbon, which is offset by reduced use of status quo lighting.

Worldwide Impact

110.45 million

Improved Energy Access, historically

How many people, cumulatively, have ever lived in a household which has an improved energy source? (i.e. solar)

2.08 million

Livelihoods Supported

How many people see their livelihoods benefit from the use of solar light products? This includes people who use their products for their business (or business-related activities) as well as direct employees within the distribution chain of such products.

93.58 million

Improved Energy Access, currently

How many people, cumulatively, currently live in a household which has an improved energy source? (i.e. solar)

36.52 million

Tier 1 Energy Needs Met, currently

How many people have access to basic energy on Tier 1 (or the "first rung on the energy ladder") of the SE4ALL Global Tracking Framework*?

1.35 million

Tier 2 Energy Needs Met, currently

How many people have acces to Tier 2 energy in their homes (or the "second rung on the energy ladder")?

NOTE

The Global Tracking Framework was introduced by the UN's SE4ALL program and comprises five tiers which address a previous shortfall in energy access categorization. Before the framework was introduced, a household either had a grid connection or it did not i.e. electricity access was seen as binary.

The framework includes a more nuanced approach, starting with Tier 1 as the most basic energy access of task lighting and phone charging, progressing up to Tier 5 which describes general home lighting system, television and fan, plus any other high power appliance.

20.8 million

Number of status quo Lighting Sources no longer in use

How many former lighting sources (kerosene lanterns, candles and battery-powered torches, etc.) are no longer used since the customer replaced them with solar lighting?

177%

Change in Available Hours of Light, per household

What is the difference in available hours of light, per day, available to a household, owing to solar products, compared to available time from previous light sources (such as kerosene or candles, on average)*?

133%

Change in Available Light Output

What is the difference in available light output (in lumens) from solar products, compared to the output of previous light sources (such as kerosene or candles), on average*?

NOTE
The averages are built on products not households i.e. we assume one product per household. The average is based on a weighted average of product sales i.e. products with higher sales volumes are weighted higher than those where fewer have been sold.

* Based on reported volume of branded products sold from January 1 to June 30, 2016

4.33 billion

Savings on Energy-related Spending, total

After buying a solar product, how much money is saved on lighting and phone charging, in aggregate?

$ 198

Savings on Energy-related Spending, per household

After buying a solar product, how much money does a household save on lighting and phone charging, on average*?

Table 6 - Social Impact per Product Category, World

	Improved Energy Access, historically	Improved Energy Access, currently	Livelihoods Supported, currently	Tier 1 Energy needs met	Tier 2 Energy Needs met
Total	**100,449,571**	**93,581,401**	**2,079,587**	**36,515,600**	**1,354,324**
0-1.5 Wp	57,345,572	54,574,805	1,212,773	10,314,758	-
1.5-3 Wp	29,220,052	26,062,843	579,174	16,252,789	-
3-10 Wp	11,433,048	10,584,588	235,213	9,494,346	-
11-20 Wp	827,037	774,657	17,215	516,820	256,295
21-49 Wp	415,758	415,688	9,238	-	413,802
50-100 Wp	446,496	446,496	9,922	-	446,417
100+ Wp	237,810	237,810	5,285	-	237,810
Not Specified					

NOTE
The averages are built on products not households i.e. we assume one product per household. The average is based on a weighted average of product sales i.e. products with higher sales volumes are weighted higher than those where fewer have been sold.

* Based on reported volume of branded products sold from January 1 to June 30, 2016

Table 7 - Social Impact per Product Category, World

	Savings on Energy-Related Spending, total	Savings on Energy-Related Spending, per household	Number of Status Quo Lighting Sources No Longer In Use	Change in Available Hours of Light, per household	Change in Available Light Output
Total	**$4,329,681,491**	**$198**	**20,795,867**	**177%**	**133%**
0-1.5 Wp	$2,741,384,575	$216	12,127,734	59%	25%
1.5-3 Wp	$1,131,205,068	$179	5,791,743	364%	146%
3-10 Wp	$394,792,366	$164	2,352,131	239%	373%
11-20 Wp	$29,739,482	$174	172,146	288%	960%
21-49 Wp	$10,923,813	$118	92,375	482%	2610%
50-100 Wp	$11,837,050	$119	99,221	783%	1626%
100+ Wp		-$6	52,847	1854%	3039%
Not Specified					

At the global level, there are currently 93.6 million people living in a household with an improved solar energy source. Compared to the last reporting period, we can observe a strong increase in the number of people reached. 22 million more people can now enjoy improved energy access, including an additional over 9 million people with Tier 1 energy access, as defined by the SE4All tracking framework. Furthermore, about 1.35 million people are able to enjoy Tier 2 energy access, indicating a trend towards larger solar home systems. This can, however, not completely be attributed to the sales of the first half of 2016. This time around, we have many companies sharing their data for the first time. To calculate the 'installed base' (i.e. all products out there that are still working) these companies were requested to report their sales over the last three years. The installed base, in turn, is the basis for many of the metrics.

Due to the replacement with solar lighting, about 21 million traditional lighting sources (i.e. kerosene lanterns, candles, battery torches, and other conventional technologies) are estimated to no longer be in use. In terms of services, the increased sales in the categories beyond 3 watts has led to improved light output as well as an increase of available hours of light. On average, using the solar products in this report brings about 177% more hours of light per day available to a household compared to traditional lighting sources such as kerosene lanterns and candles. When compared to the last reporting period, this depicts an increase of 7 percentage points. Similarly, an average 133% difference in available light output (i.e. lumens) has been achieved compared to 110% in the second half of 2015.

As these larger systems are, however, more expensive than pico-solar products, the average household estimated savings decreased slightly, going down from US$ 205 to US$ 198 over the lifetime of the product. In aggregate, households have saved around USD 4.3 billion after buying a solar product. The bulk of savings with USD 4. 27 billion comes from 0-10 Wp products. Therein, 0-1.5 Wp products account for 63% of all savings while 1.5-3 Wp products account for another 26%. Besides experiencing the benefits of off-grid solar at home, products are also utilized to support livelihoods. Approximately 2 million people, including those using solar products for business/ business-related activities as well as employees in the distribution chain, are estimated to have been able to support their livelihoods through solar products.

The GOGLA working group continues to fine-tune the metrics by integrating the latest research and data harvested from the field. The metrics, as of now, mainly reflect the impact of portable solar lighting products as well as solar kits based on cash sales. The working group builds metrics to ensure they better represent the impact of larger solar home systems as well as consider ways to allow for and calculate impact depending on payment mechanism i.e. pay as you go business models.

References & Credits

- The contents of this report present market data based on the reported sales of Lighting Global quality verified products and products from 50 companies which are GOGLA members or IFC Lighting Global clients.
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- Standardized impact metrics for the off-grid energy sector, Version 2.0, January 2016, GOGLA
  http://gogla.org/sites/www.gogla.org/files/recource_docs/gogla-standardised-impact-metrics-for-the-off-grid-energy-sector1_1.pdf

- Lighting Global Quality Standards (Lighting Global / International Electrical Commission Technical Standard 96652)
  https://www.lightingglobal.org/qa/

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Annex 1: List of Countries Included in Data Collection

Sub-Saharan Africa
Benin
Burkina Faso
Cote d'Ivoire
Democratic Republic of Congo (DRC)
Ethiopia
Ghana
Kenya
Liberia
Malawi
Mali
Mozambique
Nigeria
Rwanda
Senegal
Sierra Leone
South Africa
Tanzania
Uganda
Zambia
Zimbabwe
Rest of Sub-Saharan Africa

Eastern Africa
Ethiopia
Kenya
Malawi
Mozambique
Rwanda
Uganda
Tanzania
Zambia
Zimbabwe

Western Africa
Benin
Burkina Faso
Côte d'Ivoire
Ghana
Liberia
Mali
Nigeria
Senegal
Sierra Leone

East Asia & Pacific
Cambodia
Indonesia
Laos
Myanmar
Papua New Guinea (PNG)
Vietnam
Rest of East Asia & Pacific

South Asia
Afghanistan
Bangladesh
India
Nepal
Pakistan
Rest of South Asia

Other Regions
Total Latin America & Caribbean (LAC)
Total Middle East & North Africa (MENA)
Rest of World

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