



Global Off-Grid Solar Market Report Semi-Annual Sales & Impact Data



Jul-Dec 2023, Public Report



In partnership with



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Executive Summary

After a peak of 9.53 million units sold in 2022, global sales of solar energy kits fell to 8.96 million units in 2023. In 2023 global sales volumes were higher than they were in 2019 (pre-pandemic), and are in fact the second highest they have been, after 2022.

Global sales of televisions, fans, solar water pumps, and refrigeration units increased from a combined 1.53 million units reported in 2022 to 1.79 million units sold in 2023. Fans are the main driver of the year-on-year growth in sales volumes with other appliance sales more stable.

During the COVID-19 pandemic, progress toward improving energy access through off-grid solar products stalled. Yet the number of people currently benefiting from improved access has increased from 100 million in early 2021, to 116 million in 2023.¹ However, there is still a long way to go for off-grid solar to reach its projected contribution toward reaching universal access by 2030. Significant growth is still needed to catch-up to where the sector was forecast to be before the effects of the COVID-19 pandemic. Moreover, the industry must significantly expand to reach emerging and nascent markets and the majority

of households that need to gain access by 2030,² while replacing and repairing products that are reaching their end-of-life.

This report is based on sales data from off-grid solar and energy efficient appliance manufacturers affiliated with GOGLA,³ and provides data and insights on observable trends at a global, regional, and country-level. It is published every six months. Key results from this edition are presented in the tables below.

Global highlights

Overall, historical data shows sales of solar energy kits (SEKs) tend to be higher during the second half of the year (H2) than during the first half of the year (H1). A significant share of TV sales reported are linked to solar home system sales in Sub-Saharan Africa and are therefore likely to follow a similar pattern. Conversely, fan sales are dominated by sales in South Asia (notably Pakistan) where fans are likely to be sold separately from a power source. Historical data shows that fan sales peak during the first half of the year, as distributors order stock ahead of the hottest months in the South Asia region.



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1 41% of new household connections between 2020 and 2030 according to [Lighting Global, IFC, Efficiency for Access, GOGLA and Open Capital Advisors, Off-Grid Solar Market Trends Report 2022: Outlook 2030, 2022.](#)

2 [Lighting Global, IFC, Efficiency for Access, GOGLA and Open Capital Advisors, Off-Grid Solar Market Trends Report 2022: Outlook 2030, 2022.](#)

3 See detailed methodology [here](#).

Executive Summary

Solar Energy Kits

Table 1 - Global sales of Solar Energy Kits (SEKs)

Product Category	Jul-Dec 2023 volumes (Cash & PAYGo)	% change from H1 2023	% change from H2 2022
Global SEK Sales	4,639,190	7%	-11%
Cash	2,944,393	14%	-7%
PAYGo	1,694,797	-2%	-17%

Table 2 - Global sales of Solar Energy Kits by category

Product Category	Jul-Dec 2023 volumes (Cash & PAYGo)	% change from H1 2023	% change from H2 2022
Global SEK Sales	4,639,190	17%	-5%
Lanterns	2,960,300	17%	-9%
Multi-light Systems	803,810	-15%	-20%
SHS 11-20 Wp	349,080	19%	-20%
SHS 21-49Wp	207,570	-15%	-6%
SHS 50-100 Wp	280,600	7%	-20%
SHS 100+ Wp	37,830	-5%	-43%

Key Appliances

Table 3 - Global sales of Key Appliances

Global Key Appliances Sales	Jul-Dec 2023 volumes (Cash & PAYGo)	% change from H1 2023	% change from H2 2022
World	769,906	-24%	20%
TVs	218,015	1%	-7%
Fans	536,679	-32%	40%
RUs	3,491	4%	-25%
SWPs	11,721	2%	-23%

Key regional takeaways

Table 4 - East Africa sales of Solar Energy Kits and Key Appliances

East Africa	Jul-Dec 2023 volumes (Cash & PAYGo)	% change from H1 2023	% change from H2 2022
SEK Sales	2,546,410	14%	-1%
Key Appliances Sales	127,019	-1%	4%
TVs	99,851	-2%	-6%
Fans	17,048	-5%	232%
RUs	1,069	21%	71%
SWPs	9,051	22%	-8%

Executive Summary

Table 5 – West Africa sales of Solar Energy Kits and Key Appliances

West Africa	Jul-Dec 2023 volumes (Cash & PAYGo)	% change from H1 2023	% change from H2 2022
SEK Sales	886,736	5%	-4%
Key Appliances Sales	265,480	-5%	14%
TVs	104,765	3%	12%
Fans	158,576	-9%	18%
RUs	1,470	-12%	-27%
SWPs	-	-	-

Table 6 – South Asia sales of Solar Energy Kits and Key Appliances

South Asia	Jul-Dec 2023 volumes (Cash & PAYGo)	% change from H1 2023	% change from H2 2022
SEK Sales	348,103	-17%	-23%
Key appliances	330,148	-43%	48%
TVs	-	-	-
Fans	328,343	-43%	48%
RUs	-	-	-
SWPs	1,625	-	-



Executive Summary

Impact update

Sales data shared by companies are translated into impact through the GOGLA standardised impact metrics⁴ and the Efficiency for Access' Off- and Weak-Grid Appliances Impact Assessment Framework.⁵

- **An estimated 116 million people are currently benefiting from improved access to energy through off-grid solar energy kits reported by GOGLA affiliates. Close to 15 million people are benefiting from improved access to appliances.** Access numbers in this report are connected to affiliate sales and only represent a portion of the total reach of the off-grid solar industry. The Off-Grid Solar Market Trends Report 2022⁶ includes the full market estimates. A new edition of the MTR is planned for 2024.
- **Solar energy kits avoided 109 million metric tons of CO₂e** - the equivalent of taking 28 coal-fired power plants offline for a year. Additionally, emissions avoided through the use of high-performing TVs and fans since July 2018 are close to 33,400 metric tons, equivalent to taking 7,949 petrol-powered cars off the road for a year.⁷

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⁴ More information [here](#).

⁵ More information [here](#).

⁶ Lighting Global, IFC, Efficiency for Access, GOGLA and Open Capital Advisors, *Off-Grid Solar Market Trends Report 2022: Outlook 2030, 2022*.

⁷ United States Environmental Protection Agency (2021), Greenhouse Gas Equivalencies Calculator.

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About the Report

Authors

GOGLA

GOGLA is the global association for the off-grid solar energy industry. We are proud to champion one of the world's most innovative and impactful sectors. Hundreds of millions of people already benefit from affordable, high-quality, clean off-grid solar products and services. With the right support, our pioneering industry will be able to scale up rapidly to improve the lives of 1 billion people by 2030. To help make this happen, we promote, safeguard, and convene the industry, advocating for enabling policies and increased investment as well as supporting our 200+ members with effective services.

Contributors

Lighting Global

Lighting Global is the World Bank's initiative to rapidly increase access to off-grid solar energy for the hundreds of millions of people living without electricity world-wide. Managed by the Energy Sector Management Assistance Programme (ESMAP), we work with governments, the private sector, development partners, and end-users, continually innovating to unlock key market barriers and enable access and affordability to those that would otherwise be left behind. Our support has expanded to technologies that go far beyond lighting, including stand-alone solar systems to power the needs of households, farms, businesses, schools, health centres, and more. We operate with funding gratefully acknowledged from ESMAP and their donors. For more information, please visit www.lightingglobal.org

Efficiency for Access

Efficiency for Access is a global coalition working to promote high performing appliances that enable access to clean energy for the world's poorest people. It is a catalyst for change, accelerating the growth of off-grid appliance markets to boost incomes, reduce carbon emissions, improve quality of life, and support sustainable development. Efficiency for Access consists of 20 Donor Roundtable Members, 19 Programme Partners, and more than 30 Investor Network members. Current Efficiency for Access Coalition members have programmes and initiatives spanning 62 countries and 34 key technologies. The Efficiency for Access Coalition is coordinated jointly by CLASP, an international appliance energy efficiency and market development specialist not-for-profit organisation, and UK's Energy Saving Trust, which specialises in energy efficiency product verification, data and insight, advice, and research. For more information, please visit www.efficiencyforaccess.org. The Low Energy Inclusive Appliances (LEIA) programme is Efficiency for Access' flagship initiative. LEIA is funded by UK aid, from the UK government via the Transforming Energy Access platform and the IKEA Foundation.

The appliances section of this report has been funded by UK aid from the UK government. However, the views expressed do not necessarily reflect the UK government's official policies.

Berenschot

Berenschot is a leading Dutch management consultancy firm with an extensive track record in supporting industry associations on market data collection. Berenschot has been elected by clients as one of the best management consultancy firms of the Netherlands. Berenschot maintains a high standard of confidentiality, as stated in the Berenschot Terms and Conditions.

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The authors would also like to thank the companies involved for sharing their data on a regular basis. In particular, the team would like to acknowledge the participating companies and partners at ESMAP and Efficiency for Access who share their insights and expertise with the authors.



Join the data collection

The sales and impact data captured in this report, as well as all other market intelligence outputs from GOGLA are enabled by the participation of companies in GOGLA's sales data collection efforts.

Why join

Participating companies receive access to a personalised results platform where they can interact with the data. On this platform, companies access more granular datasets (e.g. sales by product segment at a country level) as well as their market share and their contribution to the sector's impact. Users can also download data and impact reports, which companies can use to attract investors, inform their strategy, and better understand their position in the market.

By joining the data collection, you are making a valuable contribution to developing the off-grid lighting and energy efficient appliances sector. By helping to shape the most comprehensive sales data report in the industry, you enable GOGLA, Lighting Global and Efficiency for Access to formulate effective policy guidelines and support the growth of the off-grid solar sector.

The data is also a source for key publications by other organisations in the sector including the [SDG Tracking report](#),⁸ the [World Energy Outlook](#),⁹ the [Off-Grid Solar Market Trends Report](#)¹⁰ and the [Off-grid Renewable Energy Statistics 2023](#).¹¹

Who can join the sales data collection?

Eligible companies include GOGLA members, companies selling products that meet VeraSol Quality Standards, and appliance companies that participated in the Global LEAP Awards, or are engaged in the Low Energy Inclusive Appliances (LEIA) programme.

How to join the sales data collection

To join the sales data collection please contact Patricia Njeri p.njeri@gogla.org. The next round of data collection will take place in July 2024. Eligible companies that have contacted us will be invited to participate.

A video tutorial for the questionnaire will soon be available. Until then, you can refer to the [H2 2021 introductory webinar recording](#) and to the [Frequently Asked Questions](#) from participants for more information.

Data confidentiality

Data shared by companies is confidential. All public outputs created using the data respect a three-data-point rule where at least three separate companies need to have reported sales for any single data point to be shared. Further details can be found in the [methodology annexe](#).

⁸ IEA, IRENA, United Nations Statistics Division, The World Bank and World Health Organization, [Tracking SDG7 The Energy Progress Report 2022](#).

⁹ IEA, [World Energy Outlook 2022](#).

¹⁰ Lighting Global, IFC, Efficiency for Access, GOGLA and Open Capital Advisors, [Off-Grid Solar Market Trends Report 2022: Outlook 2030, 2022](#).

¹¹ IRENA, [Off-Grid Renewable Energy Statistics 2022](#).



Global Insights



Global Insights

Background

Achieving Sustainable Development Goal 7 (SDG7) requires the industry to work on multiple fronts to provide the hardest to reach with first-time energy access, repair, replace or upgrade existing customers' products, provide back-up solutions for weak-grid customers, and increase adoption of productive appliances using renewable solar energy.

Yet, many of the current challenges of operating in emerging markets and servicing customers at the bottom of the pyramid are exacerbated by macroeconomic challenges. The industry's return to growth after the pandemic, has faltered in many core markets.

High inflation and, in many countries, rapid depreciation of local currencies, led to a double-threat for many off-grid solar companies. Lower consumer purchasing power has led to lower revenue for companies. At the same time, revenue

in local currencies has eroded in value against debt repayments in international hard currencies.

These financial challenges have been compounded with investment woes; a scarcity of new equity investments and perpetually high interest rates are a barrier to financial sustainability.

As in many industries, the last four years have been a prolonged period of uncertainty for the off-grid sector. In addition to global events, key off-grid solar markets in Africa and Asia have been hit by additional challenges including droughts and locust plagues in East Africa, extreme heat waves and flooding in South Asia, cyclones and tropical storms in Southern Africa, and greater insecurity and political instability in West Africa. Throughout this period, many companies have demonstrated their resilience and, in many cases, innovated and diversified. Other companies have failed, been acquired or pivoted.



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Data collection methodology

GOGLA, Lighting Global and Efficiency for Access, with support from Berenschot, collect data from affiliate companies via an online survey every six months. Participating companies voluntarily share data on their product specifications and sales volumes on a per product, per country basis. Data is self-reported by companies but is subject to thorough quality control and aggregation processes to ensure robustness of the insights, and protect the confidentiality of companies' data.

Analyses in this report are based on sales reported by 32 solar energy kit manufacturers and 34 appliances manufacturers¹² and may not translate into sales in the same time period. Data collected from affiliates is not extrapolated to the entire sector.¹³ Yet, it provides the broadest and most reliable dataset on the off-grid solar and energy-efficient appliances sector. For a deeper understanding of industry trends, World Bank/Lighting Global, IFC, Efficiency for Access, GOGLA and Open Capital Advisors published the Off-Grid Solar Market Trends Report 2022.¹⁴ The report explores and explains key

trends across the whole industry, beyond affiliates, and beyond sales and impact data. A new edition will be published in 2024.

Data on a specific region, country or product category is only included when at least three separate product manufacturers have reported sales for any single data point (three-data point control). Where there are fewer than three responses for a region, country or product category, no results are shown to protect the proprietary interests of companies who have supplied data in support of this industry report. This is signalled by an empty bar next to the name of the region, country, or product category. To differentiate, if there are no companies reporting data, the graph shows a '0'.

Additionally, impact data in this report is based on standardised impact metrics for the sector developed by GOGLA, Lighting Global and Efficiency for Access. Data collected by GOGLA is widely used by organisations in the access-to-energy sector. In particular, they are a key source to track progress made towards SDG7.¹⁵

¹² Manufacturers here designate companies selling their own branded products, by opposition with distributors of other companies' branded products.

¹³ Affiliates are estimated to represent 28% of the global off-grid solar market.

¹⁴ Lighting Global, IFC, Efficiency for Access, GOGLA and Open Capital Advisors, *Off-Grid Solar Market Trends Report 2022: Outlook 2030, 2022*.

¹⁵ More information available [here](#).

Global Insights

Sales and Impact Trends

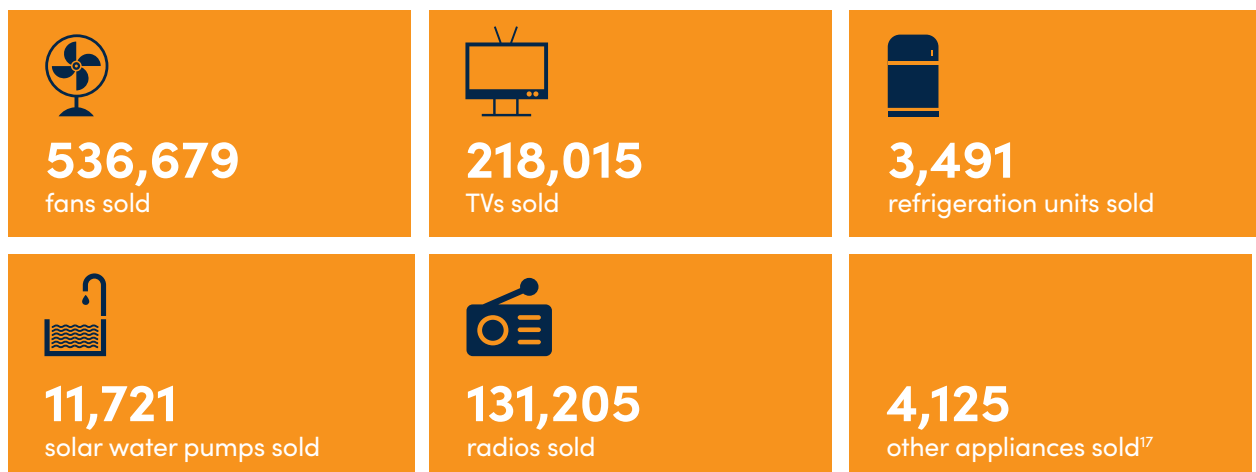
Global Key Highlights

Sales figures presented here refer to the total of all off-grid solar energy kit and off-grid appliance sales reported by participating affiliates¹⁶ in the period between July 1st and December 31st 2023.

Solar Energy Kits (SEKs)



Appliances



¹⁶ Affiliates include GOGLA members, companies selling products that meet Lighting Global Quality Standards, and appliance companies of the Global LEAP Awards or the Low Energy Inclusive Appliances (LEIA) programme.

¹⁷ Affiliates are given the opportunity to include other appliance types in their data reporting. Other appliances are generally not reported in sufficient volumes by participating companies to enable their inclusion but provide an insight into the type of appliances that are sold. This round again, the main appliance types included are hair clippers and speakers.

Global Insights

Off-Grid Solar Energy Kits

Global affiliate sales of solar energy kits (lanterns, multi-light systems and solar home systems) **between July and December 2023 reached 4.6 million units.** This is a 7% increase compared to the first half of 2023. However, compared to the peak of 5.2 million units sold in the second half of 2022, H2 2023 sales decreased 11%.

Of the 4.6 million units sold, 2.94 million were sold cash and 1.69 million products were sold PAYGo. 83% of cash sales were solar lanterns.

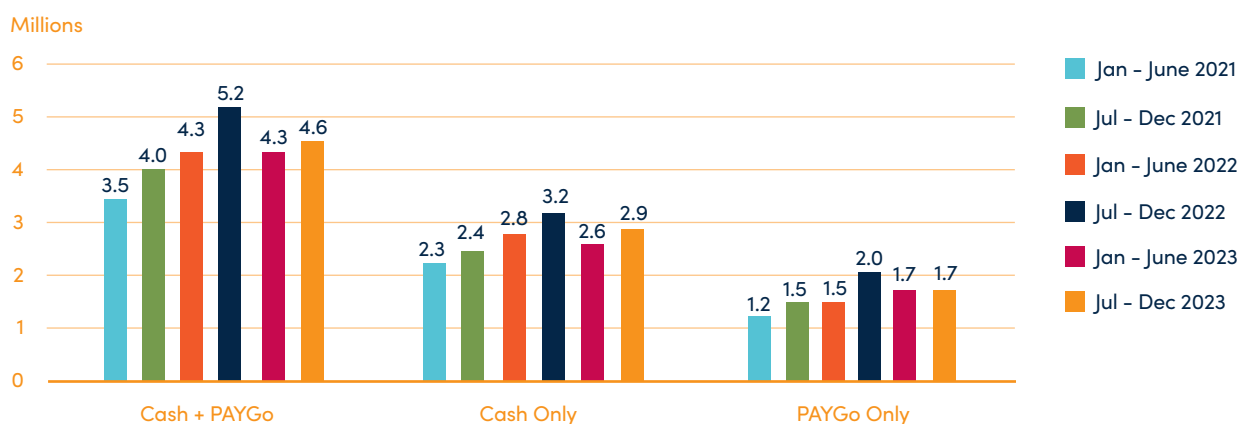
PAYGo sales decreased by 2% compared to the first half of 2023 to 1.69 million units sold, worth US\$200 million and representing 37% of all

products sold. Notably, post-COVID-19, the number of lanterns sold on a PAYGo basis increased.

Cash sales increased by 14% compared to the first half of 2023 and decreased by 7% compared to the second half of 2022. 61% of SEKs were sold in cash in the second half of 2023. The global value of cash sales for July-December 2023 is US\$60 million.¹⁸

Detailed insights by region and country can be found in the following chapters, but notably, sales decreased compared to the second half of 2022 in the three largest regional markets (East Africa, West Africa and South Asia) while more nascent regional markets (Central Africa and Southern Africa) recorded growth in volumes sold.

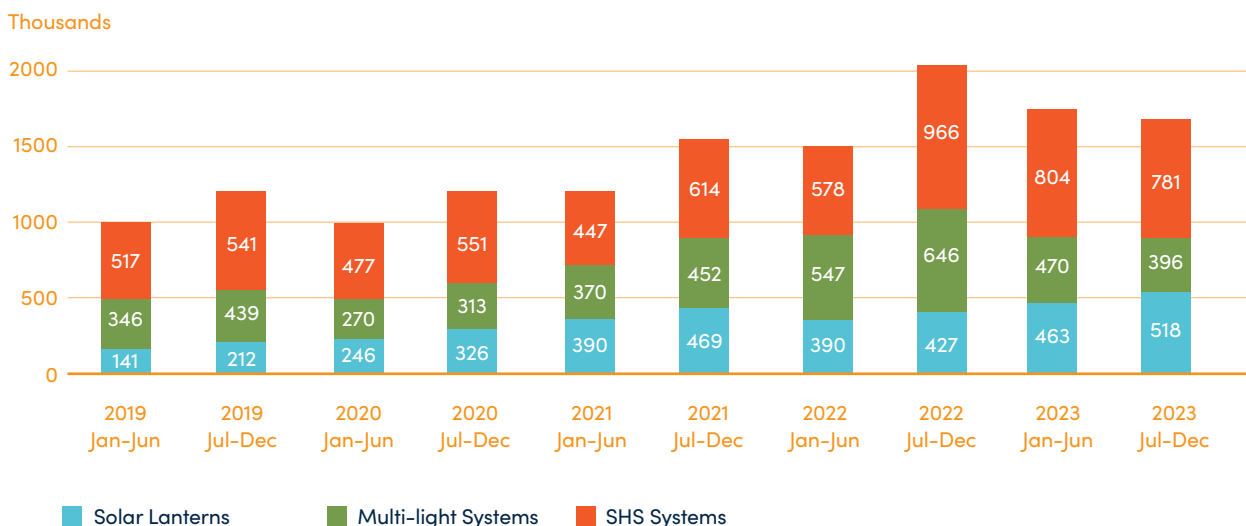
Figure 1 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits Sold - World



NOTE:

Products are classified as 'Cash' when sold in a single transaction (including products purchased via tenders), or as 'PAYGo', when the customer pays for the product in instalments over time or pays for use of the product as a service.

Figure 2 - Semi-annual Evolution of PAYGo Sales Volumes of Solar Energy Kits by Category- World



¹⁸ Market values are estimates. See Methodology Annex for details.

Global Insights



Solar Lanterns

Solar lanterns represent 64% of sales during the second half of 2023 with 2.9 million units sold. Lantern sales increased by 17% compared to the first half of 2023.

- Sales of smaller 0-1.5 Wp lanterns increased by 33% to 1.73 million compared to the first half of 2023.
- Larger 1.5-3 Wp lanterns with phone-charging capability sold similar volumes of 1.22 million, compared to the first half of 2023. 42% of lanterns with phone charging were sold through PAYGo.

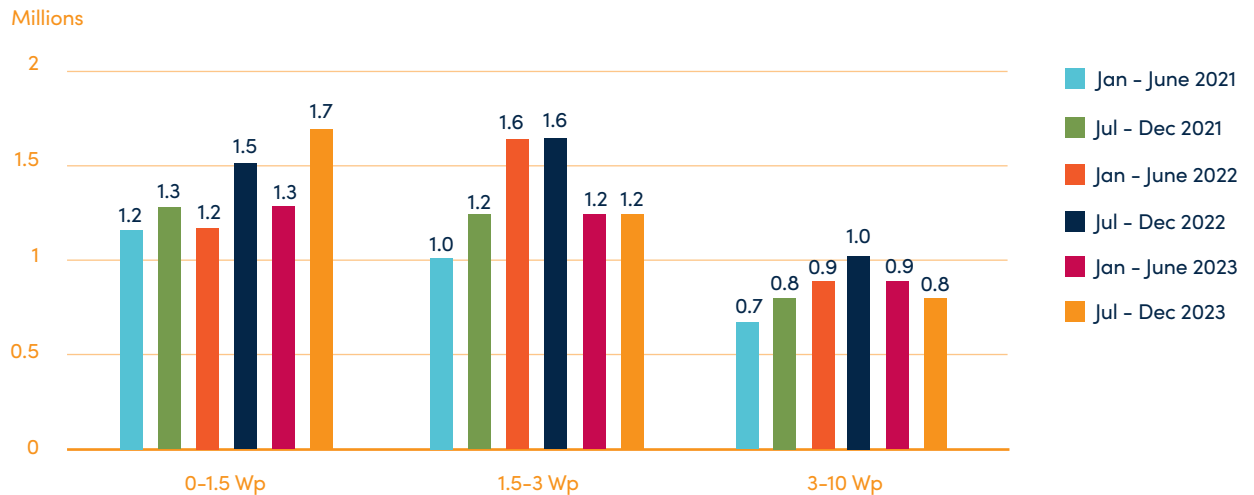


Multi-light Systems

Sales of multi-light systems (3-10 Wp) reached 803,000 units between July and December 2023. This represents 17% of total global sales and a 15% decrease compared to the first half of 2023.

408,000 units were sold cash, a 14% decrease compared to the first half of the year, and 395,000 units were sold PAYGo, a 43% increase compared to the H1 2023.

Figure 3 - Semi-annual Evolution of Sales Volumes of Solar Energy Kit by Category (0-10 Wp) - World



NOTE:

Lanterns 0-1.499 Wp include one light and no phone charging, lanterns 1.5-2.999 Wp one light and phone charging, and multi-light systems 3-10.999 Wp at least two lights and phone charging.



Global Insights



Solar Home Systems (SHS)

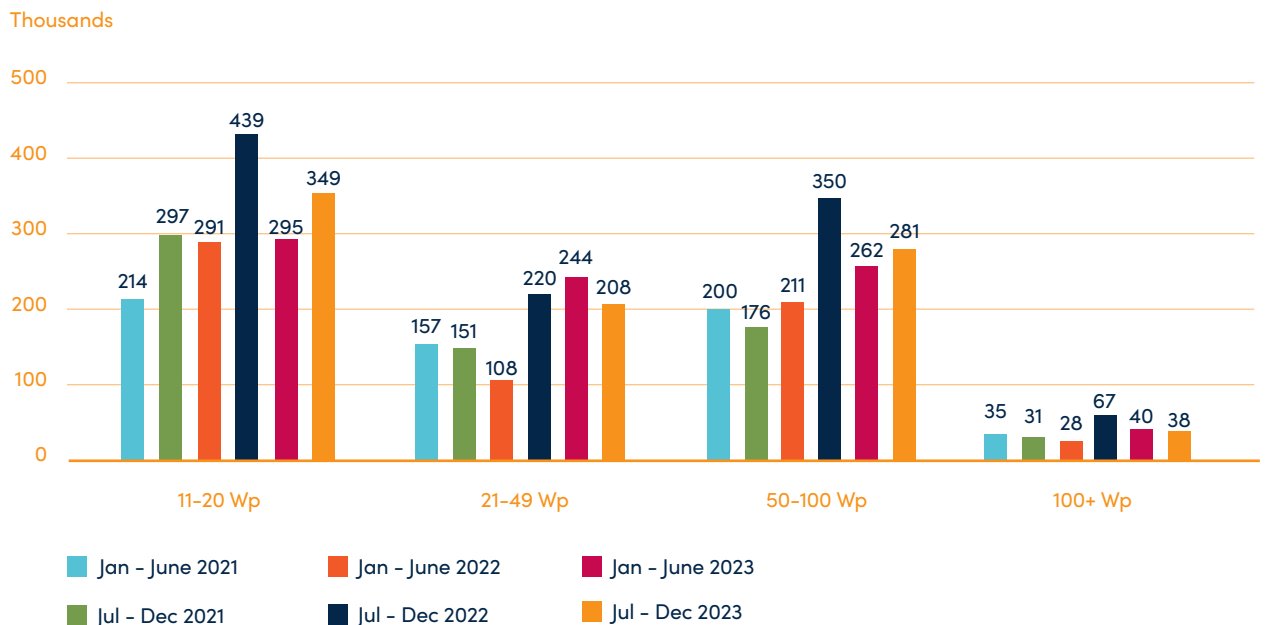
SHS, a category comprising all products of wattage 11 Wp and higher,¹⁹ with a range of price points, recorded sales of 875,000 units in the second half of 2023. Sales increased by 4% compared to the previous six-month period and are 19% lower than the second half of 2022. **89% of all SHS sold between July and December 2023 were sold through PAYGo.**

In addition to these products, companies reported close to half a million sales of larger systems equipped with inverters. These systems were excluded from total sales, but will be included in future sales reporting, enabling more insights on these product categories.

All SHS segments exhibited different rates of growth and decline in H2 2023 compared to H1 2023:

- 11-20 Wp SHS sales increased 19%, reaching 349,000 units sold.
- 21-49 Wp SHS sales decreased 15%, reaching 208,000 units sold.
- 50-100 Wp SHS sales increased 7% reaching 281,000 units sold.
- 100+ Wp sales decreased 5% reaching 38,000 units sold.

Figure 4 - Semi-annual Evolution of Sales Volumes of Solar Energy Kit by Category (11-100+Wp) - World



¹⁹ The largest systems included exceed 360 Wp.

Global Insights

Off-Grid Solar Appliances²⁰

In this series of sales reports, the appliance section focuses on reporting sales of appliances which have reached mainstream levels of production.²¹ These are currently regarded as: TVs, fans, refrigeration units and solar water pumps (SWPs). These are collectively referred to as “Key Appliances” when reported in aggregate. These appliances are reported individually where sufficient sales warrant it, and data confidentiality allows it. Where data cannot be shared due to the limited number of manufacturing companies reporting, it is specified.

Between July and December 2023, affiliate companies reported total global sales of 770,000 Key Appliance units. This represents a 24% decrease compared to the first half of 2023. This is largely explained by strong seasonal variations of fan sales in Pakistan where distributors typically build up stocks in the first few months of the year ahead of the hot season, when demand from end-users peaks.²²

The breakdown of sales by appliance type for the second half of 2023 is provided in the chart below:

Overall, PAYGo appliance sales decreased by 5% compared to the first half of 2023. This is largely due to the strong drop of SHS sales in Sub-Saharan Africa, in particular in West Africa where both TVs and fans are popular appliances. Cash sales in the second half of 2023 also decreased significantly, by 38% compared to the first half of 2023. This is driven by decreased fan sales in Pakistan.

Figure 6 - Semi-annual Share of Sales Volumes of Key Appliances by Category - World

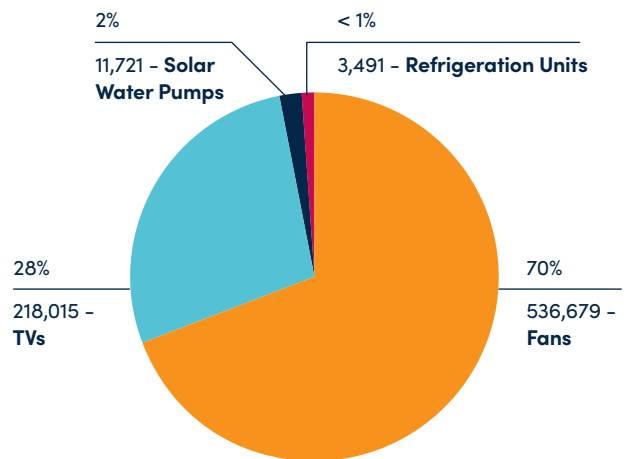
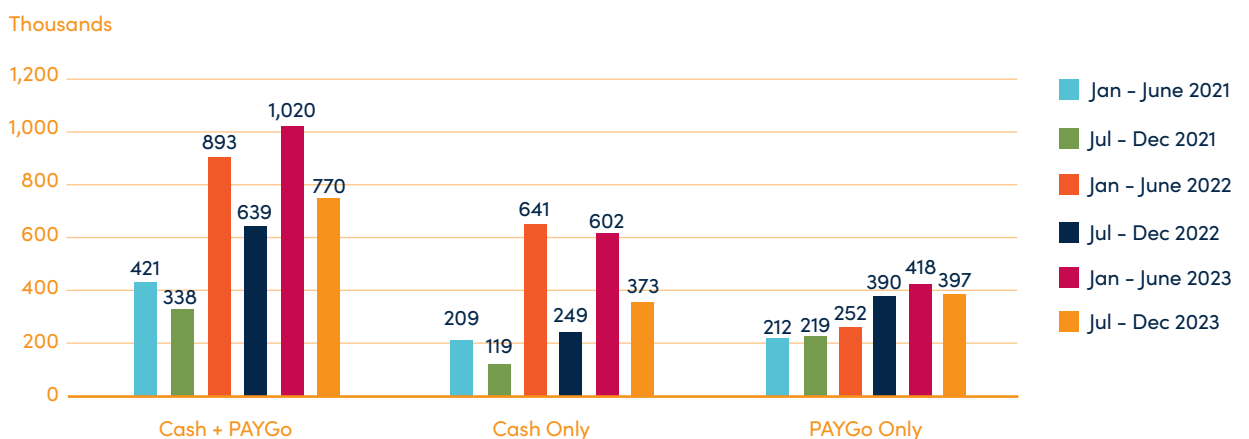


Figure 5 - Semi-annual Evolution of Sales Volumes of Key Appliances - World



NOTE:

- The category ‘Key Appliances’ refers to the sum of all TVs, fans, SWPs and RUs reported as sold.
- Products are classified as ‘Cash’ when sold in a single transaction (including products purchased via tenders), or as ‘PAYGo’, when the customer pays for the product in instalments over time or pays for use of the product as a service.

²⁰ The sales data collection for off-grid appliances is at an early stage. Please note, as the number of companies reporting their sales and product information is still growing, there may be limitations on how representative the data is for total sales in certain country markets. We therefore advise users to complement it with other sources where possible.

²¹ Radios were originally excluded due to being sold on a much higher scale. While we now feature radios in the report, we do not aggregate their sales to the Key Appliances.

²² See South Asia section.

Global Insights



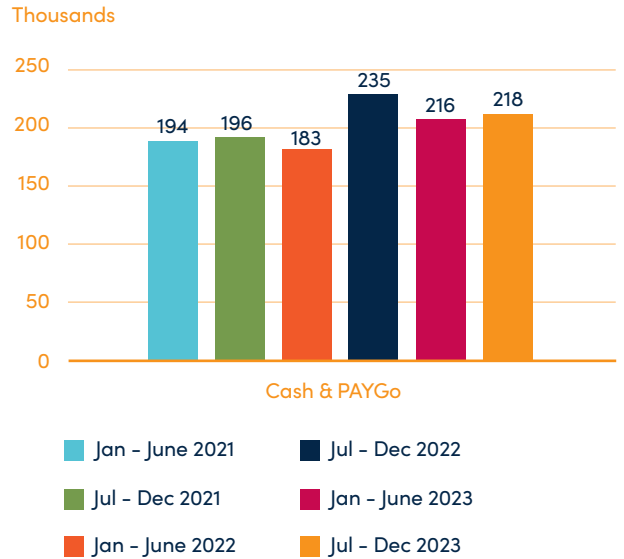
Televisions

218,015 TV units sold in the second half of 2023.

This represents a 1% increase compared to the first half of 2023, and a 7% decrease compared to the second half of 2022. The vast majority of TV sales are in Sub-Saharan Africa (93%) where they are bundled with SHS 93% of the time. 98% were sold through PAYGo.

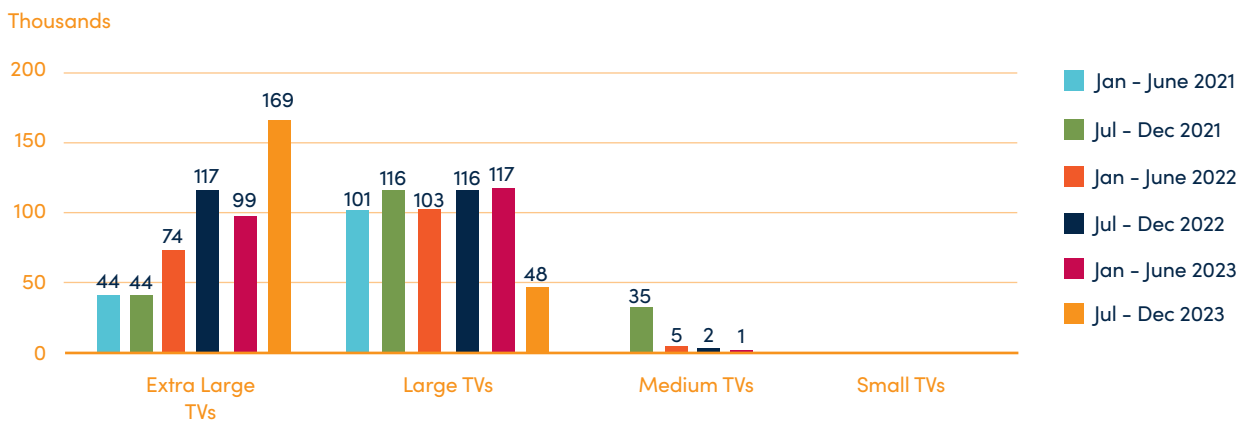
Overall, the market is rapidly moving away from small TV sizes towards larger models. Over 168,800 units of extra-large TVs were sold in the second half of 2023. In the second half of 2023, extra-large (30+”) TV sales once again exceeded large TV (24-29”) sales (47,900 units sold) after this occurred for the first time in H2 2022.

Figure 7 - Semi-annual Evolution of Sales Volumes of TVs – World



NOTE:
Products are classified as 'Cash' when sold in a single transaction (including products purchased via tenders), or as 'PAYGo', when the customer pays for the product in instalments over time, or pays for use of the product as a service.

Figure 8 - Semi-annual Evolution of Sales Volumes of TVs by Category - World²³



²³ Between H2 2021 and H1 2022, the sharp drop in medium-sized TVs was in-part due to the re-categorisation of one TV model from medium to large.

Global Insights



Fans

Fans recorded 536,679 units sold in the second half of 2023. This is a 32% decrease compared to the first half of 2023, but a 53% increase compared to the second half of 2022. The decrease in sales can be seen as part of the seasonal pattern of fan sales in Pakistan. Higher temperatures drive distributors to build up stocks in the first half of the year.

61% of sales occurred in South Asia where fans are generally sold on a cash basis, and usually not bundled with a solar energy kit. This reflects the prevalence of component-based sales in the Asian solar market, as opposed to the plug-and-play solar kits that are more common in Sub-Saharan Africa. Fan sales in Sub-Saharan Africa represented 34% of total volumes during the second half of the year and are largely concentrated in Nigeria. In contrast with the trend in Asia, 93% of fans in Sub-Saharan Africa were sold bundled with a power system – usually a SHS – and 93% were sold through PAYGo.

Ceiling fans and pedestal fans are the two best-selling categories of fans this reporting round. Sales volumes for each category exceed 208,000 units. Again, significant declines in sales in these categories can be tied to the seasonal dip in sales in Pakistan.

Figure 9 - Semi-annual Evolution of Sales Volumes of Fans – World

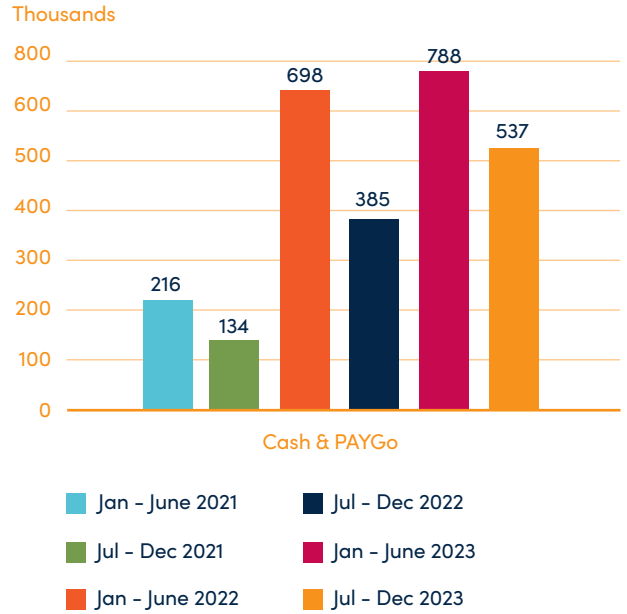
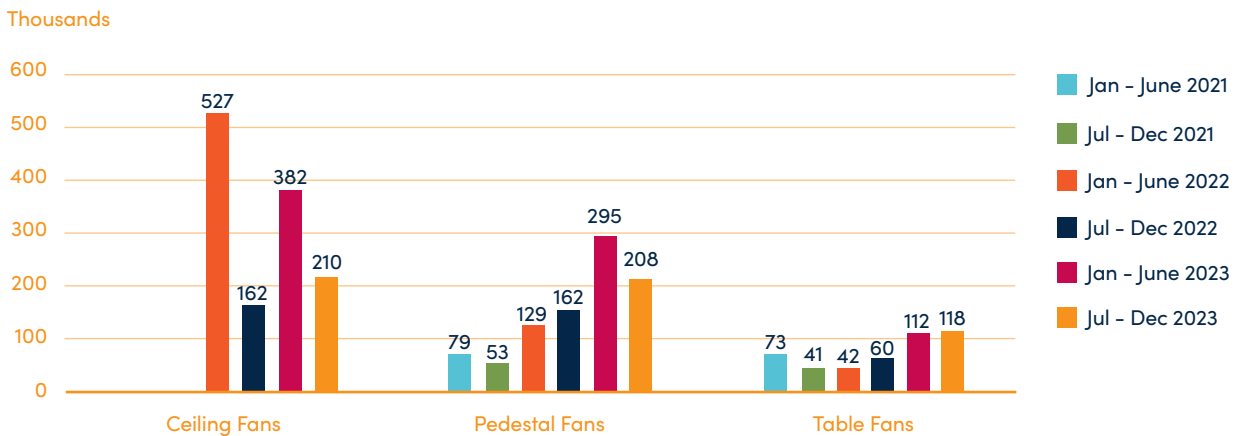


Figure 10 - Semi-annual Evolution of Sales Volumes of Fans by Category - World²⁴



²⁴ High ceiling fan sales in H1 2022 correspond to a round where several companies joined the data collection for the first time. Further data collection will be needed to understand trends in the market.

Global Insights



Refrigeration Units (RUs)

Globally, 3,491 RUs were sold between July and December 2023, an increase of 4% compared to the first half of 2023. However, sales are 25% lower compared to H2 2022.

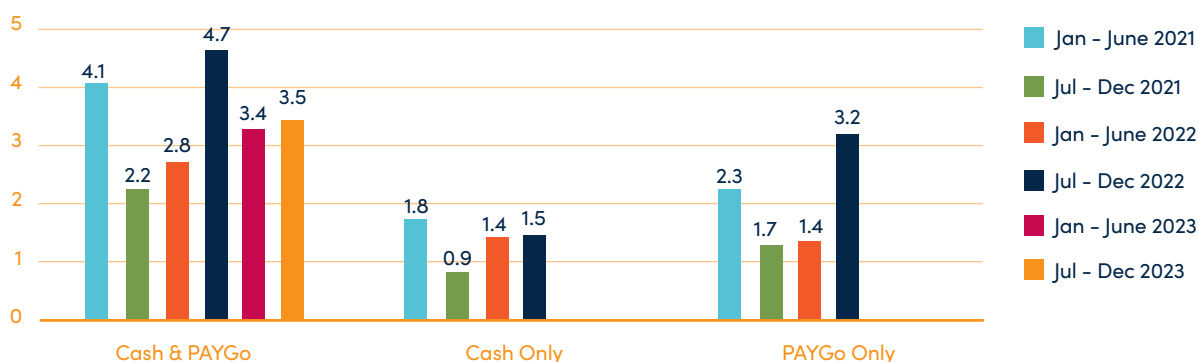
Refrigeration remains a nascent product segment and the most expensive and power hungry of all the appliance segments covered in this report. Affiliate companies focused on the manufacture and distribution of these technologies have yet to reach commercial scale. The impacts of the current uncertainties around supply and customers' ability to pay may further delay this.

Due to data confidentiality rules, volumes for cash and PAYGo sales in 2023 cannot be shown.

In terms of product category diversity, this round, multi-temperature refrigerators with freezer capability represented 33% of sales. Refrigerators represent 64% of total sales, while refrigerator-freezer combination units and freezer sales were also reported, but due to data confidentiality rules, exact numbers cannot be disclosed in this report.²⁵

Figure 11 - Semi-annual Evolution of Sales Volumes of RUs - World

Thousands



NOTE:

Products are classified as 'Cash' when sold in a single transaction (including products purchased via tenders), or as 'PAYGo', when the customer pays for the product in instalments over time or pays for use of the product as a service.

Vaccine Storage

The data collection also includes a number of vaccine refrigerators. However, due to the limited number of companies reporting such products, numbers cannot be shared in this report. Sales of these refrigerators largely follow a centrally-procured model, managed by the World Health Organization and partners under Gavi, the Vaccine Alliance. This equipment differs significantly from the lower-cost specialist off-grid

refrigerators designed to meet household or light commercial needs, yet there has been a significant amount of technology transfer. An example is the adoption of 'solar direct-drive' or SDD for mainstream off-grid markets. SDD refrigerators connect directly to a solar photovoltaic (PV) panel, and use solar energy to freeze water or other cold storage material keeping the refrigerator cold in the absence of sun.²⁶

25 Refrigerator: one or more fresh food compartments for the storage and preservation of unfrozen food and beverages. Refrigerators-freezer combination unit: at least one fresh food compartment and at least one freezer compartment. Freezer: one or more freezer compartments. Multi-temperature Refrigerator: one or more compartments that can be operated either as a refrigerator or freezer by adjusting the thermostat control.

26 Efficiency for Access (2021), Refrigerators Solar Appliance Technology Brief.

Global Insights



Solar Water Pumps (SWPs)

This report covers household, micro-enterprise and smallholder farmer appliances. Therefore, SWPs up to 3kW are included in the data collection.²⁷ **With 11,721 units sold in the second half of 2023, SWPs experienced a 2% increase in sales compared to the first half of 2023.** Overall, 75% of SWPs sold were bundled with a power source.

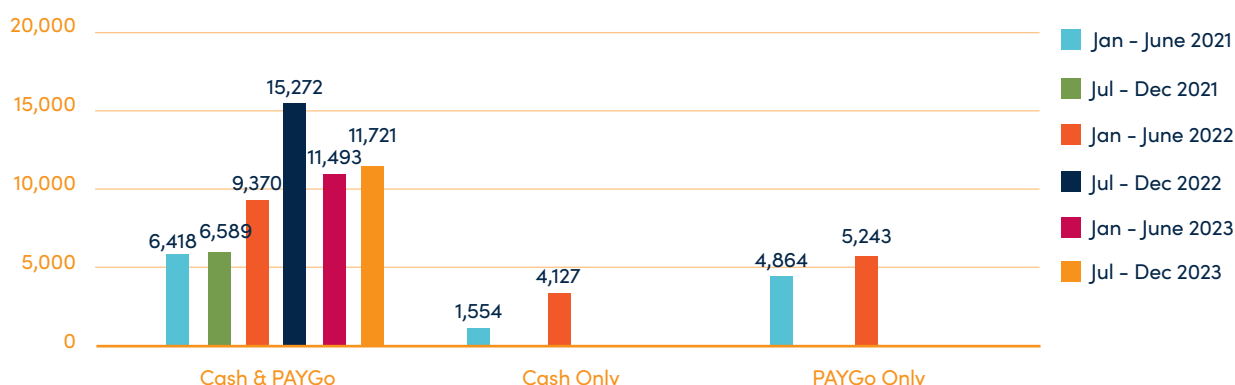
Due to limited participation in the data collection, in particular from big manufacturing companies, this report has limited visibility on what are anecdotally known to be large markets, notably in South Asia.²⁸ Additionally, due to data confidentiality rules, volumes for cash only and PAYGo only sales cannot be displayed.

Other Appliances

Sales were also recorded for a wide variety of other off-grid appliances. With the exception of radios, these appliances are generally not reported in sufficient volumes to enable their inclusion but provide an insight into the type of appliances that are sold. The variety of 'other' products reported has expanded over time and includes products such as solar powered egg incubators, solar milk-can chillers, walk-in cold rooms, agro-processing machines, sewing machines and solar ice makers.

These 'other' appliances are not included under the 'Key Appliances' category. This round, the main appliances in this 'other' category were radios with 131,205 units sold. Excluding radios, this figure is 4,125 units. Among them, the main categories were hair clippers/shavers and stereo systems.

Figure 12 - Semi-annual Evolution of Sales Volumes of SWPs - World



NOTE:

- Products are classified as 'Cash' when sold in a single transaction (including products purchased via tenders), or as 'PAYGo', when the customer pays for the product in instalments over time or pays for use of the product as a service.
- High sales reported in July-December 2019 can be linked to government programs in India and Bangladesh.

²⁷ More details [here](#).

²⁸ For example, this report does not include data from companies participating in the ambitious [KUSUM](#) scheme in India.

Main markets by appliance type July-December 2023

Data collection efforts are being made to expand participation from companies selling appliances. As this is on-going, it can be difficult to get a clear picture of the main markets per appliance type throughout this report as there are several cases where collected country data is either not shown (due to not satisfying the data confidentiality rules)²⁹ or where some of the major appliance suppliers have not yet chosen to participate in contributing data to the reports. Below is a

table summarising the top 3 markets for each appliance type by sales volume reported by Affiliates between July and December 2023. For RUs and SWPs in particular, a limited number of companies are participating in the data collection. Therefore, the main markets identified in the table below may be more representative of the main countries of focus of participating companies, while significant sales volumes may also occur in other markets.

Table 7 - Top 3 Markets by Appliance Type Based on Sales Volumes Reported by Affiliates Between July and December 2023

Rank	TVs	Fans	Refrigeration units	Solar Water Pumps
1	Nigeria	Pakistan	Nigeria	Kenya
2	Kenya	Nigeria	Uganda	India
3	Tanzania	India	Kenya	Zambia



© Solar Works

29 See Methodology Annex for more details.



**East
Africa
Insights**



East Africa Insights



Regional Sales Trends

Off-Grid solar energy kits

Sales of off-grid solar energy kits in East Africa between July and December 2023 surpassed 2.5 million units. This is a 14% increase compared to the first half of 2023, yet a 1% decrease compared to the second half of 2022.

Cash sales, led by solar lantern sales, increased by 22% compared to the first half of 2023, yet are 4% lower than the second half of 2022. PAYGo sales volumes increased by 5% compared to the previous reporting round and are 3% higher than during the second half of 2022.

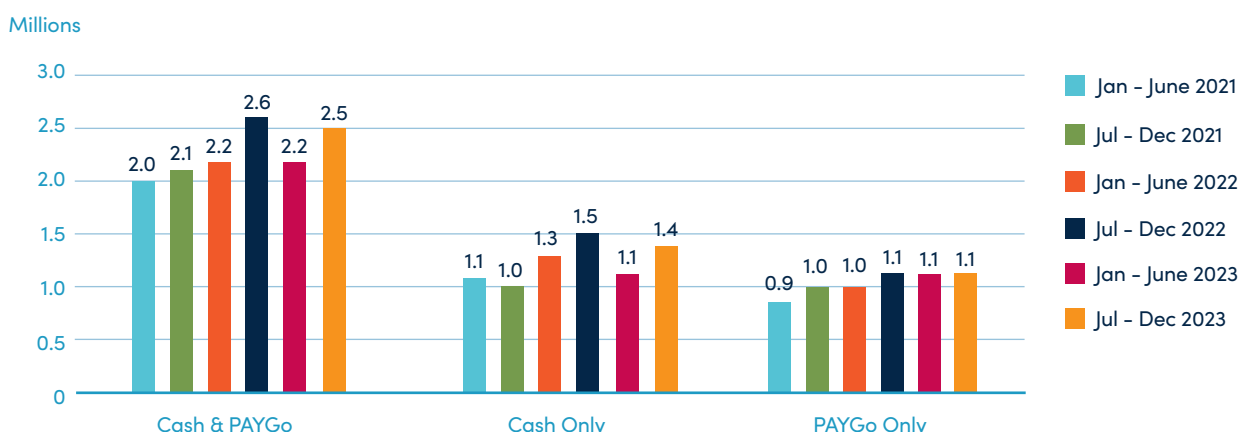
Product Trends

Sales of lanterns increased by 17% compared to the previous round. While sales of 0-1.5 Wp lanterns grew 33%, sales of larger lanterns with phone charging capacity remained consistent with the first half of 2023. 42% of solar lanterns with phone charging were reported as sold via PAYGo.

Multi-light systems sales decreased by 15% since the first half of 2023 and are 20% less than in the second half of 2022. 49% of the total sales in this round were reported as PAYGo.

Overall, SHS sales decreased by 5% compared to the previous round to 16% lower than the second half of 2022. The decrease in sales is particularly prominent in the 11-20 Wp category.

Figure 13 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits - East Africa



NOTE:

Products are classified as 'Cash' when sold in a single transaction (including products purchased via tenders), or as 'PAYGo', when the customer pays for the product in instalments over time or pays for use of the product as a service.

Table 8 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Category - East Africa

Categories		Jul-Dec 2022 volumes (Cash & PAYGo)	% change v. Jan-June 2023	% change v. Jul-Dec 2022
Lanterns	0-1.5Wp	928,944	24%	14%
	1.5-3Wp	730,596	16%	-11%
Multi-light systems	3-10Wp	560,767	8%	1%
Solar Home Systems	11-20Wp	37,066	-41%	-46%
	21-49Wp	182,851	-5%	1%
	50-100Wp	86,036	20%	-12%
	100+Wp	20,148	35%	16%

East Africa Insights

Countries Overview

Kenya is the largest market in the region and represents 74% of the total sales. Sales in Kenya continued upward momentum reported in the last four rounds and grew 12% compared to H1 2023.

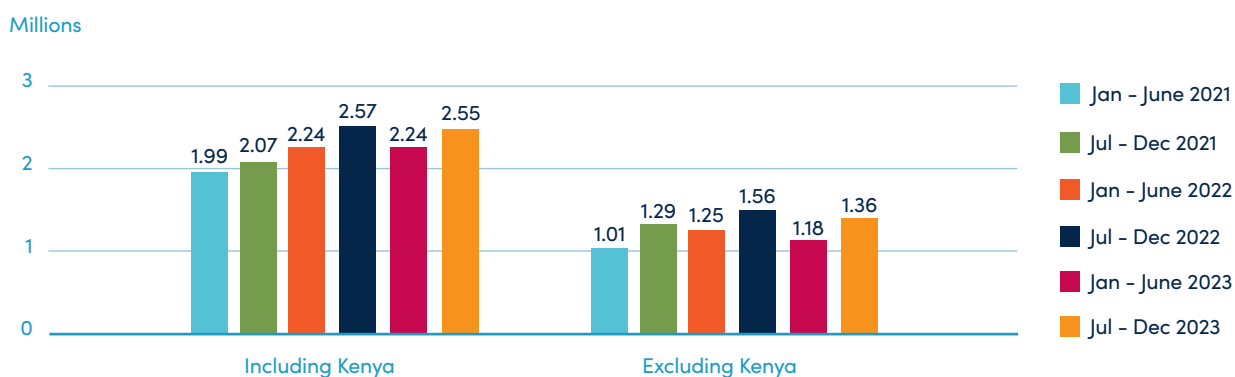
Table 9 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country – East Africa

Region / Countries	Jul-Dec 2023 volumes (Cash & PAYGo)	% change v. Jan-June 2023	% change v. Jul-Dec 2022
East Africa	2,546,408	14%	-1%
Kenya	1,181,746	12%	17%
Ethiopia	330,504	174%	177%
Zambia	295,260	23%	2%
Uganda	250,215	37%	43%
Tanzania	137,175	9%	-11%
Malawi	73,893	-23%	-57%
Mozambique	72,018	-12%	-21%
Rwanda	65,108	12%	-40%
Zimbabwe	51,086	-22%	60%
Madagascar	50,162	-64%	-35%
Somalia	21,673	180%	-93%
Burundi	17,546	-	-51%

NOTE:

Countries not featured in this table did not see enough companies reporting to pass the three-data point rule.

Figure 14 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits – East Africa with and without Kenya



East Africa Insights

Off-Grid Solar Appliances

Between July and December 2023, the total number of Key Appliances sold in East Africa reached 127,019 units. This is only a 1% decrease compared to the first half of 2023 and a 4% increase compared to the second half of 2022. TVs are the most common appliance sold in East Africa and represent 70% of total sales volumes.

Product Trends

TVs sold in East Africa account for 46% of total TV sales in Sub-Saharan Africa with 99,851 units and 55% of the TVs sold globally. In East Africa, 99% of TVs were sold bundled with an SHS. Extra-large TVs represent 77% of TV sales in East Africa, followed by large TVs (24-29") at 22%. This seems to confirm the trend towards large and extra-large TVs as the vast majority of TVs sold.

Refrigeration units sold in East Africa at 1,059 units, represent 75% of total Sub-Saharan African RU sales and 33 % of global sales. This is a 21% increase compared to the previous round. The most common type of RUs sold are refrigerators. It has been reported by companies over the last few rounds that direct current (DC) solar RUs are facing increasing competition from cheaper alternating current (AC) RUs being solarised for use off-grid (in combination with an inverter and battery) or powered by a generator.

SWPs sales in East Africa represent 93% of total Sub-Saharan African sales and 77% of global sales, with 9,051 units. This is a 22% increase compared to the first half of 2023, yet 8% lower than sales in the second half of 2022.

Sales of fans in the region slightly decreased to 17,048 units, compared to 17,981 units sold in the first half of 2023.

Figure 15 - Semi-annual Evolution of Sales Volumes of Key Appliances - East Africa

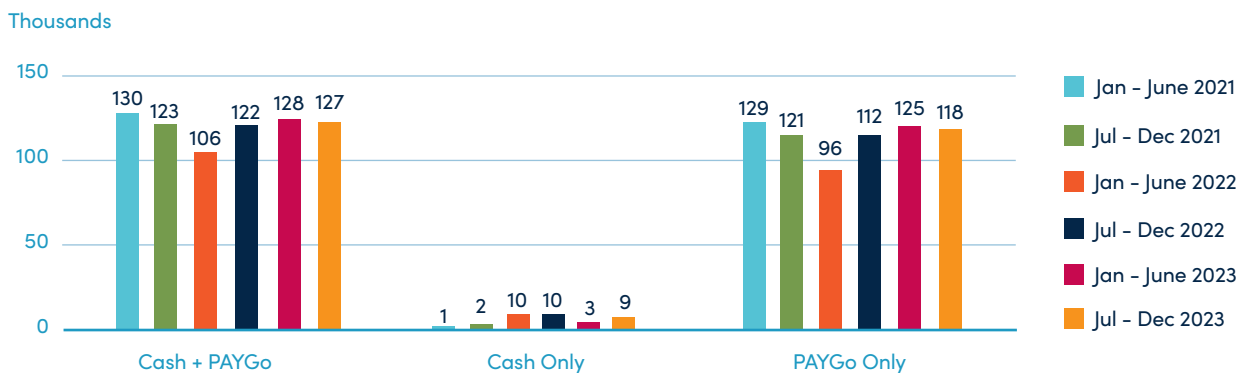


Table 10 - Semi-annual Evolution of Sales Volumes of Key Appliances by Type - East Africa

Appliance	H2 2023	% change from H1 2023	% change from H2 2022	Share reported as sold PAYGo	Share sold bundled with a power system
TVs	99,851	-2%	-6%	97%	98%
Fans	17,048	-5%	232%	97%	99%
RUs	1,069	21%	71%	-	28%
SWPs	9,051	22%	-8%	-	81%

East Africa Insights

Countries Overview

Companies in Kenya reported the largest sales with 73,521 units sold and accounts for 58% of sales in the region. Sales grew by 4% to reach 73,521 units sold. Other markets in the region continue to see much lower appliance sales as the chart presenting regional appliance sales with and without Kenya demonstrates.³⁰

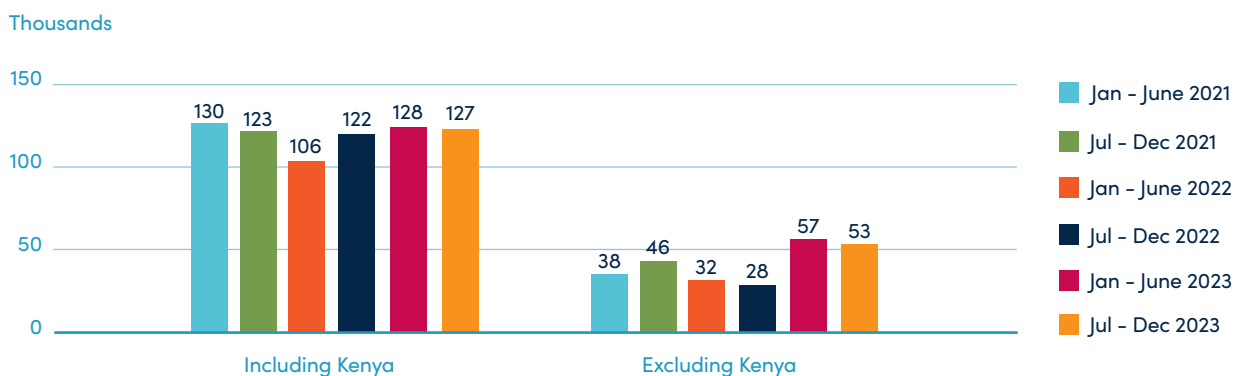
Table 11 - Semi-annual Evolution of Sales Volumes of Key Appliances by Country - East Africa

Region / Countries	Jul-Dec 2023 volumes Key Appliances (Cash & PAYGo)	% change v. Jan-June 2023	% change v. Jul-Dec 2022
East Africa	127,019	-1%	4%
Kenya	73,521	4%	-22%
Tanzania	16,684	11%	96%
Uganda	7,813	-53%	55%
Zambia	7,645	18%	-86%
Malawi	5,675	-	283%
Mozambique	5,639	6%	153%
Madagascar	4,360	74%	-20%
Zimbabwe	1,831	-	-
Rwanda	1,496	-64%	-16%
Ethiopia	1,250	0%	404%

NOTE:

- The category 'Key Appliances' refers to the sum of all TVs, fans, solar water pumps and refrigeration units.
- Countries not featured in this table did not see enough companies reporting to pass the three-data point rule

Figure 16 - Semi-annual Evolution of Sales Volumes of Key Appliances - East Africa with and without Kenya



³⁰ The increase in sales in 2023 is partially linked to increased participation in the data collection for appliances. Further data collection will be required to establish trends.



Kenya Insights

Background

Kenya is the most mature market for plug-and-play off-grid solutions and has become the largest market overall, surpassing India in 2019. The COVID-19 pandemic led to a shortfall in sales in 2020 and 2021, but the last four rounds saw annual sales steadily increase, reaching 1.18 million units. Droughts continued to affect Kenya in 2023, leading to less disposable income in rural areas. Companies operating in Kenya were also affected by the devaluation of the Kenyan Shilling which fell by more than 22% against the US dollar between 2022 and the beginning of 2024.³¹

As the most mature market, Kenya is rapidly developing informal alternatives to off-grid solar products, notably for DC appliances. This includes technicians coupling AC appliances – from TVs to refrigerators and egg incubators – with solar panels, batteries and inverters. These solutions are potentially more affordable than DC appliances, but may also present quality and safety issues depending on the quality of appliances purchased and the professionalism of the installers.

Several ongoing interventions reported support for the off-grid sector in Kenya in 2023:

- The Kenya Off-Grid Solar Access Project for Underserved Counties (KOSAP) is being implemented by the Ministry of Energy with financing from the World Bank. The project closing date is expected to be extended until May 2025. Over 20 firms have been selected to date, with the aim of selling 250,000 solar home systems in 14 counties.
- The Sustainable Energy for Smallholder Farmers (SEFFA) project (EnDev, IKEA Foundation, GIZ, SNV) which will provide up to €8 million to support productive use of renewable energy in the dairy and horticultural value chains in Ethiopia, Kenya and Uganda.

- The Africa Enterprise Challenge Fund (AECF) Renewable Energy and Adaptation to Climate Technologies (REACT) results-based financing (RBF) programme, funded by the Swedish International Development Cooperation Agency, provides financing for off-grid solar and clean cooking solutions, with additional financial incentives for companies to reach the poorest households.
- The Productive Use Appliance Financing Facility (PUAFF) began disbursing in 2023. It includes US\$ 2.1 million in procurement subsidies as well as further support through capacity building grants and advisory support. The fund focuses on electric pressure cookers, induction cookers, fans, milling, solar water pumps, refrigeration units and walk-in cold rooms. The markets covered are DRC, Ethiopia, Kenya, Nigeria, Sierra Leone and Uganda.

Sales Trends

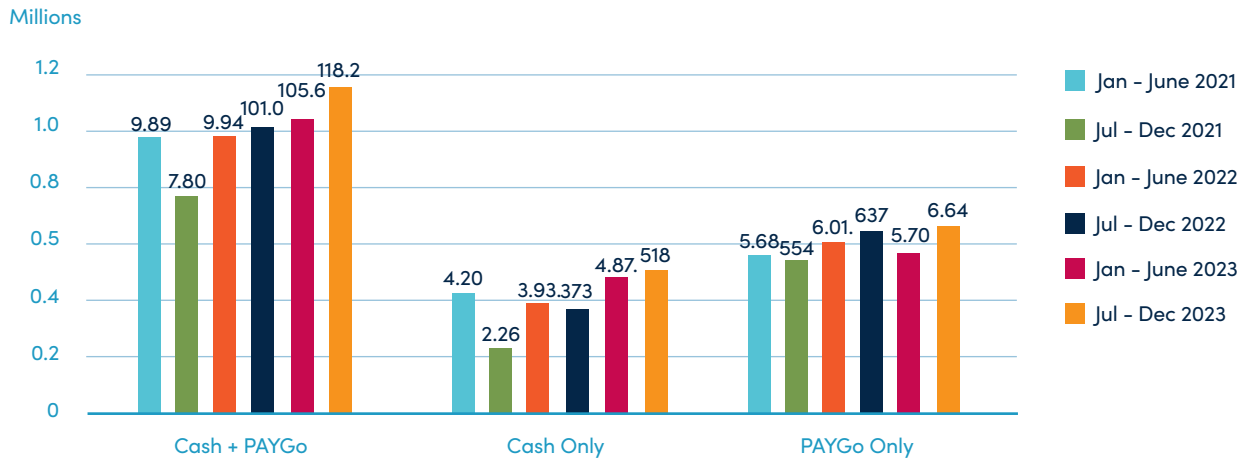
Off-Grid Solar Energy Kits

- **Reported double-digit growth in sales volumes.** Sales grew by 12% compared to the first half of 2023, and are now 17% higher than in the second half of 2022. 1.18 million units sold in the second half of 2023.
- **Steady growth for both cash and PAYGo sales.** Sales this round is driven primarily by lanterns, lanterns with phone charging, and multi-light systems. Most lanterns with phone charging and multi-light systems sold through PAYGo, contributed to the overall increase in PAYGo volumes.
- While detailed numbers cannot be shared due to data confidentiality rules, sales of smaller SHS, 11-49 Wp in Kenya in the second half of 2023 have decreased compared to the first half of the year, sales of larger systems (50+ Wp) increased during the same period.



Kenya Insights

Figure 17 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Kenya



Appliances

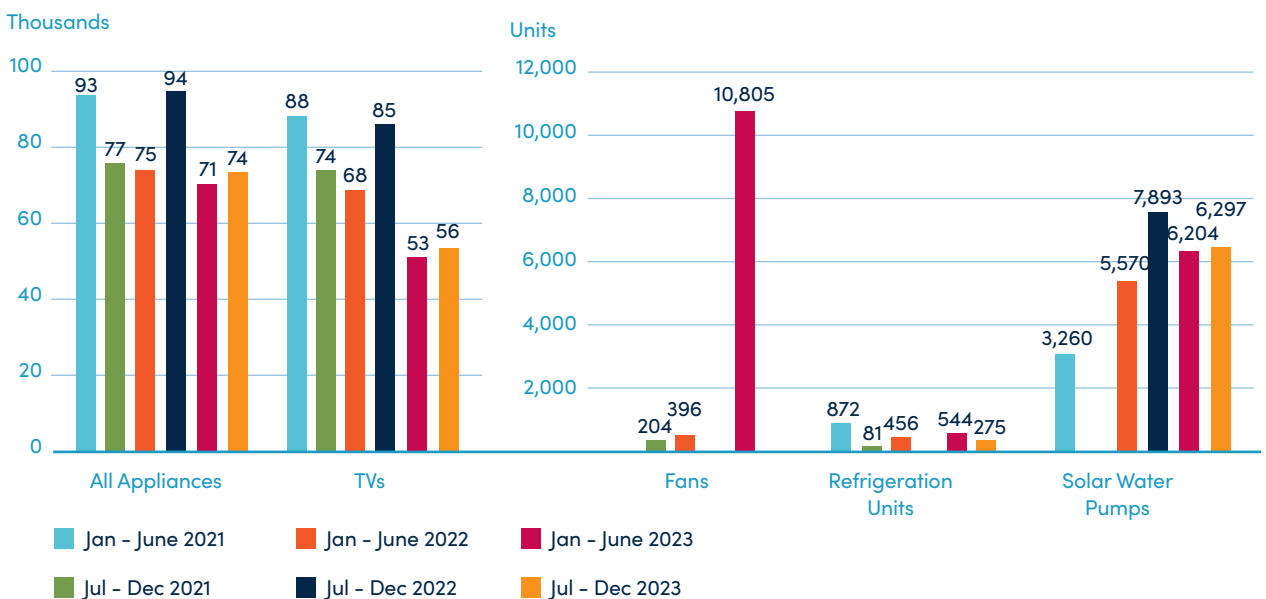
TVs sales reported in this round increased 6% compared to H1 2023 reaching 56,161 units. The increase can be linked to the higher reported sales of SHS capable of powering TVs. The appliance market in Kenya is primarily dominated by TVs accounting for 76% of key appliance sales, 99% of which were sold bundled with SHS.

Although detailed data cannot be shared in this report due to confidentiality rules in the fan category, **sales decreased compared to the first half of 2023.**

RU sales decreased 49% compared to the first half of 2023 to 275 units.

SWP sales increased just 1% from 6,204 to 6,297 units compared to the first half of 2023. However, sales remain 20% lower compared to the highest sales recorded in H2 2022.

Figure 18 - Semi-annual Evolution of Sales Volumes of Key Appliances – Kenya³²



32. The sharp increase in fan sales in 2023 can be linked to newly participating companies.



Malawi Insights

Background

In 2023, Malawi experienced fuel, medicine and fertiliser shortages due to lack of access to foreign currencies. Importing non-essential products became complicated during this period due to foreign exchange restrictions. This situation ultimately led the government to devalue the Kwacha by close to 44% which significantly damaged revenues of companies operating in Malawi.³³ This followed previous devaluations in 2022 and translated into consumer price increases for off-grid solar products.

Restoration of the Kapichira hydropower station, damaged in 2022 by cyclone Ana, has also contributed to increased grid reliability. It had been noted in past rounds that unreliable grid connection had been a driver of demand for off-grid solar solutions.

2023 marked a transitional year in terms of programmatic interventions. The Malawi SHS Kick-Starter programme ended. The World Bank funded Ngwee Ngwee Ngwee Fund (NNNF)³⁴ was announced, but began disbursement later than originally anticipated. It is expected that market impact of the NNNF disbursements will be realised in 2024.

Sales trends

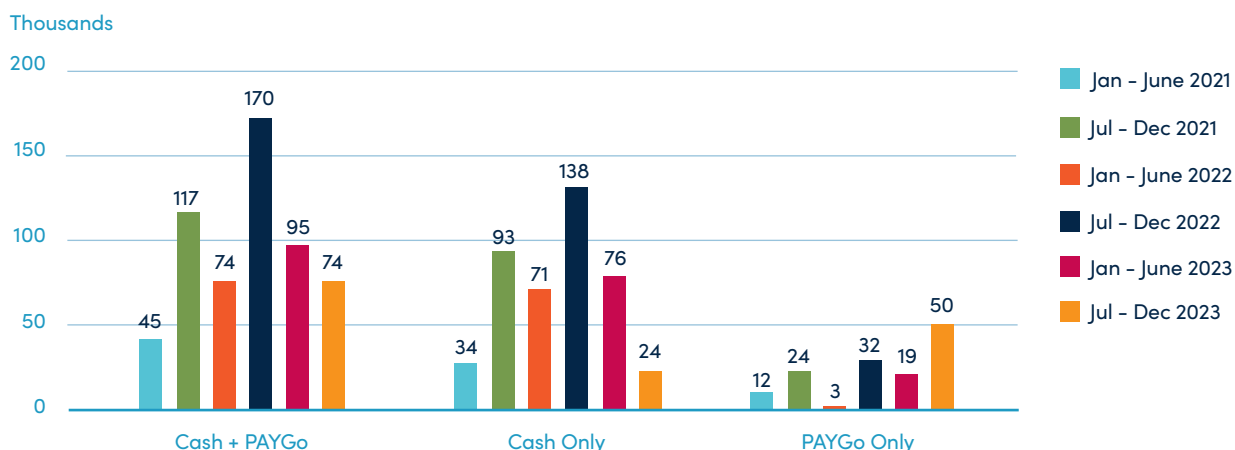
Off-Grid solar energy kits

- Malawi has typically seen strong seasonal variations in sales reported, with higher sales during the second half of each year. However, with 73,900 units sold this round, sales decreased by 23% compared to the first half of 2023, and 57% compared to the second half of 2022, breaking the previously observed seasonal trend.
- Cash sales decreased by 68%, yet PAYGo recorded significantly higher sales (158%) than during the first half of 2023.

Appliances

- In the second half of 2023, 5,675 Key Appliance units were sold in Malawi, with TVs accounting for 62%. TVs.
- Too few companies reported other types of Key Appliance sales to be disclosed, yet fans and RUs were also reported.

Figure 19 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Malawi



³³ BBC, Malawi kwacha: 44% drop in value against US dollar sparks unease, Nov. 2023.

³⁴ More information available [here](#).



Madagascar Insights

Background

Double-digit inflation stifled demand from households in Madagascar, already one of the poorest countries on the continent. Insights from the ground also suggest the fear of political instability before and after the election (November 2023) was a factor that may have led to slower sales in the second half of the year.

The World Bank’s US\$40 million Off-Grid Market Development Fund (OMDF), supported by the Government of Madagascar, is helping increase access to off-grid energy in Madagascar by providing financial aid to companies offering solar lanterns and solar home systems bundled with appliances. The fund has attracted new market players and led more distributors to focus on high-quality VeraSol-certified products. In April 2023 a new World Bank funded project, the Digital and Energy Connectivity for Inclusion in Madagascar (DECIM) was announced, which will likely provide some form of follow-up to the OMDF.

Sales trends

Off-Grid solar energy kits

- Sales of off-grid solar products reached 50,200 units in the second half of 2023, a 64% decrease compared to the first half of 2023, and 35% lower than in the second half of 2022.
- Cash sales decreased by 81% while PAYGo sales decreased by 37% compared to the first half of 2023.
- Strong variations between the two halves of 2023 are likely in part due to this report’s focus on manufacturer data, as distributor sales data for the same period is more evenly spread.

Appliances

- 4,360 Key Appliances sold during the second half of 2023, a 74% increase from 2,504 units sold during the first half of 2023.
- The most common Key Appliances sold are TVs with 3,350 units sold (77% of Key Appliances sold in Madagascar).
- Other types of Key Appliances sold include fans and SWPs.

Due to a low number of reporting companies and limited historical data, no further details can be provided regarding the appliance sales in Madagascar.

Figure 21 - Semi-annual Evolution of Sales Volumes of Key Appliances - Madagascar

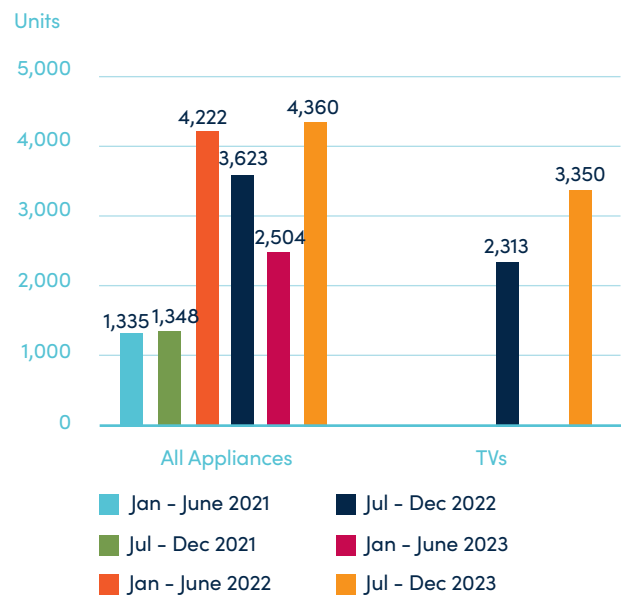
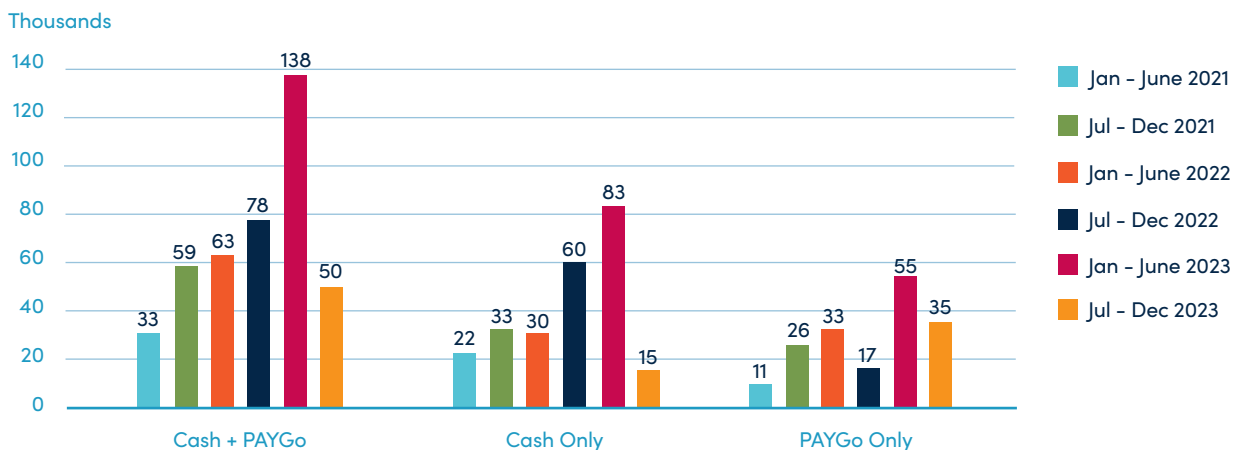


Figure 20 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Madagascar





Uganda Insights

Background

Uganda's economy grew 5% in 2023, showing signs of a strong rebound, while inflation was brought under control during the first half of the year. In Uganda, off-grid solar is seen as a key component in achieving universal access targets and has benefited from interest and support from the Ministry of Energy. In addition to this favourable context, the sector benefited from programmatic interventions including:

- The €8 million Sustainable Energy for Smallholder Farmers (SEefa) project, alongside Ethiopia and Kenya. The project is funded by EnDev and the IKEA Foundation and aims to support PUE in dairy and horticultural value chains.
- The Private Sector Foundation Uganda (PSFU) and EnDev Last-Mile RBF incentivises companies to expand their reach into more rural and remote areas.
- EnDev is rolling out demand-side subsidies (DSS) for off-grid solar and clean cooking. Close to US\$5 million has been committed for Uganda.
- The Beyond the Grid Fund for Africa (BGFA) – Uganda, funded by Denmark and Sweden and implemented by NEFCO and REEEP has committed US\$14.5 million, and the programme will run until 2026.
- The Uganda Energy Access Scale-up Project (EASP) funded by the World Bank and implemented by UECCC was launched in 2023 but is expected to start disbursing into

the market in 2024. US\$90 million has been committed and will cover working capital financing, result-based finance and include US\$27 million earmarked for access to energy in displacement settings.

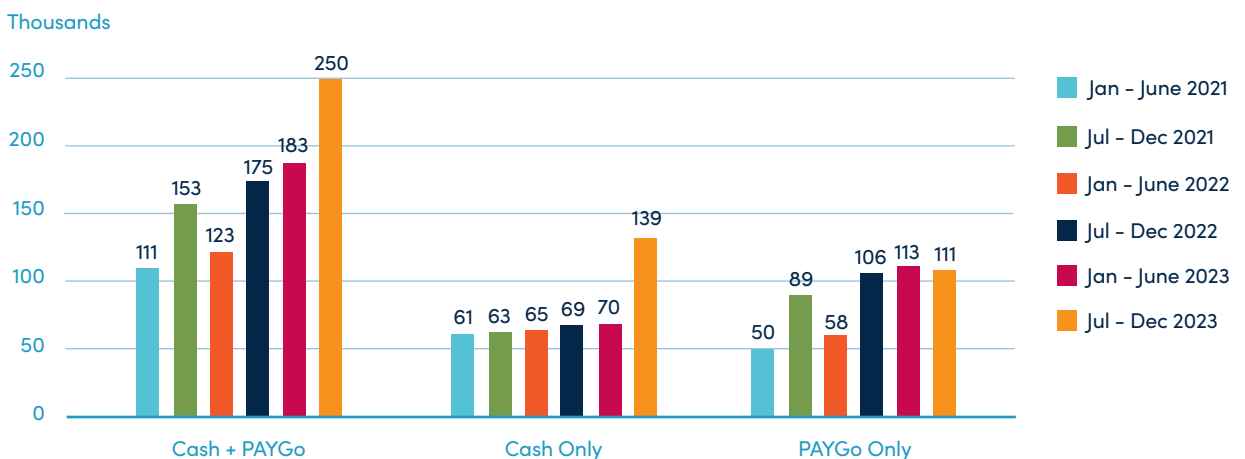
- The Productive Use Appliance Financing Facility (PUAFF) began disbursing in 2023. It includes US\$ 2.1 million in procurement subsidies as well as further support through capacity building grants and advisory support. The fund focuses on electric pressure cookers, induction cookers, fans, milling, solar water pumps, refrigeration units and walk-in cold rooms. The markets covered are DRC, Ethiopia, Kenya, Nigeria, Sierra Leone and Uganda.

Sales trends

Off-Grid solar energy kits

- **Sales of Solar energy kits reached 250,215 units during the second half of 2023, a 37% increase compared to the first half of 2023, and 43% higher than the second half of 2022.** Sales volumes in the country appear to have returned to sustainable growth, and are now even higher than their peak in pre-COVID-19 levels.
- **Cash sales in Uganda increased by 99% compared to H1 2023 while PAYGo sales decreased by 1% compared to the same round.** Cash sales are driven by lantern sales. Further data collection will be needed to assess whether this number represents a peak or part of a trend.

Figure 22 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Uganda





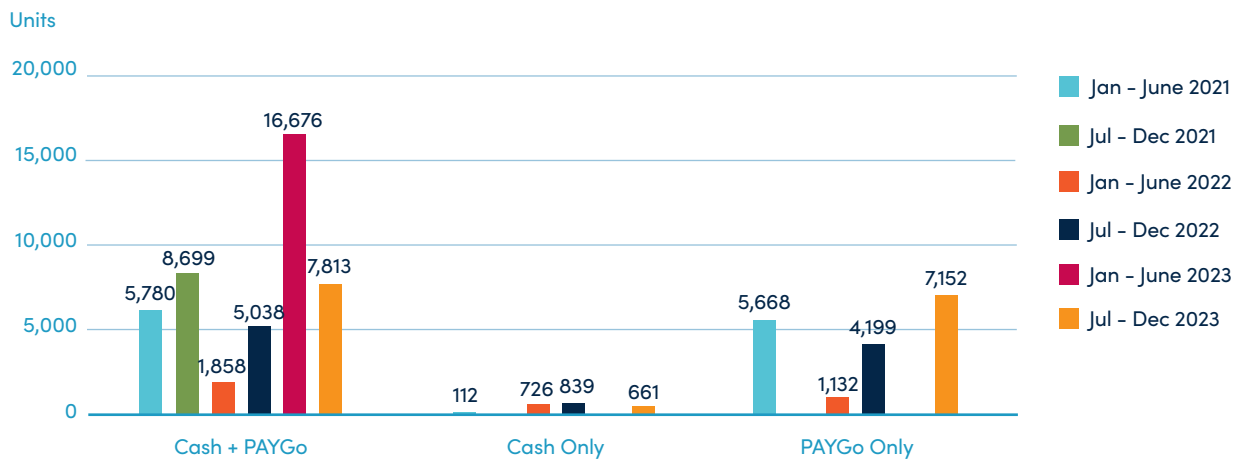
Uganda Insights

Appliances

- **This round, 7,813 units of Key Appliances were sold in Uganda.** This is a 53% decrease compared to the first half of 2023, where a surge in TV sales was observed. Sales in the second half of 2023 remain 55% higher than during the second half of 2022.
- **In H2 2023 6,276 TVs were sold. This is a 61% decrease compared to the first half of the year.** TV sales represent 80% of all appliances sold in the second half of 2023.
- **SWPs sales totalled 845 units, fan sales were 224 units and RUs sales were 468 units in the second half of 2023.**

Due to data confidentiality rules, comparison of the sales numbers with the previous round is not possible for the Key Appliances except the TV sales.

Figure 23 - Semi-annual Evolution of Sales Volumes of Key Appliances - Uganda



East Africa Insights



Zambia Insights

Background

Companies felt the effects of the Zambian Kwacha depreciating by more than 20% against the US dollar in 2023.

In terms of programmatic interventions, Zambia receives continued support from the Beyond the Grid Fund for Africa (BGFA) with over US\$28 million in funding committed to be disbursed by 2027.

Sales Trends

Off-Grid solar energy kits

- **Sales of solar energy kits reached 295,000 units in the second half of 2023, a 23% increase compared to the first half of 2023 and a 2% increase compared to the second half of 2022.** The main driver of sales since 2020 was a strong increase in the sales of solar lanterns, notably in the 0-1.5 Wp category.
- **Cash sales increased by 28% and PAYGo sales by 15% compared to the first half of 2023.** While the cash sales are led by lanterns, the increased PAYGo sales are led by multi-light systems (3-10 Wp).

Appliances

- **The last four rounds recorded sales volumes in Zambia increasing steadily.** With 7,645 units of Key Appliances sold this reporting round, Zambia records an 18% increase in sales compared to the first half of 2023 and an 86% increase on the second half of 2022.

- **84% of units of total Key Appliances sold were TVs totalling 6,406 units.**
- Other types of Key Appliances sold include fans, RUs and SWPs. Due to data confidentiality rules, the sales volumes for these appliances cannot be shared in this report.

Figure 25 - Semi-annual Evolution of Sales Volumes of Key Appliances – Zambia

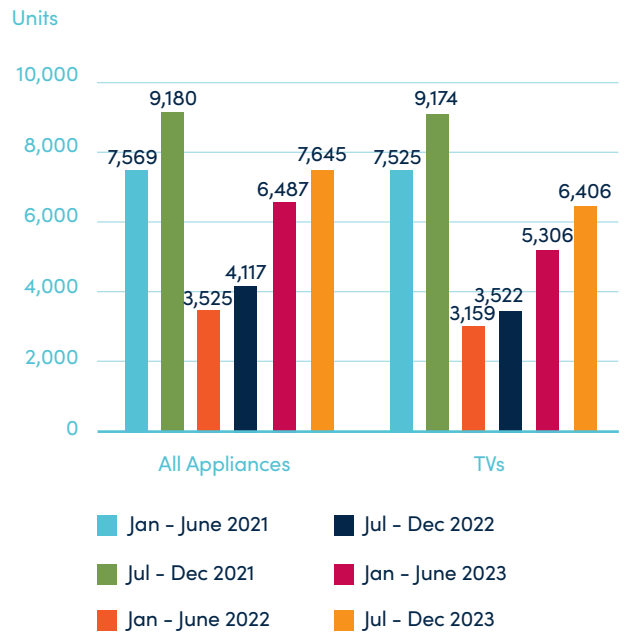
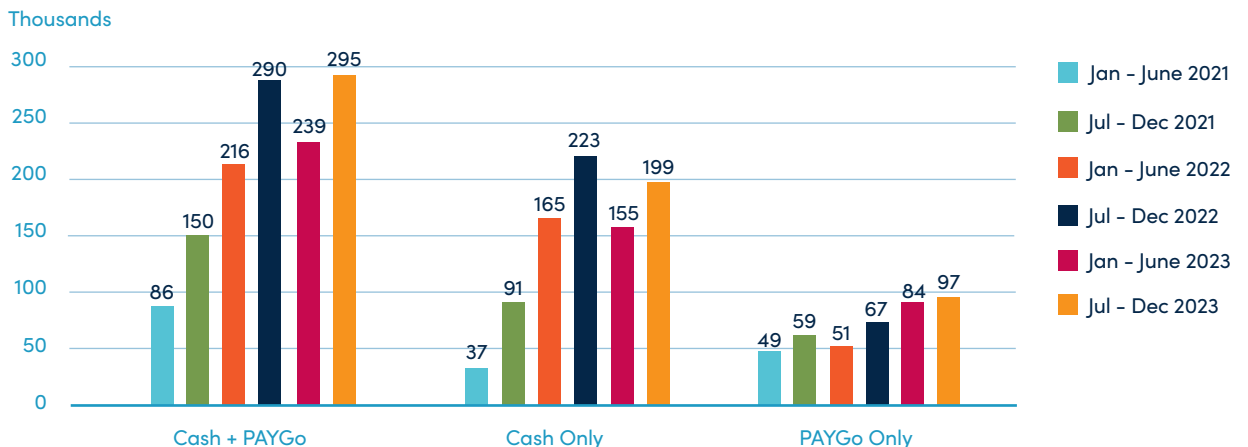


Figure 24 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Zambia





Other East African Countries

Mozambique

Sales in Mozambique had been growing year on year over the last four years. The market usually recorded significant seasonal variations with higher sales in the second half of the year. With 72,000 solar energy kits sold, sales in the second half of 2023 are **12% lower than in the first half of 2023 and 21% lower than in the second half of 2022.**

Appliance sales increased by 6% compared to the previous reporting round to 5,639 units, and showed a significant increase of 153% compared to the second half of 2022. In the second half of 2023, 80% of all units sold were TVs. Companies also reported sales of fans and SWPs, but details cannot be shared in this report due to confidentiality rules.

Since 2019, Mozambique's market has benefited from the support of the BRILHO programme funded by Sweden and UK Aid and the FASER RBF funded by GIZ, the Ministry of Foreign Affairs of the Netherlands, Norad and the Swiss Agency for Development and Cooperation. 2023 marked a period of relative uncertainty for companies operating in the market. Delays in a World Bank funded programme and the late announcement of continuity of the BRILHO programme may have led companies to act cautiously in 2023.

Rwanda

With 65,000 units sold, off-grid solar energy kits sales in Rwanda increased by 12% compared to the first half of 2023 and decreased by 40% compared to the second half of 2022.³⁵ While cash sales increased by 81% compared to H1 2023, PAYGo sales decreased by 24% for the same period.

1,496 Key Appliances were sold in Rwanda during the second half of 2023, which is a 64% decrease compared to the first half of 2023 and 16% decrease compared to H2 2022. Almost 59% of these sales are TVs.

In 2020, the World Bank approved a US\$150 million IDA loan to the Government of Rwanda to improve access to modern energy. US\$15 million of this is allocated to the pro-poor RBF for off-grid solar, complementing US\$15 million previously allocated to support off-grid solar through the REF. Under the pro-poor RBF (REF window 5), the government is subsidising low-income households' access to solar home systems.

Tanzania

Sales of solar energy kits in the second half of 2023 reached 137,000 units, a 9% increase compared to the first half of 2023. Cash and PAYGo sales both grew compared to the first half of 2022. PAYGo sales increased by 6% and cash sales increased by 18% compared to the previous reporting round.

Key appliance sales, of which 97% are TVs, increased by 7% compared to the first half of 2023 to reach more than 16,600 units sold.

³⁵ Anecdotal evidence suggests the sharp drop in sales between 2022 and 2023 can in part be attributed to the focus of this report on sales data from manufacturers, and may not be reflected in the trends of sales to customers.



**West
Africa
Insights**



West Africa Insights



Regional Sales Trends

Off-Grid Solar Energy Kits

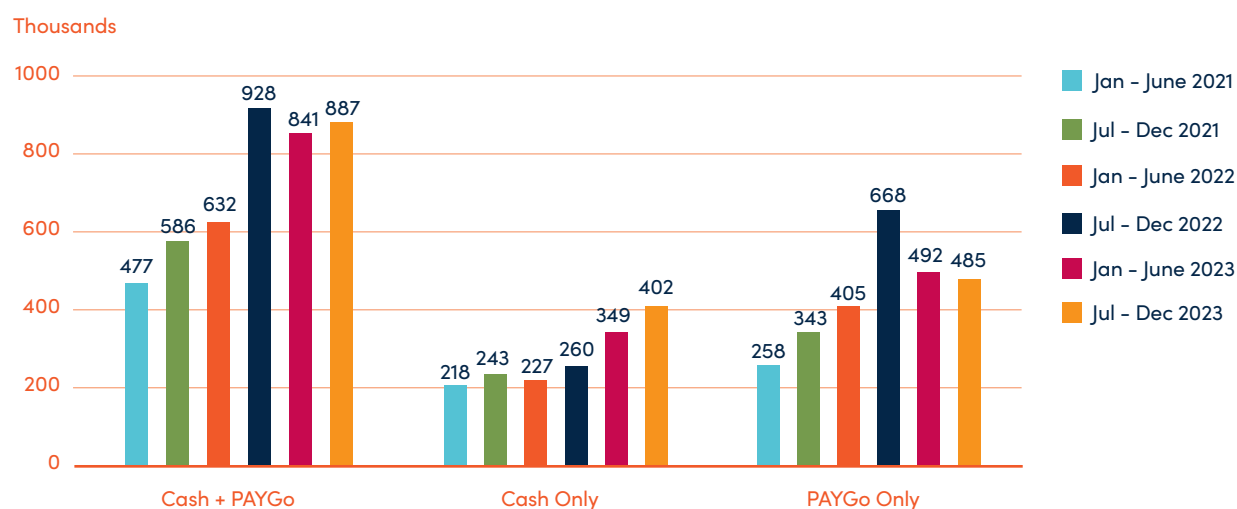
Sales of off-grid solar energy kits in West Africa between July and December 2023 reached **886,700 units**. This is a 5% increase compared to the first half of 2023, yet a 4% decrease compared to the second half of 2022.

Cash sales have steadily increased for the last four rounds. In the second half of 2023, sales increased by 15% compared to the first half of 2023 reaching **401,800 units**. The PAYGo segment had a slight decrease, 1%, and reached **484,890 units**.

Product Trends

Sales for each product category show a mixed picture. Sales of small lanterns reached an all-time high, and lantern sales increased by 18% compared to the first half of 2023. Multi-light system sales decreased by 23% while SHS sales increased by 7%. Within the SHS segment, the 21-49 Wp category showed a significant drop.

Figure 26 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits - West Africa



NOTE:

Products are classified as 'Cash' when sold in a single transaction (including products purchased via tenders), or as 'PAYGo', when the customer pays for the product in instalments over time or pays for use of the product as a service.

Table 12 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Category - West Africa

Categories		H2 2023	% change from H1 2023	% change from H2 2022
Lanterns	0-1.5Wp	248,319	23%	96%
	1.5-3Wp	56,708	1%	-27%
Multi-light systems	3-10Wp	107,607	-23%	-36%
Solar Home Systems	11-20Wp	286,075	31%	-2%
	21-49Wp	4,011	-88%	-85%
	50-100Wp	170,746	1%	-18%
	100+Wp	13,270	-32%	-54%

West Africa Insights

Countries Overview

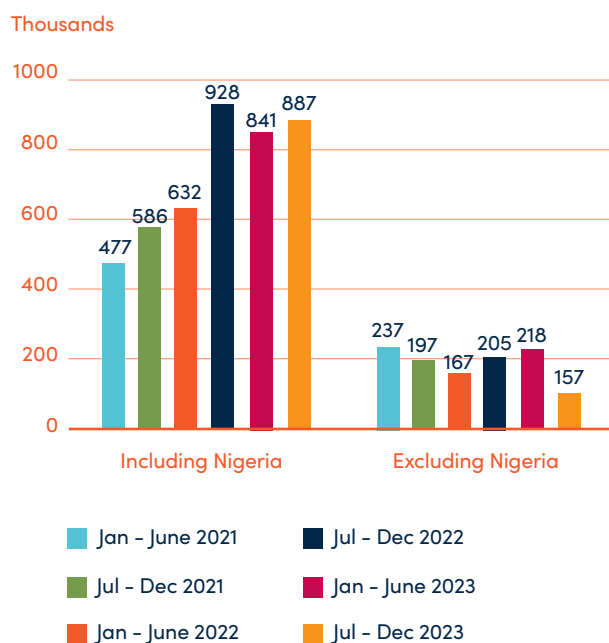
As in previous rounds, growth in West Africa is mainly representative of Nigeria. With 729,700 units sold, Nigeria represents 82% of total sales recorded in the region. The table and chart below show recent sales trends and illustrate the divide between high growth in Nigeria and mixed results in the rest of the region.

Off-Grid Solar Appliances

Sales of Key Appliances in West Africa in the second half of 2023 reached 265,480 units.

This is a 5% decrease compared to the first half of 2023, but a 14% increase since H2 2022. Key Appliance sales in West Africa account for 64% of Sub-Saharan Africa sales and confirm the region has overtaken East Africa for total Key Appliance volumes. West Africa has a more dynamic fan market than East Africa, which is a leading factor.

Figure 27 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits - West Africa with and without Nigeria



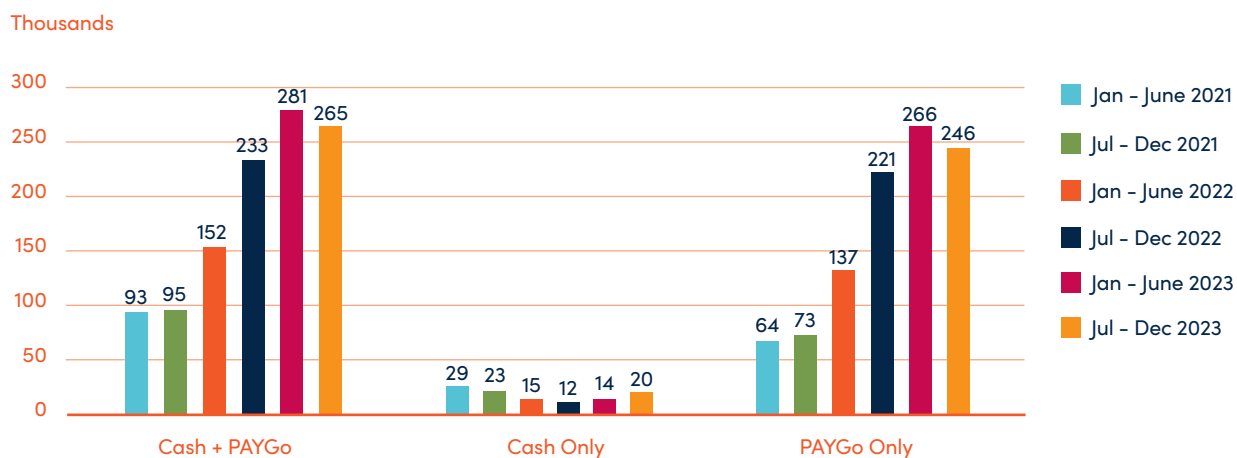
NOTE:
Countries not featured in this table did not see enough companies reporting to pass the three-data point rule.

Table 13 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country - West Africa

Region / Countries	Jul-Dec 2023 volumes (Cash & PAYGo)	% change v. Jan-June 2023	% change v. Jul-Dec 2022
West Africa	886,736	5%	-4%
Nigeria	729,727	17%	1%
Benin	49,900	7%	-13%
Togo	29,743	-6%	-14%
Burkina Faso	20,593	-36%	256%
Cote d'Ivoire	13,564	-25%	-58%
Senegal	9,641	-82%	-15%
Guinea	9,341	-10%	0%
Ghana	7,856	7%	-4%
Liberia	4,576	-38%	-74%
Mali	2,787	-	-39%
Sierra Leone	-	-	-

West Africa Insights

Figure 28 - Semi-annual Evolution of Sales Volumes of Key Appliances - West Africa



Product Trends

TVs sold in West Africa account for 48% of total TV sales in Sub-Saharan Africa with 104,745 units and 48% of TVs sold globally. In the first half of 2023 and the second half of 2023, TV sales in West Africa surpassed East Africa. West Africa is also the second largest regional market for fans, after South Asia.

TV sales in the region grew by 3% compared to the first half of 2023, from 101,679 to 104,765 units. 99% of TVs were sold bundled with a SHS. 93% of total sales reported were PAYGo. Extra-large TVs (30"+) are the most popular, accounting for 83% of total units sold. They were followed by large TVs (24"-29") accounting for 16% of all products sold, while medium TVs and small TVs represent just 1% of units sold.

158,576 fans were sold in West Africa this round, a 9% decrease on the first half of 2023. 92% of units were bundled with a power system, generally a SHS. The vast majority of fan sales in West Africa (88%) are in Nigeria. Fan sales only include pedestal fans at 72,514 units sold, and table fans at 86,062 units sold, while there were no ceiling fan sales reported.

Compared to H1 2023, refrigeration unit sales decreased by 12% to 1,470 units. Due to too few companies reporting, it is not possible to share sales numbers of SWPs in this report.

Table 14 - Semi-annual Evolution of Sales Volumes of Key Appliances by Type - West Africa

Appliance	H2 2023	% change from H1 2023	% change from H2 2022	Share reported as sold PAYGo	Share sold bundled with a power system
TVs	104,765	3%	12%	93%	99%
Fans	158,576	-9%	18%	93%	92%
RUs	1,470	-12%	-27%	-	-
SWPs	-	-	-	-	-

West Africa Insights

Countries Overview

Nigeria is by far the largest appliance market in West Africa and strong growth in the country hides more nuanced trends in other markets in the region. 88% of all appliance sales in West Africa are to Nigeria.

Table 15 - Semi-annual Evolution of Sales Volumes of Key Appliances by Country - West Africa

Region / Countries	Jul-Dec 2023 volumes Key Appliances (Cash & PAYGo)	% change v. Jan-June 2023	% change v. Jul-Dec 2022
West Africa	265,480	-5%	14%
Nigeria	232,445	-1%	33%
Benin	13,736	-14%	34%
Guinea	9,131	-	-
Senegal	4,262	-13%	-25%
Cote d'Ivoire	3,330	-75%	-79%
Liberia	884	44%	0%
Burkina Faso	787	-49%	-
Mali	161	-	-92%

NOTE:

- The category 'Key Appliances' refers to the sum of all TVs, fans, solar water pumps and refrigeration units.
- Countries not featured in this table did not see enough companies reporting to pass the three-data point rule.



West Africa Insights



Nigeria Insights

Background

In May 2023, Nigeria announced the end of its fuel subsidy. While this may provide opportunity for solar, especially to replace generators, it also places additional strain on purchasing power in a context of high inflation. In June 2023, the Nigerian Naira experienced 25% devaluation. Companies operating in Nigeria have resultantly seen their earnings in Naira shrink in value while key costs such as importation (and financing are incurred in hard currencies. As a result, companies have had to significantly raise their prices which likely affected sales.

Between 2019 and 2022, the Nigeria Electrification Program (NEP), with its US\$75 million RBF facility, played a key role in accelerating solar energy kits sales in a largely untapped market. While support from the NEP did lead to significant increases in sales over the period it was active, issues with the fund have meant that the RBF scheme was unable to honour payments due to companies that made eligible sales. It may take time to understand the full impact of these issues for some companies.

Yet sales volumes remain high, meaning distributors are still buying stock. Confidence from companies operating in the market may also be linked to the announcement of a US\$300 million RBF follow-up to the NEP RBF. The new RBF will be launched in 2024 and will be funded by the World Bank under the DARES Nigeria program.

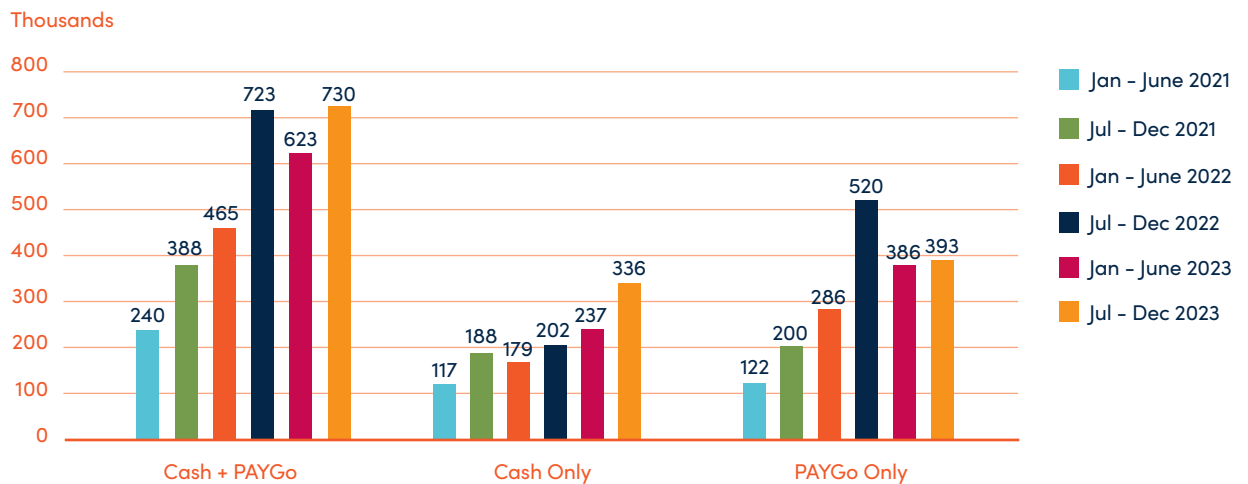
Other sector support includes the Productive Use Appliance Financing Facility (PUAFF) that began disbursing in 2023. It includes US\$ 2.1 million in procurement subsidies as well as further support through capacity building grants and advisory support. The fund focuses on electric pressure cookers, induction cookers, fans, milling, solar water pumps, refrigeration units and walk-in cold rooms. The markets covered are DRC, Ethiopia, Kenya, Nigeria, Sierra Leone and Uganda.

Sales Trends

Off-Grid solar energy kits

- **Nigeria recorded a 17% increase in sales in the second half of 2023, reaching 729,700 units. Compared to the same period in 2022, sales increased by 1%.**
- **Cash sales increased 42% compared to the previous round and PAYGo sales increased by 2%.** Increased cash sales this round are linked to larger volumes of small lanterns reported by manufacturers. The end of the NEP RBF likely contributed to the plateauing of sales, notably PAYGo sales, which include larger systems which were heavily subsidised under the programme.

Figure 29 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Nigeria



West Africa Insights

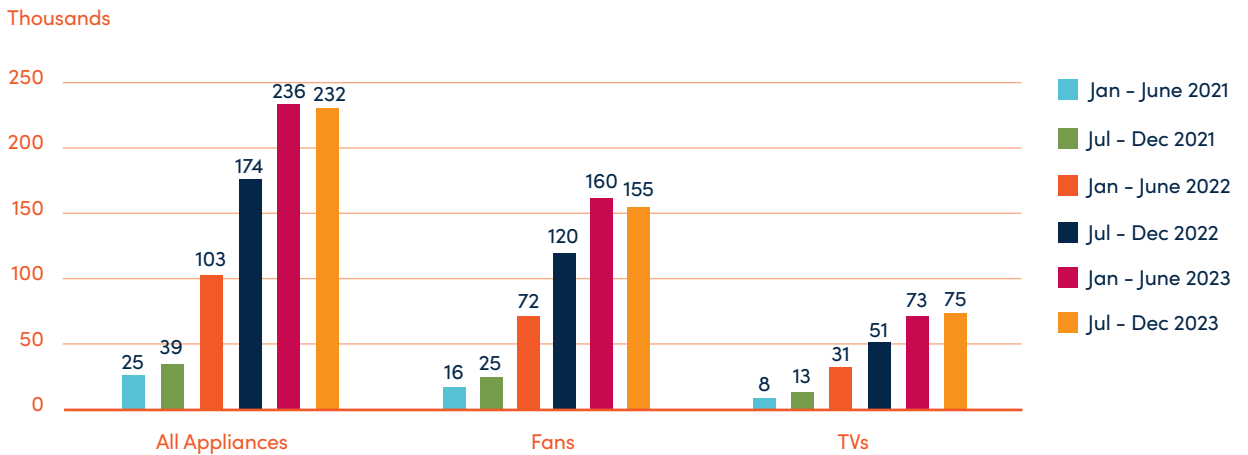


Nigeria Insights

Appliances

- Sales of Key Appliances for the second half of 2023 are 1% lower than in the first half of 2023 yet, 33% higher than in the second half of 2022.
 - TV sales experienced a 3% increase compared to the previous reporting round, reaching 75,430 units sold. All TVs are bundled with an SHS and sold as PAYGo. Among TVs, extra-large TVs (30+”) represent the most popular category with 92% of the total TV sales. Due to data confidentiality the rest of the TV categories cannot be shared in this report.
 - Fan sales recorded a 3% decrease to 155,285 units sold for the second half of 2023. All the units that were sold consisted of pedestal fans at 45% or 69,423 units, and table fans at 55% or 85,862 units, while no ceiling fan sales were reported.
- Too few companies reported sales of RUs or SWPs to share detailed insights about sales of these appliances, but both categories decreased compared to the first half of the year.

Figure 30 - Semi-annual Evolution of Sales Volumes of Key Appliances - Nigeria



West Africa Insights



Benin Insights

Background

Benin's economy has demonstrated resilience through uncertainty. The country is growing faster than the regional average and mostly managed to limit inflation.

Sales Trends

Off-Grid solar energy kits

- Solar energy kit sales for the second half of 2023 reached 49,900 units, a 7% increase in the first half of 2023.
- Although Cash sales increased by 37% to 11,660 units sold in this round, most products sold in Benin were sold PAYGo for which sales are on par with the previous round, 38,240 units.

Appliances

- Appliances sales in Benin for the second half of 2023 reached 13,736 units. This is a 14% decrease compared to the first half of 2023.
- With 12,298 units, 90% of the Key Appliances sold were TVs in H2 2023. This is a 4% decrease compared to the first half of 2023.
- Fan sales in H2 2023 decreased by 56% to 1,438 compared to H1 2023.

No other Key Appliances were sold in Benin.

Figure 31 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Benin

Thousands

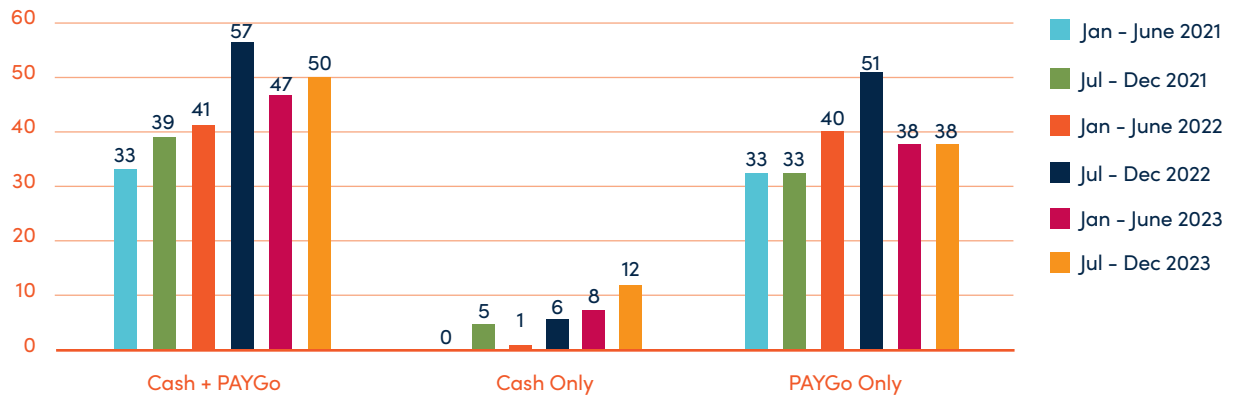
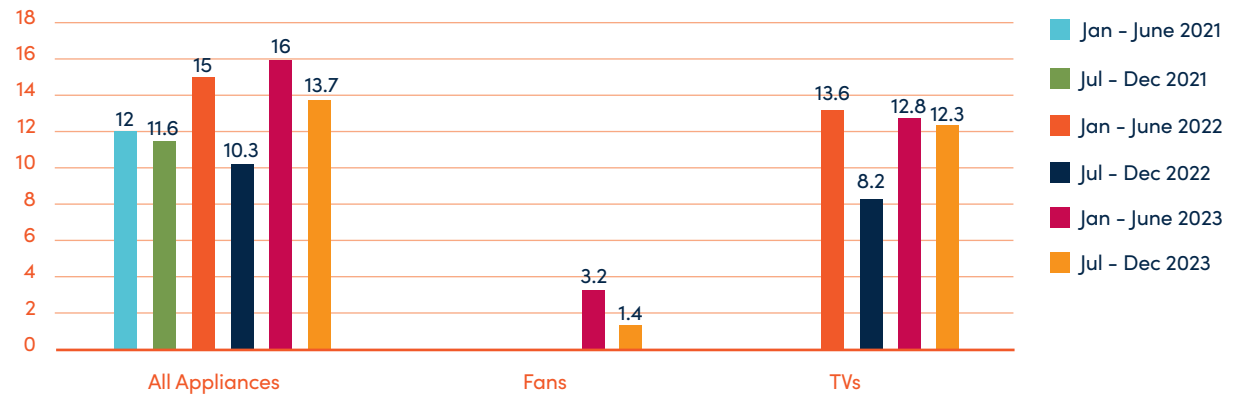


Figure 32 - Semi-annual Evolution of Sales Volumes of Key Appliances – Benin

Thousands



West Africa Insights



Other West African Countries

Burkina Faso

20,600 units of solar energy kits were sold by manufacturers during the second half of 2023.

This is a 36% decrease compared to the first half of 2023, yet 256% higher than during the second half of 2022. 96% of sales reported between July and December 2023 were a cash sales, majorly led by the lantern category.

Total Key Appliance sales is 787 which is 49% lower than the previous half year. While other key appliance sales in Burkina Faso cannot be shared due to data confidentiality, 226 fan sales were reported.

Interventions currently supporting the sector in Burkina Faso include the Beyond the Grid Fund for Africa (BGFA) which signed its first projects in 2022.

Côte d'Ivoire

Sales for the second half of 2023 decreased by 25% to 13,560 units. For the last two rounds there has been a significant decline in SHS sales, especially larger SHS (50+ Wp).

In the second half of 2023 with 3,330 units sold, sales volumes of Key Appliances decreased by 75% compared to the first half of 2023, and 79% compared to the second half of 2022. This is consistent with lower sales of larger SHS.

Due to an insufficient number of companies reporting, specific sales data cannot be shared, but fans, SWPs and RUs were reported this round.

Liberia

4,576 units of solar energy kits were sold in Liberia during the second half of 2023, a 38% decrease from the first half of 2023. Due to limited companies' reporting, Cash and PAYGo sales percentages cannot be shared in this report.

Close to 900 appliance sales were reported for the second half of 2023 which is a 44% increase compared to H1 2023.

While TVs comprised 81% of the total sales, the rest of the Key Appliances sold are fans.

Ongoing initiatives supporting the sector in Liberia that have been reported to us include:

- The Beyond the Grid Fund for Africa (BGFA) began awarding contracts in Liberia in 2022.
- EnDev is launching a demand-side subsidy pilot in Liberia with funding from the Netherlands
- The World Bank Liberia Electricity Sector Strengthening and Access Programme (LESSAP)

Senegal

Sales of solar energy kits were just above 9,600 units between July and December 2023. This is an 82% decrease from the previous reporting round and 15% lower than the sales reported in the second half of 2022. H2 2023 recorded the lowest solar energy kit sales ever reported in Senegal.

4,262 Key Appliances were sold in the second half of 2023. This is a 13% decrease from the previous reporting round and a 25% decrease from the second half of 2022. TV sales made up 96% of all Key Appliances sold with 4,114 units. Due to confidentiality, sales of the rest of the appliance categories cannot be shared.

Ongoing initiatives supporting the sector in Senegal that have been reported to us include:

- The local agricultural bank has opened a climate funding line focused on renewable energy production and green transition solutions (including SWPs).
- USAID is providing grant funding to the private sector for productive use under the Scaling Up Renewable Energy (SURE).

Togo

Off-grid solar energy kit sales in the second half of 2023 reached close to 29,750 units, a 6% decrease from the previous reporting round, and 14% decrease compared to the second half of 2022.

Cash sales are 96% lower yet PAYGo sales are 24% higher compared to the H1 2023.

West Africa Insights

Too few companies shared appliance sales data to include numbers in this report. Sales reported include TVs.

Since 2017, the market in Togo has been underpinned by the CIZO programme. The CIZO rural electrification programme has created an enabling environment for the access to the energy sector, especially PAYGo SHS providers. In particular, the customer subsidy programme often referred to as “CIZO cheque” introduced in 2019,³⁶ in which the customer pays only the unsubsidised

portion of their monthly PAYGo fee out-of-pocket, has been hailed as a success. As of end of June 2023, the CIZO programme led to the distribution of over 130,000 solar energy kits.³⁷

Furthermore, the CIZO programme’s subsidy scheme was extended in 2021 to solar water pumps³⁸ with a target to distribute 3,000 pumps.³⁹ Since October 2022, a new module enables members of the diaspora to purchase kits for rural households in Togo.



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³⁶ République Togolaise, The government launches the “CIZO solar check” to support households in the energy transition.

³⁷ Togo First, Cizo : plus de 130.000 kits solaires distribués aux ménages à fin juin 2023.

³⁸ PV Magazine, EDF s’investit au Togo dans l’irrigation solaire pour les agriculteurs.

³⁹ Togo First, Cizo: Solar-powered irrigation pumps to be set up in rural areas.



**Central
Africa
Insights**



Central Africa Insights



Regional Sales Trends

Off-Grid solar energy kits

Sales of off-grid solar products in Central Africa reached **186,900 units sold**. This is a 36% increase compared to the first half of 2023 but a 76% decrease in sales reported in the second half of 2022.

Central African sales mainly reflect sales to DRC.

Product Trends

In a notable trend, sales of small solar lanterns (0-1.5 Wp) have significantly increased with 131,700 units sold in this round and are now very close to their highest sales (152,200 units) in the second half of 2021.

Countries Overview

Cameroon is the largest market in the region and represents 90% of the total sales.

Figure 33 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits - Central Africa

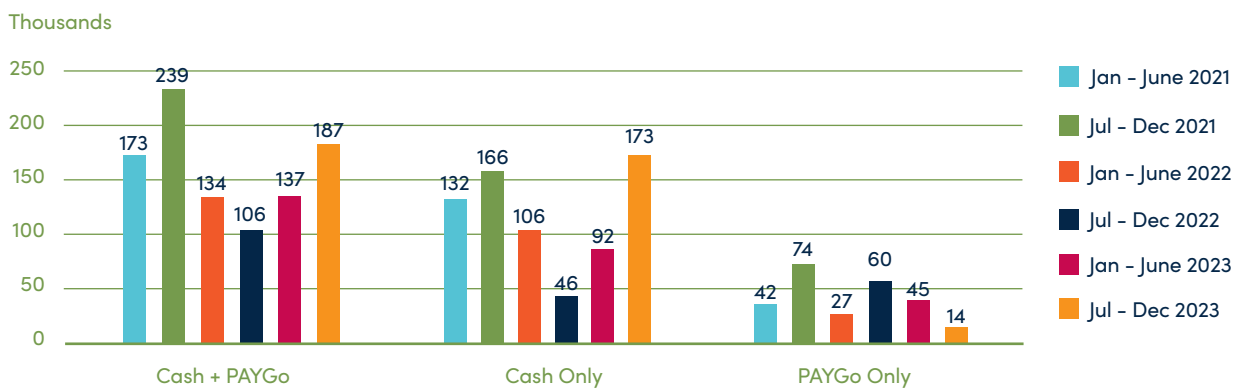


Table 16 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Category – Central Africa⁴⁰

Categories		H2 2023	% change from H1 2023	% change from H2 2022
Lanterns	0-1.5Wp	131,717	24%	14%
	1.5-3Wp	33,510	16%	-11%
Multi-light systems	3-10Wp	6,137	8%	1%
Solar Home Systems	11-20Wp	-	-	-
	21-49Wp	3,883	-5%	1%
	50-100Wp	9,581	20%	-12%
	100+Wp	-	-	-

Table 17 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country – Central Africa

Region / Countries	Jul-Dec 2023 volumes (Cash & PAYGo)	% change v. Jan-June 2023	% change v. Jul-Dec 2022
Central Africa	186,874	36%	76%
Cameroon	168,359	108%	257%
Democratic Republic of the Congo	13,169	-74%	-76%

NOTE:

Countries not featured in this table did not see enough companies reporting to pass the three-data point rule.

⁴⁰ Product reclassification means data from 2021 H2 for solar lanterns is no longer directly comparable with data from 2020 H1, H2 and 2021 H2. While this affects multiple markets, the impact is minimal except in Central Africa.

Central Africa Insights

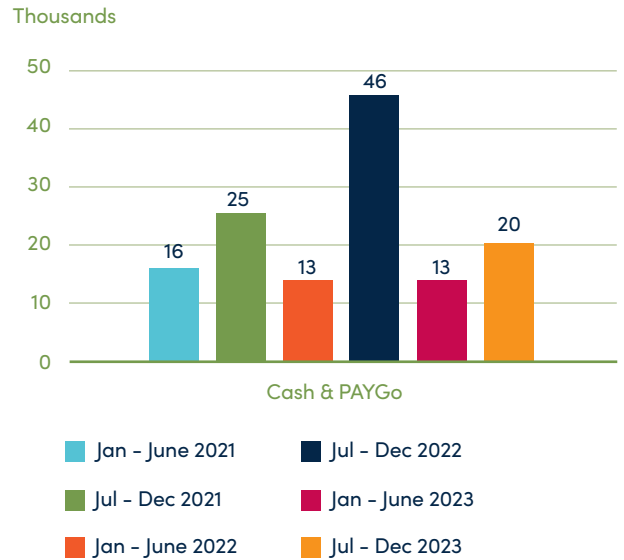
Off-Grid Solar Appliances

Key Appliance sales reached 19,600 units sold.

This is a 49% increase compared to the first half of 2023, but a 57% decrease in sales was reported in the second half of 2022.⁴¹

87% of sales of appliances reported in the region are in the DRC. 62% of units sold between July and December 2023 are TVs, followed by fans with 37% of Key Appliance sales. SWPs and RUs sales are also reported in the region.

Figure 34 - Semi-annual Evolution of Sales Volumes of Key Appliances – Central Africa



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⁴¹ Peak sales in July-December 2022 and the subsequent decrease in sales is in part attributable to this report's focus on manufacturer sales data and sales by distributors is likely to have followed a more even trend.

Central Africa Insights



Central African Countries

Cameroon

Sales of solar energy kits in Cameroon increased by 108% compared to the first half of 2023 to 186,874 units. Although detailed numbers for each category cannot be shared in this report due to data confidentiality, this increase was mostly driven by higher sales of solar lanterns and lanterns with phone charging.

Very few companies reported appliance sales in Cameroon. 2,338 units of Key Appliances were reported this round, while 99% of the units sold were TVs.

Democratic Republic of the Congo

13,169 solar energy kits were sold during the second half of 2023, a 74% decrease in sales compared to the first half of the year and a 76% decrease compared to the second half of 2022. 78% of units sold were sold through PAYGo.

Close to 44,250 units of Key Appliances were sold in DRC in the second half of 2023, a 265% increase compared to the second half of 2022. 72% of the total sales are TVs and 26% are fans. The remaining appliances include RUs and other appliances. Ongoing initiatives supporting the sector in DRC that have been reported to us include:

- The World Bank's DRC Electricity Access and Services Expansion (EASE) programme, includes an active US\$3.5 million RBF scheme.
- The Beyond the Grid Fund for Africa has begun awarding contracts in DRC
- The Productive Use Appliance Financing Facility (PUAFF) began disbursing in 2023. It includes US\$ 2.1 million in procurement subsidies as well as further support through capacity building grants and advisory support. The fund focuses on electric pressure cookers, induction cookers, fans, milling, solar water pumps, refrigeration units and walk-in cold rooms. The markets covered are DRC, Ethiopia, Kenya, Nigeria, Sierra Leone and Uganda.





**Southern
Africa
Insights**



Southern Africa Insights



Regional Sales Trends

Off-Grid solar energy kits

Sales of off-grid solar products in Southern Africa reached 215,650 units sold. This is a 62% increase compared to the first half of 2023 and a 63% increase in sales reported in the second half of 2022. In Southern Africa, this sales number is the highest amount ever reported during the data collection overall. Cash sales, led by lanterns, increased by 78% compared to the two previous half years. PAYGo sales in the region remain limited.

Off-Grid Solar Appliances

Product Trends

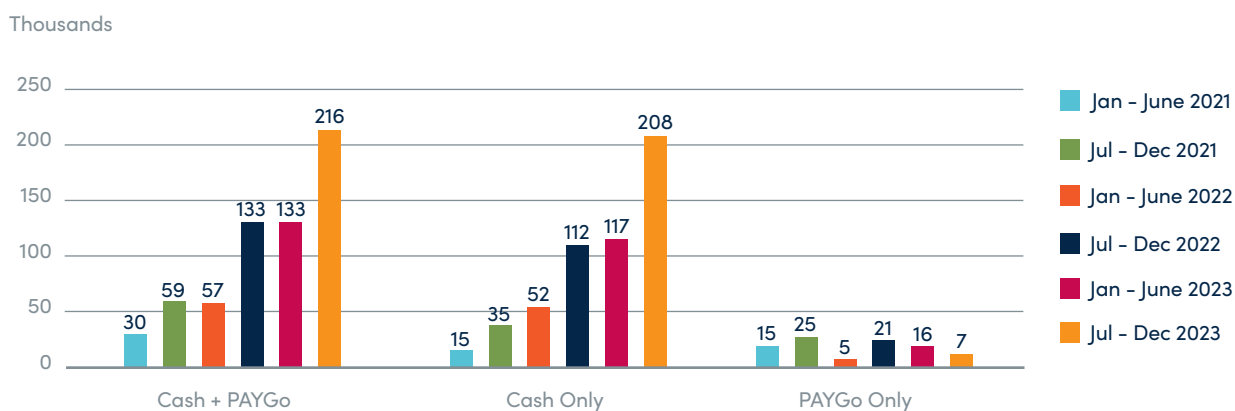
1,403 units were sold between July and December 2023, more than 90% of which were fans. This is a 63% decrease compared to the first half of 2023.

There were 110 TV units TVs sold in H2 2023. RUs and SWPs also reported sales this round, however due to few companies reporting, the numbers cannot be shared in this report.

Countries Overview

South Africa is the largest market in the region representing 47% of total sales. Higher sales, notably of solar lanterns, have also been recorded in markets such as Namibia and Lesotho, but the data cannot be shared due to data confidentiality rules.

Figure 35 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Southern Africa



NOTE:

Products are classified as 'Cash' when sold in a single transaction (including products purchased via tenders), or as 'PAYGo', when the customer pays for the product in instalments over time or pays for the use of the product as a service.

Table 18 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country – Southern Africa

Region / Countries	Jul-Dec 2023 volumes (Cash & PAYGo)	% change v. Jan-June 2023	% change v. Jul-Dec 2022
Sub-Saharan Africa	3,835,668	15%	3%
Southern Africa	215,650	62%	63%
South Africa	101,354	351%	402%



**South
Asia
Insights**



South Asia Insights



Regional Sales Trends

Off-Grid solar energy kits

Sales of off-grid solar energy kits in South Asia have decreased by 17% compared to the first half of 2023, to reach just above 348,100 units sold.

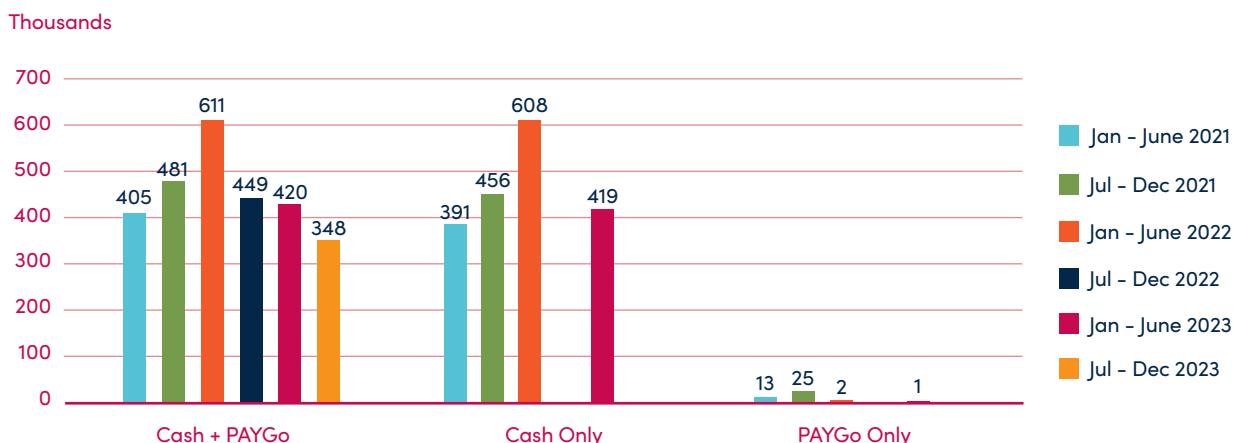
Sales of solar lanterns and plug-and-play kits are experiencing a continued trend of decreasing sales, partly due to increased grid electrification, and a shift towards component-based and hybrid solutions which can be paired with a weak grid connection. Cash and PAYGo sales numbers for this round cannot be shared due to data

confidentiality. However, the PAYGo market in India is not established. Where financing is made available to customers, it is usually through third parties such as micro-finance institutions (MFIs).

Product Trends

Sales in South Asia are predominantly driven by solar lanterns. Lantern sales made up 84% of all sales in this round.

Figure 36 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – South Asia



NOTE:

Products are classified as 'Cash' when sold in a single transaction (including products purchased via tenders), or as 'PAYGo', when the customer pays for the product in instalments over time, or pays for the use of the product as a service.

Table 19 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Category – South Asia

Categories		H2 2023	% change from H1 2023	% change from H2 2022
Lanterns	0-1.5Wp	115,898	-20%	-17%
	1.5-3Wp	175,569	-7%	-36%
Multi-light systems	3-10Wp	51,740	-32%	69%
Solar Home Systems	11-20Wp	-	-	-
	21-49Wp	4,008	-21%	1%
	50-100Wp	-	-	-
	100+Wp	-	-	-

South Asia Insights

Countries Overview

India is the largest market in the region representing 92% of total sales. With 348,103 units sold, India remains by far the largest market in South Asia despite decreasing sales.

Table 20 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country - South Asia

Region / Countries	Jul-Dec 2023 volumes (Cash & PAYGo)	% change v. Jan-June 2023	% change v. Jul-Dec 2022
South Asia	348,103	-17%	-23%
India	322,051	-19%	-25%



South Asia Insights

Off-Grid Solar Appliances

Product Trends

330,148 units were sold between July and December 2023, more than 99% of which were fans. This is a 43% decrease compared to the first half of 2023 but a 48% increase compared to the second half of 2022. Fans sold in South Asia account for 62% of total fan sales globally.

Fans help households cope with high temperatures and increasingly frequent strong heatwaves. The dip in sales compared to the first half of the year can be explained by the seasonal fan sales patterns, with distributors buying stock at the beginning of the year ahead of the hotter months.

Furthermore, larger, more powerful ceiling-mounted fans are also typically the largest sellers in the region, followed by pedestal fans, and table fans.

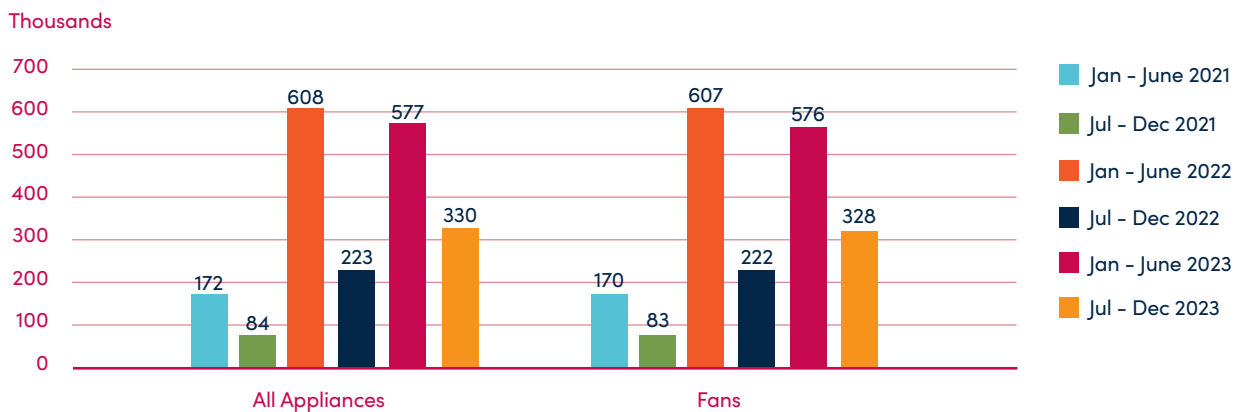
In contrast with trends in Sub-Saharan Africa, fans in South Asia are generally sold separately from a power source and are almost exclusively cash sales. The prevalence of cash in the region can

be seen as a result of the limited penetration of PAYGo sales in the region more broadly, and is also applicable to solar energy kits. However, customers do have access to financing through microfinance institutions that are key players in the distribution and financing of off-grid solar and energy-efficient appliances in the region. Furthermore, the product mix in the off-grid energy access market trend towards component-based systems rather than the kits being favoured in Sub-Saharan Africa, which limits product bundling.

Finally, for the past few rounds DC fans have been progressively replaced with sales of hybrid fans.⁴² Companies have highlighted this is largely linked to the prevalence of weak-grid customers over off-grid customers, but is also linked to cost considerations for manufacturers.

Due to limited data, no trend analysis or other data points can be shared for the appliances other than fans.

Figure 37 - Semi-annual Evolution of Sales Volumes of Key Appliances – South Asia



42. Hybrid AC/DC fan sales are also captured in this report.

South Asia Insights



India Insights

Background

Sales reported in India have been on a long-term declining trend as the product mix is moving away from traditional off-grid products like lanterns and plug-and-play kits, and toward weak-grid products, which this report does not capture.

Companies in the off-grid sector are adapting to this progressive pivot, diversifying to include weak-grid products in their portfolio. Nonetheless, lanterns and other off-grid solar solutions remain relevant for the Indian market for outdoor usage, as a backup to the grid or as a primary lighting source.⁴³ A recent study commissioned by GOGLA provided additional evidence of the use of torches, solar lanterns and solar home systems (or larger systems with inverters), as well as kerosene lamps and candles by households in weak-grid areas. The study also showed households that had lanterns often had lower-quality lanterns that this report may not capture.⁴⁴

The off-grid sector in India has benefited from the Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) scheme. One of the scheme's aims is to install 1.4 million stand-alone solar water pumps in off-grid areas. According to official numbers, 278,114 have been installed so far.⁴⁵ Due to limited overlap in reporting companies, very few of these installations are captured in the sales data in this report.

Sales Trends

Off-Grid Solar Energy Kits

- Sales of solar energy kits decreased by 19% compared to the first half of 2023 and now stand at 322,000 units.
- Detailed PAYGo and Cash sales data cannot be shared in this report due to data confidentiality. Decreased sales are mostly due to lower sales of multi-light systems (3-10 Wp) and SHS sales.

Figure 38 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – India



© Sunking

43 Harrington, E., Athavankar, A. and Hsu D. (2020), Variation in rural household energy transitions for basic lighting in India, Renewable and Sustainable Energy Reviews, Volume 119. ISSN 1364-0321. <https://doi.org/10.1016/j.rser.2019.109568>.

44 GOGLA, Indian Market Outlook : Solar Lantern and Solar Home System, 2023.

45 Progress and Implementation of PM KUSUM Scheme, Ministry of New and Renewable Energy.



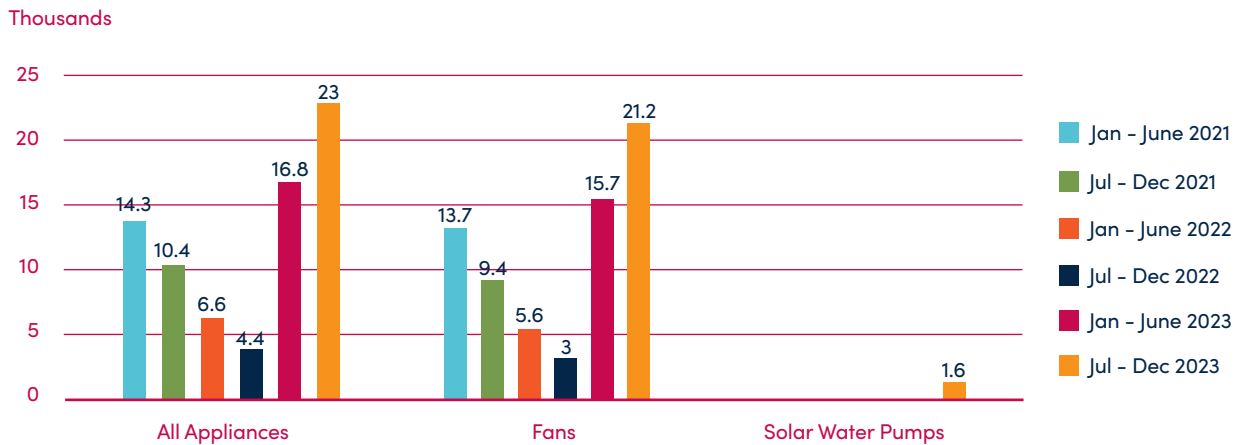
India Insights

Appliances

- **Just over 23,000 units of Key Appliances were sold in India between July and December 2023, a 37% increase compared to the first half of 2023.** This is the highest volume reported for the last seven rounds.
- **With 21,238 units sold, 92% of all the sales of the Key Appliances in India were fans.**
- **1,625 units of SWPs were reported in H2 2023.** This number represents only a small portion of what is known to be a much larger market, notably supported through the KUSUM programme.

Too few companies reported sales of other appliances to include the data in this report.

Figure 39 - Semi-annual Evolution of Sales Volumes of Key Appliances – India



South Asia Insights



Pakistan Insights

Background

In 2022, Pakistan experienced damaging climate events, with extreme heat recorded between March and May followed by catastrophic flooding. The disruptions to agriculture are likely to have lasting effects on Pakistan's economy. Additionally, the economy was impacted by government restrictions on imports, political uncertainty and inflation.

The off-grid solar market in Pakistan is dominated by component-based solutions which this report does not track. The need for space-cooling products is particularly acute and is reflected in high fan sales. Most of these fans are purchased as stand-alone appliances which customers then connect to available power sources. Companies have indicated a shift in the market with DC fans all but vanishing from sales reported here in favour of hybrid fans.

Sales Trends

Off-Grid Solar Energy Kits

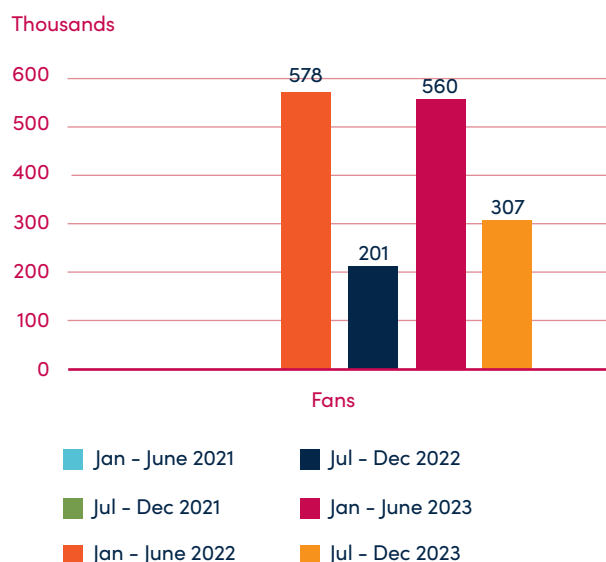
Too few companies reported sales in Pakistan, therefore, due to data confidentiality the sales cannot be shared in this report.

Appliances

- **Over 307,100 units of fans were sold in Pakistan between July and December 2023, a 45% decrease compared to the first half of 2023 but a 53% increase compared to the second half of 2022.**
- Fans are the only appliances sold in Pakistan during this round. As mentioned previously in this report, fan sales in Pakistan are known to follow a seasonal trend with much higher sales to distributors at the beginning of the year ahead of the hottest months.

There is an active local fan manufacturing industry in Pakistan, serving off-grid and weak-grid customers with DC and, increasingly, AC/DC fans.⁴⁶ Sales data reported to GOGLA has progressively evolved from mostly DC fans to almost exclusively AC/DC fans. These now form the bulk of the sales reported. Insights shared by companies suggest some manufacturers are moving away from DC fans altogether as hybrid fans cover both the grid-connected and off-grid markets.

Figure 40 - Semi-annual Evolution of Sales Volumes of Key Appliances – Pakistan





East Asia & Pacific Insights



East Asia & the Pacific Insights



Regional Sales Trends

Off-Grid Solar Energy Kits⁴⁷

Sales of off-grid solar energy kits totalled 214,700 units in the region between July and December 2023. This is a 7% decrease in sales compared to the first half of 2023. Sales in the region follow a seasonal pattern with consistently higher sales in the second half of the year.

Product Trends

The most notable trend was the significant increase in sales of solar lanterns with phone charging capacity (1.5–3 Wp) reaching an all-time high.

Figure 41 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – East Asia and the Pacific

Thousands

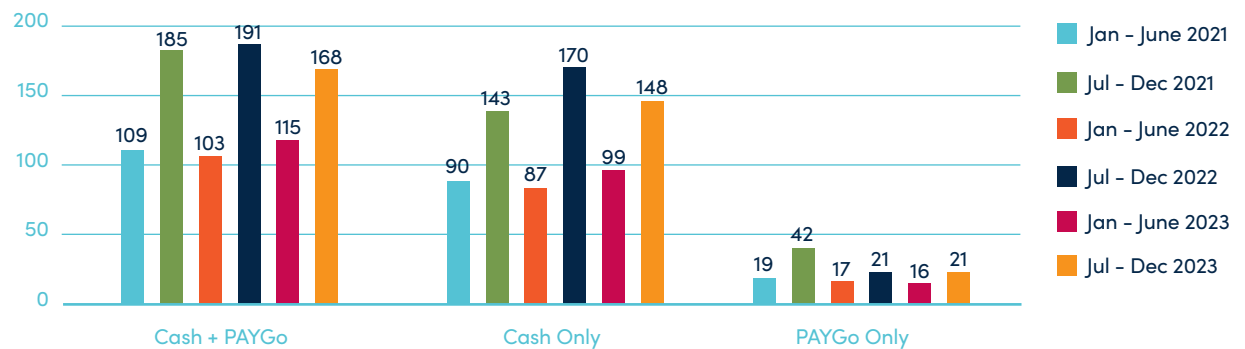
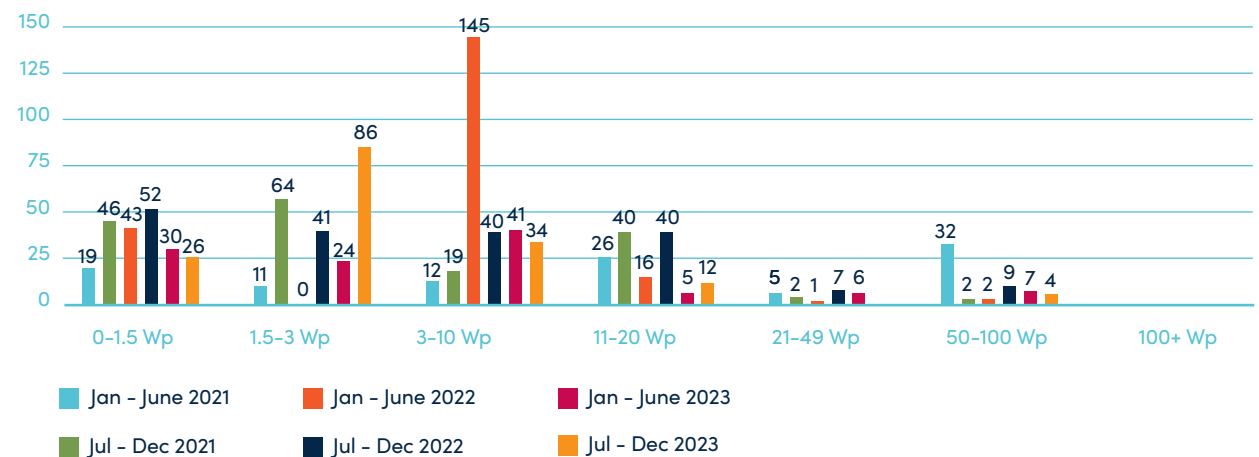


Figure 42 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Category – East Asia and the Pacific

Thousands



⁴⁷ The sales of solar energy kits to East Asia and the Pacific presented in this report exclude units reported as sold to China. In the vast majority of cases, China is not the country of destination where they will be sold to customers. These sales are counted as part of Global sales, unfortunately they cannot be attributed to the correct country where end-user transactions take place.

East Asia & the Pacific Insights

Countries Overview

The largest country is Myanmar and accounts for 38% of sales in the region. Reported sales of solar energy kits in most countries in the region have historically been irregular and identifying patterns is difficult. High sales in Myanmar this round can be attributed to bulk purchasing under public procurement.

Off-Grid Solar Appliances

13,840 Key Appliance units sold between July and December 2023, a 34% increase compared to the first half of 2023, and a 12% increase compared to the second half of 2022. Seasonal trends for Key Appliance sales is evident, with higher sales in the second half of the year being consistently reported. Among appliances reported this round, fans represent 90% of volumes, TVs 8%, and RUs and SWPs together represent the remaining 2% of sales.

Table 21 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country – East Asia and the Pacific

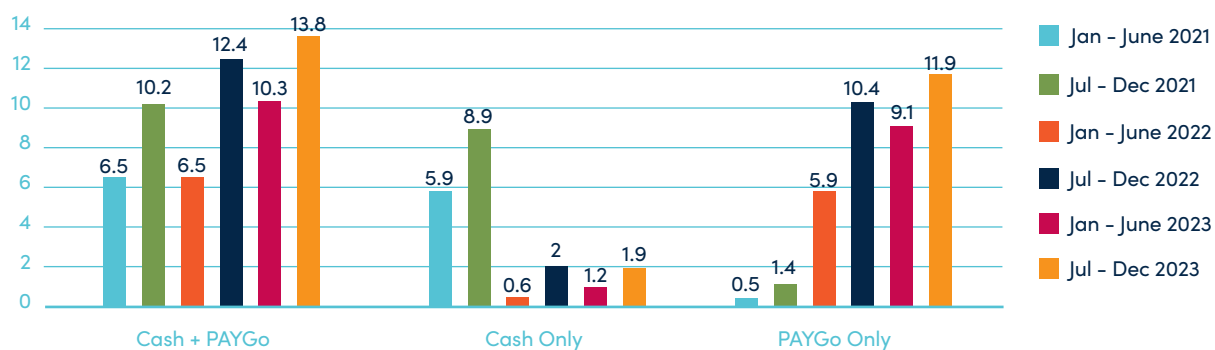
Region / Countries	Jul-Dec 2023 volumes (Cash & PAYGo)	% change v. Jan-June 2023	% change v. Jul-Dec 2022
East Asia and Pacific	214,716	-7%	-62%
Myanmar	80,865	882%	-
Papua New Guinea	51,581	-8%	-55%
Vanuatu	23,829	127%	69%
Philippines	6,644	-62%	-66%

NOTE:

Countries not featured in this table did not see enough companies reporting to pass the three-data point rule.

Figure 43 - Semi-annual Evolution of Sales Volumes of Key Appliances – East Asia and the Pacific

Thousands



East Asia & the Pacific Insights



Papua New Guinea Insights

Off-grid solar energy kit sales totalled 51,600 units in the second half of 2023. This represents an 8% decrease compared to the first half of 2023. The data collection over the past few rounds has recorded the emergence of a seasonal trend with higher sales in the second half of the year. There were no Key Appliances sales in this round to be reported in the country.

to the first half of 2023, by 127%, and reached 23,830 units. This also represents a 69% increase compared to the second half of 2022. It is the first time Vanuatu sales are included in this report, however data has been reported since 2019 and shows progressive growth in sector sales.

Vanuatu Insights

In the second half of 2023, off-grid solar energy kit sales volumes increased significantly compared

There were 798 Key Appliance units sold in Vanuatu during H2 2023. 47% of these were TVs. Fans and RUs were also reported during this round. Due to too few companies reporting, the exact numbers cannot be shared in this report.



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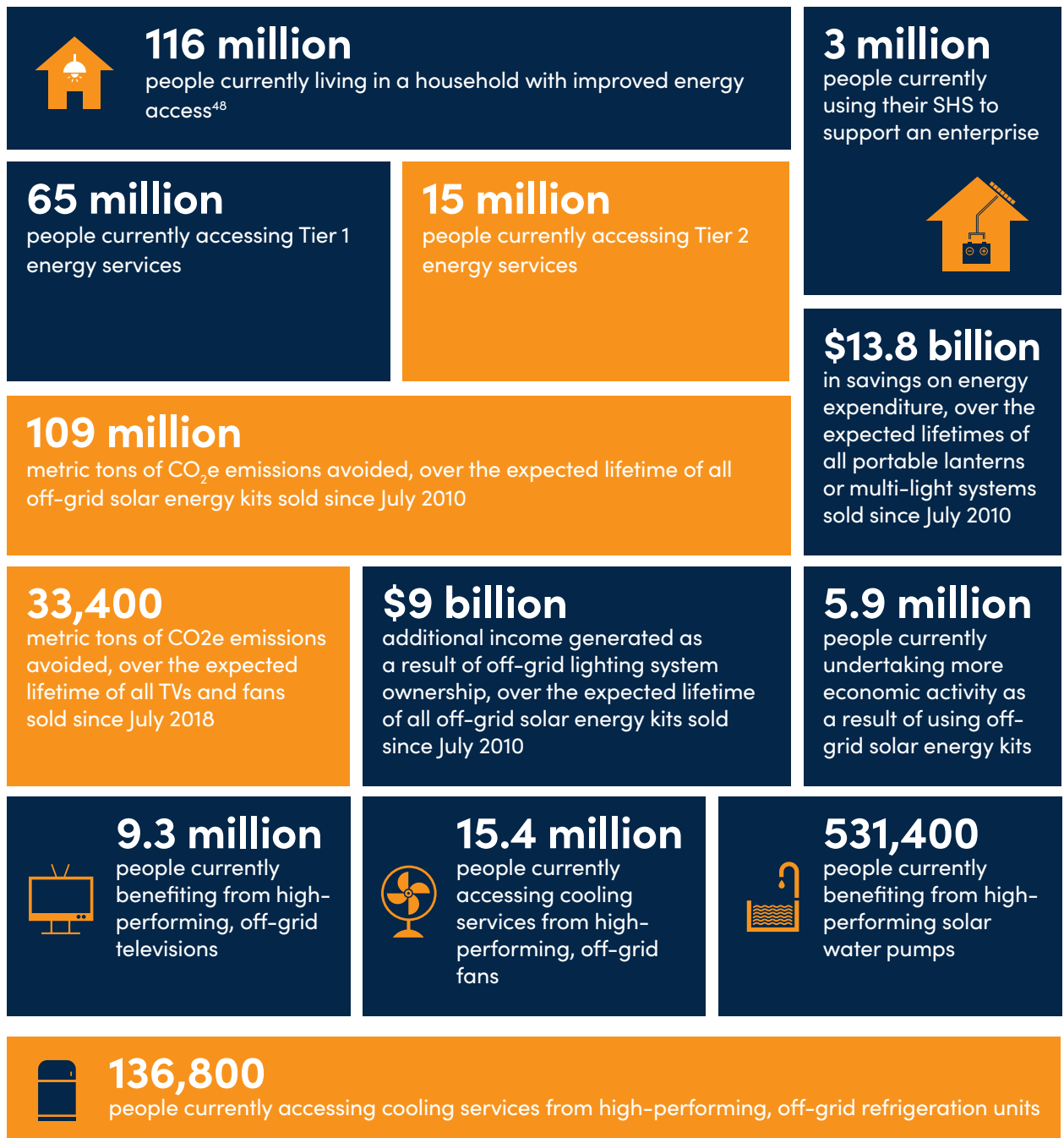


**Global
Impact**



Global Impact

Estimated Impact of Off-Grid Solar Energy Kits and Appliances Sold by Affiliates



⁴⁸ In this context, 'improved' is used to reflect lighting and energy provided by appropriate (less expensive, less dangerous, better quality) technologies such as solar, instead of baseline technologies such as kerosene lanterns, battery lights, candles, or even poor-quality solar products etc.

Global Impact

Energy Access

GOGLA affiliates have cumulatively provided access to energy to over 461.3 million people based on sales reported to GOGLA alone. From these affiliate sales, 115.8 million people are currently benefiting from improved energy access through an off-grid solar product. 65 million of these are currently accessing Tier 1 systems, and 15 million are accessing larger SHS, Tier 2, solutions.⁴⁹

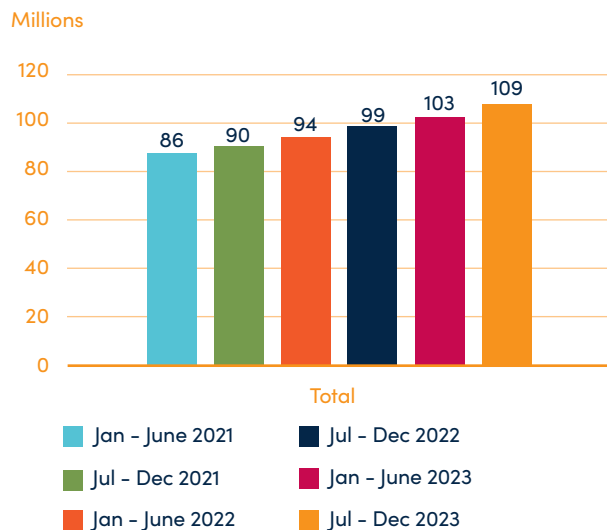
Economic Impacts of Solar Energy Kits

5.9 million people are currently undertaking more economic activity as a direct result of owning an off-grid solar energy kit. Cumulatively, economic opportunities unlocked or improved through ownership of off-grid solar products have generated US\$9 billion in additional income for customers since 2010. This, coupled with savings that smaller off-grid products, such as lanterns and multi-light kits have created for households, has unlocked an additional US\$24.1 billion for millions of low income households since 2010. In particular, off-grid solutions are boosting economic opportunity across rural and peri-urban communities. An estimated 3.2 million small and micro-enterprises are currently supporting their activity with off-grid solar products. The majority of these are based in rural regions.

Environment and Air Pollution

Total CO₂e emissions avoided through replacing kerosene lighting since 2010 across product lifetimes now exceeds 109 million metric tons. This is the equivalent of taking 28 coal-fired power plants offline for a year.⁵⁰ Emissions reductions also have critical health benefits. Emissions are avoided when off-grid solar solutions replace the use of toxic kerosene lamps. Research shows that inhaling kerosene can lead to respiratory illness, pneumonia and tuberculosis^{51&52} and the most damaging effects are felt by women and children. Removing kerosene pollution from homes significantly improves air quality and health.

Figure 44 - Semi-Annual Evolution of CO₂e Emissions Avoided (metric tonnes) Through Usage of Solar Energy Kits Cumulatively - World



Emissions are also avoided when solar appliances replace appliances powered by diesel generators. Emissions avoided by high-performing fans and TVs since July 2018 exceed 33,400 metric tons. This is equivalent to taking 7,949 petrol-powered cars off the road for a year.⁵³

Access to High-Performing TVs

An estimated 9.3 million people are benefiting from the use of off-grid TVs, and they are being used in 181,700 businesses.

TVs and other communication devices, such as radios and mobile phones, provided vital access to health information, educational programmes and news during the pandemic, and they continue to bring communities together and connect them with important news and events. An estimated 8.3 million people currently have improved access to information through news, current affairs and political programmes through their high-performing TVs sold by affiliates.

49 The Tiers of Energy Access are computed based on the Sustainable Energy for All (SEforAll) Global Tracking Framework. Tier 1 refers to basic energy access, including lighting and phone charging, while households with Tier 2 access receive enough electricity to additionally power energy-efficient household appliances such as TVs.

50 United States Environmental Protection Agency (2021), Greenhouse Gas Equivalencies Calculator.

51 Pokhrel et al. (2010), Tuberculosis and Indoor Biomass and Kerosene Use in Nepal: A Case-Control Study.

52 Bates et al. (2013), Acute Lower Respiratory Infection in Childhood and Household Fuel Use in Bhaktapur, Nepal.

53 United States Environmental Protection Agency (2021), Greenhouse Gas Equivalencies Calculator.

Global Impact

Access to High-Performing Fans

High-performing fans are currently benefiting over 15.4 million people and are used within 88,000 businesses.

Predominantly sold in South Asia, off-grid fans are an essential tool to combat heat stress. With climate change leading to longer and more pronounced periods of intense heat, the importance of cooling systems to keep body temperature at a safe level cannot be understated - and high-efficiency, off-grid technologies have a significant role to play. An estimated 14.4 million people currently experience improved thermal comfort from a high-performing fan sold by affiliates.

Access to Solar Water Pumps and Refrigeration Units

An estimated 552,200 people are currently benefiting from access to a solar water pump, sold by affiliates, through agricultural outcomes or improved access to water.

207,000 people are currently benefiting from high-performing RUs sold by affiliates, reducing food wastage and improving food security. Research has also shown that RUs sold by affiliates are likely to be used for income generating activities by a majority of customers.⁵⁴



© FuturePump

Global Impact




















Table 22 - Global Impact by Product Category - solar energy kits

Product Categories	People with improved energy access - cumulatively	People with improved energy access - currently	People with access to Tier 1 energy services - currently	People with access to Tier 2 energy services - currently
All categories	463 million	104.4 million	65.2 million	14.8 million
0-1.5 Wp	183.5 million	26.1 million	6.8 million	
1.5-3Wp	166.1 million	31.8 million	26.1 million	
3-10Wp	67.5 million	21.1 million	21.6 million	0
11-20 Wp	16.5 million	8 million	8.4 million	0.003 million
21-49 Wp	11.6 million	5.4 million	2.3 million	2.9 million
50-100 Wp	13.3 million	8.9 million	0.4 million	9 million
100+ Wp	4.5 million	3.1 million		3 million

Product Categories	People undertaking more economic activity	People using products to support enterprise	People that spend more time working	Additional income generated - cumulatively
All categories	5.9 million	3.1 million	3 million	US\$ 7.9 billion
0-1.5 Wp	0.9 million	0.7 million	0.3 million	US\$ 8.9 billion
1.5-3Wp	0.9 million	0.6 million	0.3 million	US\$ 1.7 billion
3-10Wp	2.1 million	1.1 million	1.3 million	US\$ 3 billion
11-20 Wp	0.6 million	0.2 million	0.4 million	US\$ 0.7 billion
21-49 Wp	0.4 million	0.1 million	0.2 million	US\$ 0.6 billion
50-100 Wp	0.6 million	0.2 million	0.3 million	US\$ 0.7 billion
100+ Wp	0.2 million	0.08 million	0.3 million	US\$ 0.3 billion

Product Categories	Additional light hours used - cumulatively	Additional light hours used - household (average)	Change in quality of light - household (average)
All categories	129.3 billion	1,967	206
0-1.5 Wp	49.8 billion	2,028	-10
1.5-3Wp	45.9 billion	2,102	51
3-10Wp	2.3 billion	2,853	1,845
11-20 Wp	4.5 billion	1,487	306
21-49 Wp	3.4 billion	1,612	654
50-100 Wp	17.4 billion	1,639	169
100+ Wp	6.1 billion	2,555	601
















Global Impact






Product Categories	Change in energy spending - cumulatively	Change in energy spending - household	Kerosene lanterns replaced - currently	CO2e emissions avoided - cumulatively
All categories	US\$ 13.2billion	\$194	21.8 million	108.7 million
0-1.5 Wp	US\$ 7.6 billion 	\$199 	6.7 million 	42.5 million 
1.5-3Wp	US\$ 5.6 billion 	\$167 	6.4 million 	37.8 million 
3-10Wp	-	-	0.5 million 	1.7 million 
11-20 Wp	-	-	1.2 million 	3.8 million 
21-49 Wp	-	-	1.1 million 	3.4 million 
50-100 Wp	-	\$225 	4.5 million 	15.5 million 
100+ Wp	-	-	1.4 million 	4 million 

NOTE:

- The impact is estimated using the GOGLA Standardised Impact Metrics for the Off-Grid Solar Energy Sector. Please note that the current approach is based on the best available research information and data. All numbers calculated using the metrics should be interpreted as estimates.
- Lanterns 0-1.499 Wp include one light and no mobile charging, lanterns 1.5-2.999 Wp one light and mobile charging, and multi-light systems 3-10.999 Wp at least two lights and mobile charging. Solar home systems >11 Wp are classified based on panel wattage.

Table 23 - Global Impact by Product Category - Appliances

Appliance types	Number of people who gained first time access to an off-grid appliance - cumulative	Number of people who currently have access to an off-grid appliance	Number of customers/HH currently accessing off-grid appliances through flexible financing	Tonnes of CO2e emissions avoided - cumulative
TVs	14,598,797 	9,325,995 	1,595,675 	31,180 
Fans	23,282,284 	15,365,226 	838,829 	24,485 
RUs	206,974 	136,840 	14,094 	2,225
SWPs	552,184 	531,414 	41,002 	596,984 

Appliance types	Number of People using their appliance to support enterprise	No. of people generating additional income	Number of people accessing information through TV	Number of people who are experiencing improved thermal comfort
TVs	181,675 	80,745 	8,300,136 	N/A
Fans	88,221 	Unavailable	N/A	14,443,312 
RUs	Unavailable	Unavailable	N/A	N/A
SWPs	Unavailable	Unavailable	N/A	N/A

NOTE:

- The impact is estimated using the [Off- and Weak-Grid Appliances Impact Assessment Framework](#) developed by Efficiency for Access and Rural Senses/SVT and the [Standardised Impact Metrics for High-Performing Appliances: Fans and TVs](#) developed by GOGLA and Efficiency for Access. Please note that the current approach is based on the best available research information and data. All numbers calculated using the metrics should be interpreted as estimates.
- Results are marked as "N/A" when a given metric is not applicable for the appliance type considered. Results are marked as "Unavailable" where the metric is applicable but is not yet available as part of this data collection and reporting exercise.



Methodology of Sales Data Collection



Methodology of Sales Data Collection

General

Overview

Every six months, GOGLA, with support from Lighting Global, Efficiency for Access (the Partners) and Berenschot, collects data from participating companies through an online survey. Companies share data on product specifications and volumes sold per product and per country for the past half-year. Products include Solar energy kits (solar lanterns, multi-light systems and solar home systems) and energy-efficient electric appliances (with a focus on TVs, fans, refrigeration units and solar water pumps). This report collected sales data for the period ranging from July to December 2022.

Collected data is processed and aggregated by GOGLA and Berenschot, with support from Partners, to provide the insights needed for this report. All data goes through a thorough quality control process to ensure consistency, but companies are ultimately responsible for accurate reporting.

Data is collected from manufacturers and distributors (see definition below). To avoid double-counting sales, only data compiled from products for which companies are categorised as manufacturers is presented. Data published in this report is mostly aggregated sales volume data. Other computations include:

- The estimated market value for Solar energy kits is calculated separately for cash and PAYGo products (see definitions below). For cash sales, market value is determined by multiplying the sales volume by an estimate of retail price. This price is based on FOB prices reported by companies and a markup to estimate margins. For PAYGo, sales volumes are multiplied by the Total Cost of Ownership (TCO, see definition below).
- The newly installed capacity from Solar energy kits represents the total peak power output of solar panels deployed during this reporting round.

- The sector's impact is estimated using the Standardised Impact Metrics for the Off-Grid Solar Energy Sector,⁵⁵ the Standardised Impact Metrics for High-Performing Appliances: Fans and TVs⁵⁶ and the Off- and Weak-Grid Appliances Impact Assessment Framework.⁵⁷

The detailed methodology can be accessed on the [GOGLA website](#).

Key definitions

Cash/PAYGo:

- **Cash sales** are when the product is sold to the customer in a single transaction. Note that this category also typically includes products purchased as a tender by governments and humanitarian agencies.
- **Pay-As-You-Go (PAYGo)** sales are when the customer pays for the product in instalments over time or pays for the use of the product as a service. This includes products sold by distributed energy service companies (DESCOs), as well as those sold as lease-to-own.

As the report relies on manufacturer data, it is often whether a product is PAYGO-enabled or not which is used as a proxy.

Manufacturers/Distributors: Companies are classified as distributors when they sell other companies' branded products, or as manufacturers when they sell their own-brand products.

Total Cost of Ownership: The TCO represents the average amount received from a customer repaying the product in full and on time, including deposit payment and all regular daily, weekly, or monthly payments, without applying a financial discount rate to this value.

55 GOGLA, Standardised Impact Metrics for the Off-Grid Solar Energy Sector.

56 CLASP, Standardised Impact Metrics for High-Performing Appliances: Fans and TVs.

57 Efficiency for Access, Off- and Weak-Grid Appliances Impact Assessment Framework.

Methodology of Sales Data Collection

Scope

Participating companies

This report solely includes data on products sold by affiliates. Affiliates are companies connected to the partner organisations involved in the reporting process. Companies include GOGLA members, companies selling products that meet VeraSol Quality Standards, and appliance companies that participated in the Global LEAP Awards or are engaging with the Low Energy Inclusive Appliances (LEIA) programme. **71 companies participated in**

this round and reported sales covering the period July–December 2023. Among them 41 reported sales for both solar energy kits and appliances, 16 just for solar energy kits and 14 just for appliances. The table below details the list of reporting companies and whether they are identified as distributors and/or manufacturers of solar energy kits and/or appliances.

Table 24 - List of Participating Companies

#	Company Name	Off-Grid Solar Energy Kits	Off-Grid Solar Appliances	#	Company Name	Off-Grid Solar Energy Kits	Off-Grid Solar Appliances
1	Agsol Kenya Ltd	-	MAN	38	Plug The Sun Limited	MAN	-
2	ALPH TECHNOLOGIES	DIS	-	39	Powerlive Zimbabwe	DIS	DIS
3	Alternative Energy Technologies Group (Altech Group)	DIS	DIS	40	Qotto	MAN&DIS	MAN
4	ARESS	DIS	-	41	RDG Collective	MAN&DIS	MAN&DIS
5	BAOBAB+	DIS	DIS	42	Savanna Circuit Technologies Limited	-	MAN
6	Barefoot Power	MAN	MAN	43	SelfChill	-	MAN
7	Bboxx Ltd.	MAN&DIS	MAN&DIS	44	SHENZHEN JCN NEW ENERGY TECHNOLOGY CO.,LTD	MAN	-
8	BioLite	MAN	MAN	45	Shenzhen Power Solution Ind Co., Ltd.	MAN	MAN
9	Bonergie SARL	DIS	DIS	46	SHENZHEN POWEROAK NEWENER CO.,LTD	MAN	MAN
10	Bright Products AS	MAN	-	47	Shenzhen Solar Run Energy Co.,Limited	MAN	MAN
11	Clamore Solar	-	MAN	48	Simusolar. Inc.	-	MAN
12	d.light design. Inc.	MAN	MAN	49	Sinoware Technology Co.. Ltd	MAN	-
13	Davis & Shirtliff Ltd.	-	MAN	50	Smarter Grid International	MAN	MAN
14	Devidayal Solar Solutions Pvt. Ltd.	-	MAN	51	Solar Panda	MAN	MAN
15	Easy Solar (Azimuth)	DIS	DIS	52	Solar Sister	DIS	DIS
16	Energy + SA	DIS	DIS	53	Solar Village AS	MAN	MAN&DIS
17	ENGIE Energy Access	MAN	MAN	54	SolarWorks! BV	DIS	DIS
18	ennos ag	-	MAN	55	SOLEKTRA RWANDA LIMITED	DIS	-
19	FINCA PUS LLC T/A BrightLife	DIS	DIS	56	Spark	MAN	MAN
20	FUTUREPUMP LIMITED	-	MAN	57	Starco Fans	-	MAN
21	GLOBAL ICE TEC AG	-	MAN	58	StarTimes Solar	MAN	MAN
22	Goodbook Investments/ Kumusha Power	DIS	-	59	SunCulture	MAN	MAN
23	GREENLAND SOLUTIONS	MAN	MAN	60	SunDanzer	-	MAN
24	GREENLIGHT PLANET INCORPORATED	MAN	MAN&DIS	61	SUNKEN LIMITED	-	DIS
25	Harness Energy	DIS	DIS	62	SunnyMoney (SolarAid)	DIS	DIS
26	JUA Energy Company Limited	MAN	MAN	63	Tamoor fans	-	MAN
27	Khursheed Fans	-	MAN	64	The Sure Chill Company	-	MAN
28	Koolboks	-	MAN	65	TotalEnergies Offgrid Solar Solutions SAS	MAN&DIS	DIS
29	Lagazel	MAN	-	66	Villageboom	MAN	-
30	LIB Solar	DIS	DIS	67	VITALITE Senegal	DIS	DIS
31	Lightbox Africa SA	DIS	DIS	68	X-Solar Systems Ltd.	MAN	DIS
32	LittleSun GmbH.	MAN	-	69	Zimpertec GmbH & Co KG	MAN	MAN&DIS
33	Namene Solar Lights Limited	MAN	-	70	Zola Electric	MAN	MAN
34	Natfort Energy	DIS	DIS	71	Zuwa Eneqy (Pty) Limited	DIS	DIS
35	OKRA SOLAR PTY LTD	MAN	-				
36	OmniVoltaic Energy Solutions Company Limited	MAN	MAN				
37	Oolu Solar	DIS	DIS				

NOTE:

Companies are classified as either distributors (DIS) of other companies' branded products, or as manufacturers (MAN) if they are selling their own-brand products. There may be companies classified as both manufacturers and distributors, as companies may sell both their own branded appliances, while also distributing other companies' products.

Methodology of Sales Data Collection

All data in this report is self-reported by the companies. Although it is cross-checked for consistency, the companies are ultimately responsible for accurate reporting of product specifications, pricing information, sales volumes, and locations of sales.

Market Share Represented

For Off-Grid Solar Appliances, the proportion of the total market that is represented by our affiliates has not yet been accurately estimated. Most recent efforts to assess the market share of affiliates for productive use appliances (RUs and SWPs) provide a range of 20% to 50%.⁵⁸

For Off-Grid solar energy kits, based on the recently completed analysis for the '2022 Global Off-Grid Solar Market Trends Report', it is estimated that, in 2021, sales of affiliates represent an estimated 28% of all solar energy kits including component-based systems.

Countries and Regions

The regional groupings in this report follow those outlined by the World Bank country and lending groups.⁵⁹ Sub-regional groupings in Sub-Saharan Africa follow the United Nations' categorisation of geographical sub-regions.⁶⁰

Confidentiality and the Three-data Point Rule

Data on a specific region, country or product category is only included when at least three separate product manufacturers have reported sales for any single data point (three-data point control). Where there are fewer than three responses for a region, country, or product category, no results are shown to protect the proprietary interests of the companies who have supplied data in support of this industry report. This is signalled by an empty bar next to the name of the region, country, or product category. To differentiate, if there are no companies reporting data, the graph shows a '0'.



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⁵⁸ Lighting Global, ESMAP, Efficiency for Access, GOGLA and Open Capital Advisors, *Off-Grid Solar Market Trends Report 2022: State of the Sector Report, 2022*.

⁵⁹ World Bank, World Bank Country and Lending Groups.

⁶⁰ United Nations Statistics Division, Standard Country or Area Codes for Statistical Use (M49).

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