



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



July – December 2022, Public Report



Executive Summary

In 2022 sales of solar energy kits reached a record breaking 9.5 million units, almost one million more than the 8.5 million units sold in 2019 demonstrating a bounce-back from COVID. Industry leaders in particular have contributed to the growth in sales needed to achieve this. Successful programmatic support, notably result-based finance schemes, have also been a key enabling factor. Finally, new companies joining the data collection contributed to a limited extent to the jump in sales compared to the previous reporting round. TV, refrigeration unit and solar water pump sales all grew compared to the first half of the year, but global volumes of key appliance sales decreased overall due to seasonal variations in fan sales in Asia.

Although the global headline is a positive one, many companies are still managing their recovery from the crises brought on by the pandemic and subsequent external shocks whether global (inflation) or local (such as destabilization in the Sahel, drought and cyclones in East Africa, etc.). While some industry leaders have returned to growth and are driving sector sales, several smaller and more local players who distribute off-grid solar products are still facing challenges.

Turning to impact, clear signs of recovery in sales volumes in 2022 have led to growth in current beneficiary numbers, especially for those benefiting from higher levels of service from their products. This follows a period where a shortfall in sales volumes following the COVID-19 pandemic coupled with increasing volumes of products reaching their estimated end-of-life¹ has meant net increases in access to energy via off-grid solutions slowed down considerably in 2020 and 2021. While this is a positive sign, significant growth is still needed to catch-up to what could have been without the COVID-19 pandemic while also expanding the industry's reach in emerging and nascent markets where the majority of the households that need to gain access by 2030 reside².

This report, based on sales data from off-grid solar and energy efficient appliance manufacturers affiliated to GOGLA,³ provides data and insights on observable trends at a global, regional and country-level every six months. Key takeaways from this edition include:

Solar energy kits

- **5.2 million solar energy kits were sold in the second half of 2022, a 20% increase from the first half of 2022 and 18% higher than the previous peak sales in the second half of 2019, before the COVID-19 pandemic.** In this reporting round, participation of new companies contributed towards the growth of sales. However, even without these companies joining, growth would still have exceeded 15% compared to the first half of 2022.
- **Cash sales grew by 13% compared to the previous round.** Close to 3.2 million products were sold via cash.
- **PAYGo sales grew by 33% to exceed 2 million units sold for the first time.** These are by far the highest PAYGo sales ever recorded. PAYGo sales in particular benefited from the increased number of companies reporting data.
- **While all product categories registered an increase in volumes sold, SHS recorded the most significant growth by far.** Here again, increased participation in the data collection primarily benefited SHS sales. It is also notable that sales in Nigeria were by far the main contributor. Global lantern sales grew by 11% compared to the first half of 2022 to reach 3.1 million units. Multi-light system (MLS), of 3-10Wp, sales grew by 13% to just over a million units. Solar home system (SHS) sales increased by 68% to close to 1.1 million units: 11-20 Wp system sales increased by 51% reaching 439.000 units, 20-49 Wp sales have increased by 103% to 220.000 units, 50-100 Wp SHS sales grew by 66% to 350.000 and 100+ Wp products sales more than doubled (+135%) and reached 67.000 units.

1 GOGLA uses a conservative estimate for products' expected lifespan: 1.5*product warranty period. See detailed methodology [here](#).

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

Appliances

- **Global sales of all key appliances (TVs, fans, refrigeration units and solar water pumps) have recorded a 28% decrease compared to the first half of 2022.** This drop is mostly caused by strong seasonal variation in fan sales in Pakistan.
- **Indeed, fan sales decreased by 45% from 698,000 to 385,000 units sold between the first and second half of the year.** However, in Sub-Saharan Africa, fan sales grew, driven in particular by high sales in Nigeria.
- **Global TV sales grew by 28% compared to the first half of 2022 to reach 235,000 units sold.** This can be linked to increased sales of larger SHS in key markets such as Kenya and Nigeria.
- **Global refrigeration unit (RU) sales grew 68% to 4,662 units sold between July and December 2022.** While this is encouraging given particularly low sales volumes in the past two rounds of reporting, total volumes reported are yet to show signs of sustainable growth.
- **Global solar water pump (SWP) sales grew 63% compared to the first half of 2022 to 15,272 units sold.** Growth is concentrated in Kenya and Nigeria.

Key regional takeaways

- **In East Africa, sales of solar energy kits reached close to 2.6 million units sold, a 15% increase compared to the first half of 2022.** While sales in Kenya remained stable, they grew in many other markets including notable increases in Somalia, Malawi and Zambia. **Key appliance sales for East Africa also increased by 15% to 122,000 units sold, driven by increases in TV, SWP and fan sales.**
- **In West Africa, total solar energy kit volumes also increased by 47% compared to the previous reporting round, reaching close to 930,000 units sold.** Growth in the region is almost solely driven by Nigeria, with the country representing 78% of regional sales and having grown by 55% compared to the first half of 2022. **Key appliance sales in West Africa grew by 53% to reach 233,000 units sold.** Growth in volumes was recorded for TVs, fans, RUs and SWPs. Nigeria also represents 75% of all key appliance sales reported and is driving regional growth, driven largely by TV and fans sales.
- **In South Asia, close to 450,000 solar energy kits have been sold, a 26% decrease compared**

to the first half of the year. Higher sales in the first half of the year had been in part linked to humanitarian sector sales. India, the main commercial market in the region, recorded a 1% decrease in sales. **Due to the seasonal variation in fan sales in Pakistan, South Asia records a 63% decrease in key appliance sales to 223,000 units.** Fans represent 99% of units sold in the region.

Impact update

Sales data shared by companies are translated into impact through the GOGLA standardized impact metrics⁴ and the Efficiency for Access' Off- and Weak-Grid Appliances Impact Assessment Framework⁵.

- **An estimated 104 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 recently published [Off-Grid Solar Market Trends Report 2022](#)⁶ includes the full market estimates.
- **98 million metric tons of CO₂e have been avoided by SEKs sold by affiliate companies** – the equivalent of taking 26 coal-fired power plants offline for a year. Additionally, emissions avoided through the use of high-performing TVs and fans since July 2018 reach close to 33,000 metric tons. This is equivalent to taking 7,110 petrol-powered cars off the road for a year⁷.

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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. Our 200+ members provide millions of low-income and climate-vulnerable people with affordable, high-quality products and services, rapidly increasing customers' productivity, connectivity, and resilience. To enable sustainable businesses and accelerate energy access, we provide market insights, standards and best practice, and advocate for catalytic policies, programmes and investment. With the right support, our pioneering industry can improve the lives of 1 billion people by 2030.

To find out more, visit www.gogla.org

Contributors

Lighting Global

Lighting Global is the World Bank Group's initiative to rapidly increase access to off-grid solar energy for the 789 million people living without electricity world-wide. Managed by the Energy Sector Management Assistance Program (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 systems to power the needs of households, businesses, schools, and health centers. We operate with funding gratefully acknowledged from ESMAP and their donors.

For more information, please visit

www.lightingglobal.org

Efficiency for Access Coalition

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 34 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 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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Join the data collection

The sales and impact data used in the analysis showcased 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 personalized results platform where they can interact with the data and see their market share. Via this platform users can also download the data and impact report, which companies can use to attract investors, inform strategy, and overall 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, which GOGLA, Lighting Global and the Efficiency for Access Coalition can use 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 organizations 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 2022](#)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 engaging with the Low Energy Inclusive Appliances (LEIA) program.

How to join the sales data collection

To join the sales data collection please reach out to Patricia Njeri p.njeri@gogla.org. The next round of data collection will take place in July 2022. Eligible companies that have contacted us before then will be invited to participate.

A video tutorial for the questionnaire will soon be available. In the meantime, 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 treated as 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 annex](#).

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



Background

As in many industries, the last three years have been a prolonged period of uncertainty for the off-grid sector as inflation affected costs and demand in key markets, just as supply chain disruptions and constraints in companies' operations due to the pandemic were beginning to lift. In addition to these global events, key off-grid solar markets in Africa and Asia have been hit by a variety of additional challenges including droughts and locust plagues in East Africa, extreme heat waves in South Asia, cyclones and tropical storms in Southern Africa, and increased insecurity and political instability in West Africa.

During this time and despite these challenges, the industry, with support from donors and investors, has demonstrated resilience and adaptability. As highlighted in previous editions of this report, this prolonged period of crisis has led to an acceleration of changes in the off-grid solar industry landscape:

- Companies have diversified their activity within and beyond the confines of access to energy solutions.
- Some companies have pivoted away from access to energy solutions or exited the market altogether.
- The market has entered a phase of consolidation.
- This, along with concentration of investment flows into existing industry leaders has led to increased market concentration.

Prior to the COVID-19 pandemic, markets for productive use appliances such as RUs and small SWPs were still perceived as nascent and novel. Growing efforts from development partners and governments to support access to these solutions are focusing on tackling the affordability challenge faced by potential customers. Additionally, increases in energy prices in markets where diesel is not subsidized are already driving interest in SWPs.

Achieving Sustainable Development Goal 7 (SDG7) will require continued support from donors and investors to enable the industry to work on multiple fronts to reach the hardest to reach with

first-time access, replace the products of existing customers or help them graduate to higher levels of service, provide back-up solutions for weak-grid customers and increase the adoption of productive appliances using renewable solar energy.

This report does not aim to provide a granular and extensive view of the whole sector, but it enables the reader to go beyond the global headlines to understand regional and country-level sales trends in key markets. While this report is the most comprehensive source of data on off-grid solar sales, we remind readers that information presented is collected from manufacturers of off-grid solar energy kits (lanterns, multi-light systems and solar home systems) and appliances affiliated to GOGLA only. Therefore, the data does not represent the entire market and, especially due to supply chain disruptions caused by the pandemic, there can be a gap of several months between the moment a sale is reported by a manufacturer and the moment the same product is sold by a distributor (see data collection methodology box below)¹².

For a deeper understanding of industry trends, World Bank/Lighting Global, IFC, Efficiency for Access, GOGLA and Open Capital Advisors recently published the Off-Grid Solar Market Trends Report 2022¹³. The report explores and explains key trends across the whole industry, beyond affiliates and beyond sales and impact data.

¹² Additional details can be found in the annexes of this report as well as on the [GOGLA website](#).

¹³ Lighting Global, IFC, Efficiency for Access, GOGLA and Open Capital Advisors, Off-Grid Solar Market Trends Report 2022: Outlook 2030, 2022.

Data collection methodology

GOGLA, Lighting Global and the Efficiency for Access Coalition, 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.

Analyses in this report are based on sales reported by 41 solar energy kit manufacturers and 40 appliances manufacturers¹⁴ and may not translate into sales to customers in the same time period. The data collected from affiliates is not extrapolated to the entire sector. Yet, it provides the broadest and most reliable dataset on the off-grid solar and energy-efficient appliances sector.¹⁵

Data is self-reported by companies, but goes through a thorough quality control and aggregation process to ensure robustness of the insights and to protect the confidentiality of companies' data.

Additionally, impact data in this report is based on the standardized impact metrics for the sector developed by GOGLA, Lighting Global and the Efficiency for Access Coalition. Data collected by GOGLA is widely used by organizations in the access to energy sector. In particular, they are a key source in tracking progress made towards SDG7.¹⁶



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¹⁴ Manufacturers here designates companies selling their own branded products, by opposition with distributors of other companies' branded products.

¹⁵ Affiliates are estimated to represent 28% of the global off-grid solar market.

¹⁶ More information available [here](#).

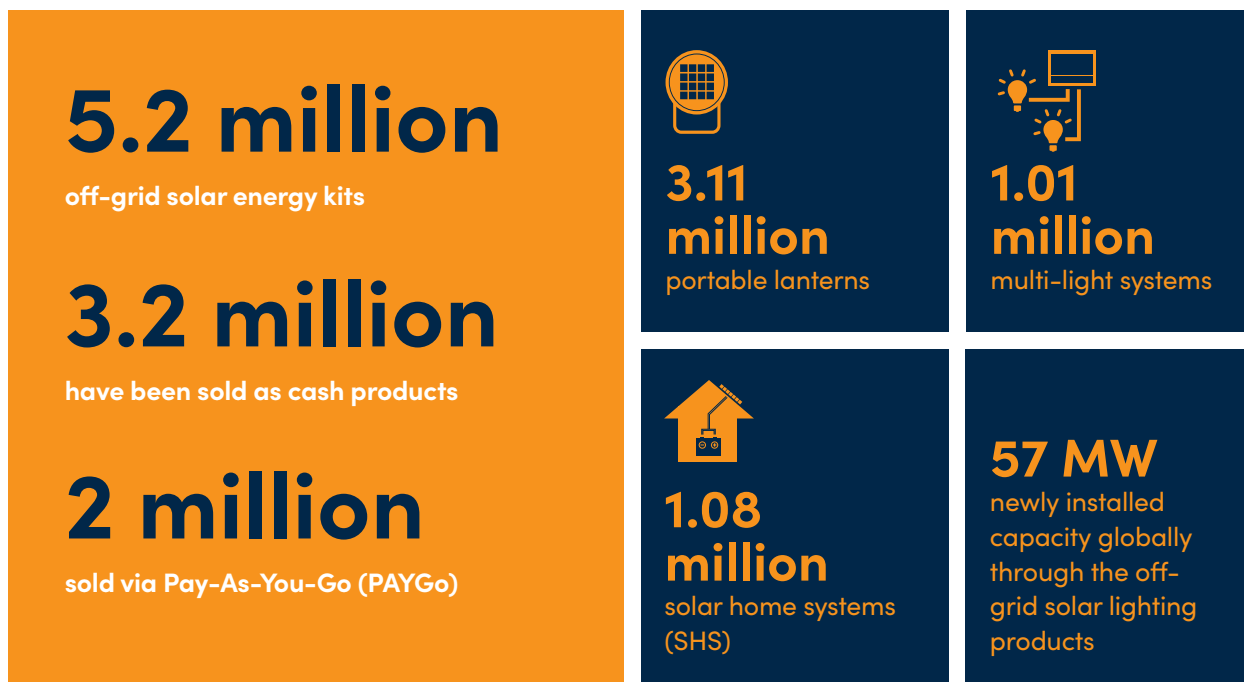
Global Insights

Sales and Impact Trends

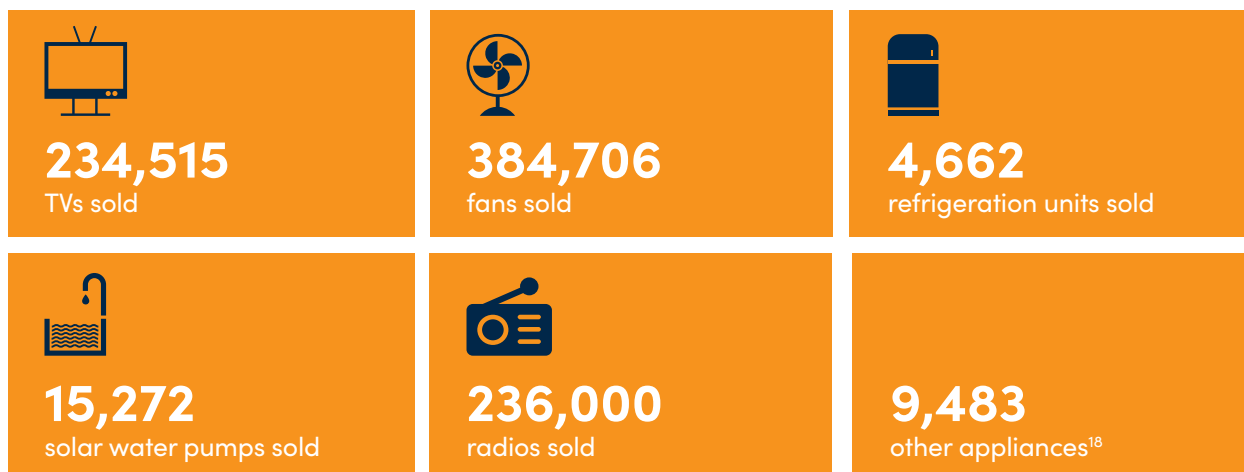
Global Key Highlights

Sales figures presented here refer to the total of all off-grid solar energy kit and off-grid appliance sales reported by participating affiliates¹⁷ in the period between July 1st and December 31st 2022.

Lighting Products Sold



Appliances



¹⁷ Affiliates include GOGILA 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) program.

¹⁸ 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 2022 reached 5.2 million units.** This is a 20% increase compared to the first half of 2022. This is the first time that half-year sales exceed the peak volume of 4.4 million units recorded as sold in the second half of 2019 before the COVID-19 pandemic began.

Of the 5.2 million units sold, 3.2 million were sold cash and 2 million products were sold PAYGo. 62% of cash sales were accounted for by solar lanterns.

PAYGo sales have grown by 33 % compared to the first half of 2022 to reach 2 million units sold. The global value of products sold via PAYGo between July and December 2022 is US\$280 million.¹⁹ PAYGo sales represent 37% of all products sold in 2022. This is significantly higher than in 2019 (26%) and is a clear sign of a shift towards PAYGo as key cash markets in South Asia like India have peaked and PAYGo becomes more and more widespread in Sub-Saharan Africa, including for lanterns.

Cash sales increased by 13% compared to the first half of 2022, and by 30% compared to the second half of 2021. Unlike PAYGo sales, cash sales remain slightly lower than during the second half of 2019, the last reporting period prior to the pandemic. The global value of cash sales for the reporting period July-December 2022 is US\$86million.²⁰

Detailed insights by region and country can be found in the following chapters.



Solar lanterns

With 3.11 million units sold, solar lanterns represent 60% of sales during the second half of 2022.

Lantern sales have increased by 11% compared to the first half of 2022.

- **Sales of the smaller 0-1.5 Wp lanterns have increased by 22% compared to the first half of 2022 to 1.5 million.**
- **Larger 1.5-3 Wp lanterns with phone charging capability have seen sales grow by 3% compared to the first half of 2022.** 27% of lanterns with phone charging were sold through PAYGo.



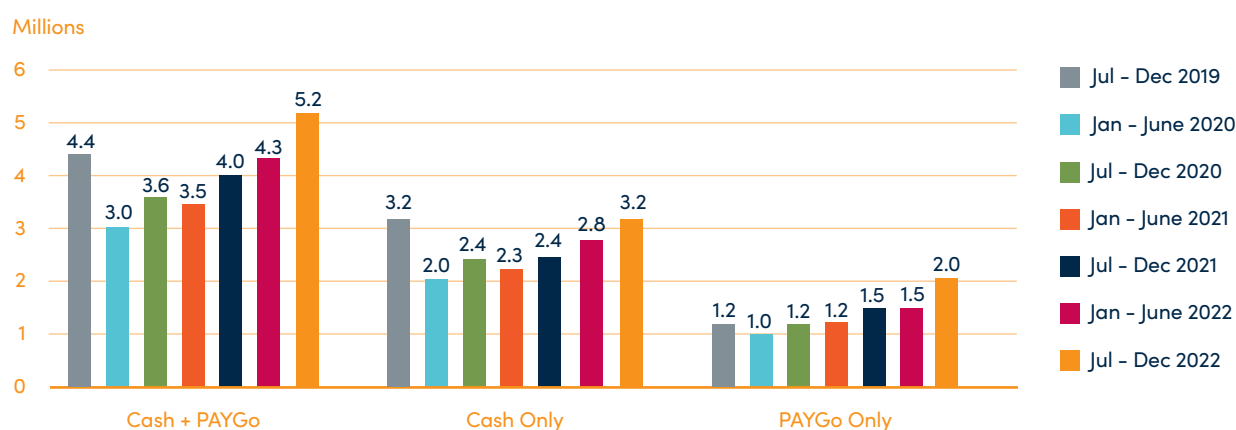
Multi-light systems

Sales of multi-light systems (3-10 Wp) reached 1.01 million units between July and December 2022.

This represents 19% of total global sales and a 13% increase compared to the first half of 2022.

364,600 units were sold cash, on par with the first half of the year, and 646,000 units were sold PAYGo, a 12% increase compared to the previous reporting round.

Figure 1 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits – 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 installments over time or pays for use of the product as a service.

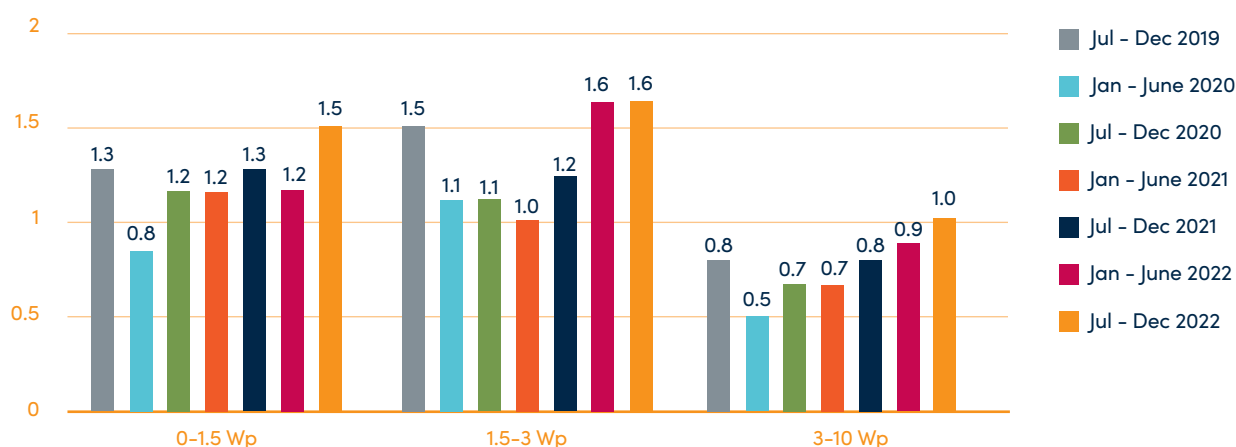
¹⁹ Market values are estimates. See Methodology Annex for details.

²⁰ Market values are estimates. See Methodology Annex for details.

Global Insights

Figure 2 – Semi-annual Evolution of Sales Volumes of Solar Energy Kit by Category (0-10Wp) – World

Millions

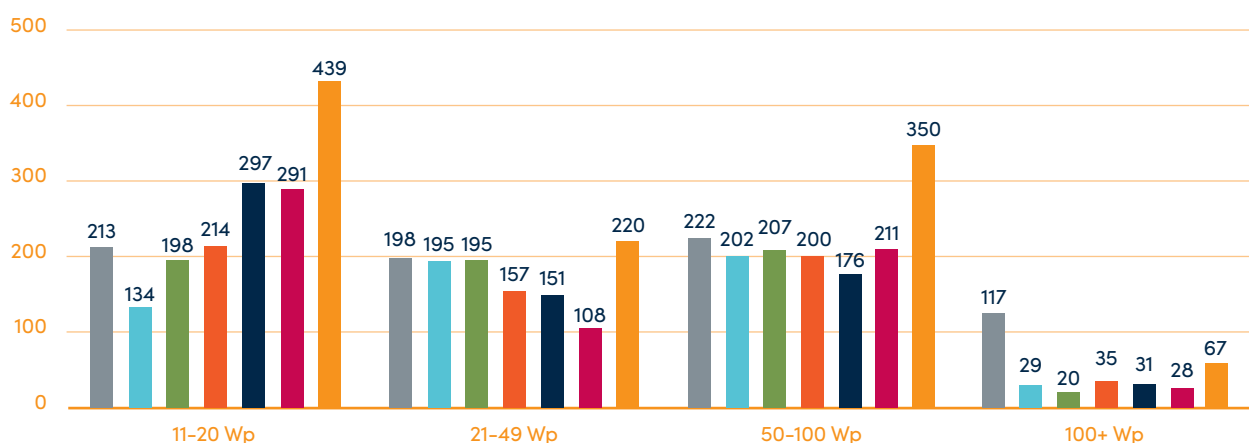


NOTE:

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.

Figure 3 – Semi-annual Evolution of Sales Volumes of Solar Energy Kit by Category (11-100+Wp) – World

Thousands



Solar Home Systems (SHS)

SHS, a category comprising all products of wattage 11 Wp and higher,²¹ with a wide variety in price points, recorded sales of 1.08 million units in the second half of 2022. Sales have increased by 69% compared to the previous six months period and are 65% higher than in the second half of 2021. **90% of all SHS sold between July and December 2022 were sold on a PAYGo basis.** This strong growth is in part due to the increased number of companies reporting sales of SHS this round. Without the additional companies participating, growth of SHS would have been 58% compared to the previous reporting round. Many of these SHS were sold 'bundled' with an appliance of some kind. Therefore increased SHS sales can be

seen to have significant influence on the sales of appliances bundled with these systems or sold to existing owners.

All SHS segments registered growth in 2022:

- 11-20 Wp SHS experienced a 51% increase in volumes sold from 291,000 to 439,000 units sold.
- 21-49 Wp systems' sales sharply grew by 103% reaching 220,000 units sold.
- 50-100 Wp sales volumes have increased by 66% compared to the first half of 2022 totaling 350,000 units.
- 100+ Wp sales volumes recorded the most significant relative increase, growing 135% to reach 67,000 units sold.

²¹ The largest systems included exceed 350 Wp.

Global Insights

Off-grid solar appliances²²

In the context of this series of sales reports, the appliance section focuses on reporting sales of appliances which have reached mainstream levels of production.²³ These are currently regarded as: TVs, fans, RUs and SWPs. These are collectively referred to as “key appliances” when reported in aggregate. These separate 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 sales, it will be specified in the report.

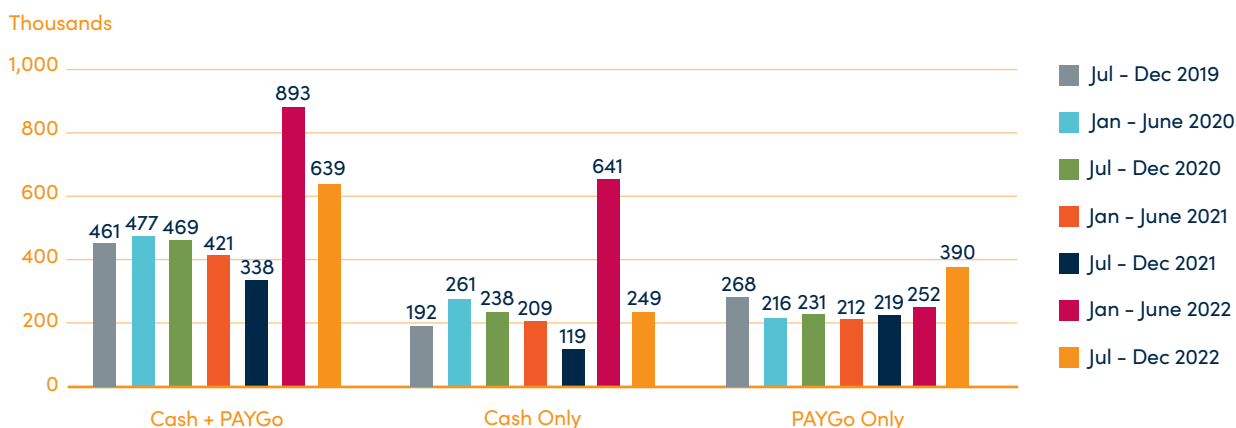
Between July and December 2022, affiliate companies reported total global sales of 639,000 units of the key appliances represented in this report. This represents a 28% decrease compared to the first half of 2022 which is largely explained by strong seasonal variations of fan sales in

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.

Fans represented the majority of sales with 60% of key appliance volumes recorded as sold, amounting to 385,000 units. TVs with 235,500 units sold made up 37% of sales. While with 15,272 units sold, SWPs account for slightly more than 2% of key appliances sold and the 4,662 RUs sold represent less than 1% of volumes.

Overall, PAYGo sales increased by 55% compared to the first half of 2022. This is mostly due to strong growth of PAYGo SHS sales in Sub-Saharan Africa, in particular in West Africa where both TVs and fans are popular appliances that are bundled with sales or purchases by SHS owners at a later date.

Figure 4 – 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 installments over time or pays for use of the product as a service.

²² The sales data collection for off-grid appliances is at an early stage. Please note that, as the number of companies reporting their sales and product information is still growing, there may be limitations on how representative the data is of total sales in certain country markets. We therefore advise users to complement it with other sources where possible.

²³ 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.



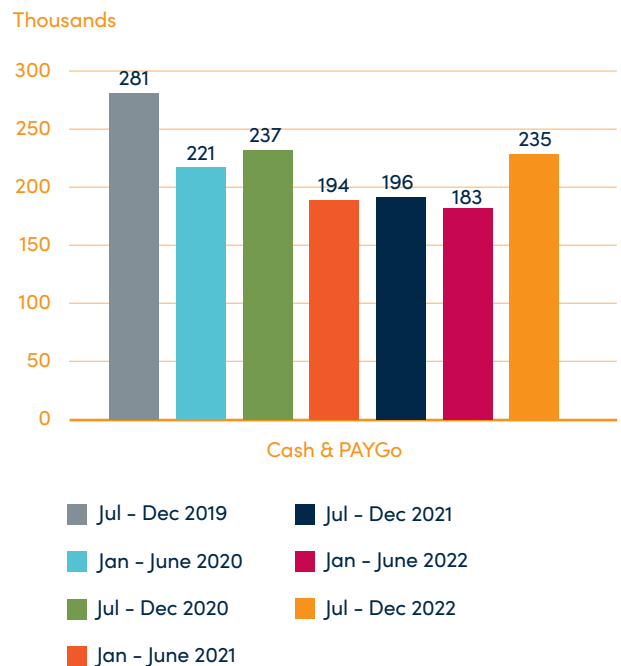
Televisions

TVs recorded 235,500 units sold in the second half of 2022. This represents a 28% increase compared to the first half of 2022 and a 20% increase compared to the second half of 2021.

The vast majority of TV sales are to Sub-Saharan Africa (99%) where they are bundled with SHS 99% of the time, and 98% were sold on a PAYGo basis.

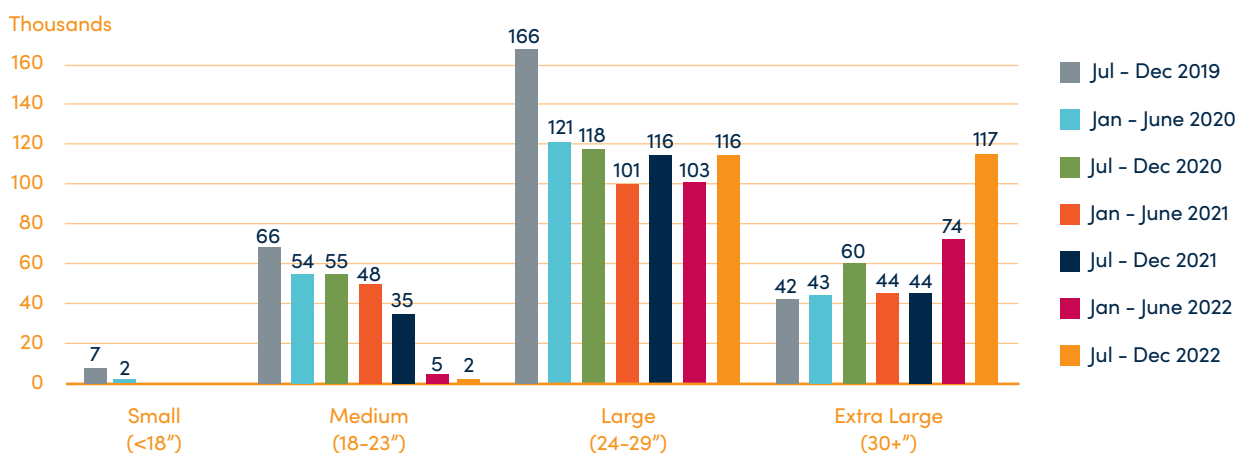
Overall, the market is quickly moving away from small TV sizes towards larger models. This trend is particularly noticeable in 2022 as medium size TV sales shrank to just over 2,000 units sold while extra-large TV sales now exceed 100,000 units sold in six months. This is in part due to the re-categorisation of one product from medium to large size between 2021 and 2022, but also aligns with a long-term increase in demand for larger TVs. With 117,000 units sold, extra-large (30+”) TV sales symbolically exceeded large TV (24-29”) sales (116,000 units sold) for the first time.

Figure 5 - 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 installments over time or pays for use of the product as a service.

Figure 6 - Semi-annual Evolution of Sales Volumes of TVs by Category - World



Global Insights



Fans

Fan sales in the second half of 2022 recorded 385,000 units sold. This is a 45% decrease compared to sales reported during the first half of 2022. Although this current round still far exceeds sales from the same period during 2021 and 2020, this can largely be attributed to several large DC fan manufacturers in Pakistan joining the sales data collection in the first half of 2022. This led to a peak in sales reported compared to previous rounds and limited comparability to pre-2022 data. These companies are still reporting sales for the second half of the year. Therefore, 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.

58% of sales occurred in South Asia where fans are generally sold on a cash basis and most often not bundled with a solar energy kit. This reflects the prevalence of component-based sales in the Asian solar market, as opposed to plug-n-play solar kits that are more common in Sub-Saharan Africa. Fan sales in Sub-Saharan Africa represented 40% of total volumes during the second half of the year and are largely contributed to by sales in Nigeria. In contrast with the trend in Asia, across Sub-

Saharan Africa, 86% of fans were sold bundled with a power system – usually a SHS – and 98% were sold via PAYGo. Given the drop in sales in Pakistan during the second half of the year, the larger market share for Sub-Saharan Africa this round leads to an even higher share of bundled fan sales globally.

Ceiling fans and pedestal fans are the two best-selling categories of fans this reporting round. Sales volumes of both categories exceed 160,000 units.

However, while the sales volumes of the pedestal fans increased 26% compared to the first half of 2022, the sales volumes of the ceiling fans decreased 70% compared to the same period. These trends can also be linked to the relative shift of volumes from Asia to Africa this round as ceiling fans are most commonly sold in Asia as part of component based systems sold for cash while the majority of pedestal and table fans are sold in Sub-Saharan Africa bundled alongside or as accessories to SEKs, nearly always on PAYGo basis. Table fan sales increased by 44% compared to the first half of 2022 due to growth in Sub-Saharan Africa more than canceling lower sales of table fans in South Asia.

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

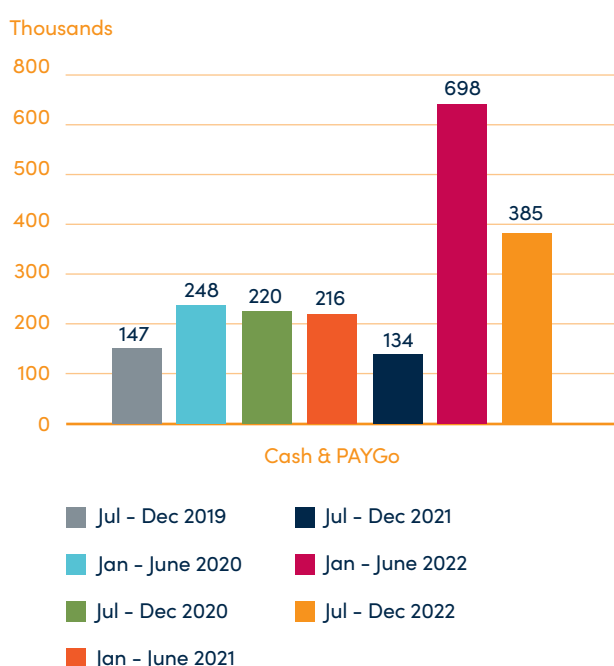


Figure 8 - Semi-annual Evolution of the Share (%) of Fans Sold Bundled with an Energy Source – World²⁴

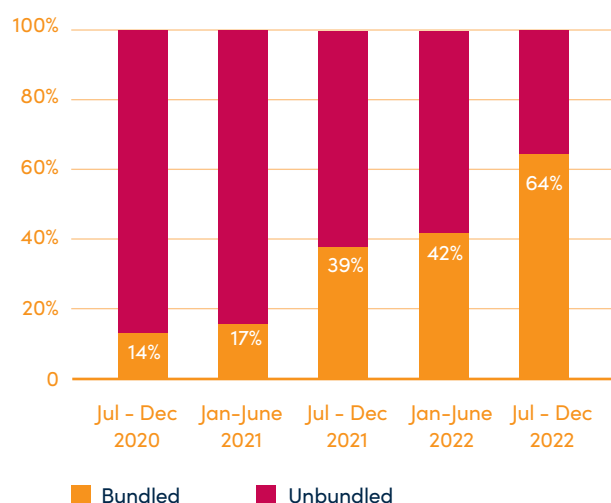
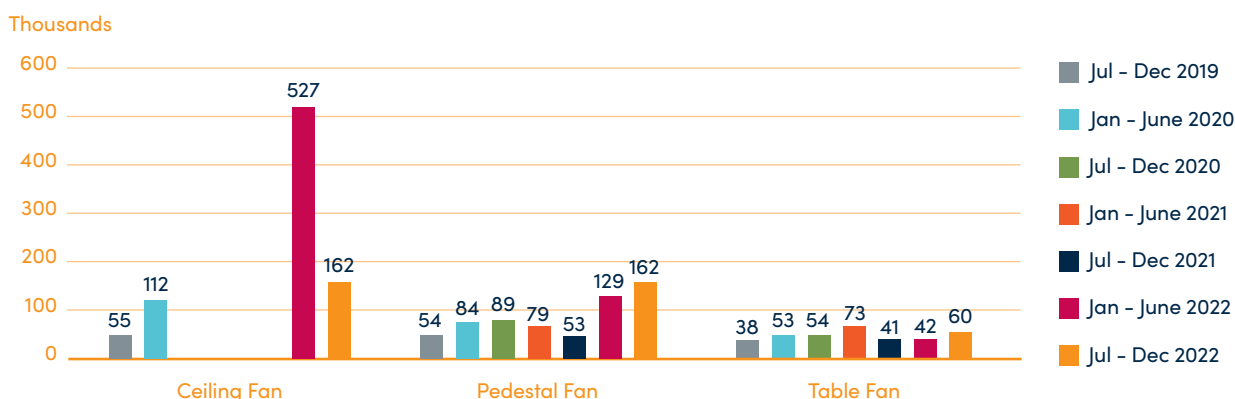


Figure 9 – Semi-annual Evolution of Sales Volumes of Fans by Category – World



Refrigeration Units (RUs)

Between July and December 2022, 4,662 units were sold globally. RU sales increased 68% compared to the first half of 2022. This growth is mostly tied to PAYGo sales. Further data collection will be needed to assess whether this is a meaningful trend in asset financing unlocking sales of RUs.

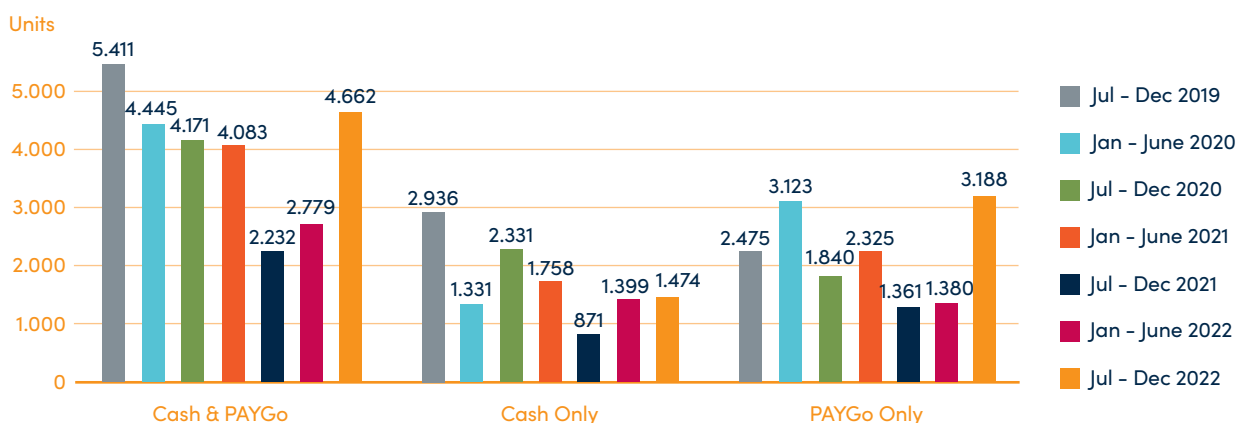
Refrigeration remains a nascent segment and products are the most expensive and power hungry of all the appliance segments covered in this report. Affiliate companies focused on the manufacture and distribution of these technologies have yet to reach commercial scale and the impacts of the pandemic and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

In terms of product category diversity, this round, multi-temperature refrigerators with freezer

capability represented 61% of sales. Refrigerators represent 39% of total sales.

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. While this equipment differs significantly from the lower-cost specialist off-grid refrigerators designed to meet household or light commercial needs, there has been a significant amount of technology transfer. **A notable example is the adoption of 'solar direct-drive' or SDD for these mainstream off-grid markets.** SDD refrigerators connect directly to a solar photovoltaic (PV) panel, and use solar energy to directly freeze water or other cold storage material to keep the refrigerator cold in the absence of sun²⁵.

Figure 10 – Semi-annual Evolution of Sales Volumes of RUs – 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 installments over time or pays for use of the product as a service.

Global Insights



Solar Water Pumps (SWPs)

This report focuses on appliances suitable for households, micro-enterprises and smallholder farmers. Therefore SWPs 3kW or more are excluded from the data collection²⁶. **With 15,272 units sold in the second half of 2022, SWPs experienced a 63% increase in sales volumes compared to the first half of 2022.** Overall 80% of the total SWPs were sold bundled with a power source.

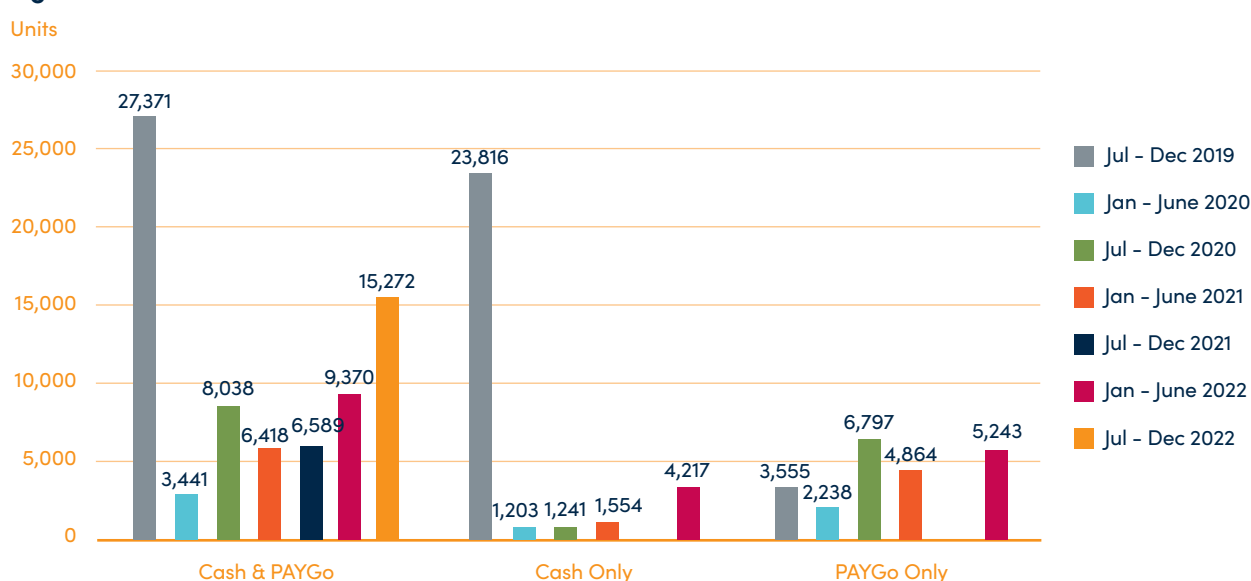
Due to limited participation in the data collection, in particular from big manufacturing companies, this report has limited visibility on what are anecdotally known to be large markets in South Asia and in some Sub-Saharan African countries.

Other Appliances

Sales are also recorded for a wide variety of other off-grid appropriate appliances. With the exception of radios, 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. These products are not included under the 'key appliances' category. This round, the main appliances in this 'other' category were radios with 236,000 units sold. All other appliances sold totaled 9,500 units. Among them, the main categories were hair clippers/shavers and stereo systems.

The variety of products reported has expanded over time and includes products such as solar powered egg incubators, solar milk-can chillers, agro-processing machines, sewing machines and solar ice makers. This is seen to reflect the combination of several reinforcing factors; clear demand for an ever-increasing range of services from people living in off-grid and weak-grid areas, an interest from private sector companies in developing efficient high-performance appliances that satisfy these domestic and productive use demands and the increasing availability of donor, government and impact investor funds for these innovations.

Figure 11 - 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 installments 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.

Main markets by appliance type July–December 2022

Efforts are being undertaken to expand participation from companies selling appliances in the data collection. As this is on-going, it can sometimes 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)²⁷ or where some of the major appliance suppliers have not yet chosen to participate in contributing data to the reports. Below is a table summarizing the top 3 markets for each appliance type by sales volume reported by Affiliates between July and December 2022. For RUs and SWPs in particular, due to the limited number of companies participating, the main markets identified may not be representative of the sector, but biased towards the focus areas of participating companies.

Table 1 – Top 3 Markets by Appliance Type Based on Sales Volumes Reported by Affiliates Between July and December 2022

Rank	TVs	Fans	Refrigeration units	Solar Water Pumps
1	Kenya	Pakistan	Nigeria	Kenya
2	Nigeria	Nigeria	Democratic Republic of the Congo	Nigeria
3	Democratic Republic of the Congo	Bangladesh	Papua New Guinea	India



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²⁷ See Methodology Annex for more details.



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 2022 exceeded 2.5 million units. This is a 15% increase compared to the first half of 2022 and a 24% increase compared to the second half of 2021. This is the first time since the COVID-19 pandemic that sales in East Africa exceeded their July–December 2019 peak.

Cash sales increased by 15% compared to the first half of 2022 and are 40% higher than during the second half of 2021. PAYGo sales volumes increased by 14% compared to the previous reporting round and are 8% higher than during the second half of 2021.

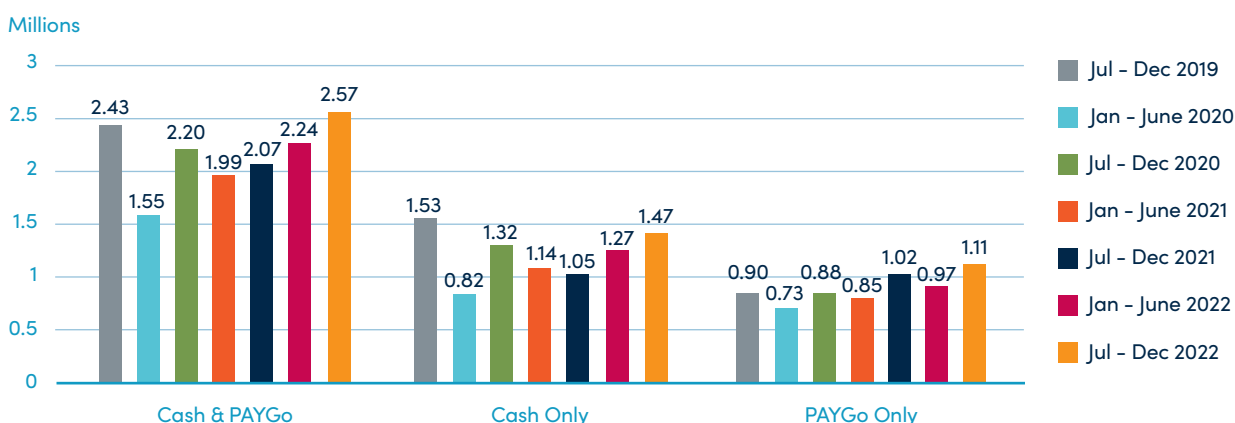
Product Trends

Sales of lanterns increased by 10% compared to the previous round. Sales of 0–1.5Wp lantern sales grew by 33% while sales of larger lanterns with phone charging capacity slightly decreased. Almost half of solar lanterns with phone charging this round were reported as sold via PAYGo.

Multi-lighting systems sales increased by 20% since the first half of 2022 and are 10% higher than in the second half of 2021. 65% of the total sales in this round were reported as PAYGo.

Overall SHS sales increased by 30% compared to the previous round, and are 31% higher than during the second half of 2021. The increase in sales is particularly noteworthy in the 21–49Wp category.

Figure 12 – 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 installments over time or pays for use of the product as a service.

Table 2 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Category – East Africa

Categories		Jul-Dec 2022 volumes (Cash & PAYGo)		% change v. Jan-Jun 2022	% change v. Jul-Dec 2021	Share of PAYGo
Lanterns	0–1.5Wp	813,786		33%	45%	0%
	1.5–3Wp	817,266		–6%	15%	47%
Multi-light systems	3–10Wp	554,144		20%	10%	65%
Solar Home Systems	11–20Wp	92,668		–32%	–22%	76%
	21–49Wp	181,028		133%	84%	–
	50–100Wp	97,600		23%	44%	–
	100+Wp	17,343		111%	52%	–

East Africa Insights

Countries Overview

The majority of markets in East Africa reported growth in sales volumes. The two key exceptions are Rwanda and Ethiopia. Sales to Kenya grew by just 2% compared to the first half of 2022, much slower than the 27% growth reported between the second half of 2021 and the first semester of 2022. Growth in overall volumes were led by smaller markets including Somalia, Malawi and Zambia.

Off-grid solar appliances

Between July and December 2022, the total recorded number of key appliances sold in East Africa reached 121,750 units. This is a 15% increase compared to the first half of 2022, but a 1% decrease compared to the second half of 2021. TVs are the most common appliance sold in East Africa and represent 86% of total volumes.

Table 3 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country – East Africa

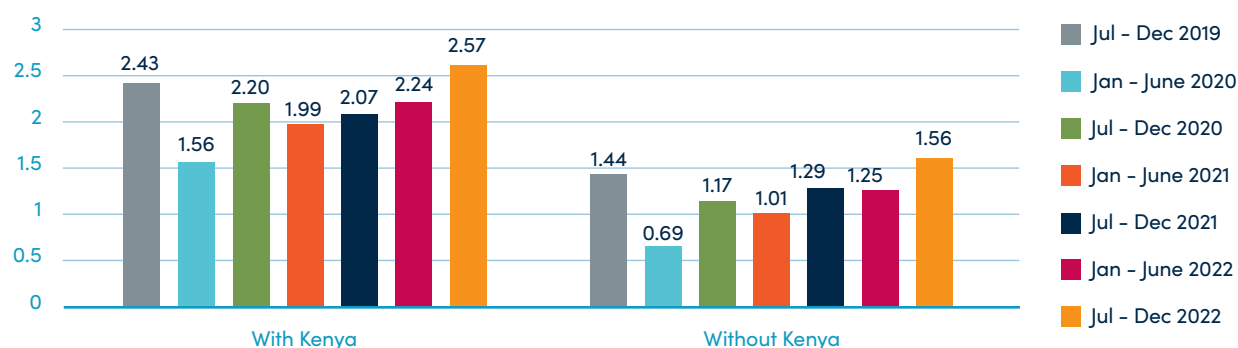
Region / Countries	Jul-Dec 2022 volumes (Cash & PAYGo)	% change v. Jan-Jun 2022	% change v. Jul-Dec 2021
East Africa	2,574,026	15%	24%
Kenya	1,009,844	2%	30%
Somalia	297,297	78%	111%
Zambia	290,228	34%	94%
Uganda	175,166	42%	15%
Malawi	170,107	129%	45%
Tanzania	153,644	37%	-5%
Ethiopia	119,425	-56%	-42%
Rwanda	108,608	-31%	-22%
Mozambique	91,676	62%	20%
Madagascar	77,553	23%	31%
Burundi	36,051	1,182%	220%
Zimbabwe	31,886	282%	51%

NOTE:

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

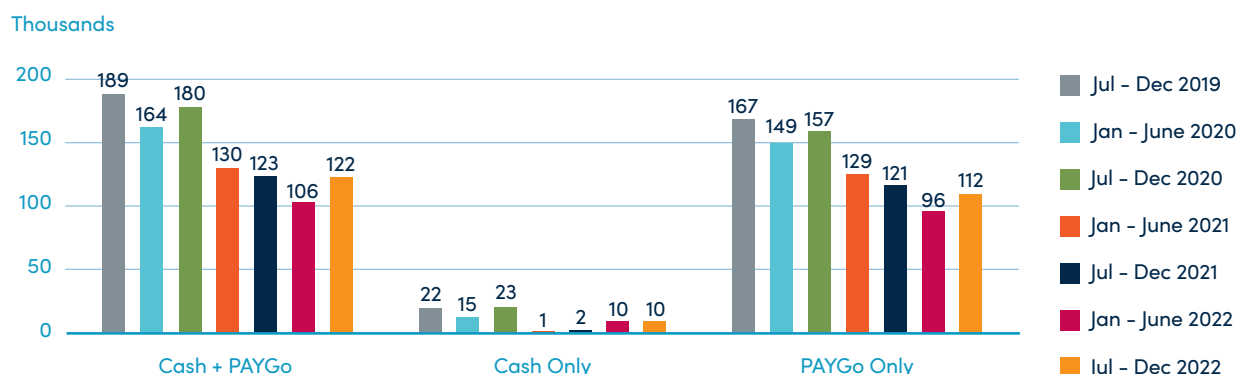
Figure 13 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits – East Africa with and without Kenya

Millions



East Africa Insights

Figure 14 - Semi-annual Evolution of Sales Volumes of Key Appliances - East Africa



Product Trends

TVs sold in East Africa account for 46% of total TV sales in Sub-Saharan Africa with 106,000 units.

This is a 9% increase compared to the first half of 2022. Higher TV sales are not surprising given higher sales of SHS with sufficient capacity to power a TV. In East Africa, 99% of TVs were sold bundled with an SHS. Among TVs, large TVs (24-29") represent almost 50% of volumes, followed by extra-large TVs (30+" at 49%) while medium and small TVs represent just 1% of sales. This seems to confirm the trend towards large and extra-large TVs representing the vast majority of TVs sold.

RUs sold in East Africa represent 17% of total Sub-Saharan African sales. Sales decreased 36% compared to the last round. The most common type of RUs sold are refrigerators. It has been reported by companies that direct current (DC)

solar refrigeration units are facing increasing competition from cheaper AC fridges being solarised for use off-grid (in combination with an inverter and battery) or powered by a generator.

SWPs sold in East Africa represent 70% of total Sub-Saharan African sales, with 9,842 units. This is a 39% increase compared to the first half of 2022 and 124% higher than sales in the second half of 2021. Feedback from companies indicates that increased fuel prices have been a factor in some countries.

Sales of fans in the region reached 5,134 units sold this reporting round compared to 497 units sold in the first half of 2022. This development appears linked to new companies joining the data collection rather than being an indication of growth in demand for fans in the region. Further data collection will be needed to confirm this.

Table 4 - Semi-annual Evolution of Sales Volumes of Key Appliances by Type - East Africa

Appliance	Jul-Dec 2022 volumes (Cash & PAYGo)	% change v. Jan-Jun 2022	% change v. Jul-Dec 2021	Share reported as sold PAYGo	Share sold bundled with a power system
TVs	106,149	9%	-41%	-	98%
Fans	5,134	933%	152%	-	-
RUs	626	-36%	-75%	-	15%
SWPs	9,842	39%	132%	-	81%

East Africa Insights

Countries Overview

While sales in Kenya have grown for the second round in a row, the picture is more mixed for other markets. In Kenya, the largest market in the region, sales grew by 26% to reach 94,000 units sold. Other

markets in the region continue to see much lower, and even overall decreasing, appliance sales as the chart presenting regional appliance sales with and without Kenya demonstrates.

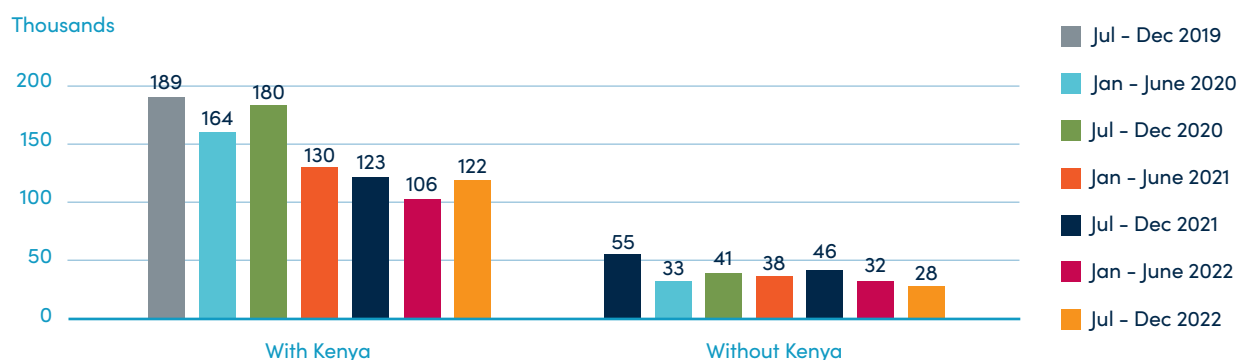
Table 5 - Semi-annual Evolution of Sales Volumes of Key Appliances by Country - East Africa

Region / Countries	Jul-Dec 2022 volumes Key appliances (Cash & PAYGo)		% change v. Jan-June 2022	% change v. Jul-Dec 2021
East Africa	121,751		15%	-1%
Kenya	94,127		26%	22%
Tanzania	8,524		-34%	-45%
Uganda	5,038		171%	-42%
Zambia	4,117		17%	-55%
Madagascar	3,623		-14%	169%
Mozambique	2,229		74%	-25%
Rwanda	1,787		-67%	-58%
Ethiopia	248		53%	

NOTE:

- The category 'Key Appliances' refers to the sum of all TVs, fans, solar water pumps and refrigeration units.
- 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 installments over time or pays for use of the product as a service.
- Countries not featured in this table did not see enough companies reporting to pass the three-data point rule.

Figure 15 - Semi-annual Evolution of Sales Volumes of Key Appliances - East Africa with and without Kenya





Kenya Insights

Background

Kenya is the most mature market for plug-n-play off-grid solutions and has become the largest market overall since overtaking India in 2019. The COVID-19 pandemic led to a shortfall in sales in 2020 and 2021, but 2022 annual sales exceed 2019 annual sales with over 2 million units sold. In a context of increasing inflation (average 6.1% in 2021 and over 7% on average in 2022²⁸) and droughts affecting disposable income in many rural areas, post-COVID off-grid solar sales are characterized by a higher market share for lanterns among all volumes sold, in part enabled by more widely available PAYGo lanterns.

As the most mature market, Kenya is seeing rapid development in informal alternatives to off-grid solar products, notably to DC appliances. This includes technicians solarising AC appliances from TVs to refrigerators or egg incubators. These solutions are often much more affordable than DC appliances, but may also present quality and safety issues depending on the quality of appliances purchased and the degree of professionalism of the installers.

Several on-going interventions were reported to us as having supported the sector in Kenya in 2022:

- 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 PUE 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) result-based finance (RBF) program, 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.

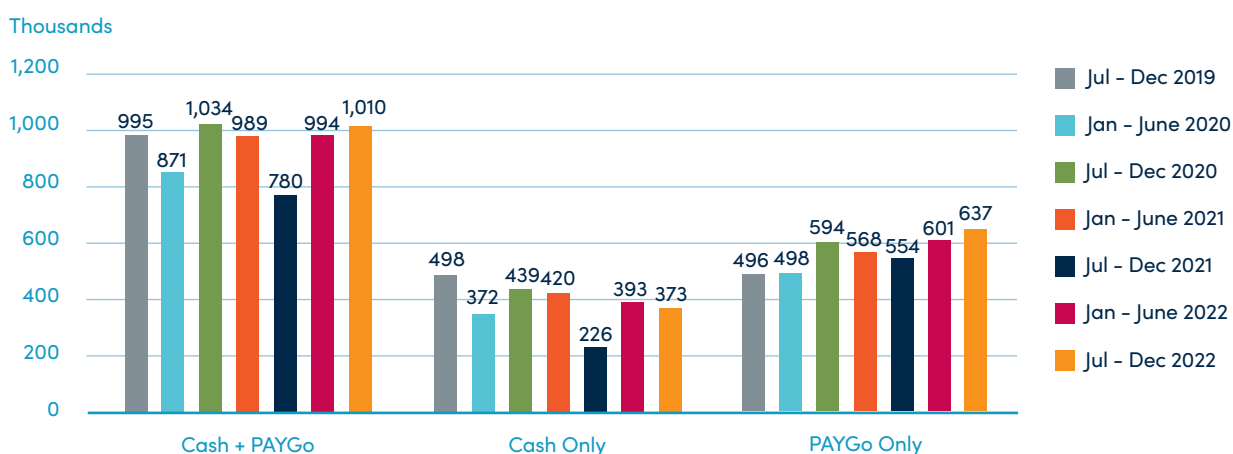
Sales Trends

Off-Grid Solar energy kits

Sales volumes grew by 2% compared to the first half of 2022 and are now 30% higher than in the second half of 2021. 1,010,000 units were sold in the second half of 2022.

Growth in sales this round is driven primarily by SHS sold PAYGo, especially SHS of 21Wp or larger, meaning the growth in value is likely more significant. Sales of smaller solar energy kits in Kenya in the second half of 2022 actually decreased compared to the first half of the year.

Figure 16 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Kenya





Kenya Insights

Appliances

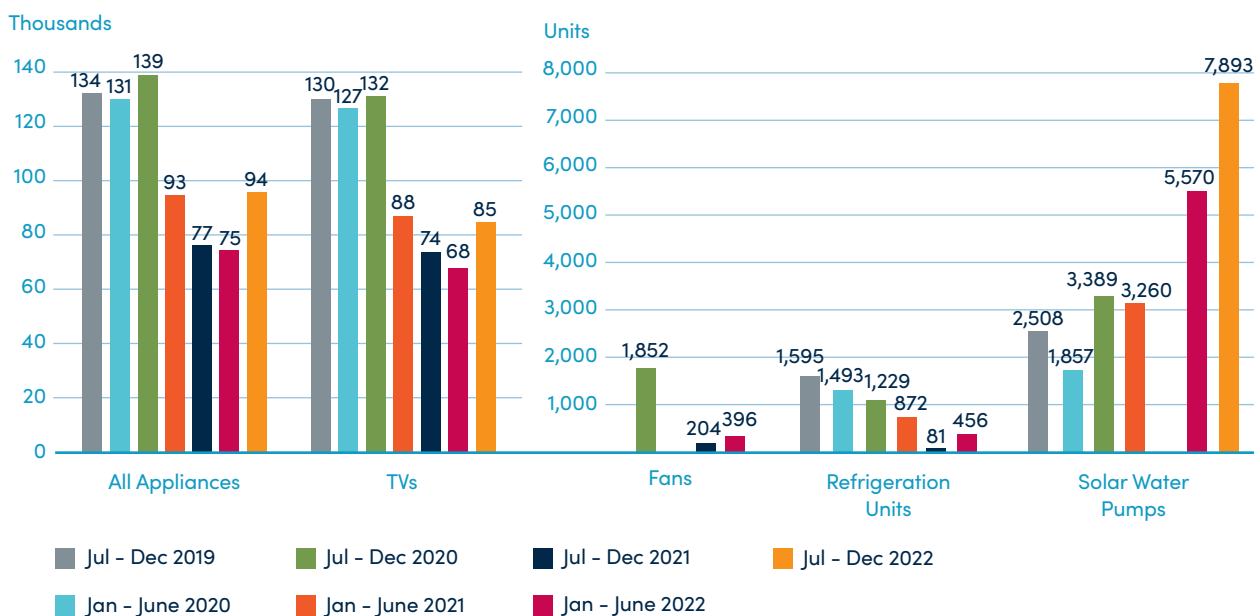
The 25% increase in TV sales can be linked to the higher reported sales of SHS capable of powering TVs. Sales reported this round reached 85,000 units. The appliance market in Kenya is primarily dominated by TVs (91% of key appliance sales), the vast majority of which were sold bundled with SHS.

SWP sales have increased from 5,570 to 7,893 units compared to the first half of 2022. These are the

highest sales ever recorded in Kenya and are not affected by changes in participation of companies in the data collection.

Although detailed data cannot be shared in this report due to data confidentiality rules in both categories; Fan sales increased and RUs sales decreased compared to the first half of 2022.

Figure 17 - Semi-annual Evolution of Sales Volumes of Key Appliances - Kenya





Malawi Insights

Background

The Malawi SHS Kick-Starter Program came to an end in Summer 2022, having played a key role in the growth of SHS sales in the country. However the data shows market growth has continued during the second half of 2022, which can be attributed to successful market building efforts by the sector with strong support from donors, notably through the Kick-Starter Program and the Energising Development (EnDev) programme among others.

In parallel, Malawi's power generation was reduced by 30% due to damage caused to one of its hydro power plants by tropical storm Ana at the very beginning of 2022. This unfortunate event has led to an increase in power outages in grid-connected areas and an increased demand for back-up solutions including SHS.

In February 2022, the government waived duty and excise taxes on solar lamps, solar water pumps and solar fridges, which has already benefited companies operating in Malawi. However, companies have also been affected by the 25% devaluation of the Kwacha²⁹, inflation above 20%³⁰ and fuel shortages³¹ which are limiting the ability of companies to operate effectively.

Sales Trends

Off-Grid solar energy kits

Malawi has seen strong seasonal variations in sales reported, with higher sales during the second half of each year. However sales are following a clear growth trend on an annual basis. With 170,000 units sold this round, sales in Malawi increased by 129% compared to the first half of 2022 and increased by 45% compared to the second half of 2021. Both cash and PAYGo sales are significantly higher than during the first half of 2022.

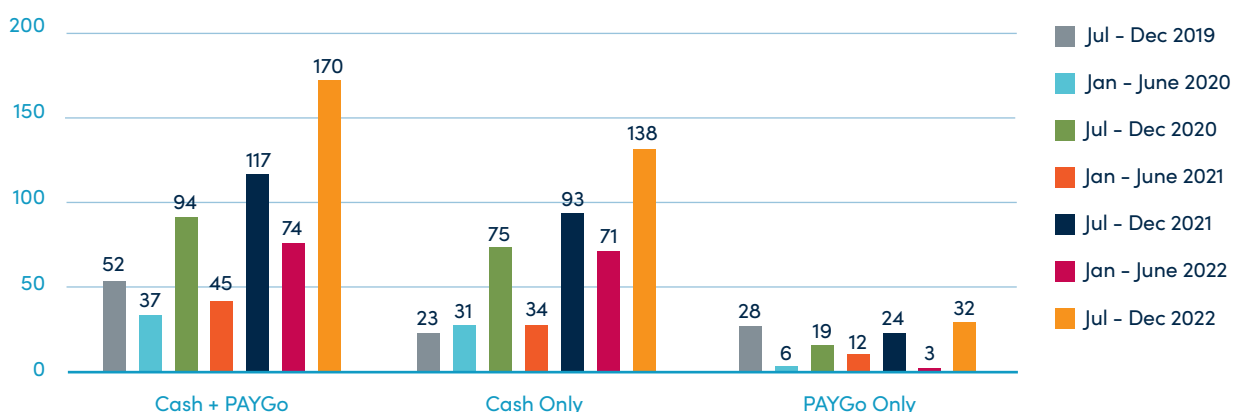
Growth in total volumes were mostly driven by a large increase in lantern sales. However, SHS sales also doubled compared to the previous reporting round.

Appliances

In the second half of 2022, close to 1,500 units had been reported, the vast majority of which were TVs. Not enough companies reported sales of appliances during this round of data collection to share further details on the volumes per appliance type.

Figure 18 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Malawi

Thousands



²⁹ Reuters, Donor-dependent Malawi devalues kwacha by 25% as forex runs low.

³⁰ World Bank, In 7 charts: The Urgent Need for Macroeconomic Stabilization in Malawi.

³¹ The Guardian, Petrol pumps run dry across Malawi as fuel import problems deepen.



Mozambique Insights

Background

Mozambique has been hit by double digit inflation rates in 2022³² which is affecting customers' ability to pay. Continued violence in the Province of Cabo Delgado is leading to a growing internally displaced population. On-going initiatives supporting the sector in Mozambique that have been reported to us include:

- The BRILHO program financed by the United Kingdom and Sweden, and implemented by SNV, has been running since 2019 providing funding (through catalytic grants and RBF) and technical assistance to kick-start businesses in the off-grid sector (SHS, clean cooking and mini-grids).
- Support from the Fundo de Acesso Sustentável as Energias Renováveis (FASER) RBF set up by the Fundação para o Desenvolvimento da Comunidade (FDC) and GIZ, through the Energizing Development (EnDev) and Grüne Bürgerenergie (GBE) programs. The programme supports SHS, improved cookstoves and PUE solutions.

Sales Trends

Off-Grid solar energy kits

Mozambique is another East African market that has experienced a strong growth trend over the past few years, with seasonal variations. **With 91,700 solar energy kits sold, sales for the second half of 2022 are 62% higher than in the first half of 2022 and 20% higher than in the second half of 2021.** The increase in sales volume is driven by higher sales of solar lanterns, lanterns with phone charging and multi-light systems.

Appliances

Appliance sales increased by 74% compared to the previous reporting round with close to 2,300 units, but remained 25% lower than during the second half of 2021. 67% of units sold are TVs. Companies also reported sales of fans, RUs and SWPs, but details cannot be shared in this report due to confidentiality rules.

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

Thousands

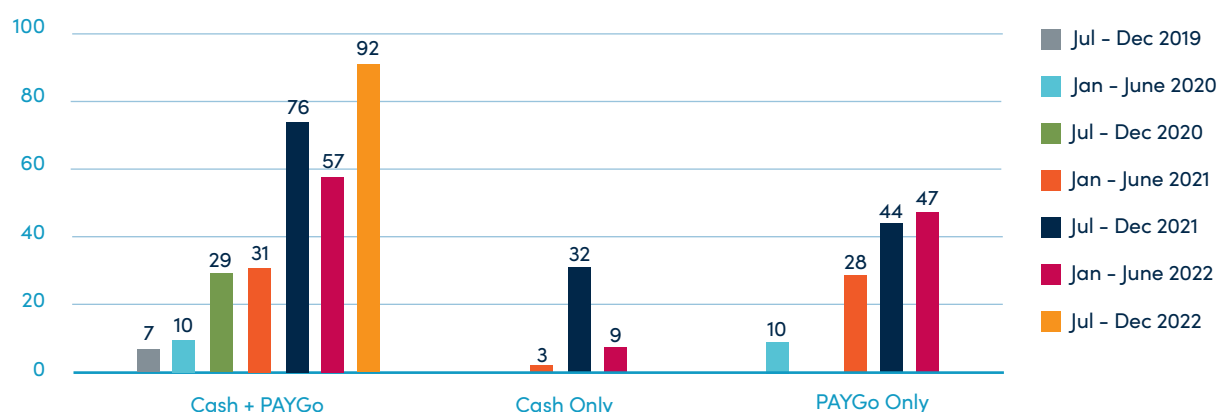
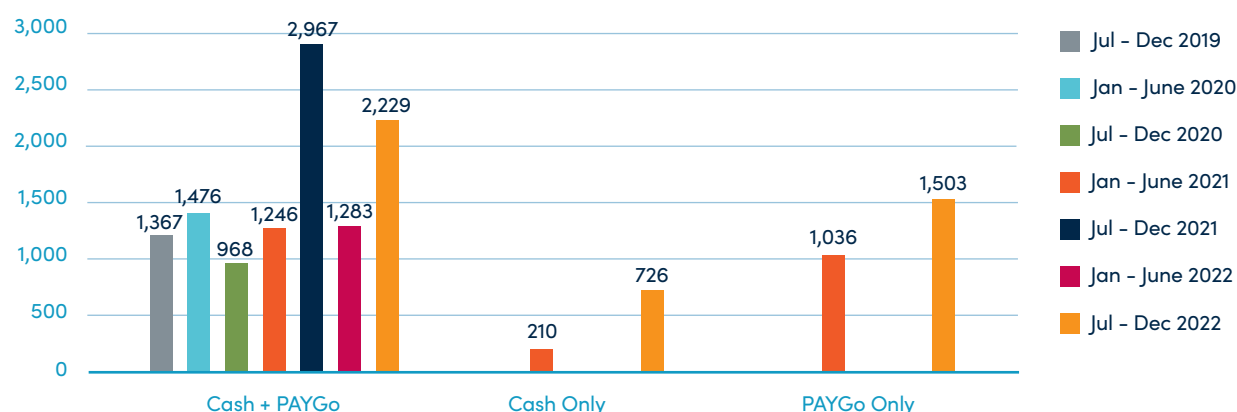


Figure 20 – Semi-annual Evolution of Sales Volumes of Key Appliances – Mozambique

Units





Uganda Insights

Background

Current interventions supporting the sector in Uganda include:

- Uganda is one of the countries targeted by 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 pilot funded by USAID and Sz incentivises companies to expand their reach into more rural and remote areas.
- The Beyond the Grid Fund for Africa (BGFA) – Uganda, funded by Denmark and Sweden and implemented by NEFCO and REEEP has made US\$20.7 million available in RBF, and the program will run until 2026.

Sales Trends

Off-Grid solar energy kits

Sales of Solar energy kits reached 175,000 units during the second half of 2022, a 42% increase compared to the first half of 2022, and were 15% higher than during the second half of 2021. Sales volumes in the country seem back on a sustainable growth path, but are yet to reach pre-COVID levels and the share of SHS in total volumes has decreased from 14% in the second half of 2019 to 9% this round.

Appliances

This round, 5,038 units of key appliances sold including 1,671 TVs and 902 SWPs. This is a 171% increase compared to the first half of 2022 but a 42% decrease compared to the second half of 2021. TV sales represent 33% of all appliances sold and solar water pumps 18%. Companies also report sales of fans and RUs, but further details cannot be provided in this report due to data confidentiality rules.

Figure 21 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Uganda

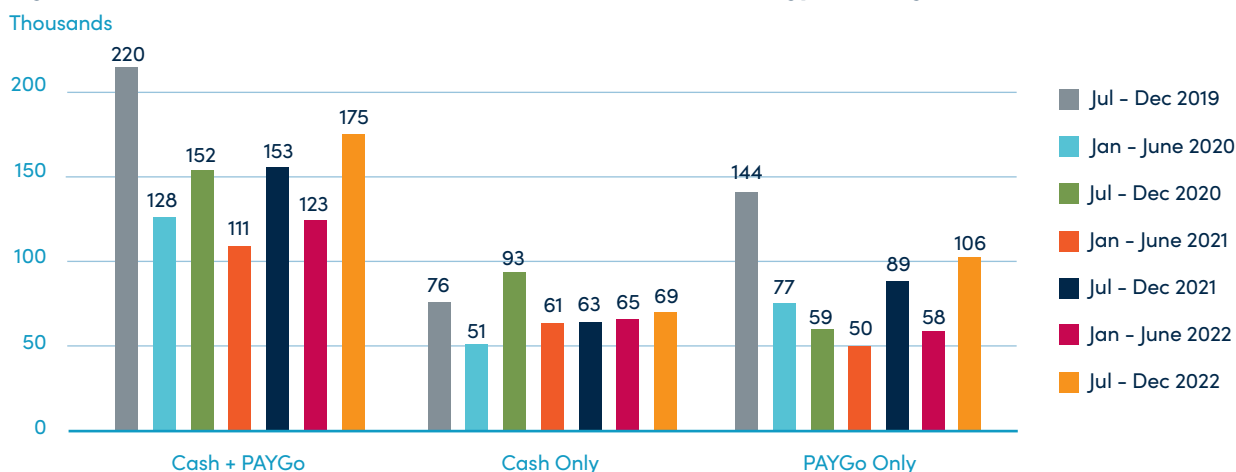
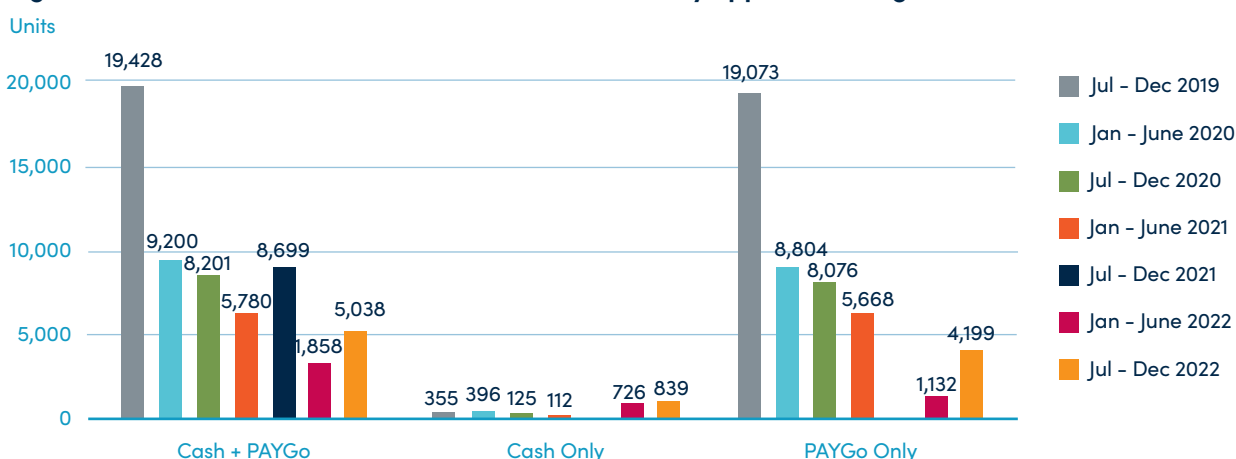


Figure 22 - Semi-annual Evolution of Sales Volumes of Key Appliances – Uganda





Zambia Insights

Background

A major positive development for the sector in 2022 was the publication of the Customs Handbook for Solar PV Products in Zambia by the Government of the Republic of Zambia and the Africa Clean Energy Technical Assistance Facility (ACE-TAF) which companies have reported has led to a more consistent application of duty and value-added tax (VAT) waivers.

Another factor that may have favored sales of off-grid solar solutions is the particularly high load-shedding in Zambia due to low water levels in dams.

Current interventions supporting the sector in Uganda include:

- Zambia receives continued support from the Beyond the Grid Fund for Africa (BGFA) with US\$10 million in funding from Germany and Sweden to be disbursed by 2025.

Sales Trends

Off-Grid solar energy kits

Sales of Solar energy kits reached 290,000 units in the second half of 2022, a 34% increase compared to the first half of 2022 and a 94% increase compared to the second half of 2021.

The main driver of sales growth since 2020 has been a strong increase in the sales of solar lanterns, notably in the 0-1.5Wp category. This has led to a change in the landscape of products

sold in Zambia compared to before the COVID-19 pandemic. In the second half of 2019, lantern sales represented 38% of sales. They now represent 76% of volumes sold.

Appliances

With 4,117 units of key appliances sold this reporting round, Zambia records a 17% increase in sales compared to the previous reporting round. 86% of units sold are TVs. There were also 135 RUs sold in the second half of 2022 in Zambia.

Figure 24 - Semi-annual Evolution of Sales Volumes of Key Appliances – Zambia

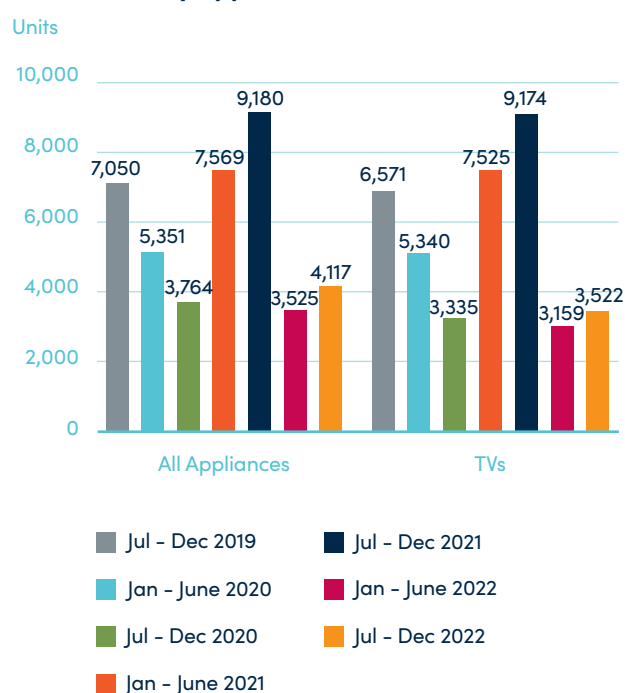
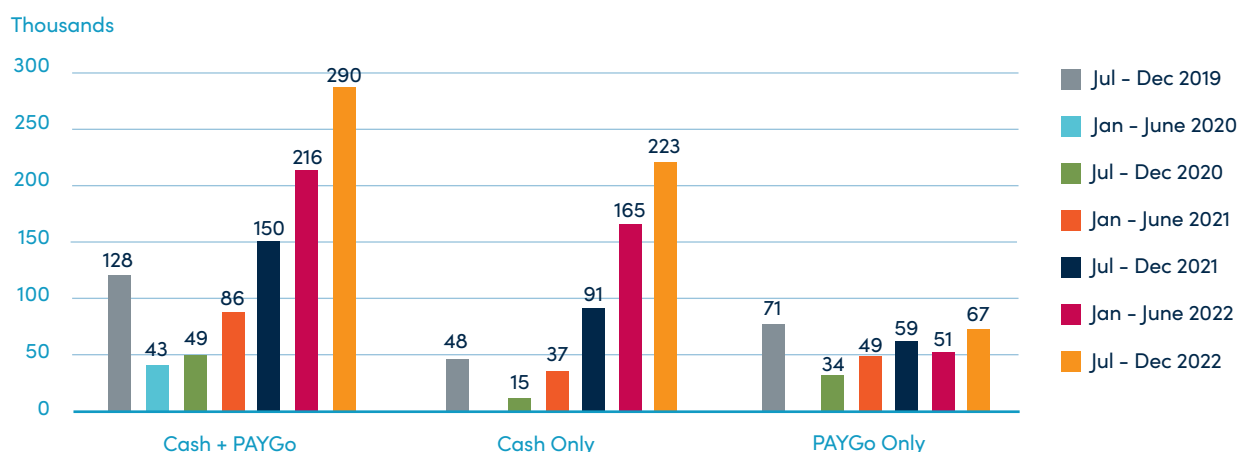


Figure 23 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Zambia





Other East African Countries

Ethiopia

With 119,400 units sold this round, sales in Ethiopia have decreased by 56% compared to the first half of 2022³³. However, it should be noted a large share of sales for the first half of the year were attributed to humanitarian bulk procurement. Nonetheless, sales this round are also 42% lower than those recorded in the second half of 2021, in line with the continuous decrease in sales observed since 2020. The vast majority of products sold are solar lanterns or multi-light systems.

Reported sales of appliances in Ethiopia are negligible. 248 key appliances were reported sold this round. Too few companies reported data to provide any other insights in this report. Low appliance sales can be linked to limited SHS sales in Ethiopia and low PAYGo penetration.

Madagascar

Sales of off-grid solar products reached 77,600 units in the second half of 2022, a 23% increase compared to the first half of 2022. Sales are also 31% higher than in the second half of 2021. Cash sales increased by 104% compared to the first half of 2022 while PAYGo sales decreased by 48%.

3,623 key appliances were sold during the second half of 2022, a decrease from 4,222 units sold during the first half of 2022. The most common appliances are TVs with 2,313 units sold. Sales also 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.

On-going initiatives supporting the sector in Madagascar that have been reported to us include:

- The US\$40 million Off-Grid Market Development Fund (OMDF), offering RBF and debt funding for providers of solar lanterns and solar home systems including appliances by the Government of Madagascar, funded by the World Bank and implemented by Bamboo Capital Partners is currently playing a significant role in boosting off-grid energy access in Madagascar. The fund has attracted new market players and led more distributors to focus on high-quality Verasol-certified products.

Rwanda

With 108,600 units sold, off-grid solar energy kits sales in Rwanda decreased by 31% compared to the first half of 2022. Cash and PAYGo sales both decreased compared to the first half of 2022; PAYGo sales decreased by 37% and cash sales decreased by 21%.

5,400 key appliances were sold in Rwanda during the second half of 2022, which is a 26% increase compared to the first half of 2022. Almost 100% of these sales come from TVs.

On-going initiatives supporting the sector that have been reported to us include:

- In 2020, the World Bank approved a US\$150 million IDA loan to the Government of Rwanda to improve access to modern energy, of which US\$15 million are allocated towards 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 subsidizing low-income households' access to solar home systems. As of December 2022, the RBF had recorded close to 235,000 units sold.

Tanzania

Sales of solar energy kits in the second half of 2022 reached 153,600 units, a 37% increase compared to the first half of 2022. Cash and PAYGo sales both grew compared to the first half of 2022. PAYGo sales increased by 21% and cash sales increased by 142% compared to the previous reporting round.

Key appliance sales, of which 97% are TVs, have decreased by 34% compared to the first half of 2022 to reach just above 8,500 units sold.

Since July 1st 2022, Tanzania has introduced an Excise Duty on lead acid batteries, charged at 5% for locally manufactured lead acid batteries and 10% for imported ones. The effect that this may have on sales is not clear at this stage.

³³ The Ethiopian market is mostly a cash market with limited options for consumer financing. Sales that are described as PAYGo in data collected by GOGLA are sales of PAYGo-enabled products, but evidence points to the fact these are also mostly sold cash.

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West Africa Insights

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Regional Sales Trends

Off-Grid Solar energy kits

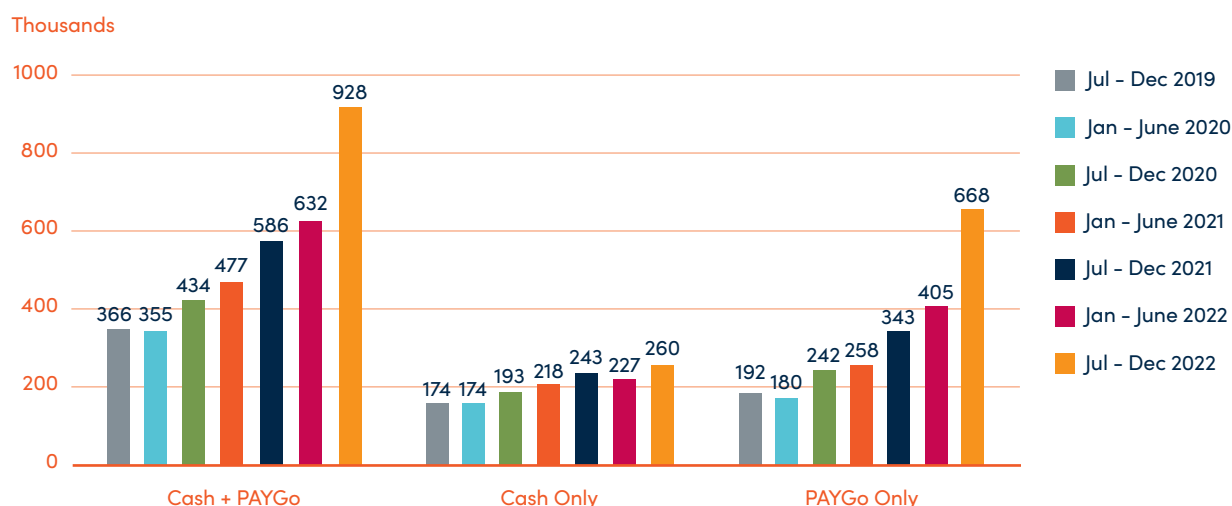
Sales of off-grid solar energy kits in West Africa between July and December 2022 reached 928,000 units. This is a 47% increase compared to the first half of 2022 and a 58% increase compared to the second half of 2021.

Cash sales increased by 14% compared to the first half of 2022 reaching 260,220. The PAYGo segment remained on a robust growth trajectory increasing by 65% over the same period reaching 668,000 units sold.

Product Trends

Sales per product category show a mixed picture. Lantern sales decreased by 4% compared to the first half of 2022, multi-light system sales grew by 9% and SHS by 109%. Within the SHS segment, 11-20Wp and 50-100Wp SHS in particular have been driving growth.

Figure 25 – 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 installments over time or pays for use of the product as a service.

Table 6 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Category – West Africa

Categories		Jul-Dec 2022 volumes (Cash & PAYGo)		% change v. Jan-Jun 2022	% change v. Jul-Dec 2021	Share of PAYGo
Lanterns	0-1.5Wp	126,783		-23%	-22%	0%
	1.5-3Wp	77,799		62%	19%	-
Multi-light systems	3-10Wp	167,906		9%	36%	73%
Solar Home Systems	11-20Wp	291,967		149%	197%	96%
	21-49Wp	27,490		-3%	-131%	-
	50-100Wp	207,214		94%	154%	92%
	100+Wp	28,573		119%	98%	-

West Africa Insights

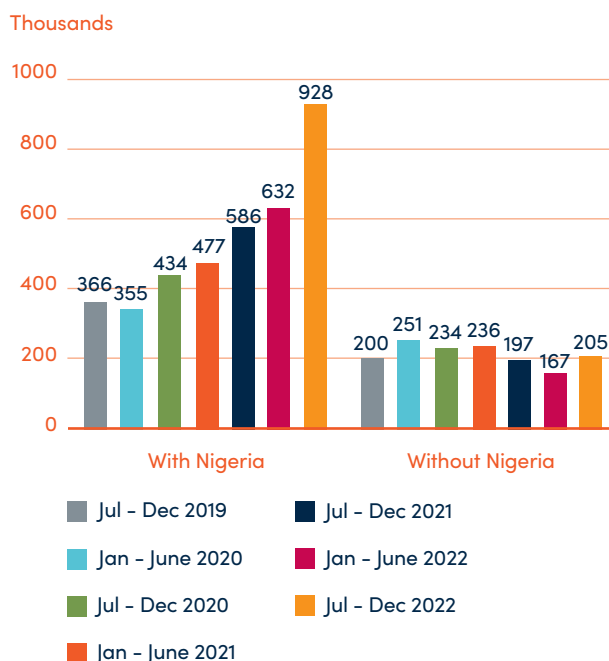
Countries Overview

As in previous rounds, positive trends in West Africa are mainly representative of Nigeria with few other markets showing consistent growth. With 722,600 units sold, Nigeria represents 78% of sales recorded in the region. The table and chart below show the 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 2022 reached 233,500 units. This is a 53% increase compared to the first half of 2022. Appliance sales in West Africa account for 58% of Sub-Saharan Africa sales and confirm the region has overtaken East Africa for total key appliance volumes with the existence of a dynamic fan market in West Africa and not in East Africa being the leading factor.

Figure 26 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits - West Africa with and without Nigeria



NOTE:

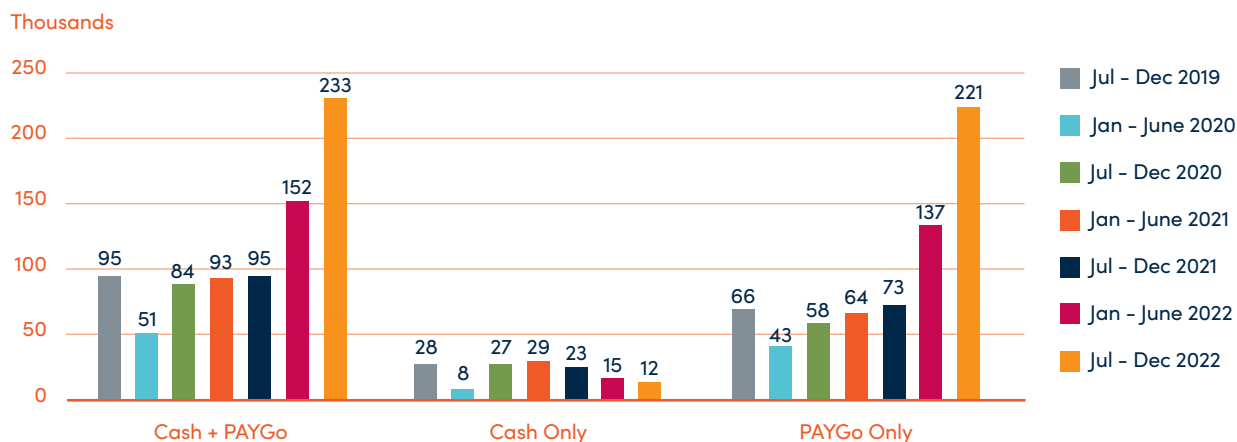
Countries not featured in this table did not see enough companies reporting to pass the three-data point rule.

Table 7 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country - West Africa

Region / Countries	Jul-Dec 2022 volumes (Cash & PAYGo)	% change v. Jan-Jun 2022	% change v. Jul-Dec 2021
West Africa	927,783	47%	58%
Nigeria	722,614	55%	86%
Benin	57,495	40%	49%
Togo	34,752	26%	6%
Cote d'Ivoire	32,206	116%	161%
Sierra Leone	21,346	20%	200%
Liberia	17,862	581%	-
Senegal	11,333	-27%	-55%
Guinea	9,371	-34%	-1%
Ghana	8,175	213%	47%
Burkina Faso	5,787	-73%	-86%
Mali	4,602	-46%	-62%

West Africa Insights

Figure 27 - Semi-annual Evolution of Sales Volumes of Key Appliances - West Africa



Product Trends

West Africa is the second largest regional market worldwide for TVs after East Africa. It is also the second largest regional worldwide market for fans, after South Asia.

TV sales in the region grew by 31% compared to the first half of 2022, from 71,000 to 93,000 units. 99% of TVs were sold bundled with a SHS. 89% of total sales reported were PAYGo. Extra-large TVs (30"+) are the most popular, accounting for 53% of total units sold. Large TVs (24"-29") record the second highest volumes, accounting for 46% of all products sold, while medium TVs and small TVs represent just 1% of units sold. In the past, the region had

reported significant sales of smaller TVs and now appears to be following the same trend in TV size sales as in East Africa.

134,000 fans were sold in West Africa this round, a 70% increase on the first half of 2022. 86% of units were sold bundled with a power system, generally an SHS. The vast majority of fan sales in West Africa (90%) are to Nigeria.

Refrigeration unit sales grew by 63% to 2,020 units sold while SWP sales jumped by 250% to 3,902 units sold.

Table 8 - Semi-annual Evolution of Sales Volumes of Key Appliances by Type - West Africa

Appliance	Jul-Dec 2022 volumes (Cash & PAYGo)	% change v. Jan-Jun 2022	% change v. Jul-Dec 2021	Share reported as sold PAYGo	Share sold bundled with a power system
TVs	93,273	31%	38%	89%	99%
Fans	134,296	70%	413%	-	86%
RUs	2,020	63%	219%	-	81%
SWPs	3,902	250%	490%	-	-

West Africa Insights

Countries Overview

Nigeria is by far the largest appliance market in the region and strong growth in Nigeria hides more nuanced trends in other markets in the region. 75% of all appliance sales in West Africa are to Nigeria.

Table 9 - Semi-annual Evolution of Sales Volumes of Key Appliances by Country - West Africa

Region / Countries	Jul-Dec 2022 volumes Key appliances (Cash & PAYGo)	% change v. Jan-June 2022	% change v. Jul-Dec 2021
West Africa	233,492	53%	145%
Nigeria	174,127	68%	352%
Cote d'Ivoire	15,919	204%	75%
Benin	10,268	-31%	-12%
Senegal	5,678	-46%	-45%
Mali	2,138	48%	-36%

NOTE:

- The category 'Key Appliances' refers to the sum of all TVs, fans, solar water pumps and refrigeration units.
- 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 installments over time or pays for use of the product as a service.
- Countries not featured in this table did not see enough companies reporting to pass the three-data point.





Nigeria Insights

Background

Inflation in Nigeria exceeded 20% by the end of 2022³⁴, a 17-year high compounded with a foreign exchange (FOREX) crisis which has been an issue for companies operating in Nigeria.

On-going initiatives supporting the sector in Nigeria that have been reported to us include:

- The Nigeria Electrification Program (NEP), which is carried out by the Rural Electrification Agency with funding from the World Bank and the African Development Bank aims to provide electricity access, through mini grids and stand-alone off-grid solutions and to accelerate the proliferation of productive appliances for off-grid communities. In particular, it includes a US\$75 million RBF facility for solar energy kits which has played a key role in driving the rapid sales growth seen between 2019 and 2022. The NEP also provides funding for productive use appliances including SWPs. It was recently announced that this had already led to the installation of 1,300 units.

- The Solar Power Naija Program (SPN) was announced in December 2020 and aims to electrify 5 million households, serving about 25 million Nigerians, through SHS and mini-grids, under the Economic Sustainability Plan³⁵.

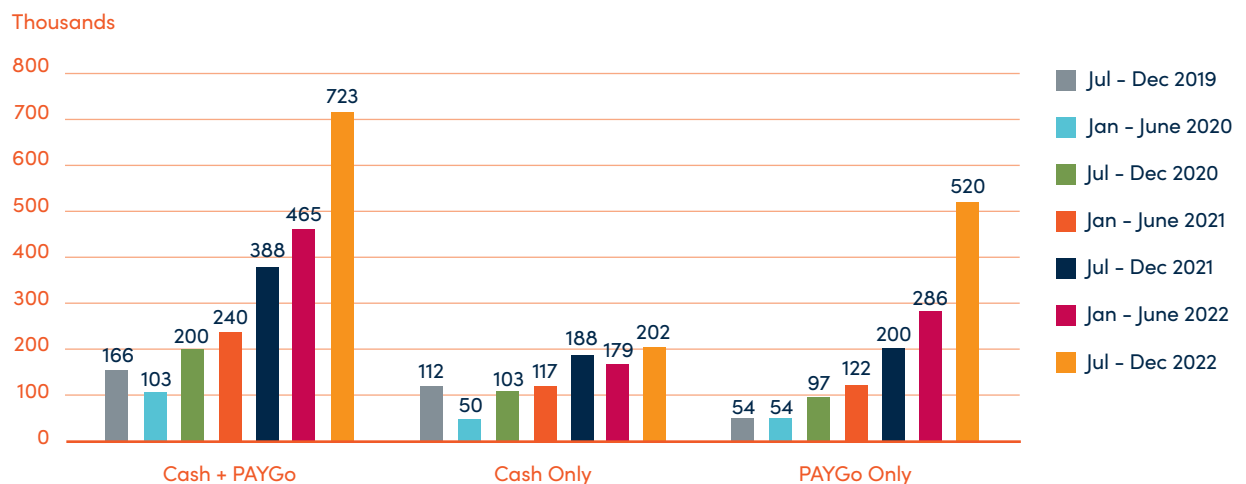
Sales Trends

Off-Grid solar energy kits

Nigeria represents 78% of West African sales. **Nigeria has again recorded particularly high sales volumes this reporting round, reaching 722,600 units. This is a 55% increase on the first half of 2022 and a 86% increase compared to the second half of 2021.** The increase was in particular driven by an 82% increase in PAYGo sales while cash sales grew by 13%.

With multi-light systems sales increased by 7% and SHS sales by 136%. Lantern sales decreased by 2% compared to the previous reporting round.

Figure 28 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Nigeria



³⁴ Premium Times, Nigeria's inflation hits 21.82% amid cash crunch.

³⁵ REA (2020), Fg Launches 'Solar Power Naija' A 5 Million Solar Connection Programme To Off Grid Communities.

West Africa Insights



Nigeria Insights

Appliances

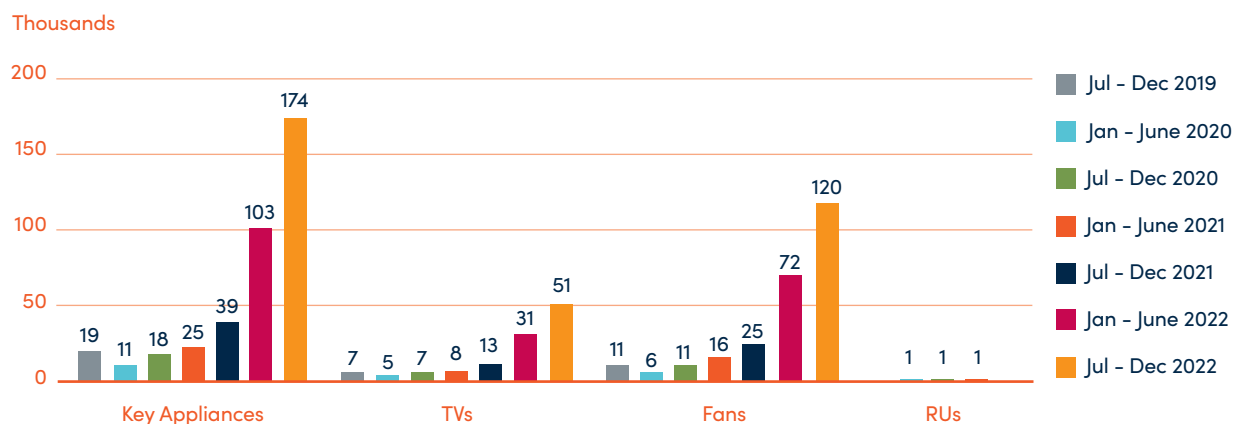
Sales of key appliances for the second half of 2022 are 68% higher than in the first half of 2022 and 352% higher than in the second half of 2021.

TV sales experienced a 65% increase compared to the previous reporting round, reaching 50,750 units sold. Almost all are bundled with an SHS and were sold as PAYGo. Among TVs, extra-large TVs (30+", 49%) represent the most popular category with 76% of the total TV sales. The extra-large TVs (30+", 49%) followed by large TVs (24-29"), 23%. Medium and small TVs represent just 1% of sales. This seems to confirm the trend towards large and extra-large TVs representing the vast majority of TVs sold.

Fans recorded a 67% increase reaching 120,200 units sold for the second half of 2022. 87% of units were sold as part of a SHS. Due to the limited number of companies reporting sales of specific fan types, detailed data on sales per fan category, except the pedestal fans, cannot be shared in this report. It can however be shared that the pedestal fans represent the majority of the total sales. Table fans also recorded sales, 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 recorded growth compared to the first half of the year.

Figure 29 - Semi-annual Evolution of Sales Volumes of Key Appliances - Nigeria





Benin Insights

Background

Benin managed to keep a handle on inflation, outperforming all other West African nations thanks to positive reforms in agricultural governance that have accelerated the country's agricultural output growth and also helped the country manage inflation³⁶.

On-going initiatives supporting the sector in Benin that have been reported to us include:

- In 2017, the Benin Power Compact from the Millennium Challenge Corporation (MCC) entered into force. Out of a total grant of US\$391 million, approx. US\$45 million are budgeted for the Off-Grid Electricity Access Project which supports mini-grid and SHS deployment.
- Other initiatives supporting the sector in Benin include a 2019-2021 RBF window from EnDev for solar energy kits and a productive use RBF from Green People's Energy (GBE) for Africa – Benin. The RBF from EnDev included up to €1.3 million for distribution of solar energy kits. The RBF by GBE includes €350,000 for PUE companies and €150,000 to companies that provide credit for PUE customers³⁷.

Sales Trends

Off-Grid solar energy kits

Solar energy kit sales for the second half of 2022 reached 57,500 units, a 40% increase on the first half of 2022. Although cash sales increased by 515% to 6,250 units sold in this round, most products sold in Benin were sold PAYGo for which sales grew by 28% to 51,250 units.

Appliances

Appliances sales in Benin for the second half of 2022 reached close to 10,300 units. This is a 31% decrease compared to the first half of 2022. 80% of units sold were TVs. Too few companies reported appliance sales in Benin for further details to be shared, but fans and SWPs sales were also reported.

Figure 31 - Semi-annual Evolution of Sales Volumes of Key Appliances – Benin

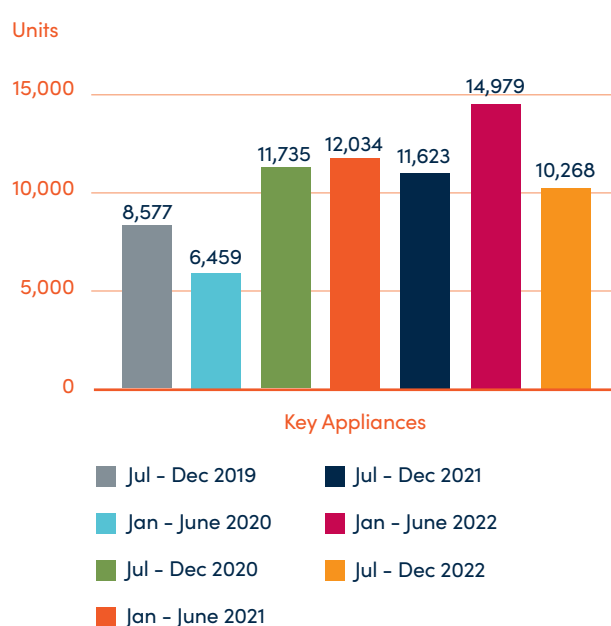
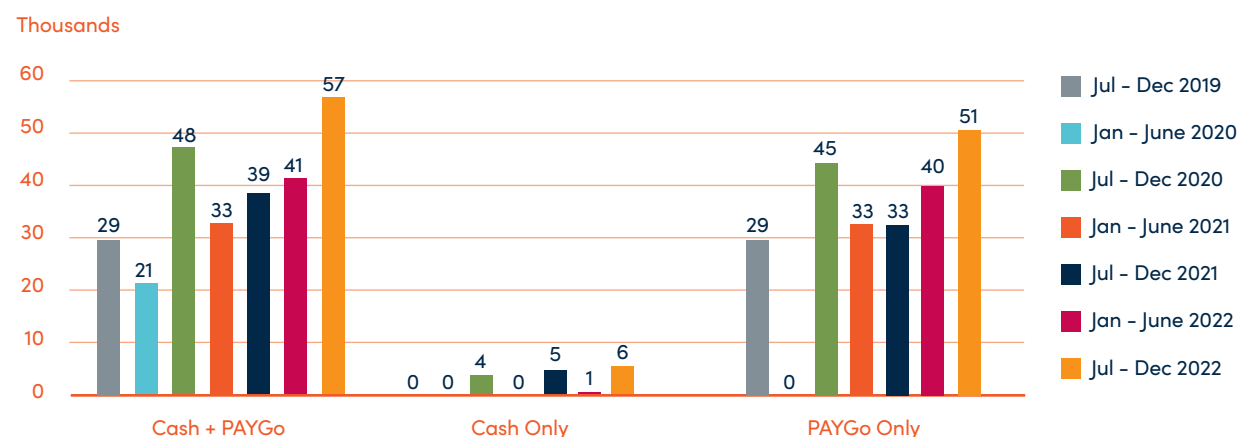


Figure 30 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Benin



³⁶ Jeune Afrique, Inflation: le Bénin, un exemple à suivre?

³⁷ More information [here](#).



Other West African Countries

Burkina Faso

Burkina Faso is traversing a prolonged period of increasing insecurity that is spreading across the region and affecting countries further south of the Sahel. In parallel, the country has also faced severe political instability, going through two coups in January and September 2022.

5,800 units of solar energy kits were sold by manufacturers during the second half of 2022.

This is a 73% decrease compared to the first half of 2022 and 86% lower than during the second half of 2021. 63% of sales reported between July and December 2022 were reported as cash sales.

Due to an insufficient number of companies reporting, data for the key appliances results cannot be shared in this report.

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

Côte d'Ivoire

Sales for the second half of 2022 increased by 116% to above 32,200 units. Future rounds of data collection will be needed to assess whether this increase is significant given the low sales reported since 2021. Anecdotal evidence points to the increased fuel prices as a driver for demand for solar solutions. It is notable that growth in sales this round comes almost exclusively from SHS and especially large SHS (50Wp and above).

In the second half of 2022 with 15,900 units sold, sales volumes of key appliances increased by 204% compared to the first half of 2022 and 75% compared to the second half of 2021. This is consistent with the increase in sales of larger SHS. **Fans, with more than 8,800 units sold, were the most popular appliances followed by TVs with above 5,900 units sold.** While due to an insufficient number of companies reporting specific sales data cannot be shared, SWPs and RUs were also reported this round.

Liberia

17,900 units of solar energy kits were sold in Liberia during the second half of 2022, a 581% increase on the first half of 2022. 93% of the total sales were PAYGo.

Close to 900 appliance sales were reported for the second half of 2022. Due to the limited number of companies reporting in the previous round, exact growth data cannot be shared.

TVs comprised 56% of the total sales, while some fans, RUs and SWPs sales were also reported.

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.

Senegal

Senegal recorded historically high inflation during the second half of 2022, exceeding 17% for food in August 2022³⁸.

Sales of Solar energy kits were above 13,300 units between July and December 2022. This is a 27% decrease on the previous reporting round and 55% lower than the sales reported in the second half of 2021.

Just below 5,700 key appliances were sold in the second half of 2022. This is a 46% decrease on the previous reporting round, and a 45% decrease on the second half of 2021. TV sales made up 96% of all key appliances sold with 5,444 units. Companies also reported 232 refrigeration units sold. A number of fan and SWP sales were also reported.

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).
- Future developments that are expected to benefit the market going forward include the USAID Scaling Up Renewable Energy (SURE) Senegal RBF for SWPs.

West Africa Insights



Other West African Countries

Sierra Leone

Solar energy kit sales in the second half of 2022 increased to 21,350 units from 7,000 units in the previous round. Numbers also increased by 200% compared to the second half of 2021.

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

Togo

Off-grid Solar energy kit sales in the second half of 2022 reached close to 34,800 units, a 26% increase on the previous reporting round, and 6% higher than in the second half of 2021. Due to insufficient number of companies reporting, cash and PAYGo sales data distribution cannot be shared in this report.

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

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

- The CIZO rural electrification program has worked to create an enabling environment for the access to energy sector and especially PAYGo SHS providers. In particular, the customer subsidy program often referred to as “CIZO cheque” introduced in 2019,³⁹ in which the customer pays only the unsubsidized portion of their monthly PAYGo fee out-of-pocket, has been hailed as a success. Furthermore, the CIZO program’s subsidy scheme was extended in 2021 to solar water pumps⁴⁰ with a target to distribute 3,000 pumps⁴¹. Since October 2022, a new module enables members of the diaspora to purchase kits for rural households in Togo.



© Baobab+

³⁹ République Togolaise, The government launches the “CIZO solar check” to support households in the energy transition.

⁴⁰ PV Magazine, EDF s’investit au Togo dans l’irrigation solaire pour les agriculteurs.

⁴¹ Togo First, Cizo: Solar-powered irrigation pumps to be set up in rural areas.



Central Africa Insights





Regional Sales Trends

Off-Grid solar energy kits

Sales of off-grid solar products in Central Africa fell to 106,000 units sold. This is a 21% decrease compared to the first half of 2022 and a 56% decrease on sales reported in the second half of 2021 when a peak in sales was reported that was in part connected to bulk purchasing of small solar lanterns.

Product Trends

Trends by product category paint a mixed picture. A notable trend is that sales of small solar lanterns (0-1.5Wp) have significantly decreased for two consecutive rounds and are now the lowest they have been since 2017. Sales of small SHS (11-20Wp) are also declining significantly.

Figure 32 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits - Central Africa

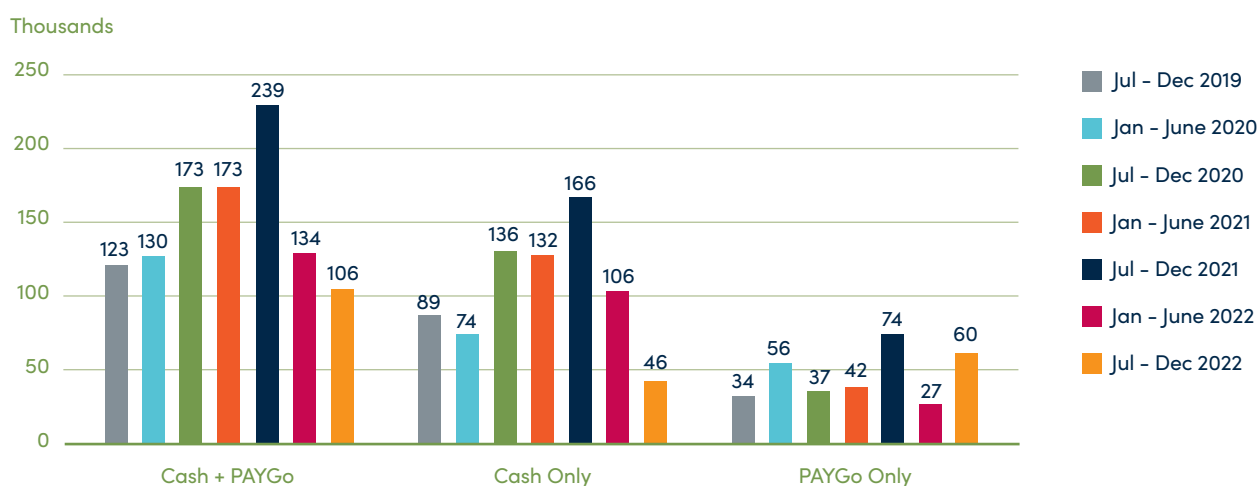


Table 10 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Category - Central Africa⁴²

Categories		Jul-Dec 2022 volumes (Cash & PAYGo)		% change v. Jan-Jun 2022	% change v. Jul-Dec 2021	Share of PAYGo
Lanterns	0-1.5Wp	21,398		-75%	-86%	0%
	1.5-3Wp	33,306		78%	21%	35%
Multi-light systems	3-10Wp	11,646		36%	-44%	79%
Solar Home Systems	11-20Wp	5,851		-24%	-61%	96%
	21-49Wp	1,431		-	-43%	100%
	50-100Wp	26,164		99%	22%	-
	100+Wp	6,517		-	-	100%

⁴² 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

Countries Overview

Sales to Cameroon decreased for the second round in a row. Sales to the Democratic Republic of the Congo (DRC) increased by 142% compared to the first half of the year, but remained lower than sales in the second half of 2021.

Off-grid solar appliances

96% of sales of appliances reported in the region are to the DRC. 72% of units sold between July and December 2022 are TVs. TVs were followed by fans with 25% of key appliance sales and RUs with 2%. A number of SWPs were also reported.

Key appliance sales reached 46,000 units in the region in the second half of 2022. This is 261% higher than in the first half of 2022 and 86% higher than in the second half of 2021. While the increase in sales this round is a positive sign, further data collection is required to identify clear trends.

Figure 33 - Semi-annual Evolution of Sales Volumes of Key Appliances – Central Africa

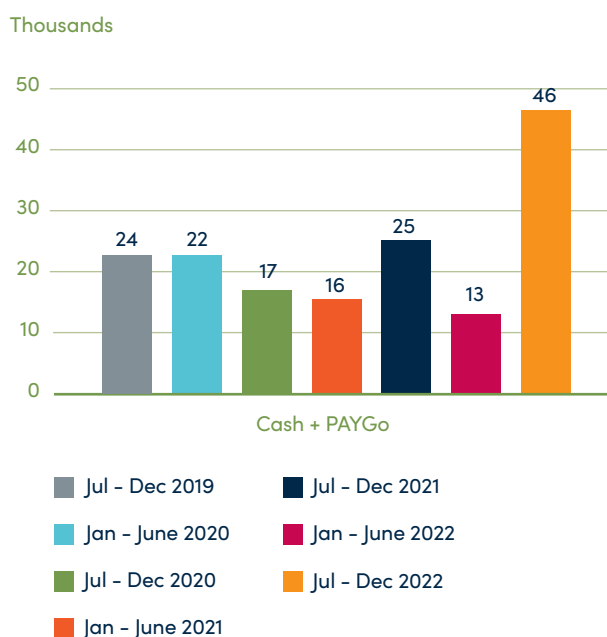


Table 11 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country – Central Africa

Region / Countries	Jul-Dec 2022 volumes (Cash & PAYGo)	% change v. Jan-Jun 2022	% change v. Jul-Dec 2021
Central Africa	106,313	-21%	-56%
Democratic Republic of Congo	54,570	142%	-22%
Cameroon	47,205	-47%	-71%
Chad	2,520	-63%	-

NOTE:

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

Central Africa Insights



Central African Countries

Cameroon

Sales of solar energy kits in Cameroon decreased by 47% compared to the first half of 2022 to 47,000 units. Although detailed numbers for each category cannot be shared in this report due to data confidentiality, this decrease was mostly driven by much lower sales of solar lanterns and lanterns with phone charging.

Very few companies reported appliance sales in Cameroon. 1,378 units of key appliances including TVs, fans and SWPs were reported this round.

Democratic Republic of the Congo

54,600 solar energy kits were sold during the second half of 2022, a 142% increase in sales compared to the first half of the year and a 22% decrease compared to the second half of 2021. 94% of units sold were sold through PAYGo. The majority of products sold are SHS.

Close to 44,250 units of key appliances were sold in DRC in the second half of 2022, a 265% increase compared to the second half of 2021. 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) program, which includes an active US\$3.5 million RBF scheme.
- The Beyond the Grid Fund for Africa has opened its first call for proposals in the DRC.



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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 26% compared to the first half of 2022 to reach just above 449,000 units sold.

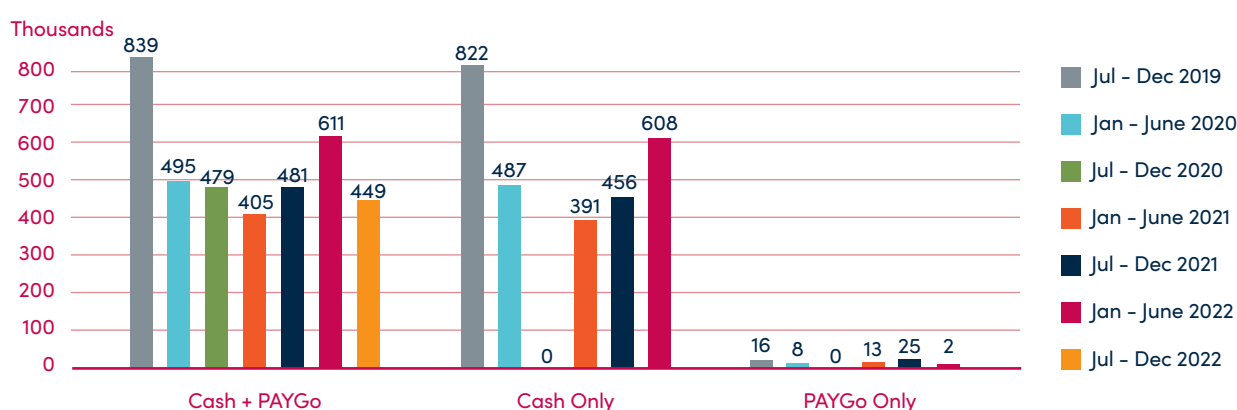
This is the continuation of a trend of lower sales for solar lanterns and plug-n-play kits linked to increased grid electrification and a shift towards component based and hybrid solutions which can be paired with a weak grid connection. Cash and PAYGo sales numbers for this round cannot be shared due to data confidentiality.

Higher sales in the first half of 2022 can be connected to large sales to the humanitarian sector in Afghanistan and Pakistan. When we remove these, the market would have decreased more linearly across the last 18 months.

Product Trends

Sales in South Asia are predominantly driven by solar lanterns. Lantern sales made up 92% of all volumes this round.

Figure 34 – 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 installments 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 – South Asia

Categories		Jul-Dec 2022 volumes (Cash & PAYGo)	% change v. Jan-Jun 2022	% change v. Jul-Dec 2021
Lanterns	0-1.5Wp	139,661	-14%	-36%
	1.5-3Wp	274,385	-23%	43%
Multi-light systems	3-10Wp	30,602	-65%	-43%
Solar Home Systems	11-20Wp	4,382	0%	-
	21-49Wp	-		
	50-100Wp	-		
	100+Wp	-		

South Asia Insights

Countries Overview

With 432,159 units sold, India remains by far the largest market in South Asia despite decreasing sales. In 2022, across both rounds, the majority of sales to Pakistan are linked to the humanitarian sector.

Off-grid solar appliances

Product Trends

223,250 units were sold between July and December 2022, more than 99% of which were fans. This is a 63% decrease compared to the first half of 2022. Fans play a key role in helping households cope with high temperatures and increasingly frequent strong heatwaves. In 2022, both India and Pakistan recorded temperatures up to 50°C⁴³. The bulk of sales in this report are registered in Pakistan (see section below). The dip in sales compared to the first half of the year can be explained by the deeply seasonal nature of fan sales 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, this does not mean that customers do not have access to financing as microfinance institutions 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 more broadly leans towards component-based systems rather than towards the kits being favored in Sub-Saharan Africa, which limits product bundling.

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

Figure 35 – Semi-annual Evolution of Sales Volumes of Key Appliances – South Asia

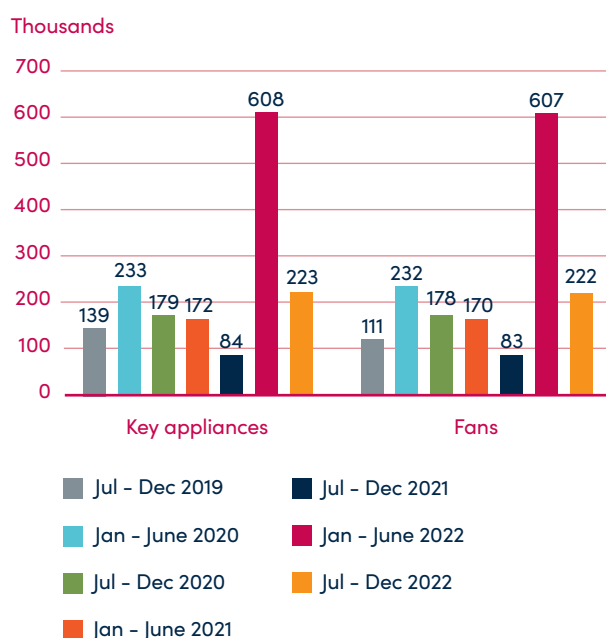


Table 13 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country – South Asia

Region / Countries	Jul-Dec 2022 volumes (Cash & PAYGo)	% change v. Jan-Jun 2022	% change v. Jul-Dec 2021
South Asia	449,264	-26%	-7%
India	432,159	-1%	-5%
Pakistan	14,284	-77%	-72%

South Asia Insights



India Insights

Background

Sales reported in India have been on a structurally declining trend as the product mix is evolving away from traditional off-grid products like lanterns and plug-n-play kits towards weak-grid products which this report does not capture. Companies in the off-grid sector are adapting to this progressive pivot and 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 back-up to the grid or as a primary source ahead of the grid⁴⁴.

Sales Trends

Off-Grid solar energy kit

Sales of Solar energy kits decreased by 1% compared to the first half of 2022 and now stand at 432,200 units. Detailed PAYGo and cash sales data cannot be shared in this report due to data confidentiality.

The drop in sales is mostly due to lower sales of small portable solar lanterns (0-1.5Wp), while sales of lanterns with phone charging (1.5-3Wp) and multi-light systems grew. SHS sales represent less than 1% of total sales.

Appliances

Just below 4,420 units of key appliances were sold in India between July and December 2022, a 33% decrease compared to the first half of 2022. Of these, 69% are fans.

Too few companies reported sales of other appliances to include the data in this report. Sales of TVs, RUs and SWPs were reported.

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

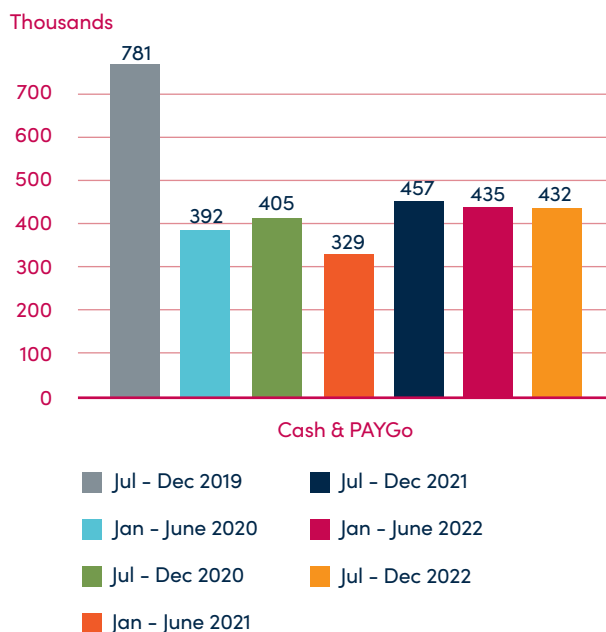
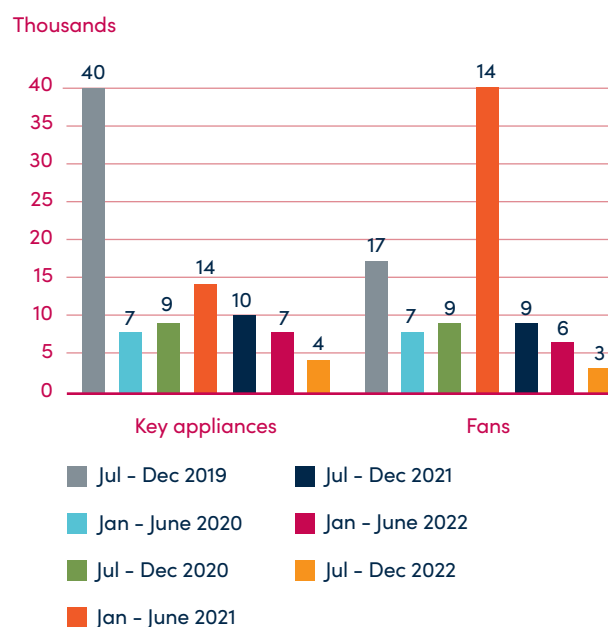


Figure 37 - Semi-annual Evolution of Sales Volumes of Key Appliances – India



44 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>.

South Asia Insights



Pakistan Insights

Background

In 2022 Pakistan was hit particularly hard by extreme climate events with extreme heats recorded between March and May followed by catastrophic flooding. According to the World Bank, without significant recovery efforts, the floodings could push 5.8 to 9 million people into poverty⁴⁵. The disruptions to agriculture are likely to also have lasting effects on Pakistan's economy.

At the same time, Pakistan has been particularly hard-hit by inflation, compounded by a weakened national currency.

The off-grid solar market in Pakistan is mostly dominated by component-based solutions. The need for space-cooling is particularly important and is reflected in the high fan sales. DC fans from local manufacturers are often coupled by customers with batteries and panels as a cost-effective solution for the hottest months of the year. Some distributors also offer fans as part of kits. There is also an even larger market for hybrid AC/DC fans in Pakistan which is not currently covered in this data collection.

Sales Trends

Off-Grid solar energy kit

14,300 units of solar energy kits were sold to Pakistan this round, a 77% decrease compared

to the first half of 2022. Peaks in sales like the one recorded during the first half of 2022 are linked to large humanitarian bulk purchasing. However, sales in this reporting round are also predominantly linked to the humanitarian sector.

Appliances

Over 200,000 units of fans were sold in Pakistan between July and December 2022, a 65% decrease compared to the first half of 2022. Fans are the only appliances that were 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, more and more commonly, AC/DC fans⁴⁶. The focus of this report has so far been on DC fans. However, anecdotal evidence points at the market for hybrid fans being even much larger than that for DC fans. Prior to 2022, participation in the data collection from Pakistani fan manufacturers had been sporadic, leading to challenges in identifying trends. Future rounds of data collection with stable participation should enable a better understanding of this market.

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

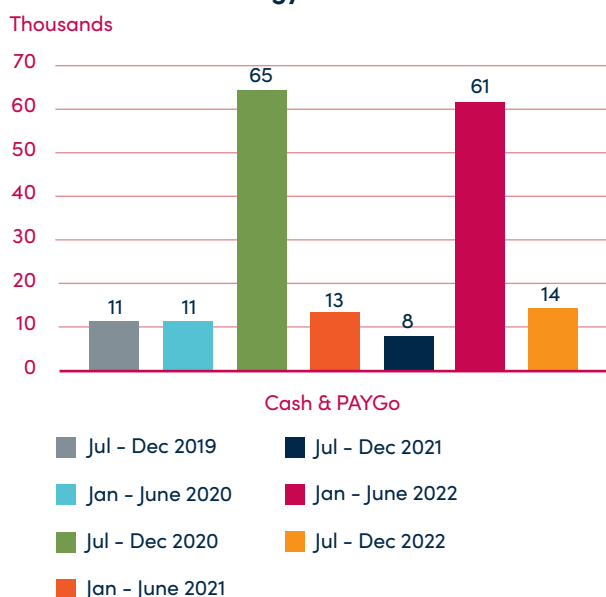
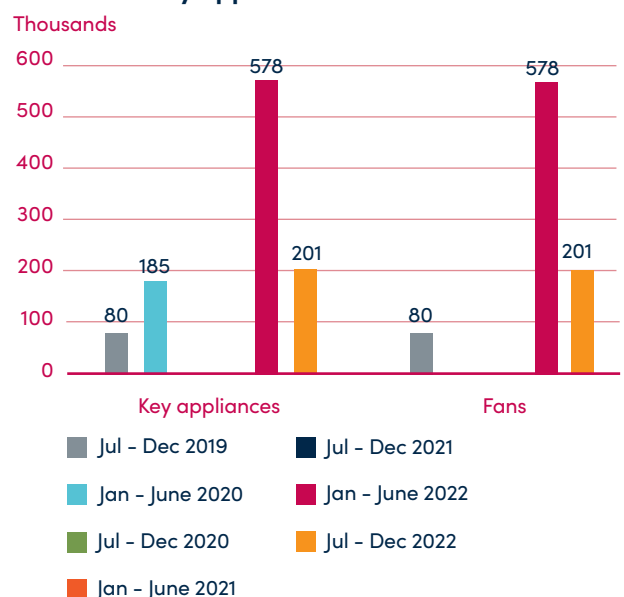


Figure 39 - Semi-annual Evolution of Sales Volumes of Key Appliances – Pakistan



⁴⁵ World Bank, Pakistan Development Update: Inflation and the Poor, October 2022.

⁴⁶ Efficiency for Access, Pakistan Off- and Weak-Grid Solar Appliance Market, 2022.



East Asia & Pacific Insights





Regional Sales Trends

Off-Grid Solar energy kits⁴⁷

Sales of off-grid solar energy kits totaled 190,630 units in the region between July and December 2022. This is an 85% increase in sales compared to the first half of 2022. Sales in the region have been following a seasonal pattern with consistently higher sales in the second half of the year.

Product Trends

All product categories recorded higher sales in the second half of 2022, in line with seasonal trends. Both sales of solar lanterns and SHS more than doubled. The growth in small solar lanterns in particular is noteworthy as it by far exceeds previous seasonal peaks.

Figure 40 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits – East Asia and the Pacific

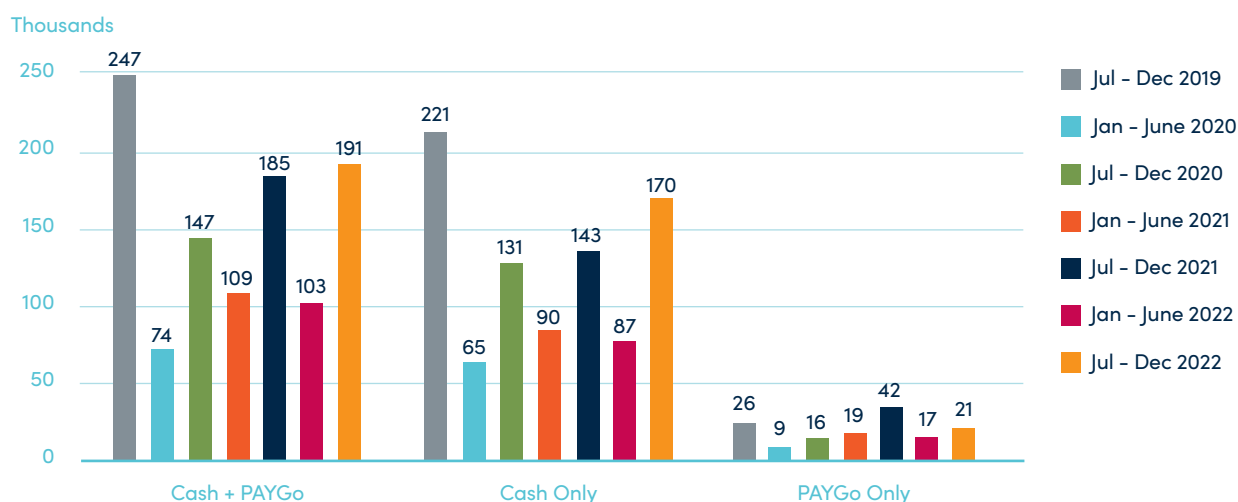


Table 14 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Category – East Asia and the Pacific

Categories		Jul-Dec 2022 volumes (Cash & PAYGo)		% change v. Jan-Jun 2022	% change v. Jul-Dec 2021	Share of PAYGo
Lanterns	0-1.5Wp	51,908		21%	4%	0%
	1.5-3Wp	41,282		80%	-37%	-
Multi-light systems	3-10Wp	40,472		137%	57%	-
Solar Home Systems	11-20Wp	40,099		154%	1%	7%
	21-49Wp	7,495		482%	203%	-
	50-100Wp	8,621		172%	470%	92%
	100+Wp	-		-	-	-

⁴⁷ The sales of solar energy kits for July-December 2022 to East Asia and the Pacific presented in this report exclude units sold to China. This is usually not necessary. However this round several companies were unable to report sales to the country of destination where they will be sold by distributors and instead reported those sales to China. These sales are counted as part of Global sales.

East Asia & Pacific Insights

Countries Overview

Reported sales of solar energy kits in most countries in the region have historically been irregular and identifying patterns is difficult. Though Papua New Guinea sales seem to follow a seasonal trend.

Other countries where sales were reported this round include Fiji, Indonesia, Myanmar, the Solomon Islands and Vanuatu.

Off-grid solar appliances

12,392 units were sold between July and December 2022, a 90% increase compared to the first half of 2022, and a 21% increase compared to the second half of 2021. The off-grid appliance sector remains more nascent in the region and sales data does not indicate clear trends as of yet, other than showing that 97% of units are bundled and 84% were sold PAYGo. Among appliances reported this round, fans represent 79% of volumes, TVs 16%, and RUs and SWPs together represent the remaining 5% of sales.

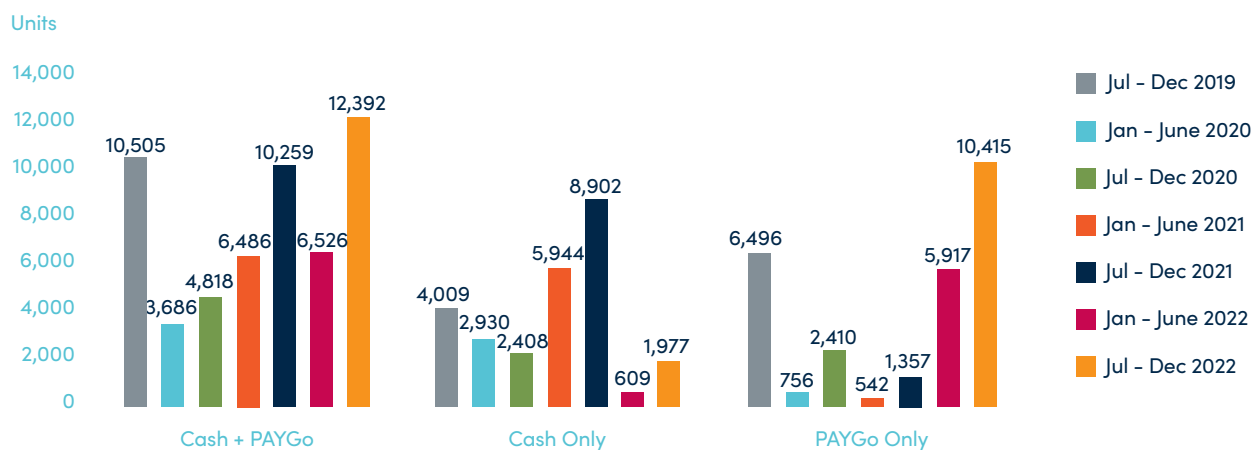
Table 15 – Semi-annual Evolution of Sales Volumes of Solar Energy Kits by Country – East Asia and the Pacific

Region / Countries	Jul-Dec 2022 volumes (Cash & PAYGo)	% change v. Jan-Jun 2022	% change v. Jul-Dec 2021
East Asia & Pac.	190,630	84%	3%
Papua New Guinea	113,512	109%	63%
Philippines	19,787	-4%	-39%

NOTE:

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

Figure 41 – Semi-annual Evolution of Sales Volumes of Key Appliances – East Asia and the Pacific



East Asia & Pacific Insights



Papua New Guinea Insights

Background

Despite being affected by increased food and energy prices, Papua New Guinea recorded a significant return to growth in 2022 on the back of increased agricultural exports and high commodity prices.

Papua New Guinea remains a fairly nascent market for off-grid solar. There are currently several donor programs supporting the sector:

- The 'Pawarim Komuniti' grant program set up by the Australian Department of Foreign Affairs and Trade (DFAT) began implementation in early 2021. However, further funding rounds of the project will focus on mini-grids.
- Further support is coming from the USAID-led Papua New Guinea Electrification Partnership (PEP) which was announced in November 2020. As part of this program, close to US\$800,000 have been dedicated to grants for off-grid solar.

Sales Trends

Off-Grid solar energy kit

Off-grid solar energy kit sales totaled 113,500 units in the second half of 2022. This represents a 109% increase in volumes compared to the first half of 2022. The data collection over the past few rounds has clearly seen the emergence of a seasonal trend with higher sales in the second half of the year.

3,077 units of appliance sales reported in Papua New Guinea during the second half of 2022, of which 36% consists of TVs sales.

Too few companies reported sales of other appliances to include the data in this report. Sales of fans, RUs and SWPs were reported.

Figure 42 - Semi-annual Evolution of Sales Volumes of Solar Energy Kits – Papua New Guinea

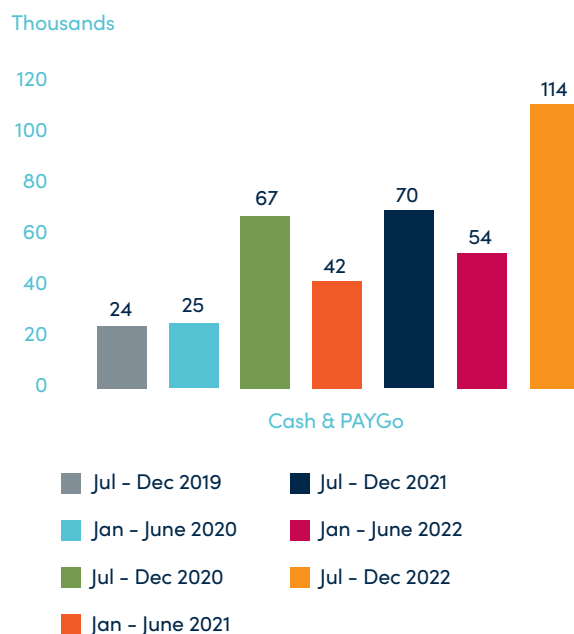
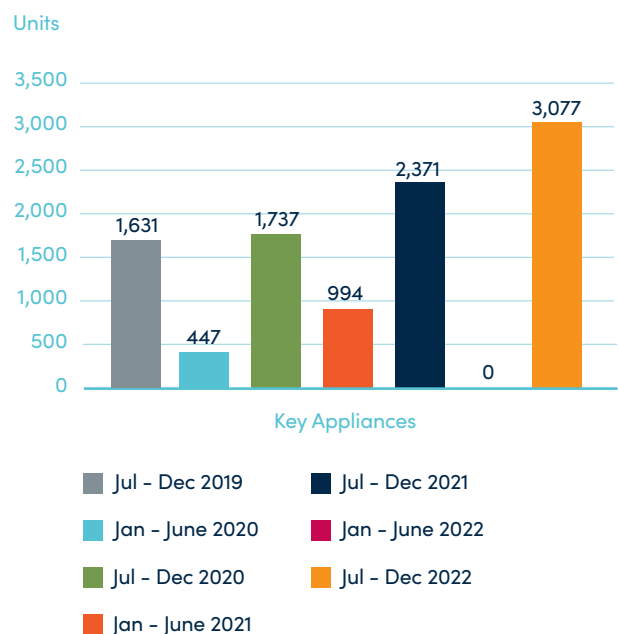


Figure 43 - Semi-annual Evolution of Sales Volumes of Key Appliances – Papua New Guinea



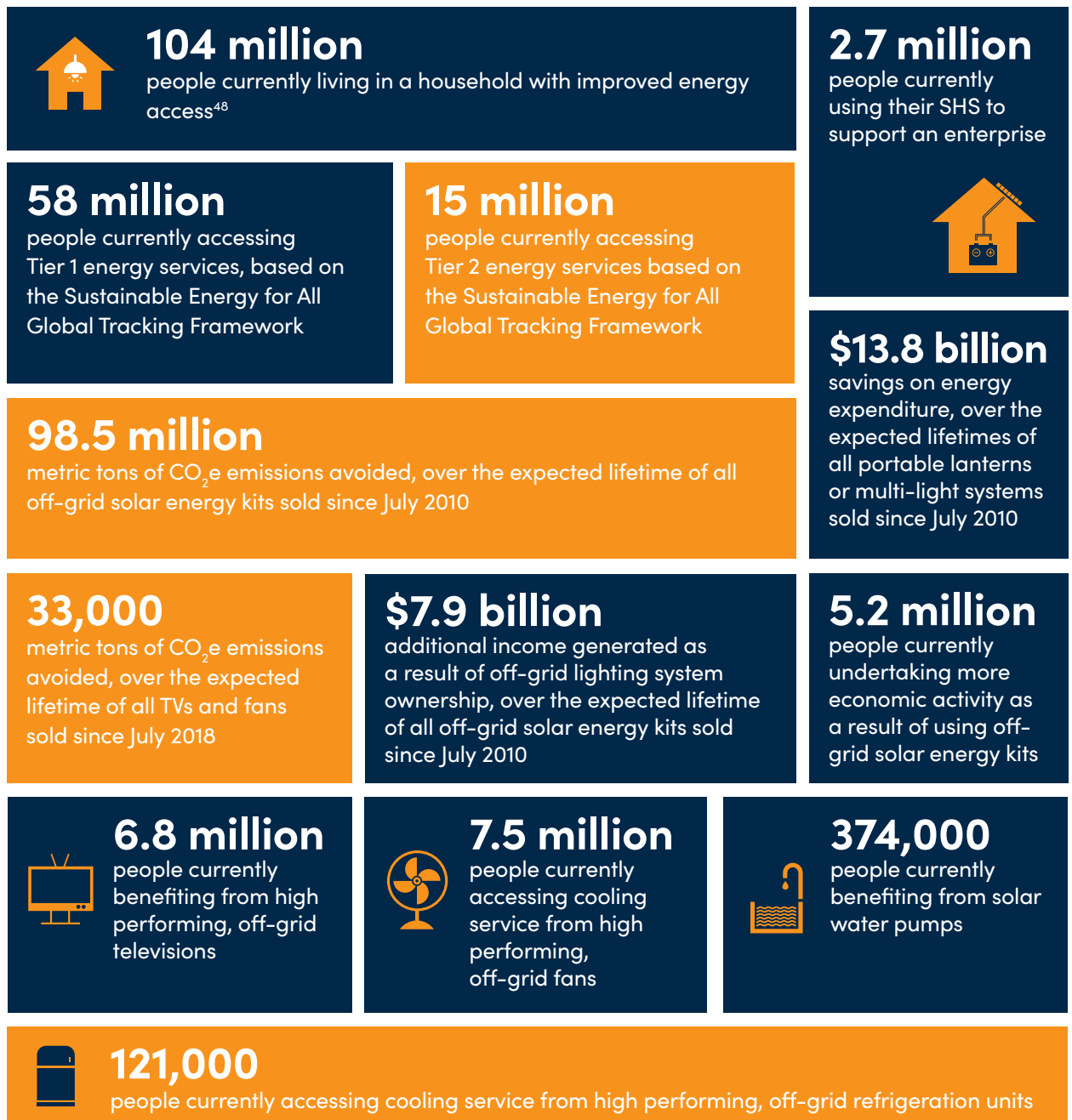
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**Global
Impact**

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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 419.6 million people based on sales reported to GOGLA alone. From these affiliate sales, 104 million people are currently benefiting from improved energy access through an off-grid solar product. Of these 104 million, 58 million are currently accessing Tier 1 systems and 15 million are accessing larger SHS, Tier 2, solutions⁴⁹.

The prolonged fall in sales volumes caused by the COVID-19 pandemic, along with past sales reaching their expected lifespan, had led to a stagnation in the number of people currently benefiting from energy access. The return to growth is translating into increased energy access again. However, to reach SDG7, the off-grid sector must play its part in not only reaching first time users, but also providing replacement products for existing off-grid solar customers⁵⁰.

Economic Impacts of solar energy kits

5.2 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 has led to US\$7.9 billion in additional income generated by customers since 2010. Coupled with the savings that smaller off-grid products, such as lanterns and multi-light kits, have created for households, the benefit to the finances of millions of low-income households is over US\$21.8 billion since 2010.

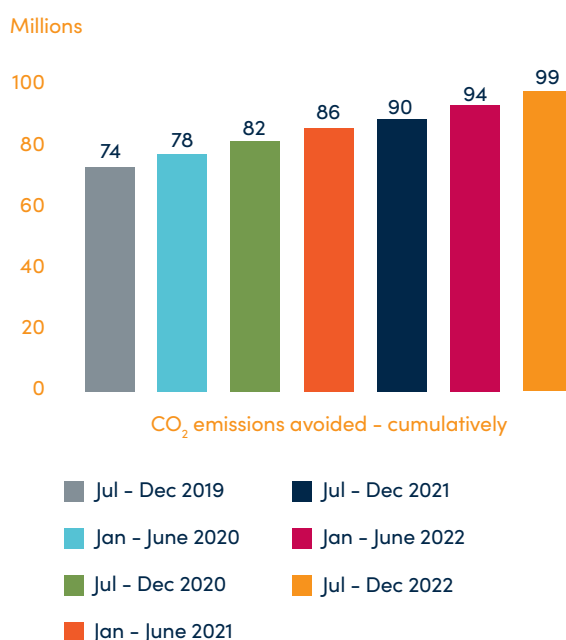
In particular, off-grid solutions are boosting economic opportunity across rural and peri-urban communities. An estimated 2.7 million small and micro-enterprises are currently supporting their activity with off-grid solar products. The majority of these are based in rural regions.

Environment & Air Pollution

Total CO₂e emissions avoided through kerosene replacement for lighting since 2010 (across product lifetime) now exceeds 98.5 million metric tons. This is the equivalent of taking 26 coal-fired power plants offline for a year⁵¹. 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 inhalation of kerosene can lead to respiratory illness, pneumonia and tuberculosis^{52&53} and that its most damaging effects are on women and children. Removing kerosene pollution from homes significantly improves air quality and health.

Emissions are also avoided when solar appliances replace appliances powered by diesel generators. Emissions avoided by high-performing fans and TVs since July 2018 are already close to 33,000 metric tons. This is equivalent to taking 7,110 petrol-powered cars off the road for a year⁵⁴.

Figure 44 – Semi-Annual Evolution of CO₂e Emissions Avoided Through Usage of Solar Energy Kits Cumulatively – World



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

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

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

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

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

Global Impact

Access to High-Performing TVs

An estimated 6.8 million people are benefiting from the use of off-grid TVs and they are being used in 132,000 businesses.

TVs and other communication devices, such as radios and mobile phones, provided vital access to access health information, educational programs and news during the pandemic, and they continue to both bring communities together, and connect them with important knowledge. An estimated 6 million people currently have improved access to information through news, current affairs and political programs they can access on their high-performing TVs sold by affiliates.

Access to High-Performing Fans

High-performing fans are currently benefiting over 7.5 million people and are being used within 38,000 businesses.

Predominantly sold in South Asia, off-grid fans are a critical 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 7 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 377,000 people are currently benefiting from access to a solar water pump sold by affiliates through agricultural outcomes or improved access to water.

























165,000 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 customers⁵⁵.































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Global Impact

Table 16 - 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	419.6 million	104.4 million	58.3 million	15.3 million
0-1.5 Wp	169.1 million 	26.1 million 	5.6 million 	
1.5-3Wp	155.8 million 	31.8 million 	25.5 million 	
3-10Wp	56.6 million 	21.1 million 	18.7 million 	0
11-20 Wp	13.6 million 	8 million 	7.5 million 	0.008 million 
21-49 Wp	9.5 million 	5.4 million 	1 million 	4 million 
50-100 Wp	10.9 million 	8.9 million 	0.3 million 	8.3 million 
100+ Wp	4.1 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	5.2 million	2.7 million	2.7 million	US\$ 7.9 billion
0-1.5 Wp	0.8 million 	0.5 million 	0.3 million 	US\$ 1.7 billion 
1.5-3Wp	0.9 million 	0.6 million 	0.3 million 	US\$ 1.5 billion 
3-10Wp	1.8 million 	0.8 million 	1.1 million 	US\$ 2.6 billion 
11-20 Wp	0.6 million 	0.2 million 	0.3 million 	US\$ 0.6 billion 
21-49 Wp	0.4 million 	0.1 million 	0.2 million 	US\$ 0.5 billion 
50-100 Wp	0.6 million 	0.2 million 	0.3 million 	US\$ 0.6 billion 
100+ Wp	0.2 million 	0.09 million 	0.1 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	112 billion	1,934	218
0-1.5 Wp	43.4 billion 	1,966 	-10
1.5-3Wp	40.9 billion 	2,040 	54 
3-10Wp	13.9 billion 	1,586 	158 
11-20 Wp	3.7 billion 	1,522 	296 
21-49 Wp	2.8 billion 	1,650 	727 
50-100 Wp	5.1 billion 	2,539 	560 
100+ Wp	2.1 billion 	2,786 	1,958 

Table continues on next page >

Global Impact















Product Categories	Change in energy spending - cumulatively	Change in energy spending - household	Kerosene lanterns replaced - currently	CO ₂ e emissions avoided - cumulatively
All categories	US\$ 13.9 billion	\$189	18.9 million	94.1 million
0-1.5 Wp	US\$ 7 billion 	\$199 	5.2 million 	37.7 million 
1.5-3Wp	US\$ 5.2 billion 	\$164 	6.3 million 	34.3 million 
3-10Wp	US\$ 1.6 billion 	\$213 	3.4 million 	11.8 million 
11-20 Wp	-	-	1.2 million 	2.9 million 
21-49 Wp	-	-	1.1 million 	2.5 million 
50-100 Wp	-	-	1.2 million 	3.2 million 
100+ Wp	-	-	0.5 million 	1.6 million 






NOTE:

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

Global Impact

Table 17 – 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/ household currently accessing off-grid appliances through flexible financing	Tonnes of CO ₂ e emissions avoided – cumulative
TVs	8,598,771 	6,771,902 	1,160,722 	19,728 
Fans	14,340,456 	7,527,471 	263,263 	13,707 
RUs	164,974 	120,938 	10,770 	Unavailable
SWPs	377,360 	374,221 	32,918 	Unavailable

Appliance types	Number of people currently using their appliances to support enterprise	Number of people currently generating additional income	Number of people accessing information through TV – cumulative	Number of people who are currently experiencing improved thermal comfort
TVs	131,920 	58,631 	6,026,993 	N/A
Fans	43,220 	Unavailable	N/A	7,075,823 
RUs	Unavailable	Unavailable	N/A	N/A
SWPs	Unavailable	Unavailable	N/A	N/A

NOTE:

- 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 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 and “Unavailable” where the metric is applicable but is not yet available as part of this data collection and reporting exercise.

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Methodology of Sales Data Collection

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Methodology of Sales Data Collection

General

Overview

Every six months, GOGLA with support from Lighting Global, the Efficiency for Access coalition (the Partners) and Berenschot collect 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 categorized as manufacturers is presented. Data published in this report is mostly aggregated sales volumes 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 mark-up 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 Standardized Impact Metrics for the Off-Grid Solar Energy Sector,⁵⁶ the Standardized Impact Metrics for High-Performing Appliances: Fans and TVs⁵⁷ and the Off- and Weak-Grid Appliances Impact Assessment Framework⁵⁸.

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 installments over time or pays for 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 are selling other companies' branded products, or as manufacturers when they are selling 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..

Scope

Participating companies

This report solely includes data on products sold by affiliates. Affiliates are companies connected to the partner organizations 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) program. **80 companies participated in this round and reported sales covering the period July-December 2022.** Among them 46 reported sales for both solar energy kits and appliances, 16 just for Solar energy kits and 17 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.

⁵⁶ GOGLA, *Standardised Impact Metrics for the Off-Grid Solar Energy Sector*.

⁵⁷ CLASP, *Standardised Impact Metrics for High-Performing Appliances: Fans and TVs*.

⁵⁸ Efficiency for Access, *Off- and Weak-Grid Appliances Impact Assessment Framework*.

Methodology of Sales Data Collection

Table 18 - List of Participating Companies

#	Company Name	Off-Grid Solar Lighting	Off-Grid Solar Appliances	#	Company Name	Off-Grid Solar Lighting	Off-Grid Solar Appliances
1	Afreesun Limited	MAN	-	42	OmniVotac Energy Solutions Company Limited	MAN	MAN
2	Agsol Kenya Ltd	-	MAN	43	Oolu Solar	DIS	DIS
3	Alternative Energy Technologies Group (Altech Group)	DIS	DIS	44	PEG Africa	DIS	DIS
4	ARESS	DIS	-	45	Plug The Sun Limited	MAN	-
5	BAOBAB+	DIS	DIS	46	Powerlive Zimbabwe	DIS	DIS
6	Barefoot Power	MAN	MAN	47	Qotto	MAN&DIS	MAN
7	Bboxx Ltd.	MAN&DIS	MAN&DIS	48	RDG Collective	MAN&DIS	MAN&DIS
8	BEEBEEJUMP TECHNOLOGY CO LTD	MAN	MAN	49	RECAPO Solar Systems	DIS	DIS
9	BioLite	MAN	MAN	50	SelfChill	-	MAN
10	Bonergie SARL	DIS	DIS	51	SHENZHEN JCN NEW ENERGY TECHNOLOGY CO.,LTD	MAN	-
11	Bright Products AS	MAN	-	52	SHENZHEN POWEROAK NEWENER CO.,LTD	MAN	MAN
12	Clamore Solar	-	MAN	53	Shenzhen Power-solution Ind.. Ltd.	MAN	MAN
13	d.light design. Inc.	MAN	MAN	54	Shenzhen Solar Run Energy Co.. Limited	MAN	MAN
14	Davis & Shirliff Ltd.	-	MAN	55	Sinoware Technology Co.. Ltd	MAN	-
15	Deevabits Green Energy Ltd	DIS	-	56	Smarter Grid International	MAN	MAN
16	Devidayal Solar Solutions Pvt. Ltd.	-	MAN	57	Solar Panda	MAN	MAN
17	Earth Technologies	MAN	-	58	Solar Sister	DIS	DIS
18	Easy Solar (Azimuth)	DIS	DIS	59	Solar Village AS	MAN	MAN&DIS
19	Energy + SA	DIS	DIS	60	SolarHome	DIS	DIS
20	ENGIE Energy Access	MAN	MAN	61	SOLARNOW	-	DIS
21	ennos ag	-	MAN	62	SolarWorks! BV	DIS	DIS
22	FINCA PUS LLC T/A BrightLife	DIS	DIS	63	Spark	MAN	MAN
23	Fosera Solarsystems GmbH & Co. KGaA	MAN	MAN	64	Starco Fans	-	MAN
24	FUTUREPUMP LIMITED	-	MAN	65	StarTimes Solar	MAN	MAN
25	GLOBAL ICE TEC AG	-	MAN	66	SunCulture	MAN	MAN
26	Goodbook Investments/ Kumusha Power	DIS	-	67	SunDanzer	-	MAN
27	Green Scene Energy PLC	DIS	DIS	68	SUNKEN LIMITED	-	DIS
28	GREENLIGHT PLANET INCORPORATED	MAN	MAN&DIS	69	Sunny Irrigation Ltd	-	DIS
29	JUA Energy Company Limited	MAN	MAN	70	SunnyMoney (SolarAid)	DIS	DIS
30	Khursheed Fans	-	MAN	71	Super Star Renewable Energy Limited	MAN	MAN&DIS
31	Koolboks	-	MAN	72	Tamoor fans	-	MAN
32	Lagazel	MAN	-	73	The Sure Chill Company	-	MAN
33	LIB Solar	DIS	DIS	74	TotalEnergies Offgrid Solar Solutions SAS	MAN&DIS	DIS
34	Lightbox Africa SA	DIS	DIS	75	Tozzi Green S.p.A.	MAN	-
35	LittleSun GmbH.	MAN	-	76	Villageboom	MAN	-
36	M-KOPA	MAN	MAN	77	VITALITE Senegal	DIS	DIS
37	Namene Solar Lights Limited	MAN	-	78	X-Solar Systems Ltd.	MAN	DIS
38	Natfort Energy	DIS	DIS	79	Zimpertec GmbH & Co KG	MAN	MAN&DIS
39	NIWA	MAN	-	80	Zola Electric	MAN	MAN
40	Offgridsun	MAN	MAN				
41	OKRA SOLAR PTY LTD	MAN	-				

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.

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.

Methodology of Sales Data Collection

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) provides a range of 20% to 50%⁵⁹.

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 groups⁶⁰. Sub-regional groupings in Sub-Saharan Africa follow the United Nations' categorization of geographical sub-regions⁶¹.

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 signaled 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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⁵⁹ Lighting Global, ESMAP, Efficiency for Access, GOGLA and Open Capital Advisors, *Off-Grid Solar Market Trends Report 2022: State of the Sector Report*, 2022.

⁶⁰ World Bank, *World Bank Country and Lending Groups*.

⁶¹ United Nations Statistics Division, *Standard Country or Area Codes for Statistical Use (M49)*.

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