GOGLA

The Voice of the Off-Grid Solar Energy Industry

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

July - December 2021, Public Report

LIGHTING GLOBAL
Catalyzing markets for modern off-grid energy

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Energy Sector Management Assistance Program

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Executive Summary

In the second half of 2021, the off-grid solar industry continued its recovery from the COVID-19pandemic. Although this has overall been slower than originally hoped, some segments of the market are now back on an overall upwards trajectory. Underneath these general trends, however, remain large disparities between individual markets.

The global highlights from the sales data presented in this report paint a cautiously positive picture of an industry on a slow path to recovery despite headwinds including supply chain disruptions, increased costs and lower ability to pay among consumers in key markets. Looking beyond the headline figures reveals that there is in fact a vast disparity of trends in each country, product category, business model or individual company. Yet, whether at the global or granular level, one fact remains clear, the number of sales still lag behind the amount needed for the off-grid sector to maximize its contribution to meeting SDG7: electrification for all.

This report, based on sales data from off-grid solar and energy efficient appliance manufacturers affiliated to GOGLA[1], provides data and insights on observable trends at a global, regional and country-level every six months. Key takeaways from this edition include:

- **Global sales volumes of lighting products (solar lanterns, multi-light systems and solar home systems) for the second half of 2021 reached almost 4 million units.** This is a 15% increase in volumes compared to the first half of 2021 though still 10% below where global volumes stood during the second half of 2019 before the pandemic.

- **While both cash and PAYGo sales have grown compared to the previous data collection round, PAYGo has been the main driver of the upwards trend in 2021, well surpassing 2019 levels.** Volumes recorded for PAYGo increased by 27% compared to the first half of 2021 (then already the highest ever recorded) to exceed 1.5 million units. A main contribution to this growth is a shift towards more sales of PAYGo solar lanterns.

- **Regional trends highlighted in the previous report confirm sharp contrasts between key markets.** South Asia, primarily driven by India, sees a 19% increase in sales compared to the first half of 2021. However grid expansion means that a return to pre-COVID sales volumes is not expected. East Africa recorded a 4% increase in sales compared to the first half of the year. Although this was driven by smaller markets in the region, with Kenya recording a 21% dip. West Africa, driven by Nigeria, recorded an overall 23% increase in sales, but most West African countries reported decreased sales compared to January-June 2021.

- **Companies have fared very differently over the past year depending on a variety of factors, including the product type, their business model and their ability to raise funds.** Data shows that 50% of companies that reported lighting product sales two years ago and for July - December 2021 have seen a significant increase in the volume of products sold, while 48% saw a significant[2] decrease.

- **Global sales for key appliances decreased by 20% compared to the first half of the year, to 338,000 units sold between July - December 2021.** This is mainly driven by lower reported sales of fans in key Asian markets, but also by stagnation in TV sales - particularly driven by lower sales in Kenya, the largest market for this appliance. The relatively smaller sales volumes of productive use equipment (such as solar water pumps and refrigeration units) continued to contribute marginally to the total number of appliances sold.

We encourage readers to delve into the full report to better understand how trends vary across markets. Below we expand on these headlines with an overview of key data points for global and regional analysis.

Globally, close to 4 million units of off-grid lighting products were sold between July and December 2021. Among lighting products:

- Solar lanterns (0-3 Wp) have experienced a 15%

1 See detailed methodology here.
2 More than 5% variation

Executive Summary

increase in sales after three years of declining sales and reached 2.5 million units sold.
- Multi-light systems (3-10 Wp) sales reached close to 795,000 units sold, an 18% increase on the previous reporting round.
- Solar Home Systems (>11Wp) recorded a slightly more moderate 8% increase in sales volumes with 656,000 units sold.

Aggregated sales of all key off-grid appropriate appliances (TVs, fans, refrigeration units and solar water pumps) **reached 338,000 units**. Key observations among this group of appliances:
- TVs had the largest sales volumes with almost 196,000 units sold, a 1% increase on the previous reporting round.
- Fan sales fell 38% compared to the previous reporting round and landed at 134,000 units sold.
- SWP sales were fairly stable (+3%) with approximately 6,600 units sold.
- RUs, typically low in sales volume, recorded a further 45% fall in sales volumes with 2,200 units sold.

Key regional markets have fared very differently over the last two years, and this continues to be true this round.

In East Africa, sales of lighting products reached just over 2 million units sold, a 4% increase compared to the first half of 2021. This moderate growth hides very different country-level trends with decreasing sales in the region's largest markets Kenya and Ethiopia, while countries including Malawi, Mozambique and Zambia reported strong increases in volumes sold. **Key appliance sales for East Africa shrank by 5% to 123,000 units sold.** As usual for the region, TVs continued to represent the overwhelming majority of volumes, and the contraction in the wider Kenyan off-grid market plays a key role in this drop. The region recorded particularly low sales of refrigeration units (449) and relatively stable SWP sales (4,400).

In West Africa, total lighting product volumes increased by 23% compared to the previous reporting round reaching 586,000 units sold.

As mentioned previously, this growth is driven by a fast growing Nigerian market which recorded a 62% growth in sales volumes. Although representing lower volumes overall, SHS saw particularly high sales increases compared to the first half of 2021.In West Africa, Nigeria represented 66% of all lighting product sales. **Key appliance sales remained fairly stable (+2%) with 95,000 units sold.** TV and fan sales both remained fairly stable, respectively reaching 57,000 and 36,000 units. Over 1,000 RUs and over 1,200 SWP sales were also reported. While Nigeria is a large market for appliances too, it only represents 40% of key appliance volumes in West Africa.

In South Asia, a total of 481,000 lighting products have been sold, a 19% increase compared to the first half of the year. This is largely driven by early signs of recovery in India. Reported sales in Bangladesh and Pakistan were lower (in part due to low company participation in the data collection in Bangladesh). **Key appliance sales in South Asia decreased by 51% compared to the previous reporting round with 84,000 units sold.** This decrease is largely driven by lower fans sales in key markets as fans represent 99% of appliance sales in South Asia between July and December 2021.

The sales data shared by companies is translated into impact through the GOGLA standardized impact metrics[3]. **Since 2010, 380 million people have benefited from improved access to energy through off-grid lighting products and 90 million metric tons of CO_2e have been avoided** - the equivalent of taking 24 coal plants offline for a year. Additionally, emissions avoided through the use of high-performing fans and TVs since July 2018 are already above 22,000 metric tons. This is equivalent to the CO_2e emissions from burning 121 railcars worth of coal[4].

Despite off-grid solar solutions providing the fastest and most affordable way to electrify hundreds of millions of people, the reversal in the growth of the off-grid solar market has led to an estimated 8 million additional people missing out on improved energy access in the last six months alone[5].

3 More information here.
4 United States Environmental Protection Agency (2021), Greenhouse Gas Equivalencies Calculator.
5 High level estimates based on access rates if sales numbers had risen by the same 13% increase as they did between 2018 and 2019, using the Standardised Impact Metrics. Low level estimates based on sales having remained stable at 2019 levels.

Executive Summary

Overall, the industry is showing signs that it is rebuilding, despite the reduced customer ability to pay, inflation and disrupted supply chains. However, as highlighted in previous reports, behind the headline figures, the picture is highly complex with some off-grid solar companies returning to growth while others struggle to regain their level of activity. While the sector's foundations remain stable, the game-changers needed to regain and surpass pre-COVID growth remain elusive. They will need to be unlocked to ensure a basic level of energy service for all by 2030.

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About the Report

Authors

GOGLA

GOGLA is the global association for the off-grid solar energy industry. Established in 2012, GOGLA now represents over 200 members as an independent, not-for-profit industry association. Its mission is to help its members build sustainable markets, delivering quality, affordable products, and services to as many households, businesses and communities as possible across the developing world. The products and solutions that GOGLA members sell transform lives. They improve health and education, create jobs and income opportunities, and help consumers save money. To find out more, go to www.gogla.org

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 17 Donor Roundtable Members, 17 Program Partners, and more than 30 Investor Network members. Current Efficiency for Access Coalition members have programs and initiatives spanning 44 countries and 22 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 specialses 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.

Global Insights

Global Insights

Background

The last two years have been dominated by the COVID-19 pandemic and its effects on global health and the economy. While the entire world has been affected by the pandemic, low income countries, and the most vulnerable within these countries will have most particularly felt the economic impact. Surveys show the poorest households in the world are also those that, on average, saw the largest relative income losses in 2020 and 2021[6]. Economic outlooks for emerging and developing markets also forecast a slow and fragile recovery[7] - slower than in advanced economies. The consequence for years to come will be increased global inequalities and a struggle to compensate for the unraveling of years of progress on economic development in the Global South[8&9].

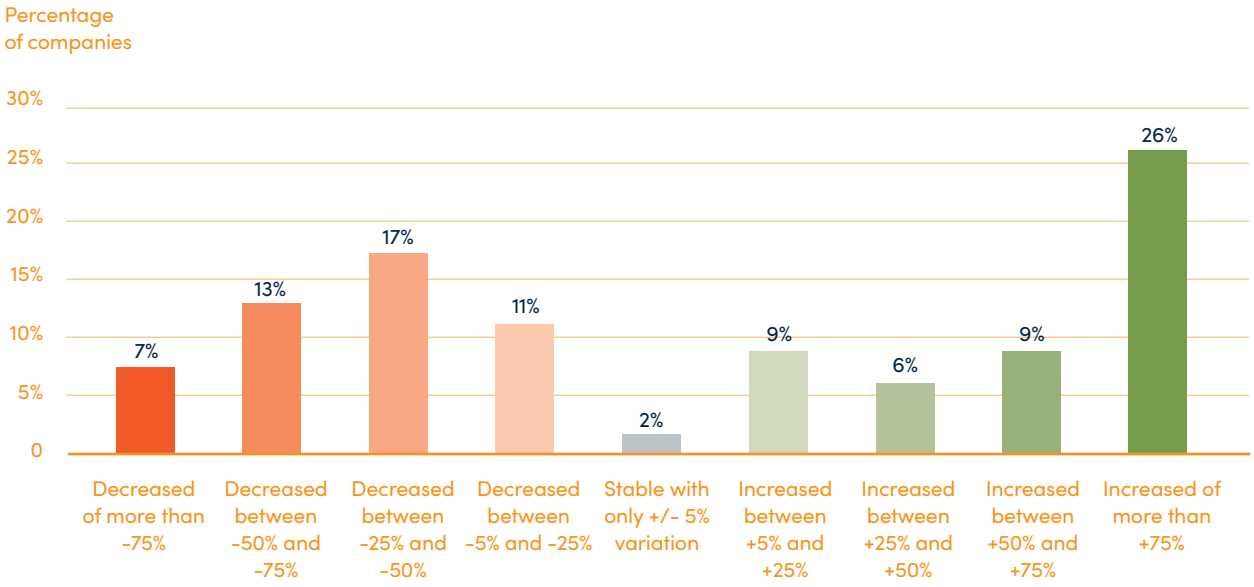
The global economy, including developing markets, began to recover in 2021. Yet, the off-grid solar industry remained affected by the aftermath of the pandemic. As highlighted in previous reports, the pandemic has caused adverse effects on both supply and demand for the industry. In 2020, issues were often linked to restrictions affecting companies' ability to operate or potential customers' ability to go out and purchase products. **In 2021, it is the disruption of supply chains, rising prices and slow recovery of income losses[10] that have slowed the growth of many off-grid solar companies.**

Despite these challenges, the industry as a whole continues on a path to recovery. Yet, as highlighted previously, this recovery is uneven and companies have fared very differently over the last two years as shown in the chart below.

The chart shows that 50% of companies reporting sales data both in the second half of 2019 and in the second half of 2021 have reported significantly higher sales than before the pandemic, with 26% of companies reporting a sales increase of more than 75%. Conversely, 48% of companies are still reporting significantly lower sales.This is an improvement from our report for the earlier half of 2021, in which 57% of reporting companies reported lower sales. This highlights that while there is a progressive improvement of the sector's performance, companies have had unequal experiences over the last 24 months, with some back on a firm recovery trajectory whilst others are still grappling with significantly lower sales levels.

The sector, with support from development partners, investors and other stakeholders has proven resilient through-out the crisis and

Figure 1 - Variation in Off-Grid Lighting Product Sales Volumes between July-December 2019 and July-December 2021 for Energy Access Companies[11] - World



6 World Bank (2021), COVID-19 leaves a legacy of rising poverty and widening inequality
7 World Bank (2022), Global Economic Prospects
8 https://blogs.worldbank.org/opendata/updated-estimates-impact-covid-19-global-poverty-turning-corner-pandemic-2021
9 World Bank (2021), COVID-19 leaves a legacy of rising poverty and widening inequality
10 World Bank (2021), 2021 Year in Review in 11 Charts: The Inequality Pandemic
11 Bespoke analysis of the sales volumes of off-grid solar manufacturers and distributors reporting in H2 2019, and H2 2021.

remains bullish. 2021 has seen the sector's total sales slowly head towards recovery and has seen the sector receive a record level of investment. However, access to funding is also unevenly distributed within the sector, with a high degree of concentration amongst a few companies, while for many companies access to finance remains a critical challenge.

Understanding the off-grid solar market requires looking beyond the global highlights. This report strives to achieve this by providing granular data and complementing it with qualitative insights from companies and partners in the field. While this report is the most comprehensive source of data on off-grid solar sales, we remind readers that information presented in this report is collected from manufacturers of off-grid lighting products and appliances affiliated to GOGLA, and does not represent the entire market.

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. For the period July-December 2021, 96 companies took part in the January data collection. Among them, 19 companies reported no off-grid product sales over the last six months. Feedback from companies points to supply chain issues as a key factor as well as lower demand for larger SHS or stand-alone appliances due to rising costs and lower ability to pay.

Analyses in this report are based on sales reported by manufacturers[12] 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[13].

Data 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 in reaching Sustainable Development Goal 7[14].

Market trends beyond affiliates

For a deeper understanding of industry trends, the World Bank and GOGLA will publish the Off-Grid Solar Market Trends Report in 2022. The report will look into key trends in the overall industry beyond just affiliates and beyond sales and impact data. The report will explore multiple aspects of the sector's evolution, in particular since 2020: progress made on Sustainable Development Goal 7, evolutions in pricing, business models, technologies, access to finance, company performance, policy, etc.

12 66 manufacturers reported sales data for the period July-December 2021.
13 As of 2020, affiliates were estimated to represent 28% of the global off-grid solar market. See methodology annex for more details.
14 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 lighting product and off-grid appliance sales reported by participating affiliates[15] in the period between July 1st and December 31st 2022.

Lighting Products Sold

3.97 million
off-grid solar lighting products

2.44 million
have been sold as cash products

1.53 million
sold via Pay-As-You-Go (PAYGo)

2.52 million
portable lanterns

795,000
multi-light systems

656,000
solar home systems (SHS)

34.6 MW
newly installed capacity globally through the off-grid solar lighting products

Appliances

196,000
TVs sold

134,000
fans sold

2,200
refrigeration units sold

6,600
solar water pumps sold

200,000
radios sold

17,000
other appliances[16]

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

16 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, the main appliance types included are hair clippers, cookstoves and speakers.

Global Insights

Off-grid lighting products

Global affiliate sales of lighting products between July and December 2021 stand at almost 4 million units. This is a 15% increase compared to the first half of 2021. Before COVID-19, global sales reached 4.4 million units in the second half of 2019. While global volumes remain 10% lower than this pre-COVID benchmark, it is the first time in two years that sales are close to pre-pandemic volumes.

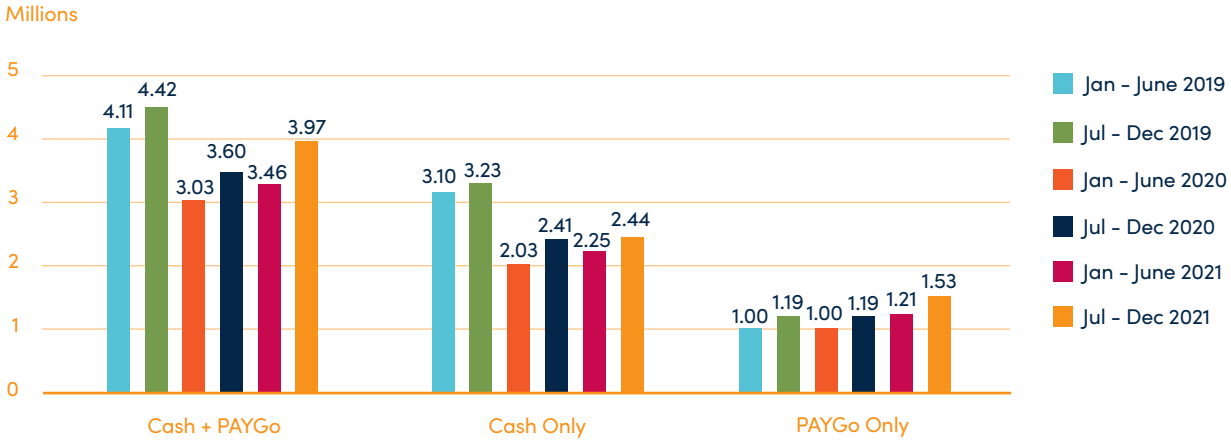
Of the 4 million units sold, 2.44 million were sold cash and 1.53 million products were sold PAYGo.

Cash sales have increased by 8% compared to the first half of 2021, but are still 25% lower than the 3.1 million units sold in the second half of 2019. The global value of cash sales for the first half of 2021 is close to US$60 million[17]. Despite cash sales having increased compared to the previous round, the total value of cash sales has decreased due to lower cash sales of SHS. Anecdotal evidence points at bulk procurements having contributed to higher cash sales of SHS in the first half of 2021.

PAYGo sales have grown by 27% compared to the first half of 2021 and are now 28% higher than in the second half of 2019. The global value of products sold via PAYGo between July and December 2021 is close to US$243 million[18]. This growth has been in part enabled by growing sales of PAYGo solar lanterns (1.5-3 Wp). PAYGo lantern sales have grown 121% over the last two years while PAYGo multi-light and SHS sales grew by just 9% compared to the second half of 2019. **This evolution in the product portfolio is a factor in understanding why the total value of products sold by PAYGo affiliates grew more slowly (+15%) than the volume.**

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

Figure 2 - Semi-annual Evolution of Volumes of Lighting Products Sold - World



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

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

Global Insights

Benchmarking against 2019

Due to the effects of COVID-19 on the global economy and the sector in particular, this report series will attempt to keep track of the sector's recovery by benchmarking the most recent data to the sales reported in 2019 in addition to comparing to the previous round of reporting.

Solar lanterns

Solar lanterns are still very much the backbone of the sector, with total sales of 2.5 million. This represents a market share of 63% of all off-grid solar product sales. As a percentage of the total sales, portable lanterns have been on a slowly decreasing trajectory from 70+% since 2018. In absolute terms, lantern sales have increased 15% compared to the first half of 2021, but remain 10% lower than during the second half of 2019.

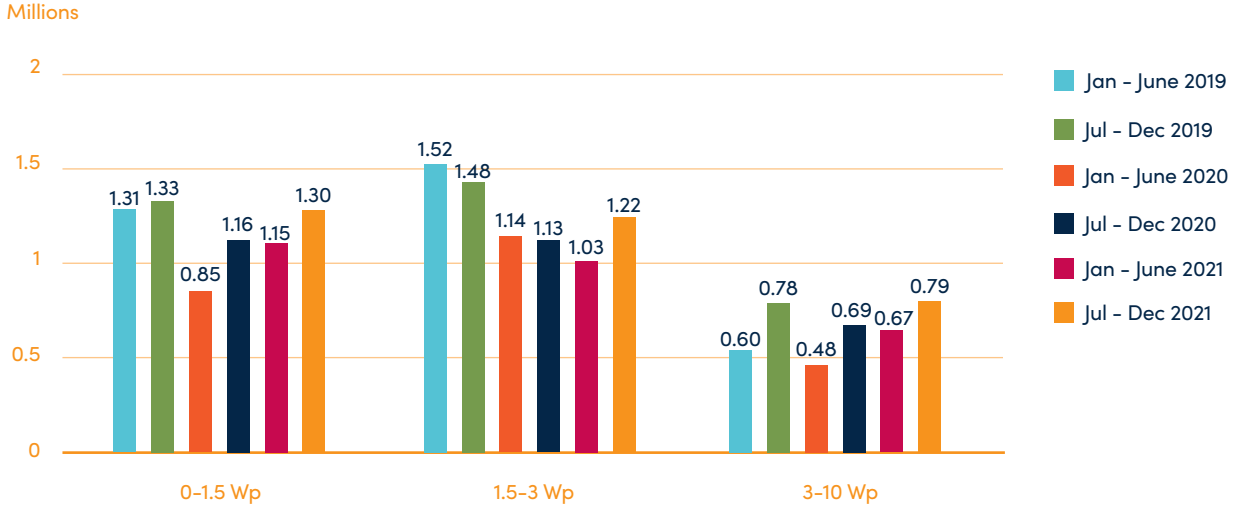
- **Sales of the smaller 0-1.5 Wp lanterns have increased by 13% compared to the first half of 2021[19] to 1.3 million, close to the 1.33 million units sold in the second half of 2019.**
- **Larger 1.5-3 Wp lanterns have seen sales grow by 18% compared to the first half of 2021 after experiencing continually declining sales since 2018.** Over 1.2 million units were sold in the second half of 2021. **A key trend in this product category is the growing importance of PAYGo.** PAYGo sales grew by 121% over two years, from representing 14% of volumes in the second half of 2019 to 38% in the second half of 2021. Over the same period, cash sales decreased by 41%

Multi-light systems

Sales of multi-light systems reached 795,000 units between July and December 2021. This represents 20% of total global sales and an 18% increase compared to the first half of 2021.

After falling to below 500,000 units sold in the first half of 2020, sales in this category are now 1% higher than during the second half of 2019. Both PAYGo and cash sales have grown (22% and 14% respectively) compared to the first half of 2021.

Figure 3 - Semi-annual Evolution of Global Sales Volumes by Lighting Product Category (0-10Wp) - World



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. Solar home systems >11 Wp are classified based on panel wattage.

19 Compared to the previous reporting round, one product reference has been reclassified from 1.5-3 Wp to 0-1.5 Wp. This has had a limited impact on global sales volumes by product category. The report will highlight where the impact of that reclassification needs to be taken into account.

Global Insights

Lanterns 0-1.499 Wp include one light and no mobile charging, lanterns 1.5-2.999 Wp one light and mobile charging, and multi-light systems 3-10.999 Wp at least two lights and mobile charging. Solar home systems >11 Wp are classified based on panel wattage.

Solar Home Systems (SHS)

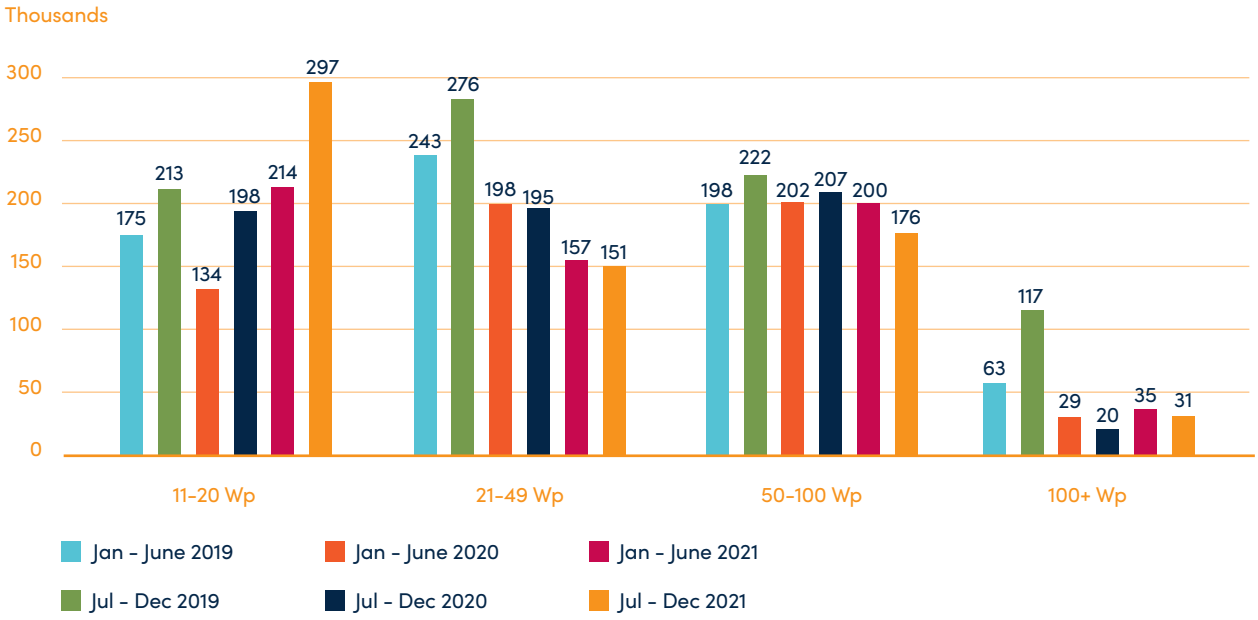
The very broad category of SHS, comprising all products of 11 Wp and higher[20], with a wide variety of price points, recorded sales of 656,000 units in the second half of 2021. Sales have grown by 8% compared to the previous six months period but are still 21% lower than total volumes sold in the second half of 2019, before the COVID-19 pandemic.

94% of all SHS sold between July and December 2021 were sold on a PAYGo basis. In the first half of 2021 the share of SHS sold PAYGo had fallen to 74% due to bulk cash purchases in Asia.

Within the SHS category, large products have fared relatively poorly:

- 11-20 Wp sales have grown 39% compared to the first half of the year and are now 40% higher than in the second half of 2019.
- 21-49 Wp sales have decreased by 4%. This is in part due to bulk purchases of cash products in this category during the first half of 2021, which led to a spike in that reporting period. PAYGo sales recorded a 9% increase. However, sales for the category remain 45% lower than during the second half of 2019.
- 50-100 Wp sales volumes have decreased by 12% compared to the first half of 2021 and are now 20% lower than during the second half of 2019
- 100+ Wp sales have also decreased by 12%, but are now 73% lower than during the second half of 2019 where a peak 117,000 units were reported to be sold

Figure 4 - Semi-annual Evolution of Global Sales Volumes by Lighting Product Category (11-100+Wp) - World



20 The largest systems included exceed 350 Wp.

Global Insights

Off-grid solar appliances[21]

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[22]. These are currently regarded as: TVs, fans, RUs and SWPs. These are collectively referred to as "key appliances" when reported in aggregate, and these separate appliances are reported individually where sufficient sales warrant it.

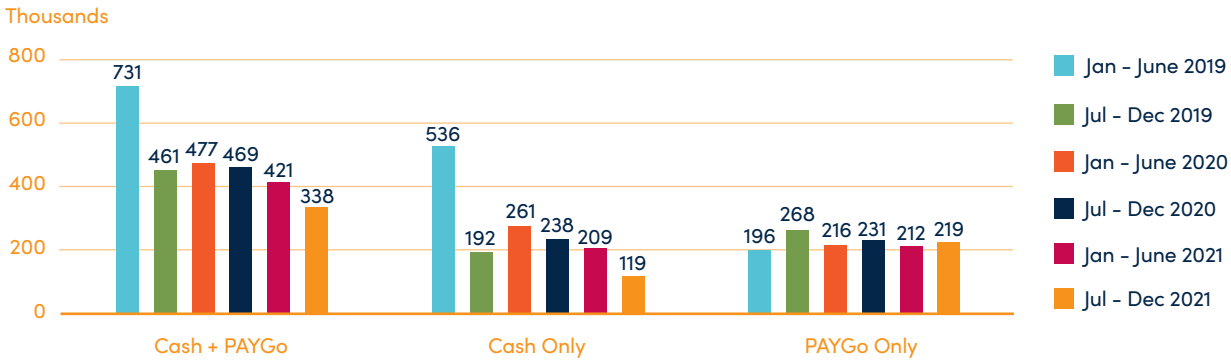
Between July and December 2021, affiliate companies reported total global sales of 338,000 units of the key appliances represented in this report. TVs represented 58% of these sales, with 196,000 units. This was followed by fans with 144,000 units (40% of the global total). SWPs and RUs represented 2% and 1% of these off-grid appliance global sales, with 6,600 and 2,200 units, respectively.

The total volume of key appliances sold between July and December 2021 is the lowest reported since the second half of 2018, the first time appliances data was published. The decrease in volumes is particularly tied to a drop in cash sales, while PAYGo sales have proved more resilient for appliances since the beginning of the pandemic. Several factors can explain this decrease. Insights from the industry point to seasonality and increased prices for fans in South Asia as a key factor. Anecdotal data collected for fans in Nigeria by the Efficiency for Access Coalition also points to significant price increases between 2018 and 2020[23]. Additionally, though anecdotal, industry insiders have indicated that this is at least partially a reflection of the declining sales of SHS which are often sold bundled with TVs, fans and even refrigerators. Information shared by the industry also highlights that TVs have been particularly affected by supply chain issues, such as chip shortage and increased costs of LCD display panels, leading to product shortages and increased prices[24]. Coupled with higher shipping and freight costs, sales are likely to be affected. Additionally, the general economic downturn in consumer spending is likely associated with suppressed purchases of the larger stand-alone and productive appliances.

The appliance segment was at a nascent stage prior to the pandemic, and significant growth was hoped for in 2020 and 2021. While the growth that was anticipated before the COVID-19 crisis has understandably not materialized, this segment has also shown clear signs of resilience and increasing maturity in terms of business model diversification. It is also recognizing that donor support is essential in driving and stabilizing sales of productive uses of stand-alone solar power.

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

Figure 5 - Semi-annual Evolution for Key Appliances sales volumes - World



NOTE:

- The category 'Key Appliances' refers to the sum of all TVs, fans, SWPs and RUs.
- 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.

21 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.

22 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.

23 Efficiency for Access Coalition (2021), Off- and Weak-Grid Appliance Market: Nigeria.

24 GOGLA (2021), Off-grid Solar Supply Chain Disruption: 87% of manufacturers expect increased prices.

Televisions

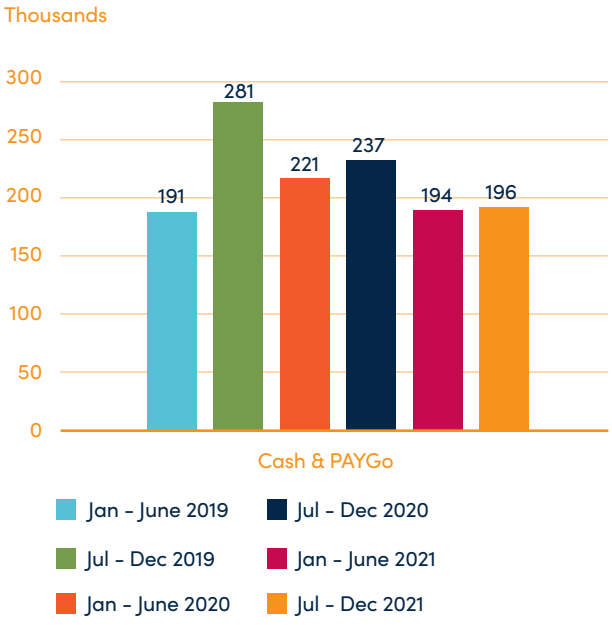
TVs recorded 196,000 units sold in the second half of 2021. This represents a 1% increase compared to the first half of 2021. Sales had reached a peak of 281,000 units sold in the second half of 2019 and had remained above 200,000 in both reporting rounds in 2020.

During the immediate impact of the COVID-19 crisis in 2020, anecdotal industry reports credited the resilience and sometimes growth in TV sales partly due to their purchase to ensure access to timely information and entertainment during lockdowns by SHS owners who could afford it. However, this is the main appliance that has reported being particularly affected by supply chain disruption caused by the COVID-19 pandemic.

Reported TV sales mainly occur in Sub-Saharan Africa which is a market where household appliance sales are often strongly linked to the SHS market and often sold bundled with systems or 'up-sold' to existing system owners. Therefore it is logical that 99.5% of TVs are sold as PAYGo, with 84% being sold bundled with a power system.

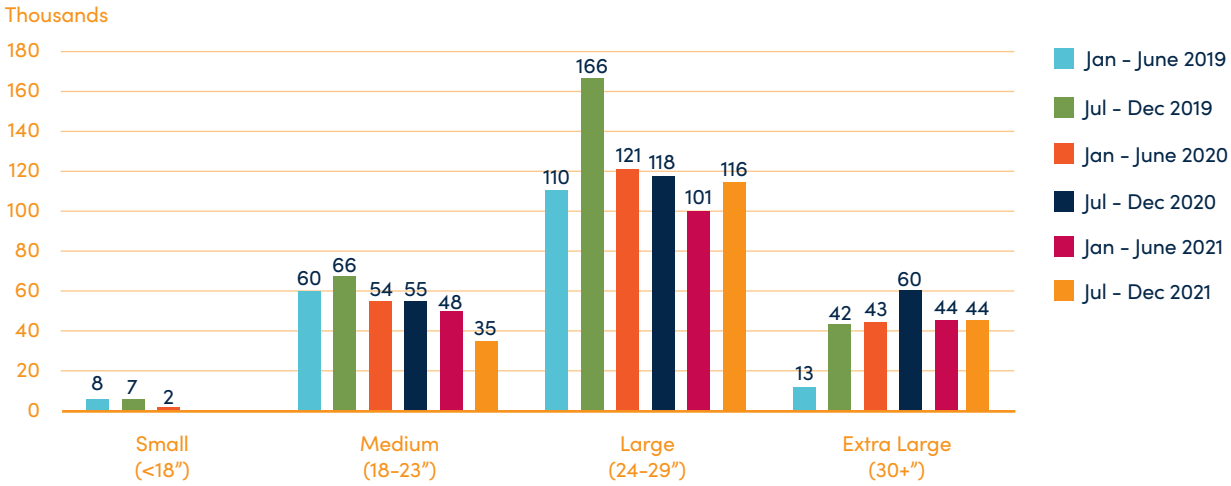
In terms of the diversity of product categories, the majority of TVs sold fall in the large category (24-29") with 116,000 units. These are followed by extra-large (30+") TVs[25] with 44,000 units sold and then medium TVs (18-23") with 35,000 units. Overall the market is moving away from small TV sizes towards larger models. This reporting round, medium TV sales decreased by 27% while large TV sales increased by 15%. Extra-large TV sales have remained stable. High sales of large TVs are a reflection of efficiency gains on larger TVs electricity consumption, which is now similar to that of smaller TVs, and of the off-grid sector benefiting from economies of scale on components shared with grid-connected TV manufacturing. These factors combined with customer appreciation for larger TVs has been found to be a major driver of their purchase.

Figure 6 - Semi-annual Evolution for TV sales volumes – 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 7 - Semi-annual Evolution of TVs sales volumes by Product Category - World



25 Extra-large TVs sold in July-December 2022 range from 32" to 43".

Global Insights

Fans

Fan sales in the second half of 2021 recorded 134,000 units sold. This is a 38% decrease compared to sales reported during the first half of 2021. Fan sales follow a particularly seasonal pattern of higher and more humid temperatures driving distributors to build up stocks in the first half of the year. Therefore, lower sales volumes are expected during the second half of the year. However, insights from the industry highlight other factors that may also be at play in explaining the dip, especially in South Asia (see South Asia section).

The majority of sales are in South Asia (60%), where fans are mostly sold on a cash basis and as a stand-alone appliance. This reflects the prevalence of component-based sales in the Asian solar market, as opposed to solar kits and the associated DESCO business models that have been widely adopted in Africa. Fan sales in Sub-Saharan Africa represented 31% of total volumes during the second half of the year. In contrast with the trend in Asia, across SSA, 89% of fans were sold bundled with a power system – usually a SHS – and are also more likely to be sold via PAYGo.

Across all geographies, 39% of fans sold between July and December 2021 were sold bundled with a power source, compared to 17% during the previous reporting round. This can be linked to growing fan sales in Sub-Saharan Africa and low sales reported in key South Asian markets.

Pedestal fans are the highest selling type of fan for the fourth consecutive reporting round. Pedestal fan sales (53,000 units) have decreased by 33% compared to the first half of 2021 while table fan sales have decreased by 43% during the same period and now reach 41,000 units sold. All table fans sold have a diameter larger than 12".

Regionally, ceiling fans are mostly sold in South Asia, while table fans are most popular in Sub-Saharan Africa. Pedestal fans are sold in both regions.

Unfortunately, although the number of ceiling fan sales can be extrapolated as significant, it is not possible to report on the sales of this category in this round due to an insufficient number of companies reporting sales to satisfy our three-data point rule.

Figure 8 - Semi-annual Evolution for Fan sales volumes – World

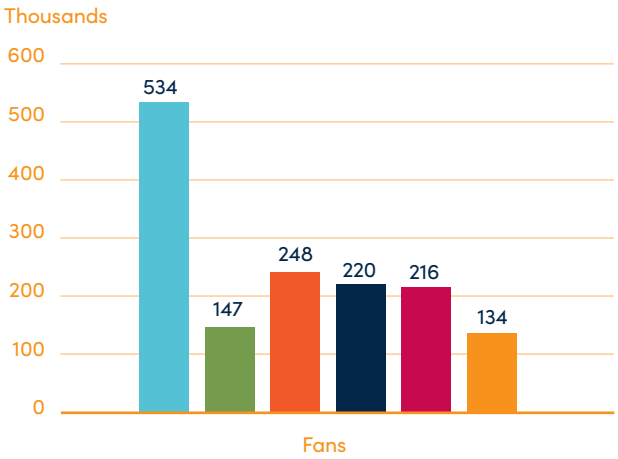
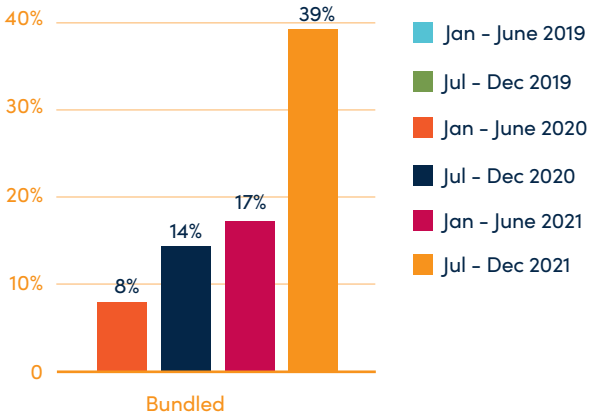


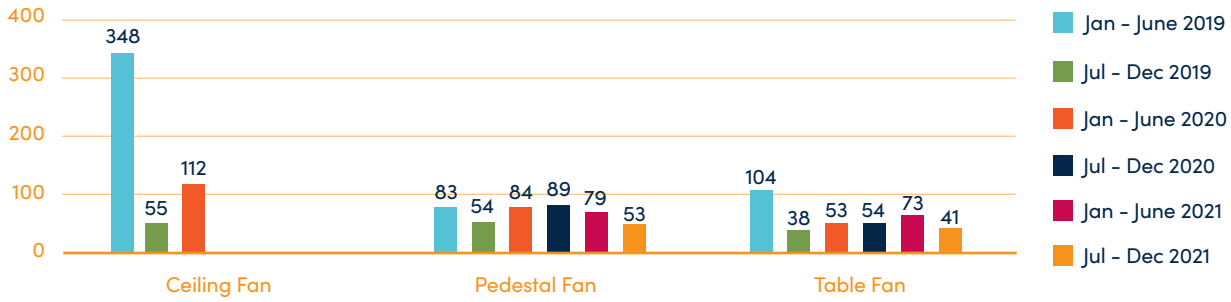
Figure 9 - Evolution of share of fans sales bundled - World



NOTE:
High sales in Jan-June 2019 can be attributed to a high volume of sales triggered by significant subsidies.

Global Insights

Figure 10 - Semi-annual Evolution of Fans sales by Product Category - World



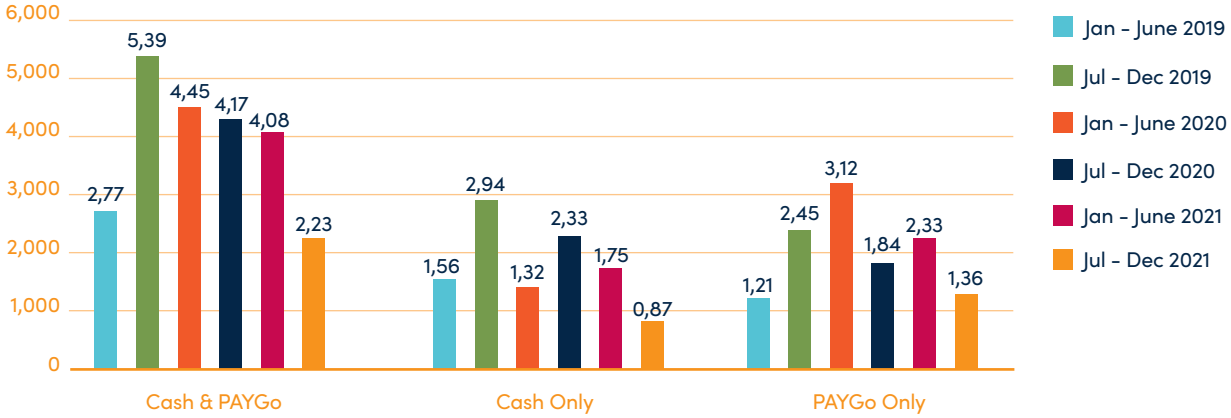
Refrigeration Units (RUs)

Between July and December 2021, 2,232 units were sold globally. After remaining fairly stable for three consecutive reporting rounds, RU sales dropped by 45% compared to the first half of 2021. These are the lowest sales volumes reported since data collection began in 2018. This can be partly attributed to a lower number of companies reporting sales data for RUs for the second half of 2021.

Anecdotal insights point to increased cost of materials and transport for what are already expensive appliances as a factor for lower sales in a context where households financials may have been constrained. Additionally, as a nascent industry, companies focusing on these technologies have been hit hard by supply chain disruptions.

In terms of product category diversity, refrigerators remain dominant, representing 65% of the global sales for all RUs categories with 1,443 units.
The second most popular products were multi-temperature refrigeration units, followed by freezers. Unfortunately, not enough companies report sales of these products to include data in this report.

Figure 11 - Semi-annual Evolution for 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.

Technology transfers from the market for off-grid vaccine cold chain equipment

This report does not reflect the significant institutional market for off-grid vaccine cold chain equipment. Sources indicate that – due to the COVID-19 pandemic – this period has seen an increase in the amount of high specification pharmaceutical grade vaccine cold storage equipment in use, some of which is off-grid. However, these refrigerators follow a centrally procured model managed by the World Health Organization and partners under GAVI, the global vaccine alliance. This equipment and the institutional markets for their use differ significantly from the commercial mass consumer market and lower-cost specialist off-grid refrigerators designed to meet household or light commercial needs. While there is some crossover reflected in this report, sales are very marginal compared to the use of refrigeration for off-grid domestic and productive uses. However, we are seeing **that the development of these off-grid PV powered refrigerators for domestic or productive use applications are utilizing a significant amount of technology transfer and borrowing techniques developed to produce reliable and highly effective equipment for the vaccine market. A notable example is the development of multiple 'solar direct-drive' or SDD PV refrigerators** for these mainstream markets. SDD refrigerators connect directly to a PV panel, and generally include an integrated thermal and/or electric battery to allow for autonomous operation at night or on cloudy days when there is no solar power. SDD technology uses solar energy to freeze water packs or other phase change materials. These ice packs keep the refrigerator cool[26].

Solar Water Pumps (SWPs)

With 6,589 units sold in the second half of 2021, SWPs experienced a small 3% increase in sales volumes compared to the first half of 2021. Due to a peak induced by bulk procurements connected with government programs in South Asia, data is not comparable with the second half of 2019.

Unfortunately, due to few companies reporting SWP sales this round, no data can be shared on the split between cash and PAYGo sales.

Blind Spots

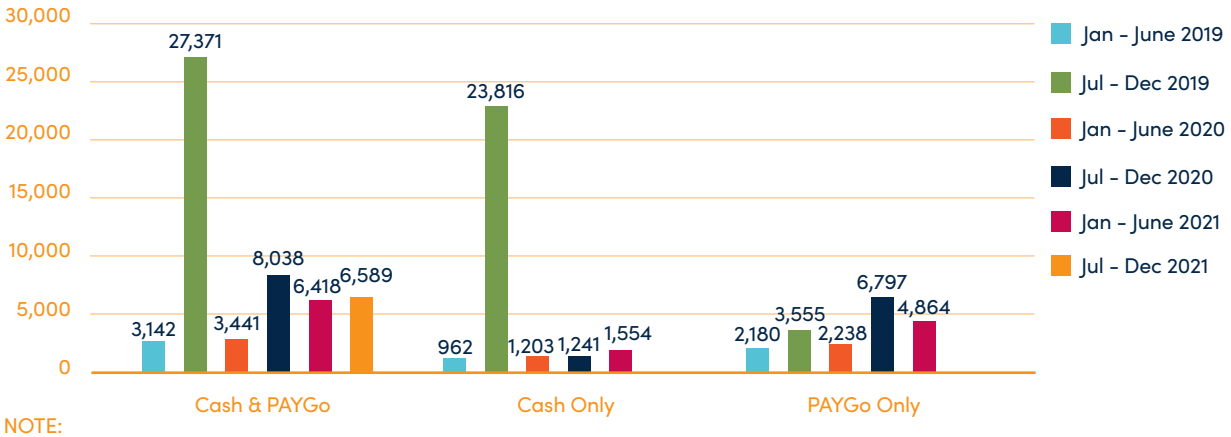
It is particularly noticeable that in this appliance segment we have very limited visibility on sales volumes of what are anecdotally known to be large markets particularly in India, other Asian and some Sub-Saharan African countries, due to the lack of affiliation of the sales data partners with the manufacturer/distributor companies which dominate in these areas.

The high upfront costs of this technology remains a barrier to mass adoption. The price of SWPs varies widely depending on type and use case, but with an average retail price of US$ 900 for surface pumps and US$ 1,600 for submersible pumps (including bundled PV power generation), this product usually requires consumer financing[27]. The challenge of financing is also reflected in the sales data, as PAYGo sales represent 85% of total SWP sales.

26 Efficiency for Access Coalition (2021), Refrigerators Solar Appliance Technology Brief.
27 Efficiency for Access Coalition (2021), 2021 Appliance Data Trends.

Global Insights

Figure 12 - Semi-annual Evolution for SWPs sales volumes - World[28]



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.

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 volume 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 as these appliances are what we can call at best 'near to market' or 'niche market'. This round, the main appliances included in this category were radios with 200,000 units sold. All other appliances sold totaled just shy of 17,000 units. Among them, the main categories were hair clippers/shavers, solar electric cookstoves and stereo systems.

The variety of products reported grows each round. 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 areas, an interest from private sector companies in developing efficient high performance appliances that satisfy these domestic and productive use demands and an ability to source funds to pay for this product and business model innovation.

Main markets by appliance type

The market for efficient appliances is still at a more nascent stage than the market for lighting products and so is the data collection effort needed for this report. Due to that, it can sometimes be difficult to get a clear picture of the main markets per appliance type throughout this report. Below is a table summarizing the top 5 markets for each appliance type by sales volume reported between July and December 2021. For RUs and SWPs, 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 5 countries by appliance type based on sales volumes between July - Dec 2021

Rank	TVs	Fans	Refrigeration units	Solar Water Pumps
1	Kenya	Pakistan	Nigeria	Kenya
2	DRC	Nigeria	Vanuatu	India
3	Tanzania	India	Senegal	Togo
4	Nigeria	Philippines	Uganda	Ethiopia
5	Benin	DRC	DRC	Mali

28 In the second half of 2019, sales of SWPs were boosted due to bulk procurements connected with government programs in South Asia

East
Africa
Insights

East Africa Insights

Regional Sales Trends

Off-grid lighting products

Sales of off-grid lighting products in East Africa between July- December 2021 reached almost 2.1 million units. This is a 4% increase compared to the first half of 2021 and a 15% decrease compared to the second half of 2019.

Cash sales further decreased while PAYGo returned to growth. Cash sales decreased by 8% compared to the first half of the year, and 32% lower than during the second half of 2019. PAYGo sales on the other hand grew by 20% compared to the previous reporting round and are now 14% higher than during the second half of 2019 before the COVID-19 pandemic.

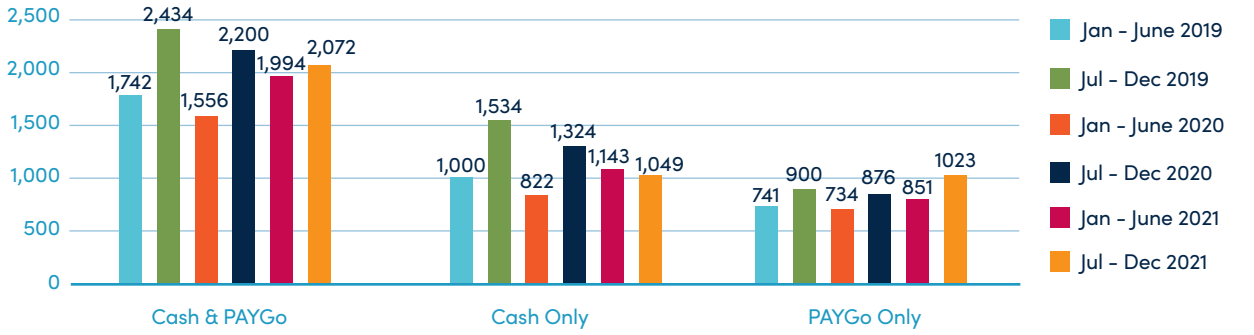
Product Trends

Sales of smaller lantern sales decreased compared to the previous round, while larger lantern sales increased. The opposite trend was noted during the previous round of reporting. Therefore, overall, total lantern sales are stable when compared to the first half of 2021, but remain below sales level in the second half of 2019. Notably, 62% solar lanterns in the 1.5-3 Wp category were sold PAYGo.

Multi-lighting systems have grown back continuously since the original dip at the start of the pandemic and are now just 9% below where they stood in 2019.

SHS sales have grown compared to the first half of 2021, but remain significantly below the volumes reported during the second half of 2019, except for SHS in the 50-100 Wp category where sales are 18% higher.

Figure 13 - Semi-annual Evolution of Volume of Lighting Products Sold - 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 Volumes Sold by Lighting Product Category - East Africa

Categories		Jul-Dec 2021 volumes (Cash & PAYGo)	% change v. Jan-June 2021	% change v. Jul-Dec 2019	Share of PAYGo Jul-Dec 2021
Lanterns	0-1.5Wp	**559,382**	-24%	-29%	0%
	1.5-3Wp	**710,853**	28%	3%	59%
Multi-light systems	3-10Wp	**504,716**	18%	-9%	62%
Solar Home Systems	11-20Wp	**119,252**	27%	-20%	98%
	21-49Wp	**98,352**	-9%	-46%	-
	50-100Wp	**67,610**	9%	18%	-
	100+Wp	**11,440**	38%	-20%	-

East Africa Insights

Countries Overview

Kenya and Ethiopia, historically key markets for off-grid solar have seen their sales further decrease (see country sections below for more details). This has been compensated by strong growth in reported sales in Uganda, Zambia, Rwanda and Malawi among others.

Off-grid solar appliances

Between July and December 2021, the total recorded number of appliances sold in East Africa reached 123,000 units. This is a 5% decrease compared to the first half of 2021, and a 35% decrease compared to the second half of 2019. The decrease was mainly linked to lower PAYGo SHS sales, as the vast majority of appliances in this region are sold bundled with SHS, while cash sales increased slightly, but remained negligible.

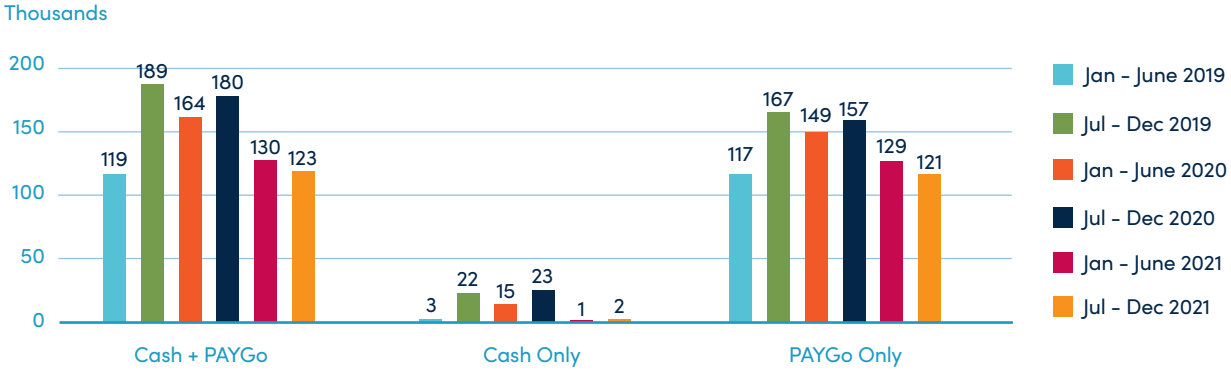
Appliance sales in East Africa represent 50% of total appliance sales in Sub-Saharan Africa (SSA), down from 54% in the last reporting round.

Table 3 - Semi-annual Evolution of Volume of Lighting Products Sold by Country - East Africa

Region / Countries	Jul-Dec 2021 (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019
East Africa	**2,071.605**	**4%**	**-15%**
Kenya	779,717	-21%	-22%
Ethiopia	204,538	-13%	-72%
Tanzania	162,239	-7%	-8%
Uganda	152,652	38%	-31%
Zambia	149,694	74%	26%
Somalia	141,130	2%	1,115%
Rwanda	139,237	43%	190%
Malawi	116,962	157%	126%
Mozambique	76,103	143%	1,058%
Madagascar	59,249	80%	93%
South Sudan	55,276		
Zimbabwe	21,180	45%	31%
Burundi	11,281		

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

Figure 14 - Semi-annual Evolution for Key Appliances sales volumes - East Africa



East Africa Insights

Product Trends

TVs sold in East Africa account for 60% of total TV sales in Sub-Saharan Africa with 117,000 units. This is a 5% decrease compared to the first half of 2021. Lower TV sales are not surprising given lower sales of SHS capable of powering such appliances. Anecdotal evidence suggests it may also be due to supply chain issues created by the COVID-19 pandemic which led to disrupted supply in-country and increased prices[29]. Among TVs, large TVs (24-29") represent almost 60% of volumes, followed by extra-large TVs (30+", 21%) and medium TVs (18-23", 18%). This also represents the larger broader trend of lower volumes sold for small TV's and increasing amounts of larger TV's, as mentioned earlier in the report.

RUs sold in East Africa represent 20% of total Sub-Saharan African sales, down from 44% last round. Sales have steadily decreased from 2,500 units in the second half of 2019 and 1,490 units in the previous reporting round to just 499 units sold. 81% of units sold are refrigerators.

SWPs sold in East Africa represent 78% of total Sub-Saharan African sales, with 4,402 units. This is a 7% decrease compared to the first half of 2021, but still 4% higher than during the second half of 2019. This comes at the end of the 2019-20 Global LEAP RBF started in October 2019, which subsidized the costs of SWPs in Kenya, Tanzania, Rwanda, Uganda, and Senegal[30]. It may be hoped that sales will continue to grow, but it is recognized that this is still a very nascent sector with significant costs even when spread out using PAYGo mechanisms. There is a growing body of research into the respective roles of policy and financial incentives in building commercial markets for SWPs, as recently explored in the IFC Lighting Global program's PULSE "Solar Irrigation System end-user subsidy reference guidelines."[31].

Sales of fans in the region reached 716 units sold this reporting round. While this is more than double the sales reported during the first half of 2021, it remains significantly lower than in 2019 (2,526 units sold).

We do not have visibility on the volume of TV or fan sales through channels who do not report as part of this report, but anecdotal reports on SWPs indicate that significant volumes are being sold through traditional component-based solar, water pump and agricultural equipment retail channels. The opposite is observable for RUs, with very few being sold in commercial markets for off-grid use.

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

Appliance	Jul-Dec 2021 volumes Key Appliances (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019	Share reported as sold PAYGo Jul-Dec 2021	Share sold bundled with a power system Jul-Dec 2021
TVs	**117,432**	-5%	-35%	99%	82%
Fans	**716**	149%	-65%	16%	98%
RUs	**449**	-70%	-82%	-	64%
SWPs	**4,402**	-7%	4%	-	95%

29 GOGLA (2021), Off-grid solar supply chain disruption: 87% of manufacturers expect increased prices for consumers.
30 Global Leap Awards (2019), Results-based financing. 2019-20 - Refrigerators & Solar Water Pumps.
31 Lighting Global (2021), Solar Irrigation System End-User Subsidy Reference Guidelines.

East Africa Insights

Countries Overview

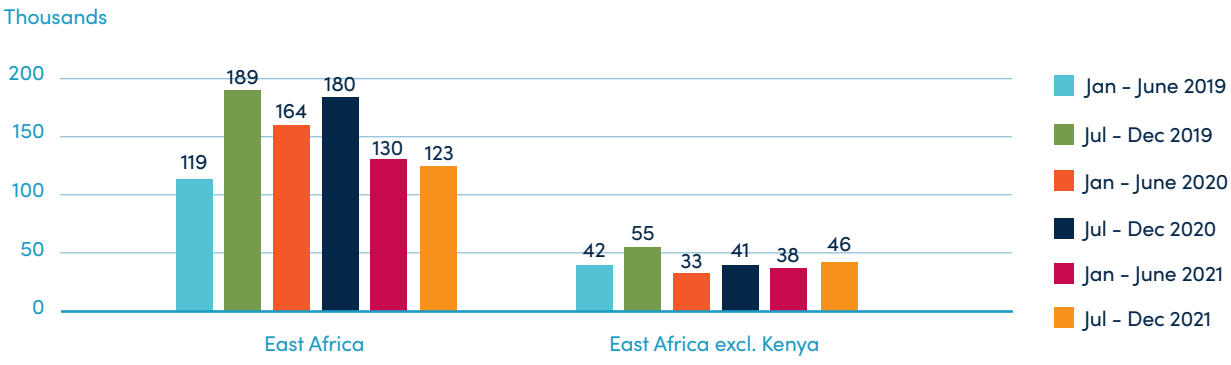
Lower sales in Kenya are primarily responsible for lower sales in the region as it is by far the largest market. No other market has been able to compensate for this decrease in volumes. Figure 14 shows how sales have evolved in East Africa with and without Kenya. When excluding Kenya, it appears that sales of appliances (mostly TVs) are slowly recovering in the rest of the region.

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

Region / Countries	Jul-Dec 2021 volumes Key appliances (Cash & PAYGo)	% change v. Jan-June 2021	% change v. Jul-Dec 2019
East Africa	**122,999**	**-5%**	**-35%**
Kenya	77,379	-16%	-42%
Tanzania	15,485	-12%	-17%
Zambia	9,180	21%	30%
Uganda	8,699	51%	-55%
Rwanda	4,300	64%	14%
Mozambique	2,967	138%	117%
Malawi	1,998		
Madagascar	1,348		
Zimbabwe	415		

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 for TV sales volumes - East Africa excluding Kenya



East Africa Insights

Kenya Insights

Background

In 2020, the Kenyan government reinstated the 14% VAT on off-grid solar products and subsequently increased it to 16% in January 2021. Recognizing the key role of decentralized renewable energy solutions, such as solar home systems, in providing 100% of Kenyans with access to electricity, the tax exemption was reintroduced, but products in stock during the second part of 2021 were likely still affected by the price increase and uncertainty around the enforcement of taxes may have also contributed to affecting pricing during the period.

Several interventions were reported to us as having supported the sector in Kenya:

- The Kenya Off-Grid Solar Access Project for Underserved Counties, known as KOSAP (World Bank, SNV and the Kenyan Ministry of Energy and Petroleum). This project focuses on SHS in the underserved counties in Kenya. This program is essential to bring off-grid solutions to parts of the market which are not directly addressable by commercial solution providers in Kenya, but its implementation has been slow.
- The Sustainable Energy for Smallholder Farmers (SEFFA) project (EnDev, Ikea Foundation, GIZ, SNV) with EUR 8 million to support PUE in the dairy and horticultural value chains in Ethiopia, Kenya and Uganda.
- The Social Impact Incentives Pilot Project (EnDev, GIZ) is a results-based finance (RBF) scheme that rewards enterprises for reaching social impact targets. Three companies are involved in this pilot.

Sales Trends

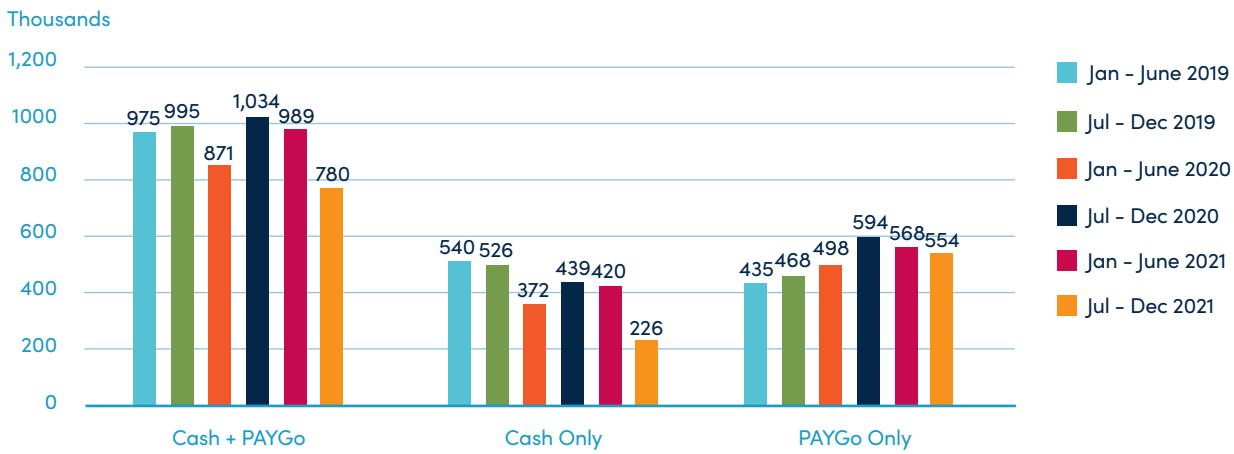
Off-grid lighting products

Sales volumes dropped by 21% compared to the first half of 2021. With 780,000 units sold, sales in the second half of 2021 are the lowest since 2018 and are even lower than during the first half of 2020 when COVID-19 first hit. Insights from companies highlight lower ability to purchase from customers due to COVID-19 and inflation as the key driver of lower sales. Anecdotal evidence also points to access to finance after two years of crisis as a challenge for companies trying to recover.

The drop in sales is notably driven by much lower sales (-54% compared to the Jan-June 2021) of small lanterns (0-1.5 Wp) sold cash. In absolute terms, this category represents 94% of the drop in sales.

However, multi-light systems and SHS sales are also down by 21% and 5% respectively. PAYGo sales declined for the second round in a row, despite continued growth throughout 2020. Detailed data cannot be shared in this report due to the number of firms reporting data for specific product categories, but there has been a shift of PAYGo volumes towards smaller products including lanterns over the last two years.

Figure 16 - Semi-annual Evolution of Volume of Lighting Products Sold – Kenya



East Africa Insights

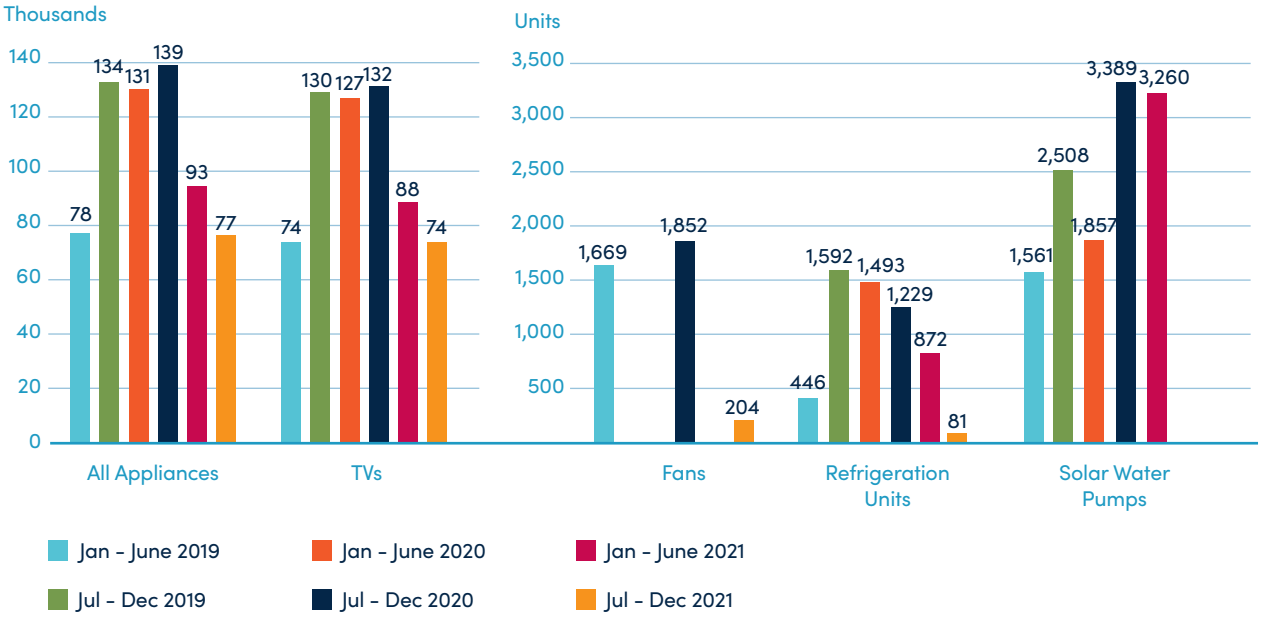
Kenya Insights

Appliances

The appliance market in Kenya is primarily dominated by TVs (96% of key appliance sales). Most TVs are sold bundled with SHS. Therefore, it is not surprising that TV sales decreased in-line with the sales of SHS capable of powering a TV which also decreased. TV sales volumes for 2021 did however fall faster than general SHS sales.

RU sales are down 29% compared to the second half of 2020 while SWP sales have remained relatively stable (-4%). Not enough companies reported fan sales for the data to be shared publicly.

Figure 17 - Semi-annual Evolution of Volume of Appliance Products Sold - Kenya



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East Africa Insights

Ethiopia Insights

Background

Ethiopia has been destabilized over the last two years by a combination of factors:

- The COVID-19 pandemic has affected Ethiopia in the same way it has affected other countries
- The conflict in Tigray, a key market for off-grid solar companies, and general insecurity in the country has limited companies' ability to operate since the end of 2020. It also hinders operations of other key actors such as MFIs.
- Due to foreign exchange constraints, importing products has become harder The Ethiopian Government's facility at the Development Bank of Ethiopia (DBE), funded by the World Bank, that provided local companies access to USD has been fully depleted as of 2021. . Combined with the devaluation of the Ethiopian Birr, importing products has become much more difficult and costly.

There have however also been steps taken in favor of off-grid solar in the market. In 2019, the government of Ethiopia announced 35% of its ambitious electrification targets would be met by off-grid solutions[32]. In May 2021, the country launched its first mobile money services. For now the state controlled Ethio Telecom's Telebirr has been the only provider, but it signed up 4 million people in just its first month[33]. Safaricom is expected to enter the market still this year[34].

Ethiopia is also one of the countries targeted by the Sustainable Energy for Smallholder Farmers project funded by EnDev and the Ikea Foundation which aims to support PUE in dairy and horticultural value chains.

Sales Trends

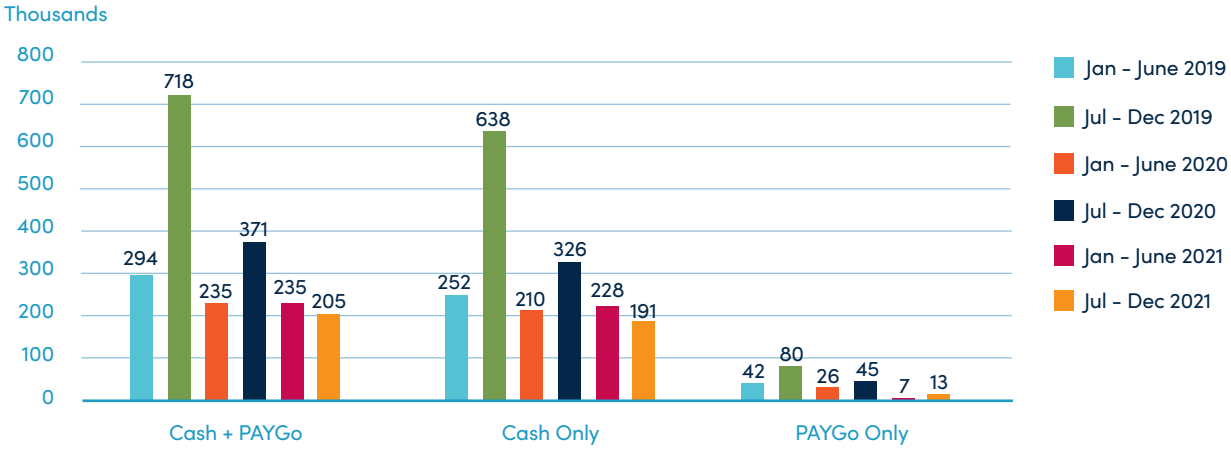
Off-grid lighting products

With 191,000 units sold this round, sales in Ethiopia have decreased by 13% compared to the first half of 2021. Even excluding the peak in sales in the second half of 2019, sales in Ethiopia are struggling to return to growth.

Most of the decrease in sales this round is attributable to cash sales. PAYGo sales grew by 91% compared to the previous reporting round, but remain almost negligible. It should be noted that products reported as PAYGo in this report are PAYGo enabled, but there is considerable evidence pointing to the fact that in Ethiopia, these PAYGo-enabled products are often not sold PAYGo. PAYGo numbers presented below might therefore be overestimated. 72% of volumes were sales of solar lanterns.

Reported sales of appliances in Ethiopia are negligible and too few companies submitted data on appliances sales to include it in this report.

Figure 18 - Semi-annual Evolution of Volume of Lighting Products Sold – Ethiopia



32 Ethiopian Ministry of Water, Irrigation & Electricity (2019), National Electrification Program 2.0 Integrated Planning for Universal Access.
33 Reuters (2021), Ethio Telecom's mobile money lures 4 mln in first month, document says.
34 Agence Ecofin (2022), Safaricom prepare le lancement de M-Pesa en Ethiopie.

East Africa Insights

Madagascar Insights

Background

The economic fallout of the COVID-19 pandemic was particularly dire in Madagascar with pre-2020 growth supported by export sectors, the freeze in global trade severely impacted the island. In 2020, the World Banks estimated that the crisis had-pushed 1.38 million people into extreme poverty and reversed a decade of progress on poverty reduction[35].

Madagascar has long been a challenging market for off-grid solar. VAT and duties exemptions were announced in 2019 and more and more companies have been able to benefit from this over the last two years. Another key recent driver of growth has been the US$ 40 million Off-Grid Market Development Fund (OMDF), offering RBF and debt funding, by the Government of Madagascar, funded by the World Bank and implemented by Bamboo Capital Partners. The fund has attracted new players into the market and led more distributors to focus on Verosol-certified products. The RBF currently has 16 beneficiaries and three companies have received loans. Over 44,000 units were sold under the RBF in 2021[36].

Sales Trends

Off-grid lighting products

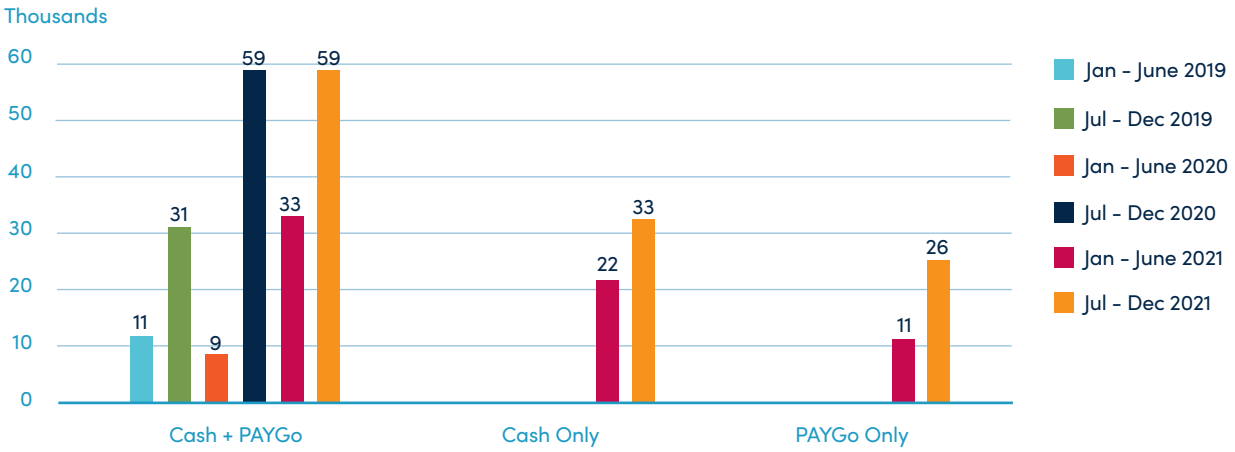
Sales of off-grid solar products reached 59,000 units in the second half of 2021, an 80% increase compared to the first half of 2021 and on par with the second half of 2020. Data suggests strong seasonality in sales which will need to be confirmed through further data collection. Anecdotal evidence also points to distributors facing stock-outs as a factor towards large orders from manufacturers.

Both cash and PAYGo sales grew significantly. PAYGo sales more than doubled compared to the first half of 2021. Over half of sales volumes consist of solar lanterns (0-3 Wp).

Appliances

Appliance sales reported in Madagascar remain limited and almost no data can be published at this stage due to too few companies participating. However, for the second reporting round in a row, over 1,300 units of key appliances were reported to have been sold on the island, most of them bundled with a power system. Products sold include TVs, fans and SWPs.

Figure 19 - Semi-annual Evolution of Volume of Lighting Products Sold – Madagascar



35 World Bank (2020), Madagascar Economic Update: COVID-19 Increases Poverty, a New Reform Momentum is Needed to Build Back Stronger.

36 More information here.

East Africa Insights

Malawi Insights

Background

Malawi was particularly affected by COVID-19 in 2021 with a third wave during the summer. Yet, the country returned to growth in 2021 with notably high agricultural outputs enabled by favorable weather and subsidies on agricultural inputs. This led to a growth in employment and income for rural Malawi which may have been favorable for off-grid solar.

USAID's Solar Home System Kick-Starter Program for Malawi, which was launched in 2019 came to an end in December 2021.

In February 2022, the government announced it will remove the import duty on solar lamps.

Sales Trends

Off-grid lighting products

Malawi has seen strong seasonal variations in sales reported, but is following a clear growing trend on an annual basis.

Indeed, with 117,000 units sold this round, sales in Malawi increased 157% compared to the first half of 2021. Overall, 2021 annual sales are 24% higher than 2020 sales volumes, which in turn are far superior to 2019 sales volumes.

Both cash and PAYGo sales have increased significantly. In terms of product categories, 3-10 Wp kits represent a majority of units sold this reporting round.

Appliances

The vast majority of appliances sold in Malawi are TVs. Almost 100% of these TVs are sold bundled with a SHS. Therefore, it isn't surprising to see appliance sales follow a similar trend to Lighting Products. No other appliance category can be reported on due to the number of companies reporting, but total volumes include fans and SWPs.

Figure 21 - Semi-annual Evolution of Volume of Appliance Products Sold - Malawi

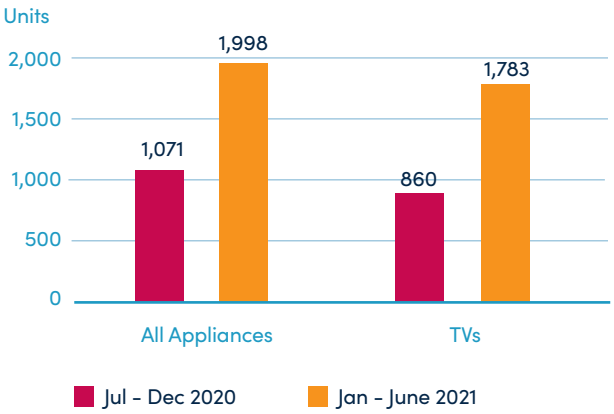
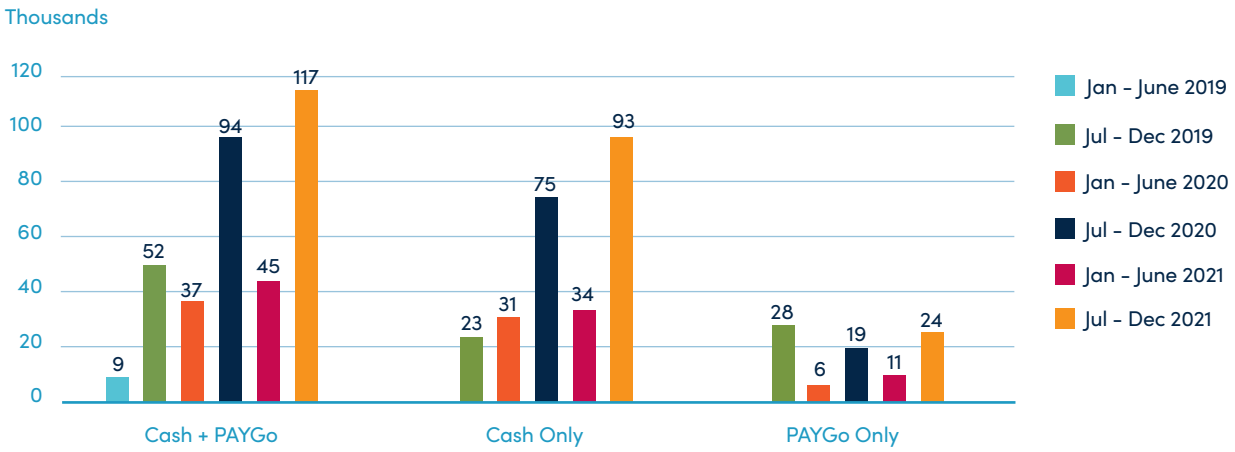


Figure 20 - Semi-annual Evolution of Volume of Lighting Products Sold – Malawi



East Africa Insights

Mozambique Insights

Background

Over the last two years, Mozambique has faced several challenges:

- The COVID-19 pandemic, which on top of the low consumption and supply chain disruptions experienced in most places, also delayed key investments in liquified natural gas.
- ncreased extreme weather events including the tropical cyclone Eloise in January 2021 which affected over 400,000 people[37]. More recently, tropical storms Ana and Gombe hit Mozambique in early 2022.
- A violent insurrection in the gas-rich northern province of Cabo-Delgado which has led to the displacement of over 850,000 people[38].

Yet, there have been several key developments in favor of the off-grid solar sector which have been instrumental in accelerating development of affordable off-grid solar solutions to underserved populations:

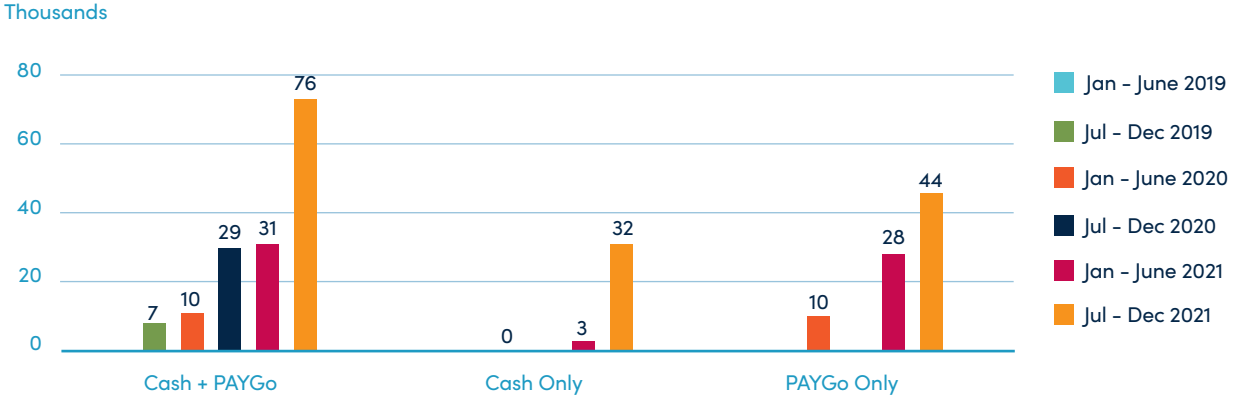
- The Government of Mozambique adopted a supportive regulatory framework for off-grid energy access which provides greater clarity to actors in the sector and recognizes the important role the sector will continue playing in rural electrification[39].
- The BRILHO program financed by the FCDO and Sweden, and implemented by SNV has been running since 2019 providing funding (catalytic grants and RBF) and technical assistance to kick-start businesses in the off-grid sector (SHS, clean cooking and mini-grids).
- There is also ongoing support from the Fundo de Acesso Sustentavel as Energias Renovaveis's (FASER) RBF set-up by the Fundação para o Desenvolvimento da Comunidade (FDC) and GIZ, through the Energising Development (EnDev) and Grüne Bürgerenergie (GBE) program.
- The FDC and GBE also supported the electrification through solar solutions of 42 off-grid rural health facilities in Mozambique.
- The Beyond the Grid Fund for Africa, funded by Sweden and implemented by NEFCO and REEEP has been launched and will run until 2025. In Mozambique the focus will be on mini-grids, but SHS could also be part of the scope.

Sales Trends

Off-grid lighting products

Sales of off-grid solar products in Mozambique have reached a significant peak with 76,000 units sold in the second half of 2021. This is a 143% increase in sales compared to the first half of 2021. Higher cash sales can be in part attributed to higher participation in the data collection from companies selling solar lanterns. However, the data also shows growth in multi-light systems and SHS. Overall, over 80% of products sold are solar lanterns (0-10 Wp). PAYGo sales grew by 58%.

Figure 22 - Semi-annual Evolution of Volume of Lighting Products Sold - Mozambique



37 IOM (2021), Mozambique Tropical Cyclone Eloise Response Situation Report #1 25 January – 12 February 2021.
38 Instituto Nacional de Gestao e Reducao do Risco de Desastres (2021), Resumo de Desclocados Internos.
39 SNV (2021), Government of Mozambique approves off grid energy regulation taking a key step towards universal access.

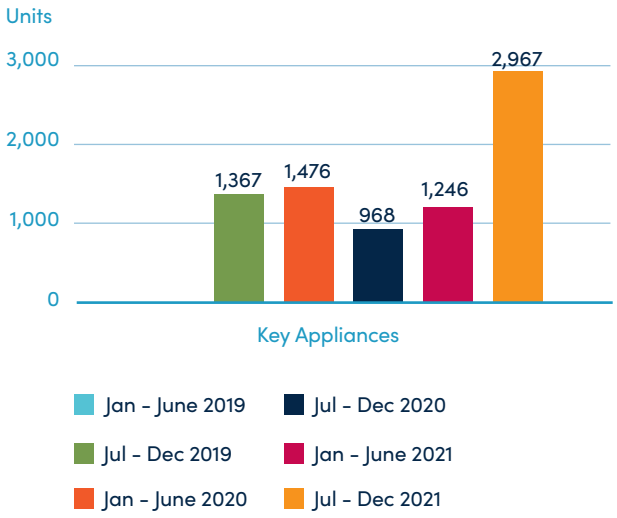
East Africa Insights

Mozambique Insights

Appliances

Close to 3,000 key appliances were sold between July and December 2021 in Mozambique. This is a 138% increase compared to the first half of 2021, and 117% higher than during the second half of 2019. 96% of volumes are TVs, but sales also include RUs and SWPs.

Figure 23 - Semi-annual Evolution of Volume of Appliance Products Sold - Mozambique



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East Africa Insights

Other East African Countries

Rwanda

Rwanda's economy returned to growth in 2021 after experiencing its first recession since 1994 in 2020. Inflation and its impact on customers' ability to pay remains a concern going forward.

In 2020, the World Bank approved a USD 150 milllion IDA loan to the Government of Rwanda to improve access to modern energy, of which USD 15 million are allocated towards the pro-poor RBF for off-grid solar, complementing USD 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.

Recently, the Development Bank of Rwanda (BRD) launched a program called CanaChallenge which campaigns for private entities and individuals to donate to help provide vulnerable Rwandans with access to energy. For every 15,000 RWF pledged, the BRD will pledge 100,000 RWF.

With 139,000 units sold, off-grid lighting products sales in Rwanda increased 43% compared to the first half of 2021 and are now 190% higher than during the second half of 2019. Cash and PAYGo sales both grew at a similar rate compared to the first half of 2021. PAYGo sales had been the main growth driver during the first half of the year.

Although no data can be shared on solar lanterns due to the limited number of companies reporting, this segment has seen the strongest growth compared to the first half of the year. Multi-light systems remain the largest category with 49% of reported sales volumes.

4,300 key appliances were sold in Rwanda during the second half of 2021, which is a 64% increase compared to the first half of 2021. Almost 100% of these sales come from TVs, which are sold PAYGo and bundled with an SHS.

Tanzania

Tanzania's economy saw positive recovery signs in the second half of 2021, including a return to pre-pandemic employment levels. However, increased prices of key and staple products is also a concern for the market in Tanzania.

In 2020 and 2021 Tanzania's off-grid sector benefited from support from the EnDev Green Economic Recovery Fund RBF.

Tanzania recorded a 7% decrease in sales compared to the first half of 2021 which was on par with the second half of 2019 before the COVID-19 pandemic. Sales reached 162,000 units in Tanzania for the second half of 2021.

The relative stability in overall volumes hides a few key discrepancies:

- Cash sales, especially small lanterns (0-1.5 Wp) dropped by over 50% compared to the first half of 2021.
- PAYGo have grown by 61% and reached 120,000 units, but driven by large lanterns (1.5-3 Wp) and multi-light systems (3-10 Wp), while larger SHS sales decreased

Like many other East African countries, most appliance sales reported in Tanzania are TVs sold bundled with PAYGO kits. As SHS sales decreased, unsurprisingly so did appliance sales. 99% of the 15,485 key appliance units sold between July and December 2021 were TVs. This represents a 12% decrease in

Uganda

Interventions currently supporting the sector in Uganda include:

- The Beyond the Grid Fund for Africa – Uganda, funded by Denmark and Sweden and implemented by NEFCO and REEEP. 20.7 million in RBF are available and the program will run until 2026.
- EnDev GIZ Uganda and the Private Sector Foundation Uganda (PSFU) are implementing the Last Mile RBF pilot to incentivize SHS providers to reach more remote areas.
- Since July 2021, lighting products up to 350 Wp will need to comply with the new test methods (IEC TS 62257-9-5) and quality standards (IEC TS 62257-9-8) approved by the Uganda National Bureau of Standards. Non-compliant products can no longer be sold.

Sales of Lighting Products reached 153,000 units during the second half of 2021, a 38% increase compared to the first half of 2021, but still 31%

East Africa Insights

Other East African Countries

below where sales stood during the second half of 2019. Increased sales this round were mostly driven by higher PAYGo sales, in particular multi-light systems (3-10 Wp).

Sales in Uganda are generally higher during the second half of the year. Sales for July-December 2021 are on par with the same period last year. Therefore it is still unclear whether the sector is back on the growth track in Uganda.

Appliance sales, dominated by TVs bundled with an SHS have followed a similar trend with 51% growth in volumes and key appliances sales reaching 8,700 units for the period. 94% of products sold are TVs, but also include 262 RUs and SWPs (data on SWPs cannot be shared due to the limited number of reporting companies).

Zambia

Zambia saw an improvement across its main macro-economic indicators. Most notably, the Zambian Kwacha appreciated, in part leaning on increased global prices for copper.

Zambia should see continued support for the sector from the Beyond the Grid Fund for Africa with funding from Germany and Sweden until 2025. Additionally, off-grid solar companies could benefit from the Bank of Zambia's Targeted Medium-Term Refinancing Facility (TMTRF). The TMTRF enables financial service providers to access Bank of Zambia funds for loans to businesses or households with focuses on certain sectors including energy.

Sales of lighting products reached 150,000 units in the second half of 2021, a 74% increase compared to the first half of the year. Volumes sold now exceed sales recorded during the second half of 2019, before the pandemic, when 118,000 units sold were reported.

A significant driver of increased volumes are large sales of small solar lanterns (0-1.5 Wp) sold on a cash basis. However, PAYGo sales also increased by 19%. Most PAYGo sales were in the 3-10 Wp category.

99.9% of appliances sold in Zambia were TVs, almost all of which were sold bundled with a SHS. **Key appliances sales grew by 21% compared to the first half of 2021 and totaled 9,180 units sold.**

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Regional Sales Trends

Off-grid lighting products

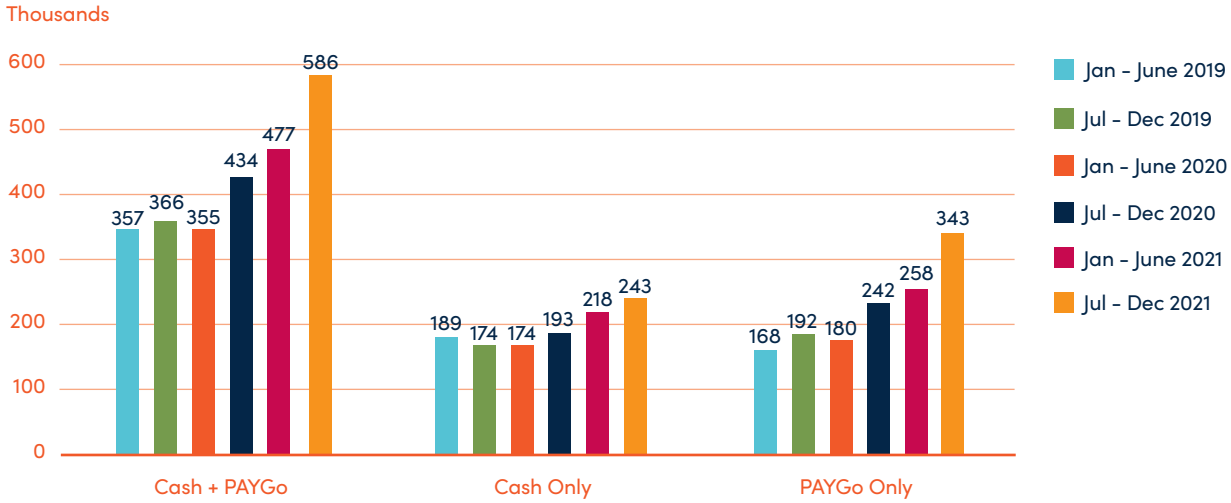
Sales of off-grid lighting products in West Africa between July and December 2021 reached 586,000 units. This is a 23% increase compared to the first half of 2021 and a 60% increase compared to the second half of 2019 and signals a potential acceleration in the sector's positive dynamic in the region.

Both cash and PAYGo sales grew compared to the previous reporting round. Around 243,000 units were sold on a cash basis. This is an 11% increase in volumes compared to the first half of 2021 and 39% more than the second half of 2019. 343,000 units were reported sold via PAYGo in the second half of 2021. This is a 33% increase compared to the last reporting round, and 79% higher than in the second half of 2019.

Product Trends

West Africa regional data shows an overall positive trend in sales volumes across a majority of lighting product categories. Growth was primarily driven by the smaller system sizes during the previous reporting round. For the second half of 2021, SHS categories all experienced significantly higher sales volume. Most notably, sales in the 11-20 Wp category doubled compared to the first half of 2021 and are four times higher than during the second half of 2019.

Figure 24 - Semi-annual Evolution of Volume of Lighting Products Sold - 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 Volumes Sold by Lighting Product Category - West Africa

Categories		Jul-Dec 2021 volumes (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019	Share of PAYGo Jul-Dec 2021
Lanterns	0-1.5Wp	**162,544**	21%	88%	0%
	1.5-3Wp	**65,473**	-20%	-34%	18%
Multi-light systems	3-10Wp	**123,029**	4%	71%	85%
Solar Home Systems	11-20Wp	**98,330**	103%	405%	98%
	21-49Wp	**40,049**	47%	35%	-
	50-100Wp	**81,683**	47%	49%	-
	100+Wp	**14,395**	27%	197%	-

West Africa Insights

Countries Overview

The increase in sales registered in West Africa this round hides country disparities and is mostly linked to strong growth in Nigeria. Nigeria represents 66% of sales reported in West Africa this round.

Off-grid solar appliances

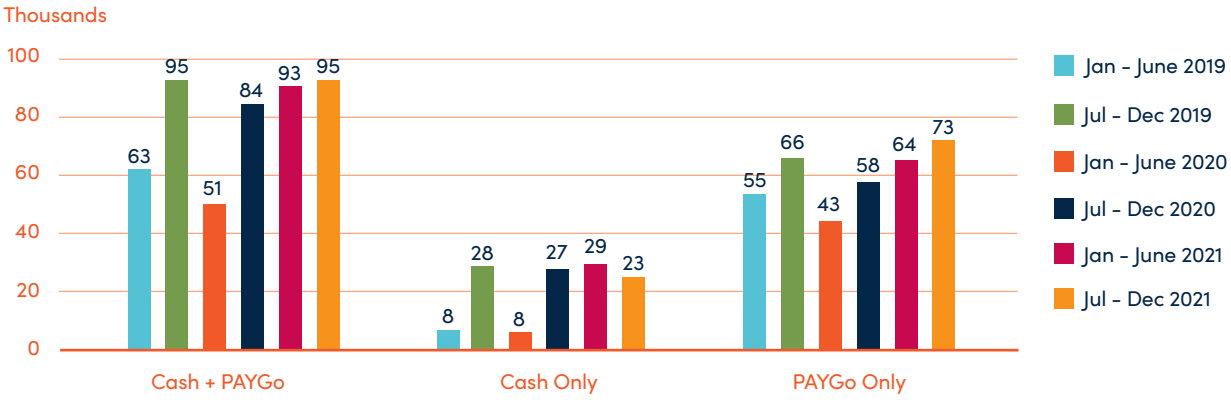
Sales of key appliances in West Africa in the first half of 2021 reached 95,000 units. This is a 2% increase compared to the first half of 2021 and on par with the second half of 2019. West Africa registered almost 40% of sales of key appliances in Sub-Saharan Africa for the second time in a row compared to approximately 25-30% on average in 2019 and 2020.

Table 7 - Semi-annual Evolution of Volume of Lighting Products Sold by Country - West Africa

Region / Countries	Jul-Dec 2021 volumes (Cash & PAYGo)	% change v. Jan-June 2021	% change v. Jul-Dec 2019
West Africa	**585,503**	**23%**	**60%**
Nigeria	388,034	62%	133%
Burkina Faso	41,458	-5%	212%
Benin	38,505	18%	33%
Senegal	25,336	-32%	-1%
Cote d'Ivoire	12,343	-36%	-65%
Mali	12,229	-43%	21%
Guinea	9,420		
Sierra Leone	7,108	-82%	-69%
Ghana	5,580	13%	-68%

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

Figure 25 - Semi-annual Evolution for Key Appliances sales volumes - West Africa



West Africa Insights

Product Trends

West Africa is the second largest regional market worldwide for TVs behind East Africa and also for fans, behind South Asia. Sales of TVs, and fans have slightly grown compared to the first half of 2021.

TV sales in the region remain stable compared to the first half of 2021. 84% of TVs were sold bundled with a SHS. Large TVs (24"-29") remain the most popular, accounting for 51% of total units sold. Extra-large TVs (30"+) record the second highest volumes, accounting for 25% of all products sold, while Medium TVs (18''-23'') represent 23% of units sold. In the past, the region had reported significant sales of smaller TVs and now appears to be following the same declining trend in sales of this category as seen elsewhere, although too few companies reported sales of small TVs for us to be able to share insights on the category.

It is notable that out of all key appliance sales in SSA, it is only fans that sell more in the West African region than in East Africa. While thorough market studies are yet to be conducted, anecdotally these sales can be seen to clearly reflect the hot and humid climatic conditions which create a greater demand for space cooling across key markets in the west african region. Fan sales in West Africa are typically highest in the second half of the year as the climate is hot and humid from June to October. Yet, fans recorded their highest sales in the region in the first half of 2021. Sales grew an additional 4% during the second half of the year reaching 36,000 units sold. The vast majority of fan sales in West Africa are bundled with SHS.

Refrigeration unit sales dropped 28% compared to the first half of 2021. Unfortunately too few companies reported sales in sub-categories for the data to be included in this report.

1,215 SWP sales were reported during the second half of 2021. Regional sales of SWPs have seen strong variations over time. Unfortunately too few companies had reported in the first half of 2021, to enable the comparison with that round.

Table 8 - Semi-annual Evolution of Volume of Key Appliances Sold by Type - West Africa

Appliance	Jul-Dec 2021 volumes Key Appliances (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019	Share reported as sold PAYGo Jul-Dec 2021	Share sold bundled with a power system Jul-Dec 2021
TVs	**56,947**	1%	-15%	-	84%
Fans	**36,032**	4%	38%	40%	88%
RUs	**1,088**	-28%	72%	-	48%
SWPs	**1,215**		84%	-	88%

West Africa Insights

Countries Overview

Strong appliance sales in Nigeria compensate for decreased appliance sales in most of the region. The Nigerian appliance market continues to dominate the region and confirmed its position as the second largest off-grid appliance market in Sub-Saharan Africa behind Kenya with 38,500 key appliances reported as sold.

Table 9 - Semi-annual Evolution of Volume of Appliances Sold by Country - West Africa

Region / Countries	Jul-Dec 2021 volumes Key appliances (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019
West Africa	**95,282**	**2%**	**0%**
Nigeria	38,533	55%	107%
Benin	11,623	-3%	36%
Senegal	10,413	-28%	-17%
Cote d'Ivoire	9,083	-23%	-66%
Togo	7,093	37%	-8%
Sierra Leone	6,390	-47%	219%
Mali	3,335	-7%	-8%
Ghana	3,269	-36%	-25%
Burkina Faso	548	-63%	-93%
Liberia	512	768%	

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.

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West Africa Insights

Nigeria Insights

Background

After experiencing its worst recession in over twenty years, Nigeria returned to growth through a combination of recovering oil prices and government intervention to contain the effects of the economic shock. Nonetheless, the COVID-19 pandemic will have a lasting effect on Nigeria. The World Bank estimates that an additional 12 million people will fall below the international poverty line in between 2019 and 2023. Furthermore, the Nigerian market must contend with the devaluation of the Naira. In the second half of 2021, the Central Bank of Nigeria devalued the currency by a further 12.5% and announced a ban on black market operators.

The government's response to the pandemic also had a direct impact on the energy sector as steps were taken to remove gasoline subsidies and electricity tariffs were adjusted to be more cost-reflective. Additionally, several programs were launched in 2020 to support the Nigerian economy including the Solar Power Naija Program (SPN) in December 2020, which aims to electricity 5 million households, serving about 25 million Nigerians, through SHS and mini-grids, under the Economic Sustainability Plan[40]. While implementation so far has been slow, it seems key partnerships are being formed to accelerate deployment in 2022. The program also includes a local assembly component aiming at fostering local employment in the sector.

The implementation of the Nigeria Electrification Program has also ramped up leading to more opportunities for companies, especially through the RBF which registered over 156,000 claims for off-grid solar in the second half of 2021. This is a 97% increase over the same period of the previous year. The program, which is carried out by the Rural Electrification Agency with funding from the World Bank (US$350 million) and the African Development Bank (US$200 million), aims to provide electricity access, through mini grids and stand-alone off-grid solutions and to accelerate the proliferation of productive appliances and equipment for off-grid communities[41]. In particular, it includes a US$75 million RBF facility to encourage private sector led market growth for faster uptake of standalone solar systems[42].

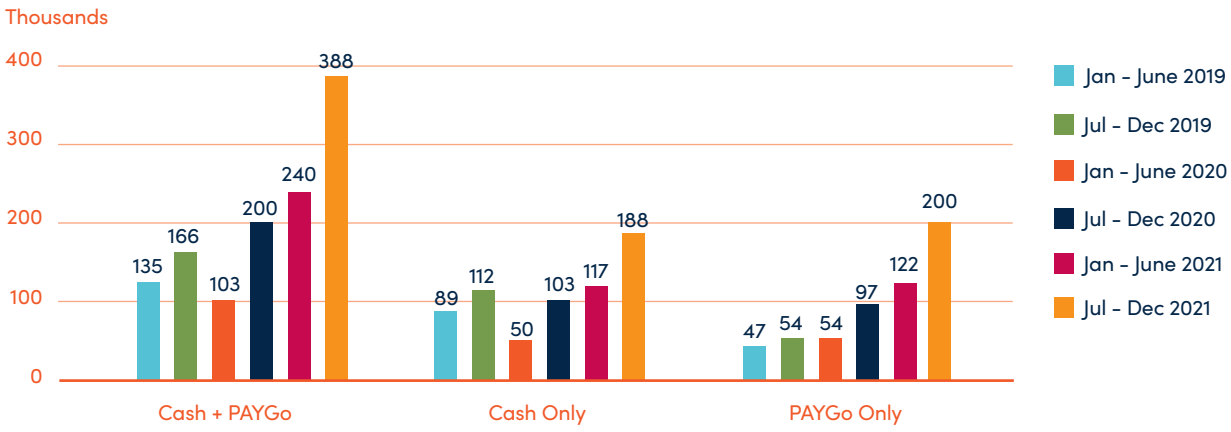
Sales Trends

Off-grid lighting products

As mentioned previously, Nigeria represents over half of West African sales and therefore the trends at the regional level are in large part reflective of the situation in Nigeria. **Nigeria has again recorded particularly high sales volumes this reporting round reaching 391,000 units. This is a 62% increase on the first half of 2021 and a 134% increase from the second half of 2019.** Both cash and PAYGo sales grew at a similar rate compared to the previous round of reporting.

Growth in volumes compared to the first half of 2021 was particularly high for SHS ranging from 11 to 100 Wp which saw their sales double. 31% of sales this round were SHS. The vast majority of cash sales are solar lanterns and the vast majority of PAYGo sales are multi-light systems and SHS. There have been very few PAYGo lanterns reported this round.

Figure 26 - Semi-annual Evolution of Volume of Lighting Products Sold – Nigeria



40 REA (2020), Fg Launches 'Solar Power Naija' A 5 Million Solar Connection Programme To Off Grid Communities.
41 More information on the NEP here.
42 Efficiency for Access Coalition (2021), Off- and Weak-Grid Appliance Market: Nigeria.

West Africa Insights

Nigeria Insights

Appliances

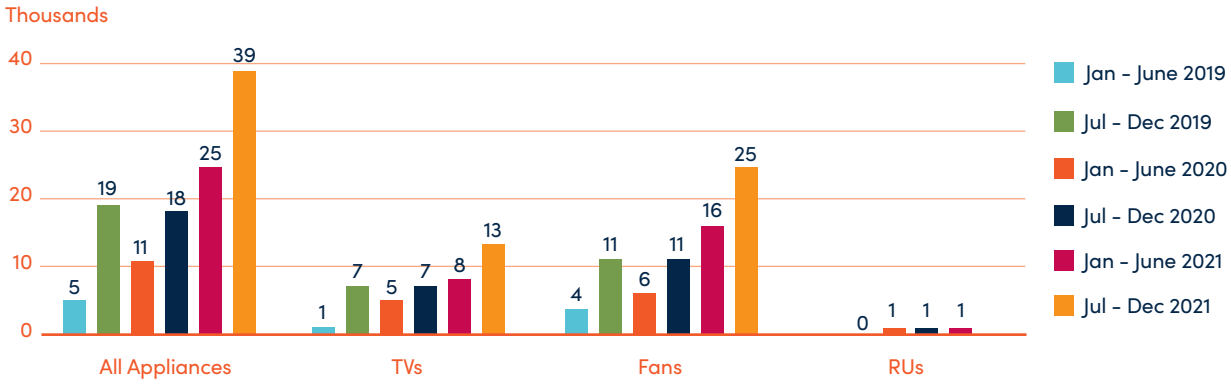
Nigeria recorded its highest yet half-year sales for key appliances. Sales volume grew 55% compared to the first half of 2021. While sales grew by 75% for TVs and 53% for fans. Not enough companies reported sales of SWPs or RUs to include them in this report.

13,700 TV sales were reported for the second half of 2021. 86% of these units had large or extra large screen sizes. All units were PAYGo enabled and the vast majority were bundled with a SHS.

24,600 fans were sold between July and December 2021. The vast majority were bundled with a SHS. While the majority of fans sold were reported as cash sales, anecdotal evidence suggests that these may often actually be reported as cash as the appliance itself is not PAYGo-enabled, but are actually sold with a SHS that is financed as PAYGo.

Data confidentiality rules do not allow for data on the types of fans sold to feature in this report, but, indicatively, the volumes reported are fairly evenly shared between table and pedestal fans with no ceiling fan sales reported for this reporting period.

Figure 27 - Semi-annual Evolution of Volume of Appliance Products Sold - Nigeria



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Benin Insights

Background

Benin's economy was affected by the COVID-19 pandemic with real GDP growth dropping from 6.4% pre-COVID to 3.8% in 2020[43]. However, there were no nationwide lockdowns and restrictions were limited to urban areas. Therefore off-grid businesses operating in rural areas were still able to conduct operations even if they may have been slowed down. Closed borders with neighboring countries, especially Nigeria remain a hindrance to the country's recovery as Benin's economy is highly linked to cross-border trade both formal and informal. Inflation, including on food prices is also a concern regarding potential customers' ability to pay. Finally, there are signs of increased insecurity in the country's north.

Benin has an access to electricity rate of 63% in urban areas and 9% in rural areas[44]. 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. In the context of COVID-19, implementation has been slow, but the MCC reports that SHS distribution has begun to expand[45].

Other initiatives supporting the sector in Benin include a 2019-2021 RBF window from EnDev for lighting products and a productive use RBF from Green People's Energy (GBE) for Africa – Benin. The RBF from EnDev included up to 1.3 million euros for distribution of lighting products. The RBF by GBE includes 350,000 EUR for PUE companies and 150,000 EUR to companies that provide credit for PUE customers[46]. In 2021 there was also a mini-grid window from SE4ALL's Universal Energy Facility in Benin.

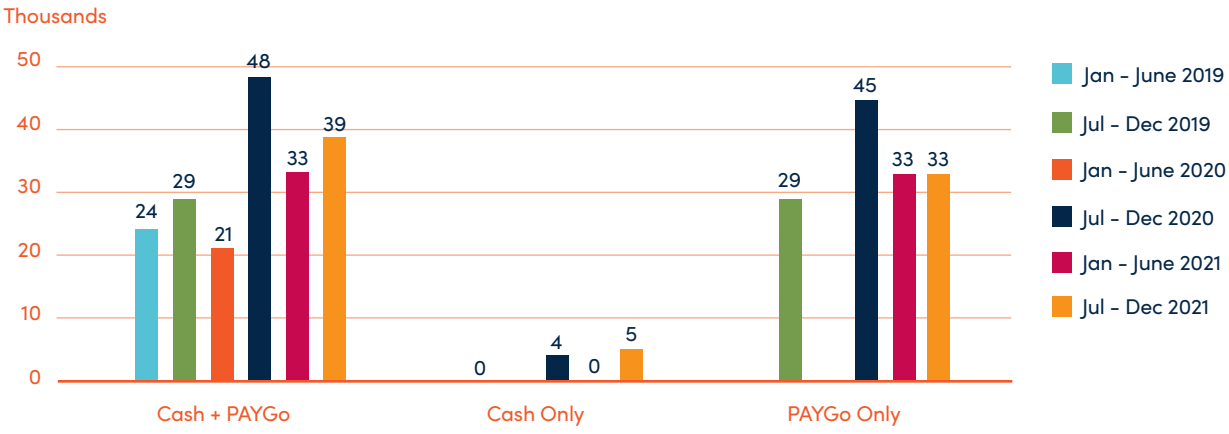
Sales Trends

Off-grid lighting products

Lighting Product sales for the second half of 2021 reached 39,000 units, an 18% increase on the first half of the year. This is unsurprising as sales in Benin are usually higher towards the end of the year due to seasonal factors. Sales for this reporting round are 33% higher than sales for the second half of 2019.

Cash sales which were negligible during the first half of 2021 exceeded 5,000 units this round while PAYGo sales were stable.

Figure 28 - Semi-annual Evolution of Volume of Lighting Products Sold – Benin



43 World Bank Data (2021).
44 IEA (2019).
45 Millennium Challenge Corporation (2022), Benin Power Compact.
46 More information here.

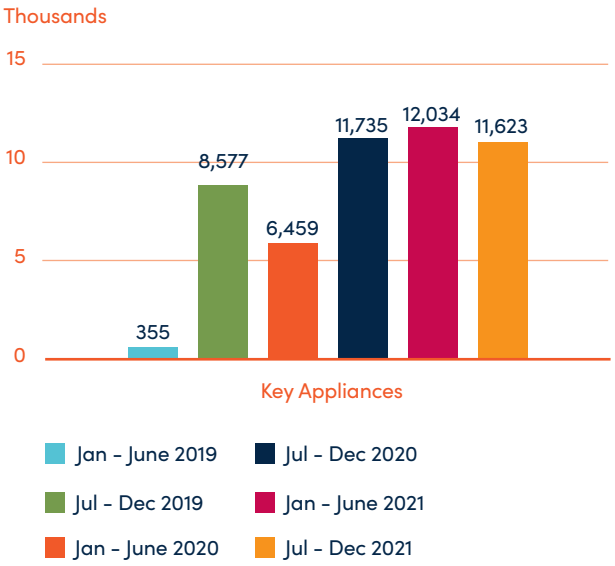
West Africa Insights

Benin Insights

Appliances

Appliances sales in Benin for the second half of 2021 exceeded 11,600 units. This is in line with the two previous reporting rounds. Too few companies reported appliance sales data in Benin to include in this report, but volumes include TVs, fans and SWPs.

Figure 29 - Semi-annual Evolution of Volume of Appliance Products Sold – Benin



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West Africa Insights

Burkina Faso Insights

Background

After a sharp slowdown in 2020, the country's economy returned to growth in 2021 notably under the impulse of the gold mining sector. However, the country's situation remains fragile, especially with growing inflation. Uncertainties around COVID-19 remain, but it is security issues and political stability that pose the greatest risks. Since 2015, Burkina Faso has been tackling growing security issues as violent extremism spreads from the country's north. Over the past three years, 2,000 people have died in terrorist attacks[47] and over a million have been displaced[48]. Additionally there has been a military coup in January 2022.

While the regulatory framework is generally supportive of off-grid solar, anecdotal evidence points at inconsistent implementation, notably for customs duties.

The Beyond the Grid Fund for Africa is currently under implementation in Burkina Faso and will hopefully yield positive outcomes in energy access in 2022. The focus in Burkina Faso will be on SHS.

In 2020, Burkina Faso signed a compact with the Millennium Challenge Corporation, but activity on the compact has been paused following the coup. The compact is poised to focus on grid extension.

Sales Trends

Off-grid lighting products

41,000 units of lighting products were sold by manufacturers during the second half of 2021. This is a 5% decrease compared to the first half of the year. While 2021 sales are higher than 2019 sales, inconsistent sales volumes make interpretation of current trends complicated and more data will be required if current figures are indicative of a growing market.

Appliances

Just over 500 units of key appliances were sold in the second half of 2021. Sales include TVs, fans and RUs. During the first half of the year, close to 1,500 key appliance units were sold of which 63% were TVs and 34% were fans.

Figure 31 - Semi-annual Evolution of Volume of Appliance Products Sold – Burkina Faso

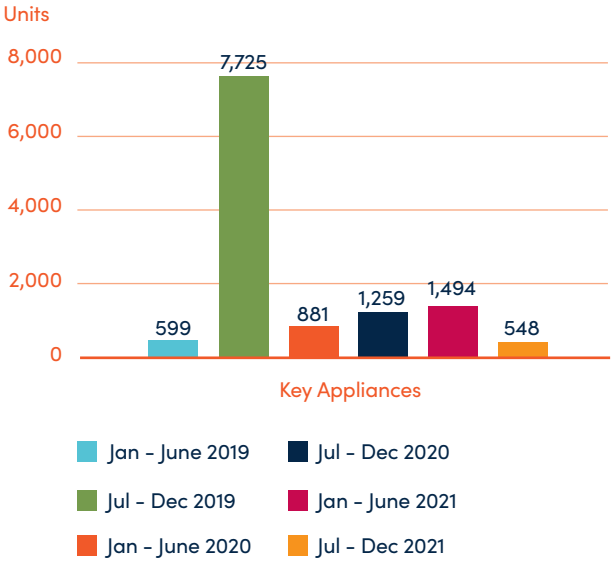
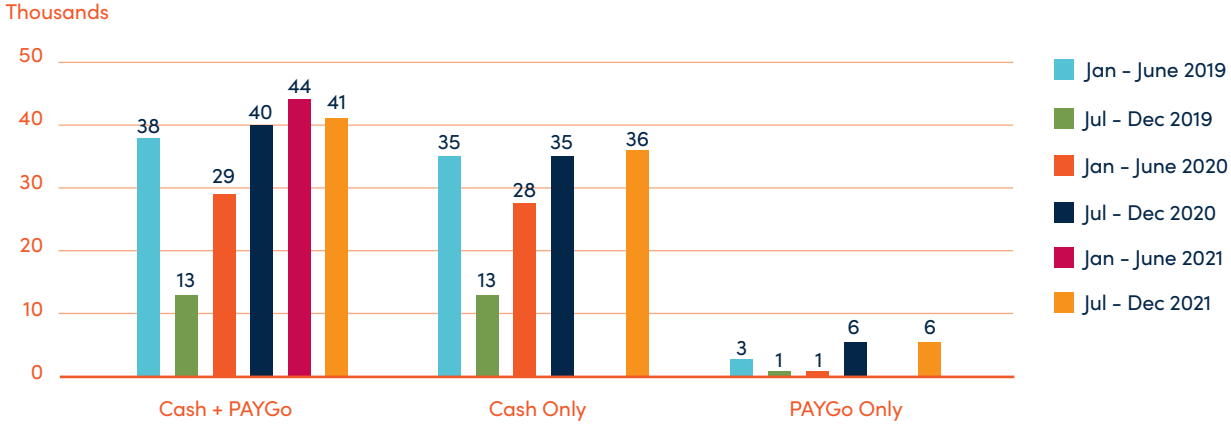


Figure 30 - Semi-annual Evolution of Volume of Lighting Products Sold – Burkina Faso



47 Demuynck et Al. (2022), Political Upheaval and Counter-Terrorism in Burkina Faso: Between a Rock and a Hard Place.
48 World Bank (2021).

West Africa Insights

Senegal Insights

Background

Senegal's economy was heavily impacted by the COVID-19 pandemic, but has bounced back to pre-COVID growth levels in 2021.

Among current projects in Senegal is an RBF grant for PUE from Grüne Bürgerenergie (GBE) for RUs and SWPs.

The VAT exemption for solar products came into effect in December 2020. The measure aimed to reduce the acquisition cost of renewable production equipment by 18%. Anecdotal evidence seems to indicate companies have been able to benefit from the exemption, though sometimes after long processes. Further data collection is needed to confirm what seems to be a positive impact on sales. Feedback from companies highlighted that the exemption was key in enabling the industry to absorb the increased cost of products while maintaining affordability.

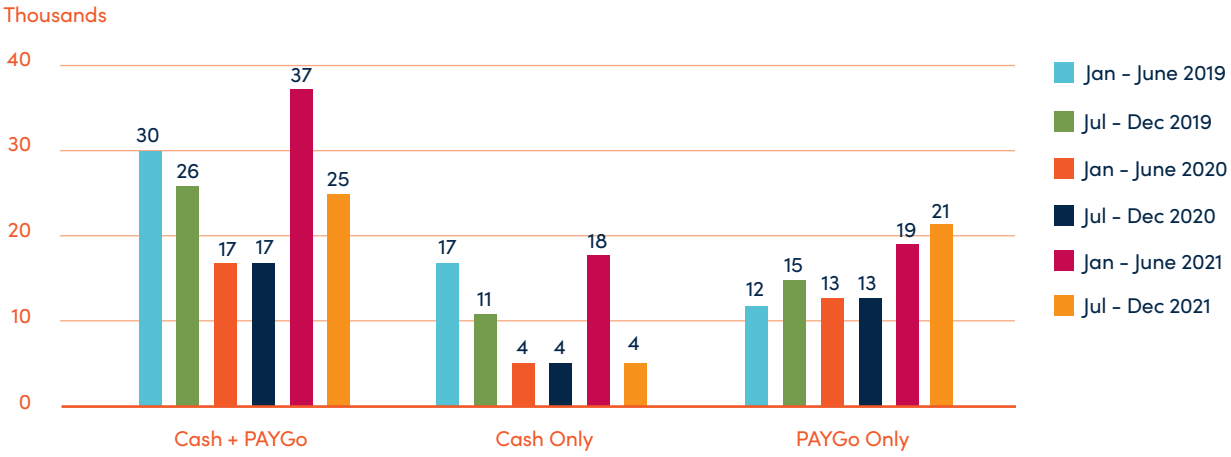
Sales Trends

Off-grid lighting products

Sales of Lighting Products reached 25,000 units between July and December 2021. This is a 32% decrease on the previous reporting round which had the highest volume reported so far in Senegal. Sales for the second half of 2021 are on par with the second half of 2019.

Cash sales reported during the first half of 2021 were particularly high. Cash sales this round are back in line with 2020 levels. Meanwhile PAYGo sales from manufacturers increased by 9% compared to the first half of 2021 and 43% compared to the second half of 2019.

Figure 32 - Semi-annual Evolution of Volume of Lighting Products Sold – Senegal



West Africa Insights

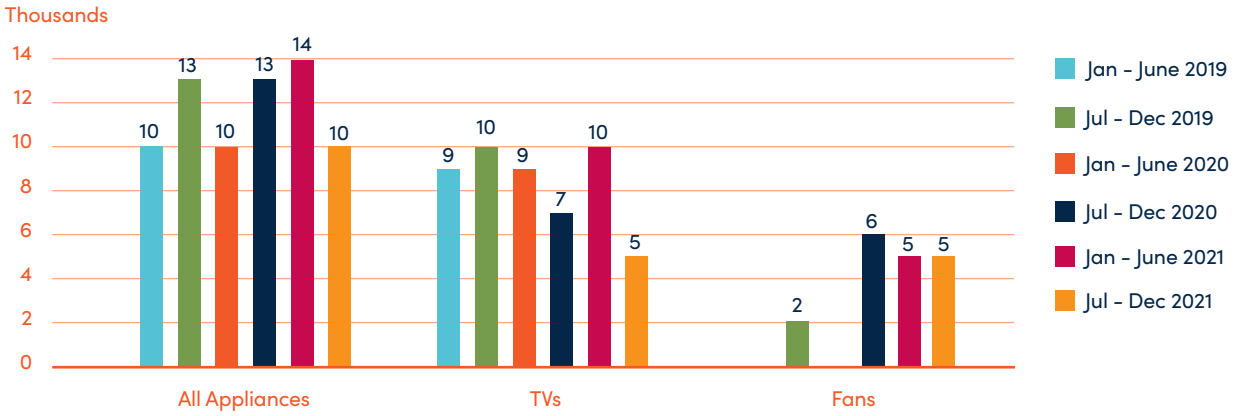
Senegal Insights

Appliances

Just over 10,000 key appliances were sold in the second half of 2021. This is a 28% decrease on the previous reporting round and a 17% decrease on the second half of 2019.

The decrease in sales is mainly driven by lower TV sales. TV sales dropped by almost 50% while fan sales were stable. Additionally, 375 RUs were sold this reporting round.

Figure 33 - Semi-annual Evolution of Volume of Appliance Products Sold – Senegal



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West Africa Insights

Togo Insights

Background

Economic growth in Togo in 2021 is almost back to the level where it was in 2019. However, as with most developing markets, this recovery is fragile. Beyond the COVID-19 pandemic, inflation and the potential for rising insecurity in the country's north are key risk factors.

Since 2017 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[49], in which the customer only pays 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 recently extended to solar water pumps[50] with a target to distribute 3,000 pumps[51].

Sales Trends

Off-grid lighting products

Off-grid lighting product sales reached their highest volumes yet for the second half year in a row. 33,000 units sold in the second half of 2021, a 12% increase on the previous reporting round and 38% higher than in the second half of 2019 before the pandemic. Sales in Togo remained relatively stable throughout the pandemic, despite a significant slowdown in GDP growth.

Cash sales decreased by 74% compared to the first half of 2021. Growth was driven by PAYGo sales which increased by 60% and represent 92% of units sold between July and December 2021. Further data collection is required to confirm such a high share of PAYGo in sales in Benin.

Appliances

7,000 key appliances were reported sold in Togo between July and December 2021. Appliance sales have been relatively stable since the second half of 2019 in absolute terms.

Unfortunately, too few companies shared appliance sales data to report on specific appliances.

Figure 34 - Semi-annual Evolution of Volume of Lighting Products Sold – Togo

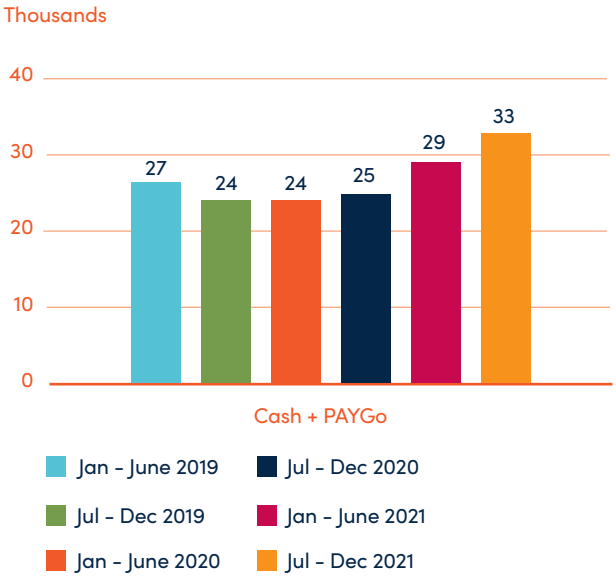
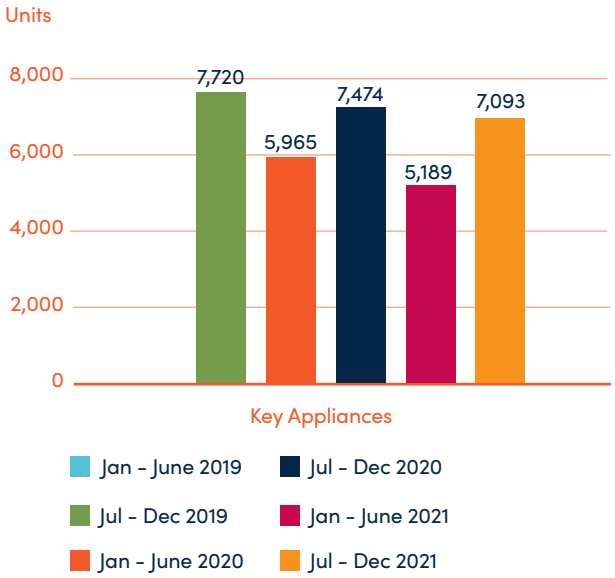


Figure 35 - Semi-annual Evolution of Volume of Appliance Products Sold – Togo



49 République Togolaise, The government launches the "CIZO solar check" to support households in the energy transition.
50 PV Magazine, EDF s'investit au Togo dans l'irrigation solaire pour les agriculteurs.
51 Togo First, Cizo: Solar-powered irrigation pumps to be set up in rural areas.

West Africa Insights

Other West African Countries

Ghana

Sales in Ghana have overall been on a declining trend since 2018. 5,580 units were sold during the second half of 2021, a small increase on the 4,900 units sold in the first half of the year. Both cash and PAYGo sales grew. 59% of sales volumes were PAYGo.

3,200 appliances were sold in the second half of 2021, a 36% decrease compared to the first half of 2021 and 25% lower than in the second half of 2019.

Unfortunately too few companies reported data per appliance type to include in this report, but only fans and TV sales were reported.

Sierra Leone

Lighting product sales have decreased by 82% compared to the first half of 2021 to reach 7,000 units sold. This also represents a 69% decrease compared to the second half of 2019. Additional data collection will be needed to identify whether this is part of a trend or not. Data from distributors hints at a much more stable market, but inflation is also a concern.

Over 6,000 units of key appliances were sold during the second half of 2021. This represents a 47% decrease compared to the first half of 2021. 69% of units sold were TVs, most of which were bundled with an SHS. Other appliances sold include fans and RUs.

© Futurepump

Central Africa Insights

Central Africa Insights

Regional Sales Trends

Off-grid lighting products

Sales of off-grid solar products in Central Africa reached 239,000 units between July and December 2021. This translates into a 38% increase compared to the first half of 2021 and a 94% increase compared to the second half of 2019. Cash sales increased by 26% while PAYGo sales increased by 77% compared to the first half of 2021.

Product Trends

Growth in sales in Central Africa is visible in all product categories. Lower sales of 1.5-3 Wp solar lanterns and high growth in the 0-1.5 Wp category are linked to product reclassification from the first category to the latter and not to evolutions in sales volumes[52]. Overall, lantern sales in Central Africa have grown compared to the first half of 2021.

Figure 36 - Semi-annual Evolution of Volume of Lighting Products Sold - Central Africa

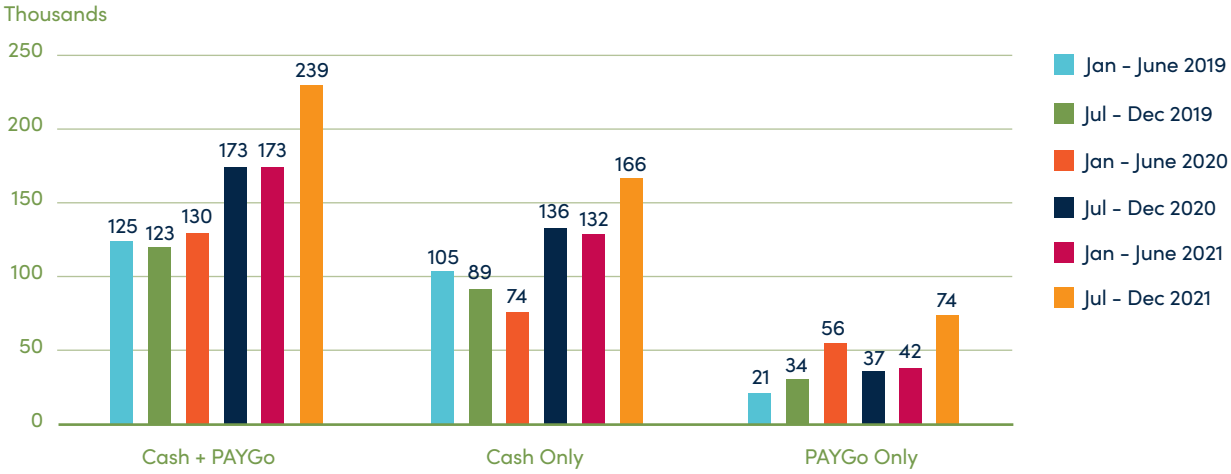


Table 10 - Semi-annual Evolution of Volumes Sold by Lighting Product Category – Central Africa

Categories		Jul-Dec 2021 volumes (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019	Share of PAYGo Jul-Dec 2021
Lanterns	0-1.5Wp	**152,183**	350%	132%	0%
	1.5-3Wp	**27,429**	-76%	4%	77%
Multi-light systems	3-10Wp	**20,651**	879%	73%	66%
Solar Home Systems	11-20Wp	**15,131**	50%	1,020%	-
	21-49Wp	**2,490**	273%	-19%	-
	50-100Wp	**21,413**	47%	46%	-
	100+Wp				-

52 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

Both Cameroon and DRC have seen strong growth in sales compared to the first half of 2021. Unfortunately, not enough companies reported data in other markets for them to be included in this report.

Off-grid solar appliances

97% of sales of appliances reported in the region are from the DRC. The vast majority of these are TVs and fans which are sold bundled with SHS. Therefore, trends in lighting products for DRC are reflected in the appliance data. **Total volumes of key appliances sold increased by 59% compared to the second half of 2020.**

Product Trends

Limited data is available on appliance sales per appliance type due to the number of companies reporting appliance sales in the DRC.

19,500 TVs were sold between July and December 2021. This is a 63% increase compared to the first half of 2021, but 19% below sales in the second half of 2019. 95% of TVs are sold bundled with a power source- and 100% are sold PAYGo. 186 RUs were reported sold, a 48% decrease compared to the previous reporting round. 70% of RUs are sold bundled.

Figure 37 - Semi-annual Evolution for Key Appliances and fans sales volumes – Central Africa

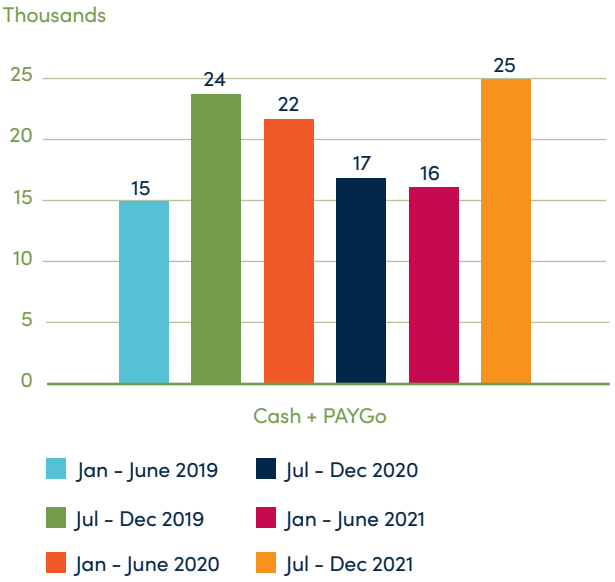


Table 11 - Semi-annual Evolution of Volume of Lighting Products Sold by Country – Central Africa

Region / Countries	Jul-Dec 2021 volumes (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019
Central Africa	**239,299**	**38%**	**94%**
Cameroon	160,724	48%	124%
Democratic Republic of Congo	70,240	68%	46%

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 Lighting Products in Cameroon grew 48% compared to the second half of 2021 reaching close to 161,000 units. This is also 124% higher than in the second half of 2019 before the pandemic affected the market. The vast majority of volumes are solar lanterns. Additional data collection rounds will be needed to confirm this trend. Anecdotal evidence points at the 2022 African Cup of Nations in Cameroon as a booster of sales in late 2021.

Unfortunately, not enough companies reported appliance sales for data to be featured in this report.

Democratic Republic of the Congo

Access to energy in DRC is currently supported by the World Bank's DRC Electricity Access and Services Expansion program which includes an active US$3.5 million RBF that has supported 26,000 sales since it started in late 2020.

70,000 lighting products were sold during the second half of 2021, a 68% decrease in sales compared to the first half of the year and a 46% increase compared to the second half of 2019, before the COVID-19 pandemic.

Close to 24,000 units of key appliances were sold in the DRC in the second half of 2021, a 57% increase compared to the first half of the year. These include almost 19,000 TVs most of which were bundled with power systems. 186 refrigeration units were also sold. Data on other appliances cannot be shared due to the limited number of companies reporting.

© FINCA International

South
Asia
Insights

South Asia Insights

Regional Sales Trends

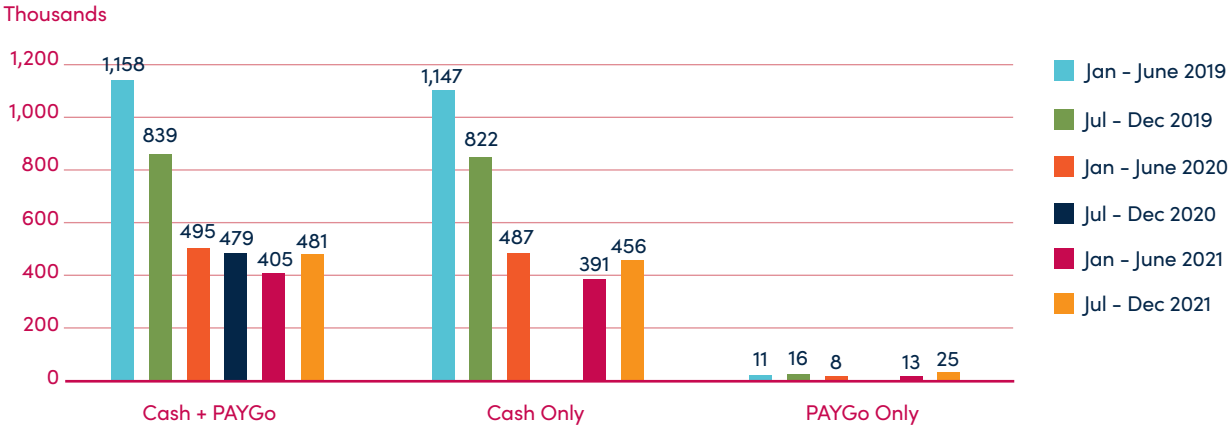
Off-grid lighting products

Sales of off-grid lighting products in South Asia have increased by 19% compared to the first half of 2021 to reach 481,000 units sold. This is the first half year with reported growth in sales since the first half of 2018. The South Asian market, dominated by India, has been on a declining trend for a few years and this decline was accelerated by the COVID-19 pandemic.

Product Trends

Sales in South Asia are predominantly driven by solar lanterns (86% of all volumes this round) and cash sales (95%). With India, representing the majority of sales reported, the trends for the region tend to reflect the Indian market which was particularly hard-hit by the pandemic in the first half of 2021 and where the product mix has been progressively evolving away from traditional off-grid solutions (see India section below). High relative increases in sales of SHS compared to the previous reporting round are mostly due to particularly low sales reported in the second half of 2020 which was in part attributable to fewer companies participating in the data collection in India and Bangladesh. With approximately 65,500 units sold, the SHS segment remains below pre-COVID levels. In the second half of 2019, 101,000 SHS were reported to have been sold in South Asia.

Figure 38 - Semi-annual Evolution of Volume of Lighting Products Sold – 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 Volume of Lighting Products Sold by Lighting Product Category – South Asia

Categories		Jul-Dec 2021 volumes (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019
Lanterns	0-1.5Wp	**219,151**	43%	-10%
	1.5-3Wp	**192,401**	61%	-55%
Multi-light systems	3-10Wp	**54,083**	-19%	-19%
Solar Home Systems	11-20Wp			
	21-49Wp			
	50-100Wp			
	100+Wp			

South Asia Insights

Countries Overview

With 457,000 units sold, India remains by far the largest market in South Asia. This round, with low participation in the data collection from companies in Bangladesh, India represents 95% of all sales in the region.

Unfortunately, not enough companies reported sales in Bangladesh for us to be able to share data this round. The low turn-out in Bangladesh means regional sales are also likely higher.

Off-grid solar appliances

Product Trends

84,000 units were sold between July and December 2021, 99% of which were fans. This is 51% lower than during the first half of 2021. Usually recorded fan sales are higher during the first half of the year than during the second half of the year. Companies have indicated that fan sales operate on a pre-booking system, causing distributors to purchase fans in bulk quantity early in the year and then selling stock to end-users from March onwards, reordering in the next year when inventories run low. A high peak in volumes in the first half of 2019 makes comparisons with the pre-COVID period hard to interpret. Low sales for the second half of 2021.

In contrast with trends in Sub-Saharan Africa, 100% of those sales were a cash basis and 93% of units were sold independently from a power source. 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 lighting products and solar home systems. 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 than towards the kits being favored in Sub-Saharan Africa. Subsequently this also decreases the possibility for the bundling of appliances with sales of solar kits.

In addition to seasonal trends explained above, several factors may have alsocontributed to lower sales for the second half of 2021:

- Fewer companies in Bangladesh took part in the data collection this round
- Shortages and increased prices of raw materials such as aluminum and copper
- Inflation in key markets leading to lower ability to pay for appliances

Unfortunately, not enough companies reported sales of other appliance categories to share data in this report. Furthermore, India is the only country for which appliance data can be shared (see below).

Figure 39 - Semi-annual Evolution for Key Appliances and fans sales volumes – South Asia

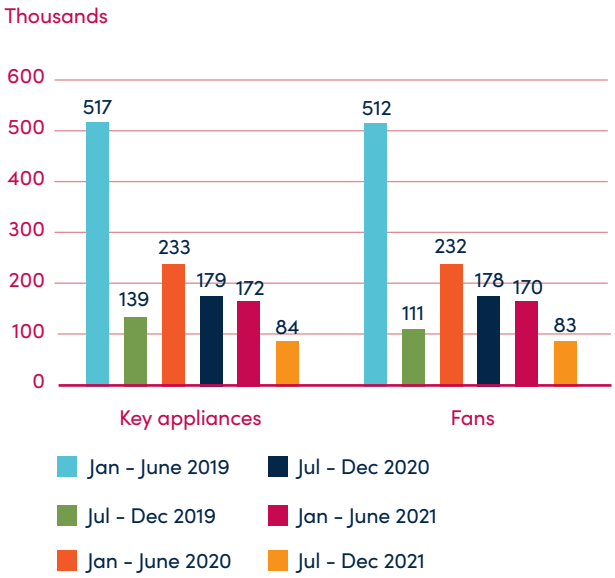


Table 13 - Semi-annual Evolution of Volume of Lighting Products Sold by Country - South Asia

Region / Countries	Jul-Dec 2021 volumes (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019
South Asia	**480,855**	**19%**	**-43%**
India	457,000	39%	-41%
Pakistan	8,319	-35%	-23%

South Asia Insights

India Insights

Background

India had been particularly hard-hit by the pandemic during the first half of 2021 with companies struggling with supply chain disruptions and COVID-19 related restrictions affecting their ability to operate. Insights shared by companies highlight that there are some positive signs from distributors, including MFIs, which play a key role in the Indian market. Supply chain issues remain an obstacle.

However, despite positive signals for 2022, sales reported in India have been on a structurally declining trend as the product mix is evolving away from traditional off-grid products like solar lanterns towards weak-grid products which this report does not aim to 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 grid[53].

Sales Trends

Off-grid lighting product

Sales of lighting products increased by 39% compared to the first half of 2021 and now stand at 457,000 units, 41% lower than during the second half of 2019. 96% of volumes were sold in cash.

Appliances

Just over 10,000 units of key appliances were sold in India between July and December 2021. Of these, 91% are fans. All fans were sold cash, but 61% were bundled with a power system.

Not enough companies reported sales of other appliances to include the data in this report.

Figure 40 - Semi-annual Evolution of Volume of Lighting Products Sold – India

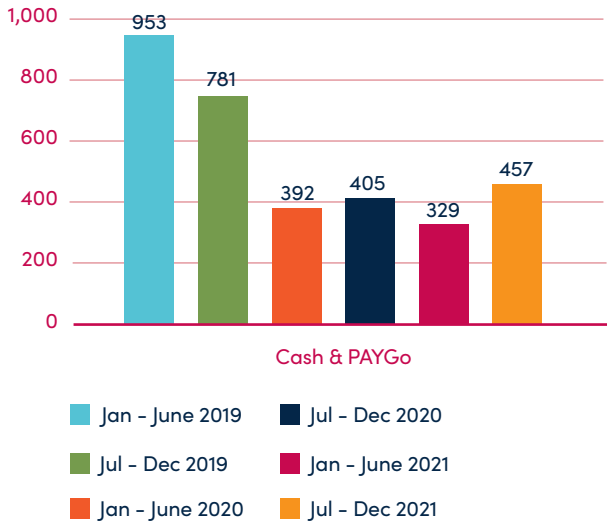
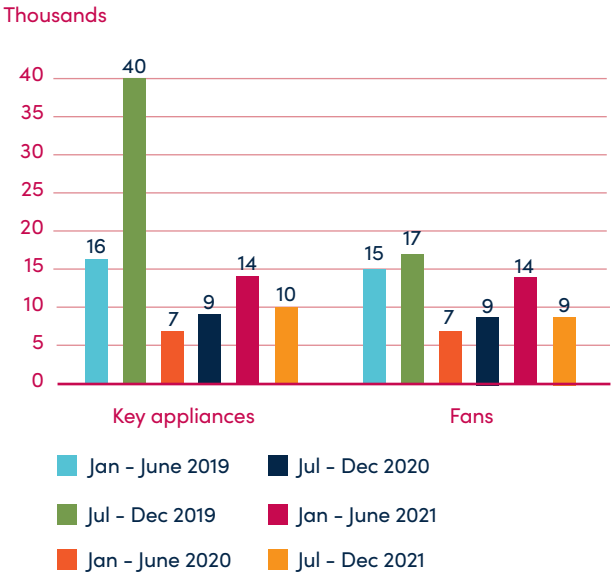


Figure 41 - Semi-annual Evolution of Volume of Key appliances and Fans Sold – India



53 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.

East Asia & Pacific Insights

East Asia & Pacific Insights

Regional Sales Trends

Off-grid lighting products

Sales of off-grid lighting products totaled 185,000 units in the region between July and December 2021. This is a 69% increase in sales compared to the first half of 2021, but remains 25% lower than during the second half of 2019 before the pandemic.

77% of volumes were cash sales, but PAYGo sales have been growing faster and more consistently over the last two years.

Product Trends

The data shows increased sales in lanterns in the second half of the year for 2021, which may be at least in part due to seasonal factors. SHS sales to the region are irregular and often include spikes linked to bulk procurements. Two of these spikes occurred in the first half of 2021 and the second half of 2019 which explains the variation in sales compared to the current reporting period.

Figure 42 - Semi-annual Evolution of Volume of Lighting Products Sold – East Asia and the Pacific

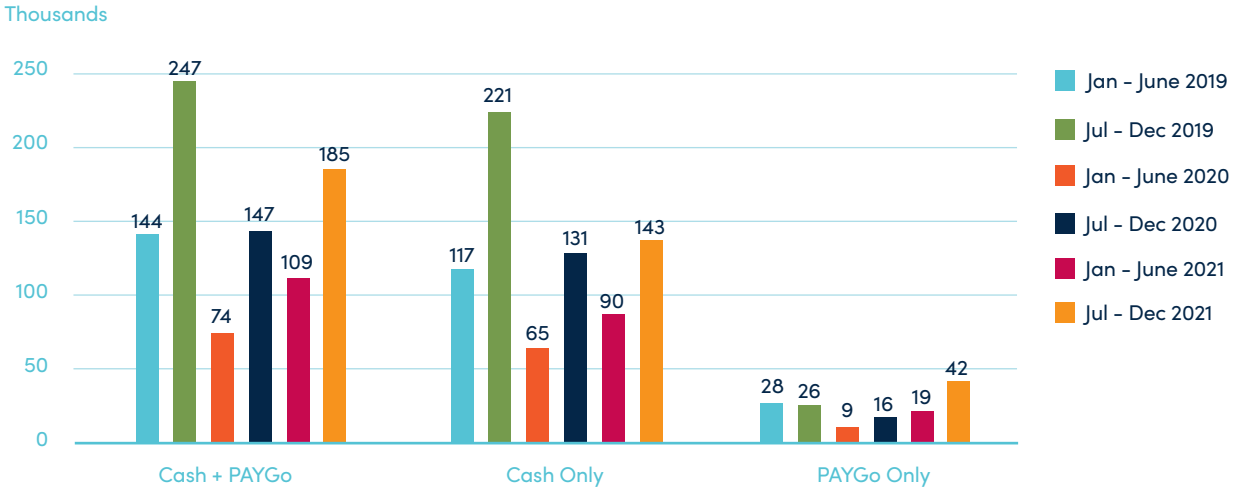


Table 14 - Semi-annual Evolution of Volumes Sold by Lighting Product Category – East Asia and the Pacific

Categories		Jul-Dec 2021 volumes (Cash & PAYGo)	% change v. Jan-Jun 2021	% change v. Jul-Dec 2019	Share of PAYGo Jul-Dec 2021
Lanterns	0-1.5Wp	**49,745**	136%	9%	0%
	1.5-3Wp	**65,628**	471%	147%	-
Multi-light systems	3-10Wp	**25,855**	107%	-10%	37%
Solar Home Systems	11-20Wp	**39,704**	52%	348%	60%
	21-49Wp	**2,476**	-50%	-47%	-
	50-100Wp	**1,513**	-95%	-98%	-
	100+Wp				-

East Asia & Pacific Insights

Countries Overview

Reported sales of lighting products in most countries in the region have been irregular overtime and discernable patters are rare. For example, sales in the Philippines spiked during the first half of 2021 due to what can anecdotally be attributed to bulk purchases.

Off-grid solar appliances

Appliance sales in the East Asia and Pacific region seem to be slowly building back up after falling below 4,000 units in the first half of 2020. **Between July and December 2021, over 10,000 units of key appliances were sold in the region.** The vast majority were sold in cash. Volumes reported for the second half of 2021 are on par with volumes reported in 2019 before the pandemic.

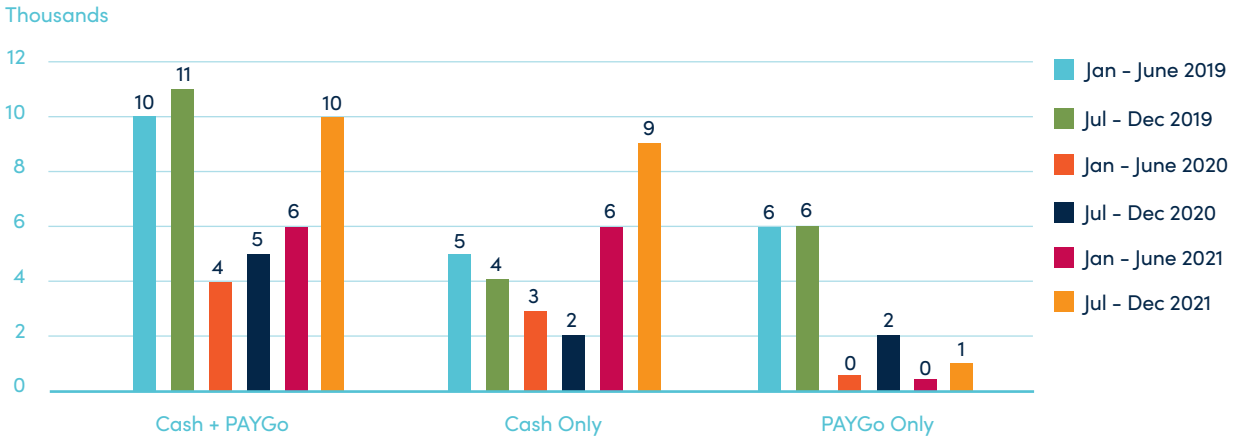
The sales include 8,600 fans and 1,100 TVs. The majority of all appliances are reported as being sold bundled with a power system.Unfortunately data on sales of RUs and SWPs cannot be shared due to the number of companies participating in the data collection.

Table 15 - Semi-annual Evolution of Volume of Lighting Products Sold by Country – East Asia and the Pacific

Region / Countries	Jul-Dec 2021 volumes (Cash & PAYGo)	% change v. Jan-Jul 2021	% change v. Jul-Dec 2019
East Asia & Pac.	**184,945**	**69%**	**-25%**
Papua New Guinea	69,572	65%	185%
Myanmar	34,011	612%	-77%
Philippines	32,398	-41%	-20%
Fiji	12,992	1,165%	
Vanuatu	11,321		
Indonesia	9,840		

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

Figure 43 - Semi-annual Evolution of Volume of Key Appliances Sold – East Asia and the Pacific



East Asia & Pacific Insights

Papua New Guinea (PNG) Insights

Background

The access to energy sector should keep on benefiting from the support of the 'Pawarim Komuniti' grant program set up by the Australian Department of Foreign Affairs and Trade (DFAT). The first four projects began implementation in early 2021.

Further support is coming from the USAID-led PNG Electrification Partnership (PEP) which was announced in November 2020 with a US$57 million budget and five years to electrify 200,000 households. An upcoming call for proposals for quality-verified Tier 1 and above stand-alone solar products was recently announced.

Sales Trends

Off-grid lighting products

Off-grid lighting product sales totaled 70,000 units in the second half of 2021. This represents an 65% increase in volumes compared to the first half of 2021 confirming the overall growth trend for PNG's off-grid market. 81% of products were cash sales. However, although data on product categories cannot be shared due to the number of companies reporting, data confirms a significant portion of sales are SHS.

Appliances

Limited data is available for appliance sales in PNG. **2,371 units sold were recorded between July and December 2021. This represents a 139% increase compared to the previous reporting round.** Additional data collection rounds will be required to confirm this, but data seems to indicate an overall positive trend with strong seasonal variations.

Fans represent 87% of products sold. All were sold cash, but bundled with a power system.

Not enough companies reported data on other appliance types to include them in this report.

Figure 44 - Semi-annual Evolution of Volume of Lighting Products Sold – Papua New Guinea

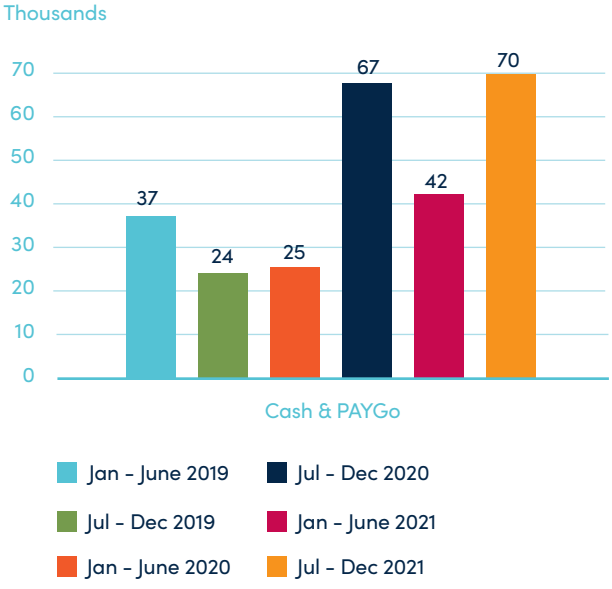
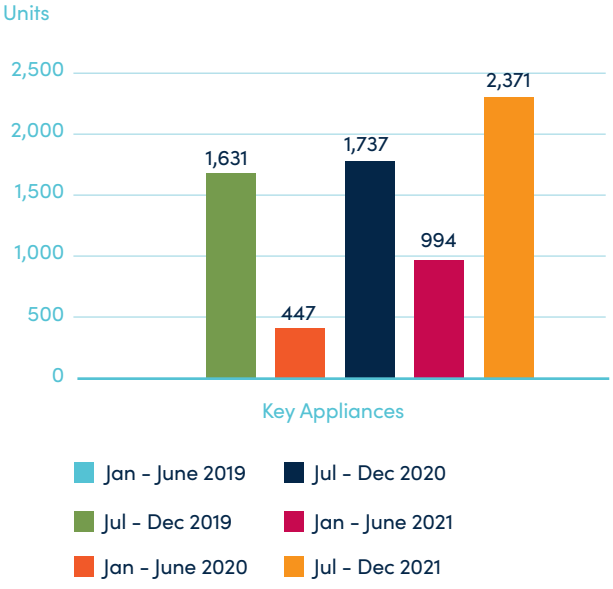


Figure 45 - Semi-annual Evolution of Volume of Key Appliances Sold – Papua New Guinea



Global Impact

Global Impact

Estimated impact of off-grid lighting products and appliances

101 million
people currently living in a household with improved energy access[54]

2.6 million
people currently using their SHS to support an enterprise*

55 million
people currently accessing Tier 1 energy services, based on the Sustainable Energy for All Global Tracking Framework

14 million
people currently accessing Tier 2 energy services based on the Sustainable Energy for All Global Tracking Framework

$12.9 billion
savings on energy expenditure, over the expected lifetimes of all portable lanterns or multi-light systems sold since July 2010

90 million
metric tonnes of carbon dioxide and black carbon emissions avoided (in CO_2e), over the expected lifetime of all off-grid solar lighting products sold since July 2010

5.6 million
people currently benefiting from high performing, off-grid televisionstelevisions

108,000
people using high-performing, off-grid TVs to support enterprise

4.9 million
people currently undertaking more economic activity as a result of using off-grid solar lighting products

4.2 million
currently accessing cooling service from high performing, off-grid fans

24,000
people using high-performing, off-grid fans to support enterprise

$7 billion
additional income generated as a result of off-grid system ownership, over the expected lifetime of all off-grid solar lighting products sold since July 2010

* E.g. charging phones for a fee or operating a bar, restaurant or shop/stall at night

54 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 380 million people based on sales reported to GOGLA alone. Currently, 101 million people benefit from improved energy access through an off-grid solar product. Of these 101 million, 55 million are currently accessing Tier 1 systems and 14 million are accessing larger SHS, Tier 2, solutions[55].

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. However, with the progressive return to growth, energy access metrics are slowly gaining pace again.

Nonetheless, more than 700 million people are still living in energy poverty[56], and population growth means that millions more will need to be reached by 2030. COVID-19 has slowed down the progress made by off-grid solar in reaching the unserved. It is estimated that during the last two years an additional 31 million people could have been reached if the industry had remained on its 2019 growth trajectory.

Off-grid solar remains an important solution to address energy poverty and climate change. It has the potential to be deployed more rapidly than any other electrification technologies, and to reach remote communities who would not be connected to the grid for decades to come. Off-grid solar also delivers a wealth of other economic, social and environmental benefits, many of which are detailed below.

Economic Impacts of Off-Grid Solar

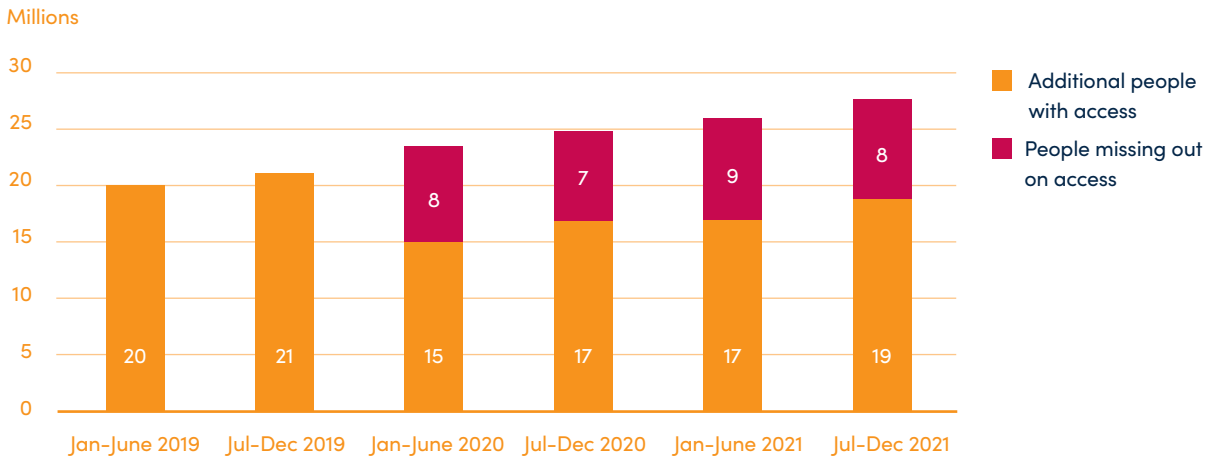
4.9 million people are currently undertaking more economic activity as a direct result of owning an off-grid lighting product. Cumulatively, economic opportunities unlocked or improved through ownership of off-grid solar products has led to US$7 billion in additional income generated by customers since 2010. Coupled with the savings that smaller off-grid products, such as lanterns and multi-light kits, have created for households, the sector's benefit to the finances of millions of low-income households is close to $20 billion since 2010.

In particular, off-grid solutions are boosting economic opportunity across rural and peri-urban communities. An estimated 2.6 million small and micro enterprises are currently supporting their activity with off-grid solar products - the majority of them based in rural regions.

Environment & Air Pollution

As with economic impact, the rate of greenhouse gas reductions created by the sector had also slowed down due to the pandemic. **However, the total CO_2e emissions avoided since 2010 (across**

Figure 46 - Semi-annual evolution of the number of people gaining improved energy access and of the number of people missing out on improved energy access due to the COVID-19 pandemic[57] - World



55 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.

56 IRENA et al. (2021), Tracking SDG 7: The Energy Progress Report 2021.

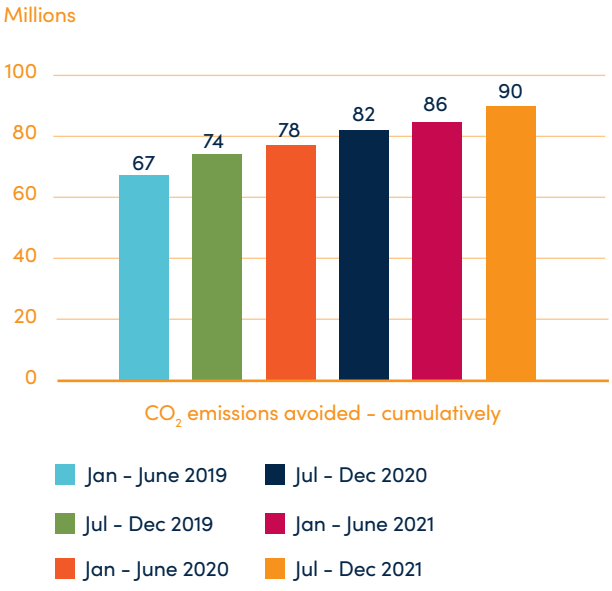
57 High level estimate based on access rates if sales numbers had risen by the same 13% increase as they did between 2018 and 2019, using the Standardised Impact Metrics.

product lifetime) now almost reaches 90 million metric tons. This is equal to the emissions avoided by taking 24 coal power plants off-line for a year[58]. Emissions reductions also have critical health benefits. Most 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[59&60] and that its most damaging effects are on women and children. Removing kerosene pollution from homes significantly improves air quality and health.

New data is also available on the emissions avoided by the use of off-grid televisions and fans. Although these products commonly provide an additional rather than replacement energy service, where solar powered TVs and fans replace those that are being powered by diesel generators, valuable benefits are seen.

Emissions avoided by high-performing fans and televisions since July 2018 are already above 22,000 metric tons. This is equivalent to the CO_2e emissions from burning 121 railcars worth of coal[61].

Figure 47 - Semi-Annual Evolution of CO_2e Emissions Avoided Cumulatively - World



Light Use & Quality

Product improvements in the sector on battery lifetime and lumen output (brightness) are leading to better and longer access to light for households. Households moving from kerosene lamps (25 lumens) or candles (12 lumens) to off-grid lighting products are gaining more than 200 lumens on average. They are also likely to gain more than 1,900 hours of access to light per year which amounts to more than five hours per day.

Access to High-Performing TVs

An estimated 5.6 million people are also benefiting from the use of off-grid TVs, 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.

Access to High-Performing Fans

High-performing fans are currently benefiting over 4.2 million people and are being used within more than 24,000 businesses.

Predominantly sold in South Asia, off-grid fans are a critical tool in cooling for health. 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.

58 United States Environmental Protection Agency (2021), Greenhouse Gas Equivalencies Calculator.
59 Pokhrel et al. (2010), Tuberculosis and Indoor Biomass and Kerosene Use in Nepal: A Case–Control Study.
60 Bates et al. (2013), Acute Lower Respiratory Infection in Childhood and Household Fuel Use in Bhaktapur, Nepal.
61 United States Environmental Protection Agency (2021), Greenhouse Gas Equivalencies Calculator.

Global Impact

Table 16 - Global Impact by Product Category - Lighting Products

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	**380 million**	**100 million**	**55 million**	**14 million**
0-1.5 Wp	157.4 million	26.8 million	5.8 million	0
1.5-3 Wp	144.4 million	32.3 million	25.3 million	0
3-10 Wp	48.0 million	18.5 million	16.5 million	0
11-20 Wp	10.3 million	6.9 million	6.4 million	0.005 million
21-49 Wp	8.1 million	6.0 million	0.8 million	4.8 million
50-100 Wp	8.4 million	7.1 million	0.02 million	6.6 million
100+ Wp	3.7 million	3.0 million	-	2.9 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	**4.9 million**	**2.6 million**	**2.5 million**	**US$ 7 billion**
0-1.5 Wp	0.8 million	0.6 million	0.3 million	US$ 1.6 billion
1.5-3 Wp	0.9 million	0.7 million	0.3 million	US$ 1.5 billion
3-10 Wp	1.6 million	0.7 million	1.0 million	US$ 2.2 billion
11-20 Wp	0.5 million	0.2 million	0.3 million	US$ 0.5 billion
21-49 Wp	0.4 million	0.2 million	0.3 million	US$ 0.4 billion
50-100 Wp	0.4 million	0.2 million	0.3 million	US$ 0.5 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	Change in quality of light - Household (average in lumens)
All Categories	**100 billion**	**1,932**	**211**
0-1.5 Wp	39.5 billion	1,922	-10
1.5-3 Wp	36.9 billion	2,022	52
3-10 Wp	11.6 billion	1,572	154
11-20 Wp	2.8 billion	1,535	309
21-49 Wp	2.5 billion	1,609	780
50-100 Wp	4.3 billion	2,779	494
100+ Wp	2.0 billion	2,841	2,028

Table continues on next page >

Global Impact

Product Categories	Change in energy spending - cumulatively	Change in energy spending - household	Kerosene lanterns replaced - currently	CO_2e emissions avoided - cumulatively
All Categories	**US$ 13 billion**	**$186**	**19.4 million**	**89.6 million**
0-1.5 Wp	US$ 6.6 billion	$187	5.5 million	36.3 million
1.5-3 Wp	US$ 5.0 billion	$173	6.5 million	32.6 million
3-10 Wp	US$ 1.4 billion	$211	3.4 million	11.0 million
11-20 Wp	$-	$-	1.2 million	2.7 million
21-49 Wp	$-	$-	1.2 million	2.4 million
50-100 Wp	$-	$-	1.1 million	3.0 million
100+ Wp	$-	$-	0.5 million	1.6 million

NOTE:

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

Table 17 - Global Impact by Product Category - Appliances

	No. of people benefitting, cummulative appliances	No. of people benefitting, currently	No. of People using their appliance to support enterprise	No. of people generating additional income	Metric tons of CO_2 avoided
TVs	6.3 million	5.6 million	108,393	48,175	14,770
Fans	8.7 million	4.2 million	24,369		7,508

NOTE:

- Impact is estimated using the Standardised Impact Metrics for High-Performing Appliances: Fans and TVs, Version 1, 2020 developed by GOGLA and the Efficiency for Access Coalition. 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.
- The metric 'Number of People Generating Additional Income' is currently only available for TVs.

Methodology

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 Lighting Products (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 2021.

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 companies categorized as manufacturers is presented. Data published in this report is mostly aggregated sales volumes data. Other computations include:

- The estimated market value for Lighting Products 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 Lighting Products 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[62] and the Standardized Impact Metrics for High-Performing Appliances: Fans and TVs[63]. Metrics for solar water pumps are currently being developed.

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.

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. **96 companies participated in this round and reported sales covering the period July-December 2021.** Among them 62 reported sales for both Lighting Products and appliances, 19 just for Lighting Products and 15 just for appliances.

62 GOGLA, Standardised Impact Metrics for the Off-Grid Solar Energy Sector.
63 CLASP, Standardised Impact Metrics for High-Performing Appliances: Fans and TVs.

Methodology of Sales Data Collection

Table 18 - List of Participating Companies

#	Company Name	Off-Grid Solar Lighting	Off-Grid Solar Appliances
1	A4&T Power Solutions Limited	DIS	DIS
2	Afreesun Limited	MAN	-
3	Agsol	-	MAN
4	Alina Energy	DIS	DIS
5	Alqaria	DIS	DIS
6	Alternative Energy Technologies Group (Altech Group)	DIS	DIS
7	ARESS	DIS	-
8	Azuri Technologies Ltd	MAN	MAN
9	BAOBAB+	DIS	MAN & DIS
10	Barefoot Power	MAN	MAN
11	Bboxx Ltd.	MAN	MAN & DIS
12	BEEBEEJUMP TECHNOLOGY CO.. LTD	MAN	MAN
13	BioLite	MAN	MAN
14	Bonergie SARL	DIS	MAN & DIS
15	Bright Products AS	MAN	-
16	CECEP SOLAR ENERGY TECHNOLOGY (ZHENJIANG) CO.. LTD.	MAN	-
17	Celfre Energy (Private) Limited	-	DIS
18	d.light design. Inc.	MAN	MAN
19	DASSY Enterprise Ltd	DIS	DIS
20	Deevabits Green Energy Ltd	DIS	DIS
21	Devidayal Solar Solutions Pvt. Ltd.	MAN	MAN
22	DGridEnergy. LLC	MAN	MAN
23	Earth Technologies	MAN	-
24	Easy Solar (Azimuth)	DIS	DIS
25	Energy + SA	DIS	DIS
26	ENGIE Energy Access	MAN	MAN
27	ENGIE Energy Access	MAN	MAN
28	ennos ag	-	MAN
29	Epicenter Africa Ltd	DIS	DIS
30	FINCA PUS LLC T/A BrightLife	DIS	DIS
31	Fosera Solarsystems	MAN	MAN & DIS
32	FUTUREPUMP LIMITED	-	MAN
33	GLOBAL ICE TEC AG	-	MAN
34	Goodbook Investments/Kumusha Power	DIS	-
35	GREENLIGHT PLANET INCORPORATED	MAN	MAN & DIS
36	Guangdong Jinyuan Solar Energy Co..Ltd	MAN	MAN
37	INNOVATION AFRICA LIMITED	-	MAN & DIS
38	Jonchn Electrical Science & Technology Co..Ltd	MAN	-
39	JUA Energy Company Limited	MAN	MAN
40	Koolboks	-	MAN
41	Lagazel	MAN	-
42	LittleSun GmbH.	MAN	-
43	Mango Energy Technologies co. Ltd	MAN	-
44	Micergy Company Limited	MAN	MAN
45	M-KOPA	MAN	MAN
46	Moon	MAN	-
47	Namene Solar Lights Limited	MAN	-
48	NIWA	MAN	MAN
49	Offgridsun	MAN	MAN
50	OmniVoltaic Energy Solutions Company Limited	MAN	MAN
51	Oolu Solar	DIS	DIS
52	Oorja Development Solutions India Private Limited	-	DIS
53	Pawame	DIS	DIS
54	PEG Africa	DIS	DIS
55	Phaesun GmbH	MAN	-
56	Plug The Sun Limited	MAN	MAN
57	Poly Solar Technologies (Beijing) Co.. Ltd.	MAN	-
58	POWER TRUST UGANDA LIMITED	DIS	DIS
59	Powerband Green Energy Ltd.	MAN	MAN
60	Qingdao LEFF International Trading Co.. Ltd	MAN	MAN
61	Qotto	DIS	DIS
62	RDG Collective	MAN	MAN
63	Renewit	MAN	MAN
64	SHENZHEN JCN NEW ENERGY TECHNOLOGY CO..LTD	MAN	-
65	Shenzhen Power-solution Ind. Ltd.	MAN	MAN
66	Shenzhen Solar Run Energy Co.. Limited	MAN	MAN
67	Simusolar. Inc.	-	DIS
68	Sinoware Technology Co.. Ltd	MAN	-
69	Smarter Grid International	MAN	MAN
70	Solar Panda	MAN	MAN
71	Solar Sister	DIS	DIS
72	Solar Village AS	MAN	MAN & DIS
73	SolarHome	DIS	MAN & DIS
74	SolarWorks! BV	DIS	MAN & DIS
75	Solibrium Solar Ltd. (Kenya)	DIS	DIS
76	Sosai Renewable Energies Company	DIS	DIS
77	Starco Fans	-	MAN
78	StarTimes Solar	MAN	MAN
79	SUNami Solar Ltd	MAN	MAN
80	SunCulture	MAN	MAN
81	SunDanzer	-	MAN
82	SUNKEN LIMITED	-	DIS
83	Sunny Irrigation Ltd	-	DIS
84	SunnyMoney (SolarAid)	DIS	-
85	Taatisolar Namibia (Pty) Ltd.	DIS	DIS
86	Tamoor fans	-	MAN
87	TotalEnergies Offgrid Solar Solutions SAS	MAN & DIS	DIS
88	UltraTec (U) Ltd	DIS	DIS
89	upOwa	DIS	-
90	Villageboom	MAN	-
91	VITALITE Senegal	DIS	DIS
92	X-Solar Systems Ltd.	MAN	MAN
93	Youmma Solar	-	MAN
94	Zimpertec Gmbh & Co KG	MAN	MAN
95	Zola Electric	MAN	MAN
96	Zonful Enterprises (Pvt) Ltd T/A Zonful Energy	DIS	MAN & DIS

NOTE:
Companies are classified as either distributors (DIS) of other companies' branded products, or as manufacturers (MAN) if they are selling their own-brand products. For the Off-Grid Solar Appliances category, there may be companies classified as both manufacturers and distributors, as companies often sell both their own branded appliances, while also distributing other companies' products.

Methodology of Sales Data Collection

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

Market Share Represented

For Off-Grid Solar Appliances, the proportion of the total market that is represented by our affiliates has not yet been estimated. This is partly due to insufficient data on the total size and number of players in this market. Continuous efforts are made to estimate such coverage as well as ongoing efforts to engage a larger number of companies in upcoming rounds.

For Off-Grid Solar Lighting Products, based on the recently completed analysis for the '2020 Global Off-Grid Solar Market Trends Report', it is **estimated that in 2018 sales of affiliates represent over 50% of the market for plug-and-play solar home systems. When including portable lanterns and multi-light systems the percentage of affiliates in 2018 decreases to 28%.**

Countries and Regions

The regional groupings in this report follow those outlined by the World Bank country and lending groups[64]. Sub-regional groupings in sub-Saharan Africa follow the United Nations' categorization of geographical sub-regions[65].

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 rule).** 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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64 World Bank, World Bank Country and Lending Groups.
65 United Nations Statistics Division, Standard Country or Area Codes for Statistical Use (M49).

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