

# Accelerating uptake of pico PV systems and high tier cookstoves in Kenya through results-based financing

Experiences and lessons learnt  
September 2020

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## Glossary

DFID	UK Department for International Development
EnDev	Energising Development Programme
ISO-IWA	International Standards Organisation-International Workshop Agreement
g/min	Gram per minute
ICS	Improved Cookstoves
IVA	Independent Verification Agent
LMEs	Last Mile Entrepreneurs
LPG	Liquefied Petroleum Gas
MESPT	Micro Enterprises Support Programme Trust
Mg/min	Milligram per minute
PAYGO	Pay-As-You-Go
RBF	Results-Based Financing
SHS	Solar Home System
SNV	Netherlands Development Organisation
tCO <sub>2</sub> e	Tonnes of carbon dioxide equivalent

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## Accelerating the uptake of Pico PV Systems and High Tier Cookstoves in Kenya through Results-Based Financing: Experiences and lessons learned.

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# Executive summary

This report presents the results and key lessons learned from two Results-Based Financing (RBF) projects implemented in Kenya between 2016 and 2019 for (1) High tier Cookstoves (***Clean Cookstoves Market Acceleration Project***) and (2) Pico PV systems (***Building Sustainable and Affordable Credit Lines for Small Solar Systems in Rural Areas project***). The projects supported higher tier cookstoves and off-grid solar systems respectively and were implemented with funding from the global Energising Development Programme, by local fund managers SNV Kenya and Micro Enterprises Support Programme Trust.

The RBF model was designed to provide financial incentives to private sector actors selling solar systems and improved cookstoves, as a temporary measure aimed at transforming the markets to an efficient and self-sustaining level. The RBF incentives were provided as an ex-post payment to beneficiaries, distributors and financial institutions per unit of product sold, upon delivery and verification of pre-agreed results by an external independent verifier.

The RBF projects overshot their targets by 181% and 126% respectively, with 272,128 quality solar systems and 100,796 improved cookstoves deployed. Distributors outperformed financial institutions in both projects as they leveraged their last-mile entrepreneurs' networks and partnerships with financial institutions to deliver products to end-users. At the time, financial institutions considered both sectors as too high risk and sales in this sector were therefore marginal.

For off-grid solar, solar home systems accounted for 61% of the total incentivised sales, while lanterns accounted for 39%, both sold through Pay-As-You-Go models. Improved charcoal stoves (tier 2) dominated cookstove sales performance at 73% followed by Liquefied Petroleum Gas (LPG) at 21%. This is attributed to well-developed charcoal supply chains in the country, compared to the less mature supply chains for LPG, briquettes and ethanol fuels.

The projects aimed to drive market maturity in both marginalised and non-marginalised counties (see Section 4.3 for details). However, non-marginalised counties registered higher sales performance with 77% and 94% of total solar and cookstoves sales respectively. Better developed infrastructure and supply chains in these counties enabled beneficiaries to expand their existing distribution networks and/or set up new ones with support from RBF funds. The low sales level in marginalised counties is attributed to high logistical costs experienced by companies due to poor road infrastructure and mobile network coverage.

As a result of the projects, 1.6 million people were able to access cleaner energy solutions and 4,678 new jobs were created along the solar and cookstoves value chains, with at least 40% of these jobs going to women. The projects also facilitated the avoidance of about 97,900 tonnes of CO<sub>2</sub> equivalent. Moreover, the projects supported market transformation through expansion and diversification of quality products, enhanced business operations and credit management, growth and expansion of distribution networks, and provision of end-user credits for solar products.

SNV's systems change concept aims to improve further our abilities to achieve and show systemic results by not only creating results for the direct target population, but also focusing on creating impact that sustains over time and grows to reach more people beyond the projects' boundaries.

The Pico PV and Cookstoves RBF projects have contributed to realising SNV's systems change through:

- leveraging households and private sector investments of Euro 47.3 million in product value;
- kick-starting solar and cookstoves markets in marginalised areas;
- promoting larger solar systems and higher tier cookstoves in the market;
- influencing governments and other stakeholders to adopt RBF approaches; and
- contributing to changing norms in terms of new business practices, emerging rural markets, and increased awareness of energy solutions among end users and stakeholders.

Key challenges and lessons learned during project implementation included the need for identification of appropriate target beneficiaries, costly verification processes, data reporting and data quality issues as well as working capital constraints by beneficiaries. These led to several adjustments during project implementation to achieve project results.

The report highlights several recommendations on RBF model design and implementation processes. Future RBF incentives should be designed in a way that motivates business growth and includes an up-front grant to facilitate initial implementation. An appropriate level of technical assistance is essential to complement the RBF incentives to support the sustainable transformation of business operations. Moreover, effective data collection to support monitoring and evaluation through a strategic partnership with a competent independent verifier is key to support timely results verification and incentive disbursements. Some of these lessons have been incorporated into the subsequent interventions in Kenya such as the EnDev III Cookstoves RBF project and the Kenya Off-Grid Solar Access Project. The report underscores the importance of flexibility in the project implementation approach from both the beneficiary's and implementer's perspectives to leave room for adaptation to dynamic market conditions.

# 1. Introduction

This publication presents the results and key lessons learned from two Result-Based Financing (RBF) projects implemented in Kenya for (1) High tier Cookstoves (***Clean Cookstoves Market Acceleration Project***) and (2) Pico PV systems (***Building Sustainable and Affordable Credit Lines for Small Solar Systems in Rural Areas project***). The RBF facility was financed by the UK's Department for International Development (DFID) and implemented through the global Energising Development (EnDev) Programme.

SNV was the lead implementer for both projects from July 2018 until closure. Micro Enterprises Support Programme Trust (MESPT) had been the fund manager from 2016 to June 2018. However, SNV took over the fund management of both projects when MESPT did not renew their contract. The Pico PV RBF project ended in September 2019, while the Cookstoves RBF project ended in December 2019.

The two projects provided financial incentives to the private sector to overcome market barriers hindering the delivery of modern energy services to households.

Due to their similar design and implementation modalities, this report combines the joint findings of the two projects, while at the same time highlighting their differences. The report provides background information on the Pico PV and Cookstoves RBF projects in Kenya and presents the RBF projects' activities, results, impacts, key lessons learned and recommendations for future RBF programmes.

## 2. Background

The necessity for an RBF-type mechanism for both off-grid solar and improved cookstoves (ICS) became increasingly apparent around 2013 when both sectors showed initial signs of commercialisation, but with various challenges hampering a market development.

Despite off-grid solar experiencing market growth in 2013, further commercialisation of the sector continued to suffer from various barriers including high upfront cost of good quality solar products, slow uptake of solar entrepreneurship in rural areas due to financial constraints, and low purchasing power of targeted consumers. Programmes such as Lighting Africa had made significant progress in driving the availability of off-grid lighting solutions in years prior, but the market required a boost towards further market maturity.

The ICS sector in Kenya had been growing over the last 30 years with successful uptake realised for entry-level tier (tier 1<sup>1</sup>) ICS. The subsistence nature of the rural economy in Kenya meant that biomass energy remained the primary energy source among the rural and urban poor communities. According to the Economic Survey 2013<sup>2</sup>, biomass accounted for 69% of the country's overall energy requirements. However, the sector still faced several challenges including, but not limited to, lack of access to finance, distribution challenges, inadequate consumer awareness/education, and inadequate or lack of after-sales services especially in the rural areas.

It was against this backdrop that the Pico PV and Cookstoves RBF projects were designed to provide financial incentives to private sector players selling solar systems and improved cookstoves. The overall objective of the Pico PV RBF project was to mitigate financing challenges constraining solar entrepreneurs in the delivery of modern energy services to the households in rural areas, and the objective of the Cookstoves RBF was to enhance the adoption of clean cookstoves and fuels by overcoming market development barriers in peri-urban and rural areas. The financial incentives were therefore designed as a temporary measure aimed at transforming the markets and speeding up market growth towards an efficient and self-sustaining level.

The project had specific targets to achieve in terms of product sales, people reached and CO<sub>2</sub> avoided, as indicated in Table 1. Additionally, the projects aimed to contribute to employment creation as well as business and market transformation.

Project	Technology promoted	Targets
Pico PV	Small solar systems	<ul style="list-style-type: none"><li>• Incentivise <b>150,000</b> product sales</li><li>• <b>700,000</b> people accessing clean energy access</li><li>• <b>27,600</b> tonnes of CO<sub>2</sub> equivalent avoided</li></ul>
Cookstoves	Improved cookstoves	<ul style="list-style-type: none"><li>• Incentivise <b>80,000</b> product sales</li><li>• <b>400,000</b> people accessing clean cooking technologies</li><li>• <b>134,500</b> tonnes of CO<sub>2</sub> equivalent avoided</li></ul>

**Table 1 Projects targets**

<sup>1</sup> <https://www.cleancookingalliance.org/technology-and-fuels/standards/iwa-tiers-of-performance.html>

<sup>2</sup> <https://www.issuelab.org/resources/21900/21900.pdf>

### 3. Project implementation: RBF design & activities

This section presents the RBF design and activities of the two projects.

#### 3.1 The Results-Based Financing (RBF) model

Results-Based Financing (RBF) approach is a financing scheme aimed at providing incentives to foster private sector investments in target markets and overcome market failures constraining delivery of services to end-users. The projects focused on energy markets and targeted beneficiary organisations that included financial institutions (commercial banks, microfinance institutions and Savings and Credit Cooperatives) and distributors of energy products (manufacturers, retailers and non-governmental organisations<sup>3</sup>).

The RBF incentives were provided as an ex-post payment to beneficiaries upon delivery and external verification of pre-agreed results. The pre-agreed results were the number of approved solar or cookstoves products sold to end users above a pre-agreed baseline (based on historical sales performance). Only sales made above the pre-agreed baseline were eligible to ensure additionality. Higher incentive rates and marginalised capping/allocation were used for more remote, less developed markets to stimulate sales in rural areas. An independent verification process of the sales reported by the beneficiary was undertaken by an Independent Verification Agent (IVA) contracted by the project, to ascertain the validity and accuracy of the information provided with zero tolerance to fraud/falsified transactions. Verification triggered incentives disbursement (See Figure 1).

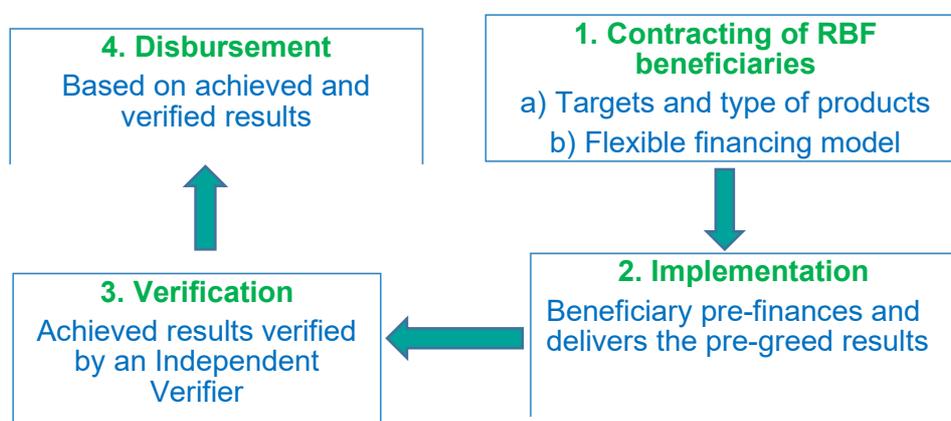


Figure 1 The RBF model

The RBF incentives could be used for partial risk cover or working capital investment in other relevant activities such as loan development, marketing and awareness, training, improving the distribution channels, and scaling up existing relevant activities.

<sup>3</sup> Non-governmental organisations supported by the project had separate commercial businesses

Specifically, the RBF incentives for the Pico PV project was classified into the following two categories:

- Incentives targeting end-user credit facilities to encourage distributors to develop or scale up flexible financing schemes for end-users through affordable and flexible credit/payment facilities.
- Incentives targeting Last-Mile Entrepreneurs (LMEs) credit facilities to encourage partnerships between financial institutions and LMEs in the solar distribution business to provide affordable credit and collateral requirements.

The objective of this second category was to enable LMEs to access enough working capital for adequate stocks and marketing activities resulting in improved sales performance to a level sustainable without RBF when the project exits. However, this model was not tested as no LME participated in the project.

### **3.2 Approved products**

The Pico PV RBF project promoted Lighting Global<sup>4</sup> certified solar lighting systems (plug and play) for use by households, including Pico PV and Solar Home Systems (SHS). The Pico PV products were subjected to a threshold of minimum light output of 60 lumens per bulb, minimum total light output of 100 lumens per system/product and multi-functionality of at least lighting and phone charging. Changes were made during the implementation period with the project encouraging distribution of larger SHS to transition consumers up the energy ladder. The minimum specifications for SHS included panel size (>20 watt peak), total light output (> 400 lumens), light output per lamp (> 100 lumens), multiple lights (at least 3 lighting points) and additional functionality (in addition to phone charging, the system should also power other devices e.g. radio, TV etc.).

The Cookstove project admitted a wide range of technologies over its implementation period, including charcoal, wood, ethanol, and gasifier cookstoves. The eligible cookstoves were locally tested by the Kenya Institute of Research and Development. The cookstove had to meet a minimum criterion of tier 2 and above based on the evaluation standards by the International Standards Organisation-International Workshop Agreement. These included:

- Indoor emissions carbon monoxide (gram per minute (g/min)) of <0.62
- Indoor emissions particulate matter 2.5 (milligram per minute (mg/min)) of <17
- Safety (>75%)
- Thermal efficiency (>25%)

However, based on the current market status of charcoal cookstoves then, EnDev revised the admissions criteria for indoor emissions PM and CO and allowed for at least one be >tier 2 while the other >tier 1.

Additionally, the project also promoted Liquefied Petroleum Gas (LPG) under the Cookstoves RBF project, in a move to support the Kenyan Government initiatives to enhance the uptake of LPG. Admission of LPG products required the beneficiaries to work with licensed gas dealers with certification by the Energy Regulatory Commission. This included low-cost gas refilling options such as 0.5 Kg and 1Kg gas cylinder sold through cash/ Pay-As-You Go (PAYGO) models and 6kg and 13kg gas cylinders sold through PAYGO models.

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<sup>4</sup> <https://www.lightingglobal.org/>

### 3.3 Incentive calculation

The value of the incentives for the Pico PV project was calculated based on a predetermined incentive rate, which was a percentage of the value of products sold to end-users through the RBF beneficiary. The level of effort in achieving results was expected to differ from one county to another, based on the market development status and dynamics including poverty rate, population density, development index and proportion of rural/urban population within the county. On this basis, the county incentive rate was lowest in Nairobi County at 2% and highest in Turkana County at 25%. During the project implementation, the incentive structure was revised (see [adjustments to incentive structure](#)) to ensure the remaining amount of RBF incentives will deliver results (in terms of sales). The eligible solar products were only those sold through PAYGO models.

Similarly, the cookstoves project incentives were initially based on the county development index. However, due to the low initial uptake of beneficiaries and sales made, the project adopted an incentive rate based on the cookstove tiers to encourage sales of more efficient products. Therefore, the cookstove tier determined the incentive rates, which ranged (approximately) from:

- <tier 2 in carbon emissions = 8 Euro
- tier 2 = 10 Euro
- >tier 3 = 13 Euro

These rates were revised biannually based on SNV’s exchange rate changes (Table 2). The project incentivised eligible cookstoves sold on both cash and PAYGO basis.

Stove tier	Incentive Rates					
	Incentive (Euro)	June to December 2017 (KES)	January to June 2018 (KES)	July to December 2018 (KES)	January to June 2019 (KES)	July to December 2019 (KES)
Exchange rate*		111.1	121.5	122.8	116.9	114.1
<tier 2	8	889	972	983	935	913
tier 2	10	1,111	1,215	1,229	1,169	1,142
tier 3	13	1,445	1,579	1,598	1,520	1,484

**Table 2 Changes in incentive rates per stove tier** (\*6 months average of exchange rate)

Overall, the payable incentive for both projects was calculated by multiplying the incentive rate per product/per county (PIR<sub>PP</sub>) by the number of products sold in that county per month, less the number of baseline products (baseline per product per county per month). The formula for incentive calculation is as illustrated in (Figure 2).

**Incentive value  $BO = (\sum Sales_{PM} - Baseline_{PC}) * PIR_{PP}$ ; where**

- **Incentive value BO= Incentive value per beneficiary organisation**
- **Sales<sub>PM</sub> refers to sales per month**
- **Baseline<sub>PC</sub> refers to baseline per county**
- **PIR<sub>PP</sub> refers to periodic incentive rate per product/rate per county**

## Figure 2 Incentive calculation

### 3.4 Project activities

The specific project implementation activities included contracting and management of RBF beneficiaries (renewals and new entrants), facilitating the independent verification process, and custody and management of the incentive fund including disbursement of incentives to beneficiaries (Figure 3).

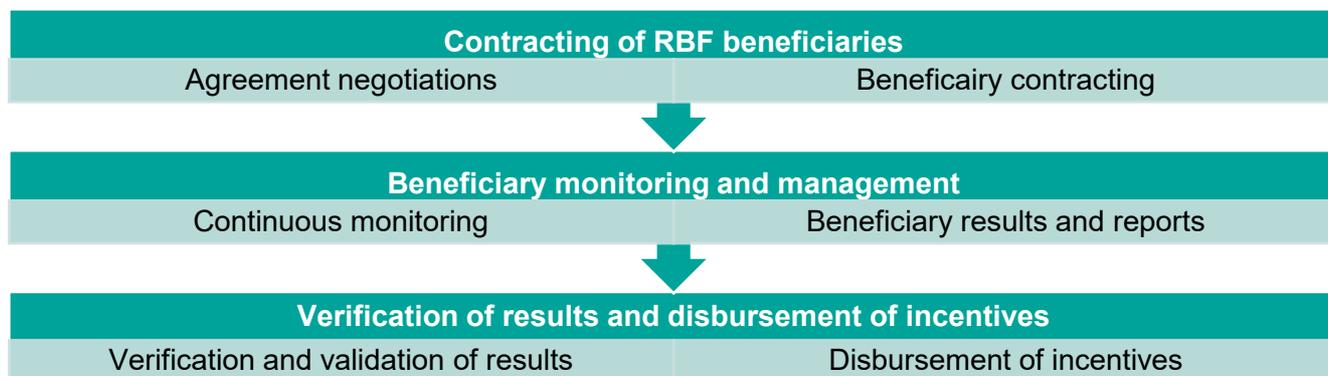


Figure 3 Fund management activities

#### Contracting of RBF beneficiaries entailed:

- Project beneficiaries were selected through a competitive approach.
- Eligibility criteria for beneficiaries focused on their legal status, use of PAYGO payment solutions, appropriate financing model, certified/approved solar and/or cookstoves products, adequacy of the management information system, and availability of financial resources to pre-finance project implementation activities.

#### Beneficiary monitoring, verification and disbursement included the following steps:

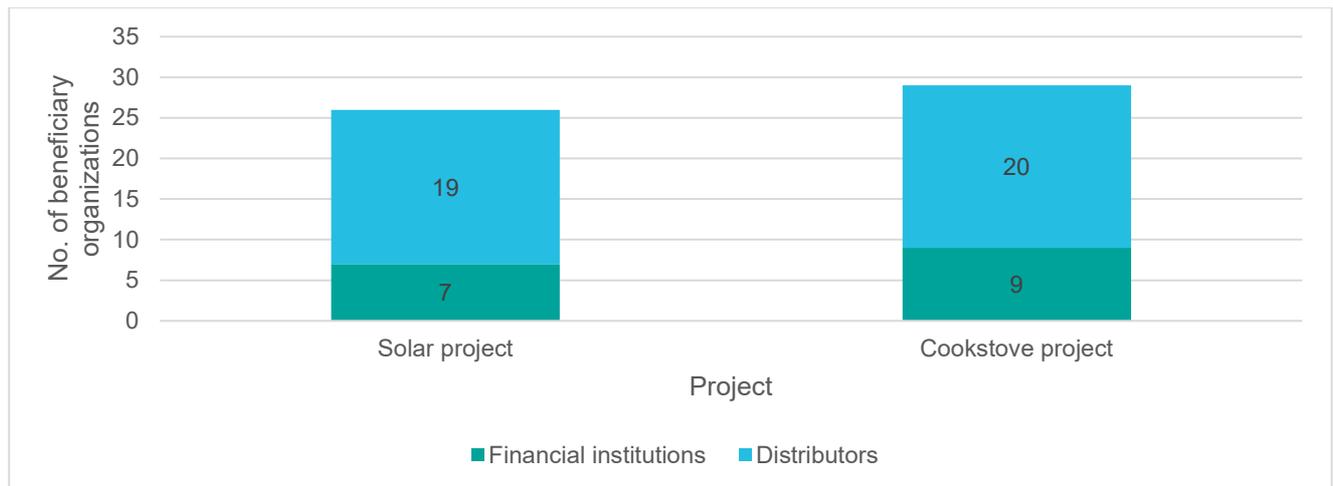
- Monitoring of beneficiaries' sales performance on a monthly basis including review and validation.
- Ad hoc and needs-based on-site visits to beneficiaries.
- Monitoring beneficiaries' bi-annual progress reporting on implementation, performance indicators, lessons and market transformation.
- Verification of beneficiary sales by an external independent verifier engaged by the project.
- Disbursement of incentive funds to beneficiaries by the fund manager in concurrence with the final signed verification report.
- Mid-term and end-term evaluation of the projects by an independent consultant contracted by EnDev.

# 4. Projects results

This section presents the results achieved by both RBF projects.

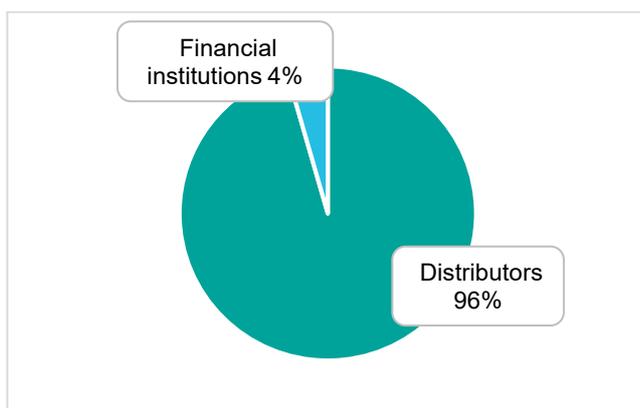
## 4.1 Private sector engagement

The projects engaged various private sector players in Kenya's energy markets throughout their duration. A total of 26 and 29 organisations benefitted from the Pico PV and Cookstoves RBF projects respectively, comprising of distributors and financial institutions (Figure 4).

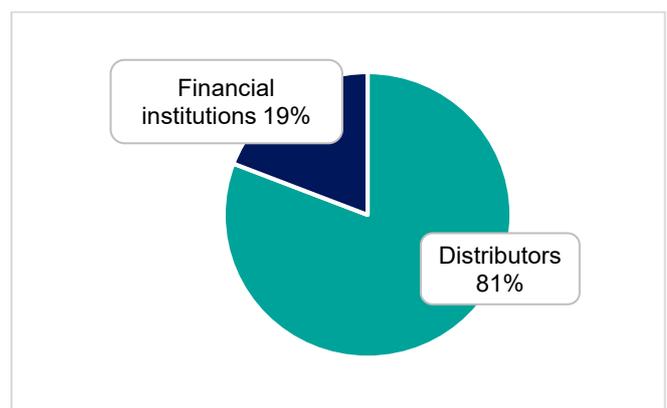


**Figure 4 Beneficiaries by organisation type**

Distributors outperformed financial institutions for both projects in terms of sales reported. Solar distributors accounted for 96% of the incentivised sales while cookstoves distributors accounted for 81% (Figure 5 and Figure 6). This is attributed to the mode of delivery employed by the distributors to easily get their products to end-users. The distributors relied on the LMEs networks and worked closely with existing financial institutions to sell their products



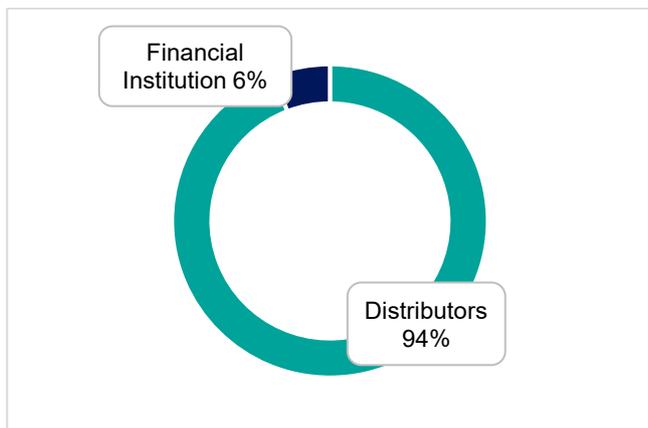
**Figure 5 Solar sales distribution by beneficiary type**



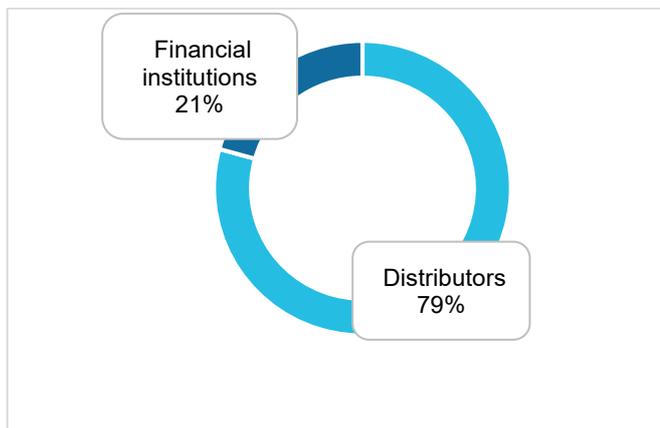
**Figure 6 cookstove sales distribution by beneficiary type**

As a consequence of the higher sales reported, distributors benefited most from both RBF projects in terms of disbursed funding. Pico PV distributors received 94% while Cookstoves distributors received 79% of the incentive fund (Figure 7 and Figure 8).

In general, financial institutions were the least performing for both projects benefiting from only 6% and 21% of the total paid incentives for solar and cookstoves respectively. The green energy portfolio within financial institutions was noted as a risky venture with minimal returns, hence attention was put elsewhere. However, it is noteworthy to mention that there was an outstanding case of a financial institution who registered remarkable results for both RBF projects. This was attributed to a more strategic focus on energy lending: the institution used the RBF incentives for the design of clean energy loans, strategic partnerships with distributors, and investment in robust digital loan and inventory tracking systems.



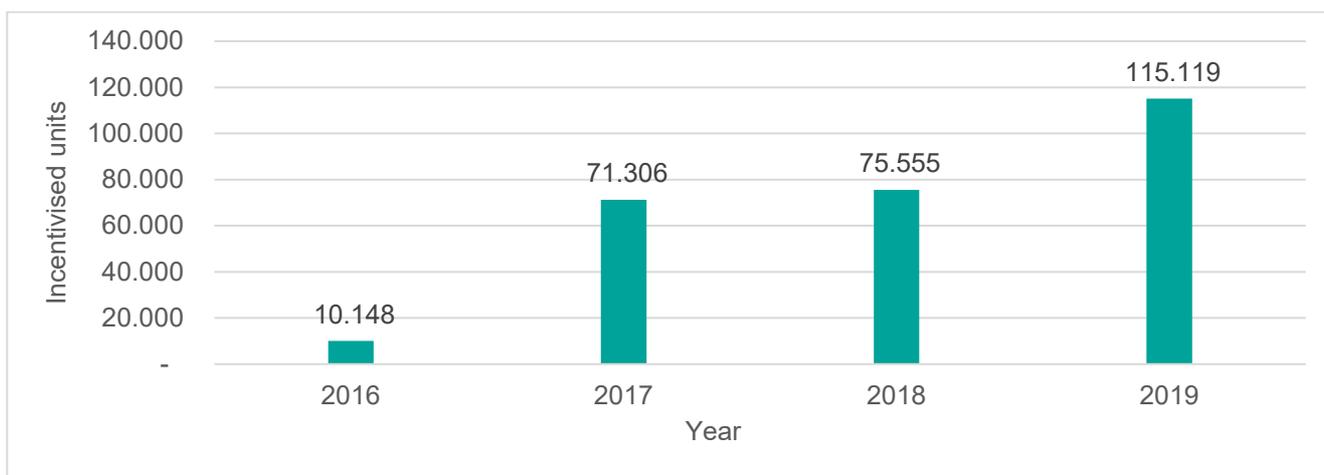
**Figure 7 Solar incentive distribution by beneficiary type**



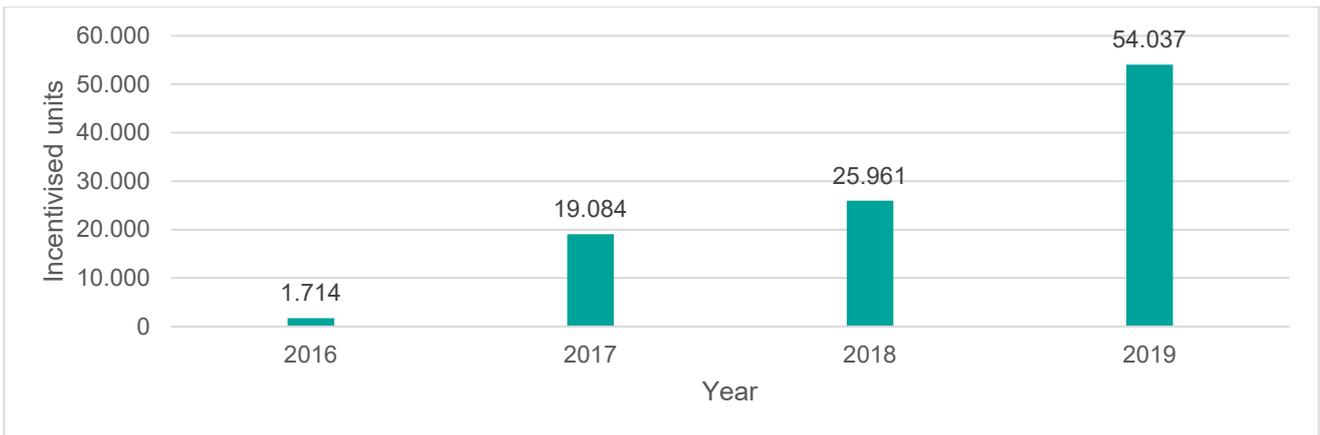
**Figure 8 Cookstoves incentive distribution by beneficiary type**

## 4.2 Household access to energy services

The RBF projects overshot their set targets and facilitated household access to energy services through the sale of 272,128 quality solar powered systems and 100,796 improved cookstoves. There was slow uptake of the RBF incentives during the projects start in 2016, however, both projects showcased an upward trajectory in terms of incentivised sales in subsequent years due to the recruitment of more beneficiaries and expansion of the products' range. (Figure 9 and Figure 10).

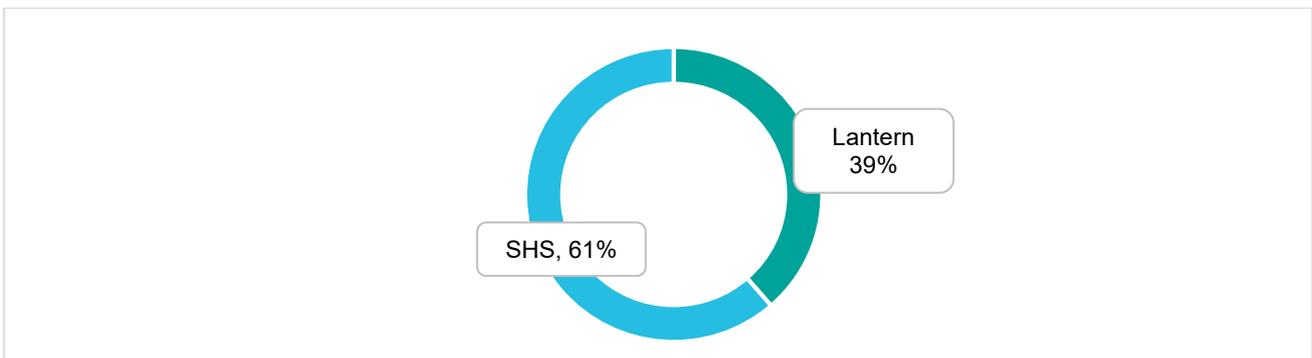


**Figure 5 Incentivised solar sales over project period**



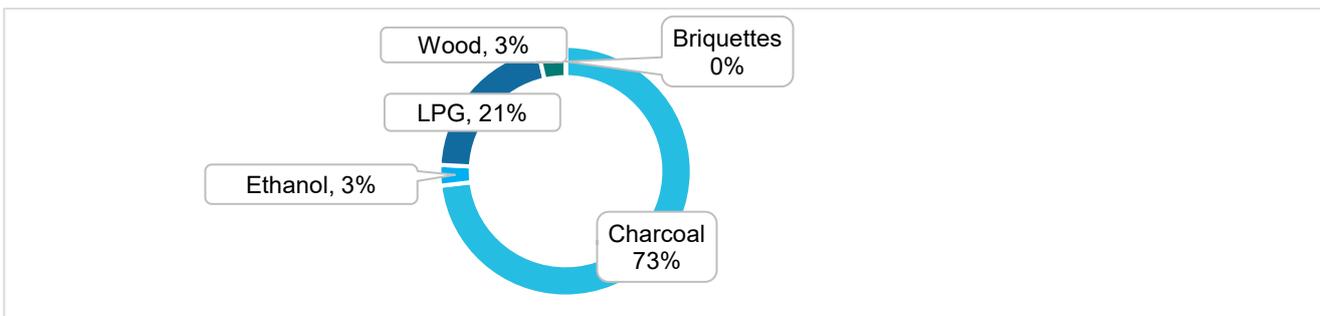
**Figure 6 Incentivised cookstoves sales over project period**

In terms of products, SHS with multi-light systems that support phone charging and radio and financed through PAYGO were the most popular lighting solution. SHS accounted for 61% of the total incentive sales over the project period (Figure 11). Lanterns only accounted for 39% of the products sold noting that the popular lantern types were mainly sold on a cash basis and therefore not eligible for the RBF incentives.



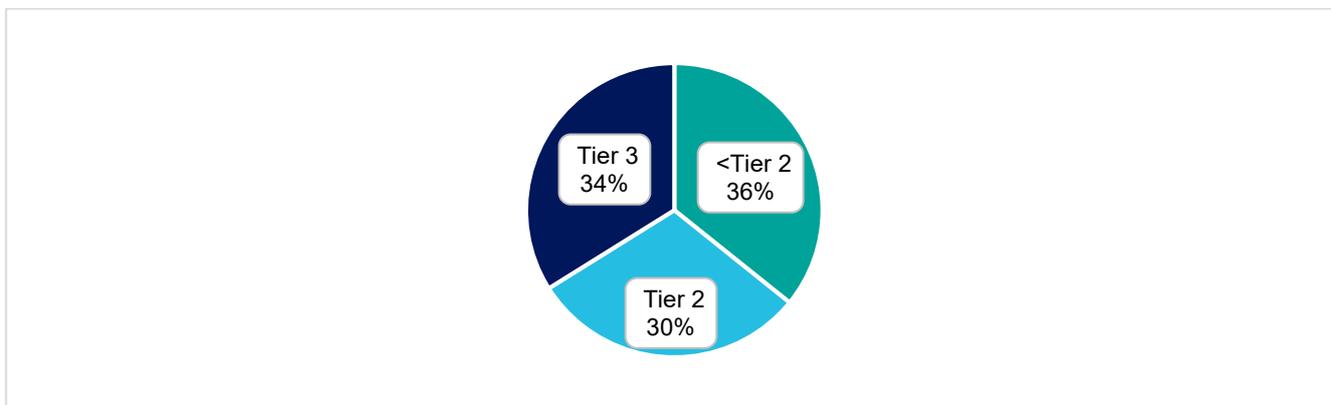
**Figure 7 Incentivised solar product types over project period**

Among cookstoves products, improved charcoal stoves were the most popular stove type accounting for 73% among the five categories of cookstoves promoted under the project (Figure 12). The good performance of charcoal cookstoves can be attributed to the fuel supply chain. The production and supply chain for charcoal is well developed in the country, compared to the less mature supply chain for briquettes and ethanol.



**Figure 8 Incentivised cookstoves types over project period**

Cookstoves sales were fairly evenly spread across the three-tier levels, with each tier accounting for at least one-third of incentivised sales (Figure 13).



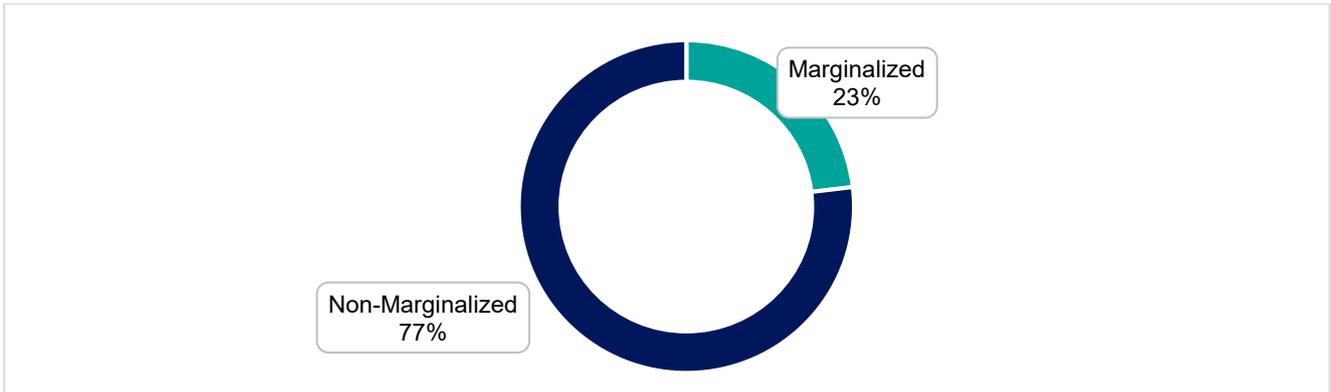
**Figure 9 Cookstoves performance by tiers**

### 4.3 County/regional coverage

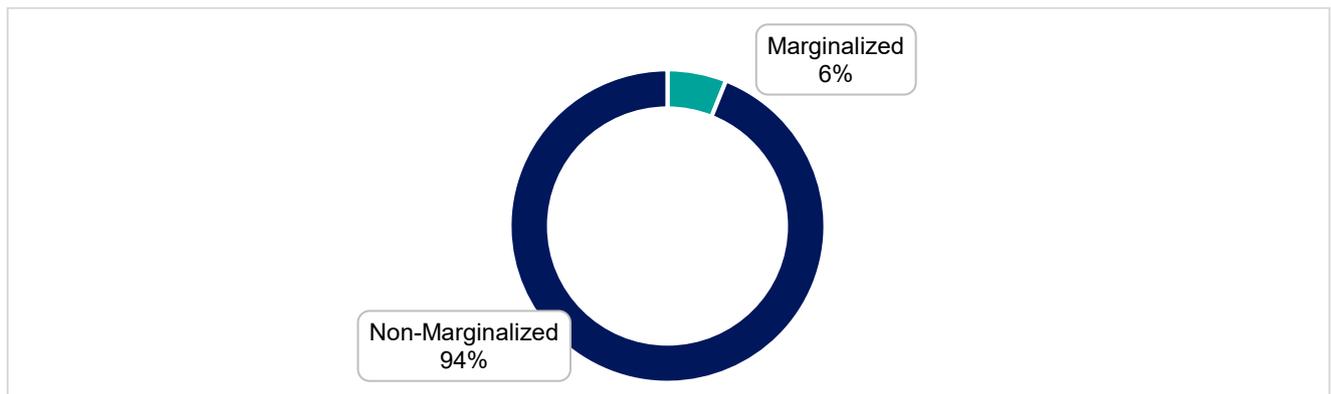
Despite clear guidance that the RBF projects supported markets in both marginalised and non-marginalised counties, sales in non-marginalised counties dominated. Sales reported from non-marginalised counties accounted for 77% of total solar sales and 94% of total cookstoves sales (Figure 14 and Figure 15). Well-developed infrastructure and supply chains in these counties enabled the beneficiaries to expand their existing distribution networks and/or even set up new ones during their participation in the RBF projects.

The projects also aimed to support market maturity in remote areas through the design of the incentive structure. However, marginalised counties only registered 23% of solar and 6% of cookstoves sales. The relatively high Pico PV sales are attributed to the higher incentive rates and capping modalities (see adjustments to incentive structure) introduced by the project. A reason for introducing these changes was to encourage beneficiaries to enter marginalised counties as the level of effort needed to achieve results was higher as compared to non-marginalised counties. A total of 18 solar and 21 cookstoves distributors operated in marginalised counties by the end of the two projects in 2019. The selection of these marginalised counties was based on Kenya’s Commission of Revenue Allocation Second Policy on Marginalised Areas<sup>5</sup>, which defines marginalised areas as “communities that have been excluded from the social and economic life of Kenya for different reasons and geographic locations (county or sub-county) where significant populations of underserved communities live”.

<sup>5</sup> [Kenya Commission of Revenue Allocation. \(2018\). Second Policy and Criteria for Sharing Revenue among Marginalised Areas. Accessed on June 2020.](#)



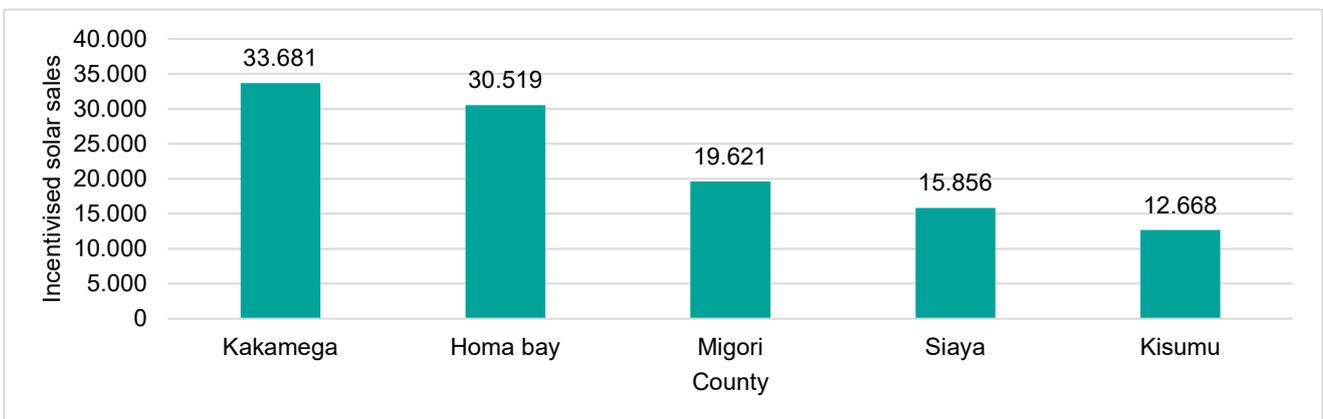
**Figure 10 Incentivised solar sales performance by county type**



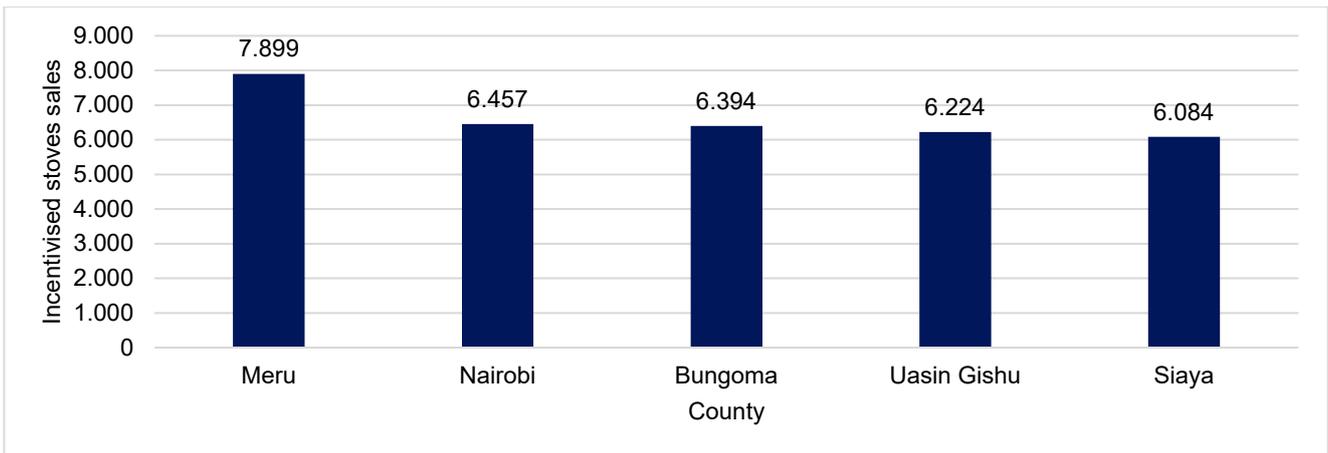
**Figure 11 Incentivised cookstoves sales performance by county type**

**Non-marginalised counties**

Population density and economic activities influence the geographic distribution of solar and cookstove products. The high levels of SHS sales can be attributed to higher population density in urban centres where consumers have higher purchasing power and prefer solar systems that can offer additional services. The high sales of lanterns in two counties (Kakamega and Homa Bay Counties) can also be linked with the economic activities of small-scale farming and fishing. Kakamega, Homabay, Migori, Siaya and Kisumu Counties reported the highest number of solar sales (Figure 16) while Meru, Nairobi, Uasin Gishu, Bungoma and Siaya Counties registered the highest cookstove sales (Figure 17).



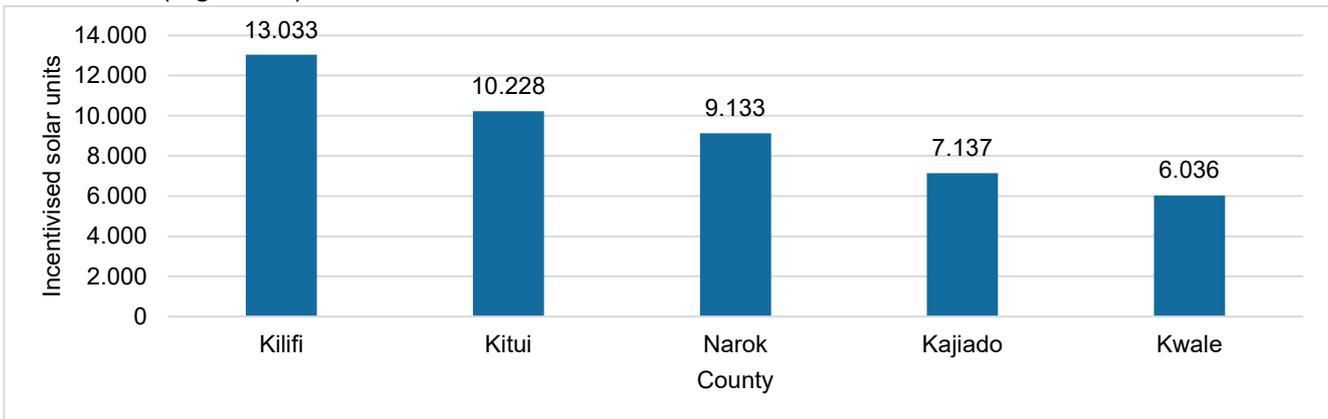
**Figure 12 Top performing non-marginalised counties for solar sales**



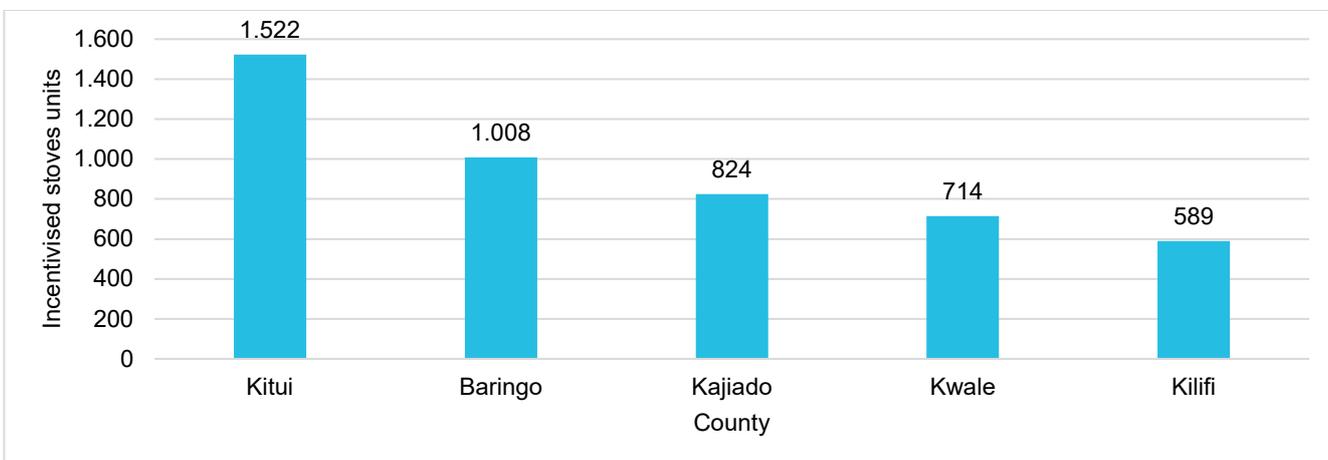
**Figure 13 Top performing Non-marginalised counties for stoves sales**

### Marginalised counties

Among the marginalised counties, the comparatively low sales level for solar and cookstoves is attributed to high logistical costs experienced by companies working in these regions due to poor road and network coverage, insecurity, and difficulty in finding qualified staff willing to work in these regions. In some cases, profit margins did not cover the extra costs associated with market entry in these counties. Kilifi, Kitui, Narok, Kajiado and Kwale Counties reported the highest number of solar sales (Figure 18) while Kitui, Baringo, Kajiado, Kilifi and Narok Counties registered the highest sales for cookstoves (Figure 19).



**Figure 14 Top performing marginalised counties for solar sales**



**Figure 15 Top performing marginalised counties for stoves sales**

## 5. Project impacts

The impact of the two projects is discussed at two levels: household and market development.

### 5.1 Household-level impact

The Pico PV and Cookstoves RBF projects enabled greater access to solar and improved cooking solutions for households. The projects facilitated the sales of 272,128 solar-powered systems and 100,796 higher tier cookstoves. This translates to investment by households and the private sector estimated at Euro 47.2 million in product value. Combined, the projects reached 1,697,182 people with access to cleaner Table 3.

Project	Incentivised units	Households/Private sector Investment (Euro)	Number of people reached	Number of jobs created	Tonnes of CO <sub>2</sub> eq. avoided
Pico PV	272,128	43,440,299	1,143,147	3,690 (40% women)	32,300
Cookstoves	100,796	3,828,077	554,035	988 (47% women)	65,600
<b>Total</b>	<b>372,924</b>	<b>47,268,376</b>	<b>1,697,182</b>	<b>4,678</b>	<b>97,900</b>

**Table 3 RBF projects household level impact**

The two projects created new job opportunities along the solar and cookstoves value chains. Tracking additional employees recruited and trained by the beneficiaries, the projects contributed to the creation of 4,678 new jobs (Table 3). The jobs created included distribution management staff, sales agents and technicians within the last mile distribution network. Out of the total number of jobs created, women accounted for 40% and 47% for the Pico PV and Cookstoves project respectively.

The projects further contributed to national climate change mitigation efforts by tracking tonnes of carbon dioxide equivalent avoided through the adoption of clean energy solutions. In total, the two projects facilitated avoidance of about 97,900 tCO<sub>2</sub>-eq since the projects started (Table 3). This was computed as annual averages based on the following estimations: an improved firewood cookstove saves around 0.55 tCO<sub>2</sub>, one electric lamp powered by SHS saves at least 0.18 tCO<sub>2</sub> and a solar lantern saves 0.09 tCO<sub>2</sub>.

### 5.2 Market transformation

Beneficiaries reported on business and market transformation indicators for their respective sub-sectors at the end of every verification cycle.

#### Expansion and diversification of quality products

Both projects contributed to the expansion and diversification of product portfolios:

The Pico PV project facilitated the sale of 51 different quality solar powered products based on Lighting Global certification standards. These included small lanterns and large multi-functional systems (plug and play), providing access to systems with more lighting points, higher lighting output and hours, and accessories such as radios and TVs. About 8 solar distributors reported the addition of 20 new products during the project duration. In addition, the minimum warranty requirement of 2 years enhanced after-sales support and ensured the durability of products.

The Cookstoves project facilitated the sale of higher tier cookstoves and alternative fuels with 10 higher tier cookstoves promoted across the country. The stoves ranged from biomass to non-biomass cookstoves that include wood, charcoal, ethanol, LPG, and briquettes stoves. The project supported sales of more efficient stoves with 46% of the products distributed overall being tier 3 and above cookstoves.

### **Enhanced business operations and credit management**

With the incentive funds received from the project, beneficiaries reported having enhanced and expanded their business operations and management. Some of the Pico PV project beneficiaries used the incentive funds to set up and/or automate their existing customer call centres and recruited new call centre staff. This improved their credit management and monitoring, enhanced customer care, and after-sales support ultimately resulting in reduced default rates. Also, some of the Cookstoves project beneficiaries reported the opening of new service centres and branch offices. This improved their business management systems with regards to inventory tracking and monitoring sales performance, as well as enhanced customer care services.

In addition, both groups of beneficiaries reported improved business management operations through training and capacity building of key management staff, the addition of field-based/regional managers, purchase of equipment to improve transport and communications such as laptops, motorbikes, and improved business management systems.

“The RBF incentives, since joining the program in 2018, have been a lifesaver for our cash flow. Through the support of the project we have been able to significantly increase our sales through activities such as awareness creation and marketing: placing a marketing officer in the branches, increase the number of group coordinators in each of our 6 branches, provide incentives to reward client group leaders to form and manage groups and opening a seventh branch. Moreover, we were able to improve our warehousing and inventory management by developing a mobile sales application and increase the number of sales per employee. We upgraded our applications for customer relationship management, data gathering and inventory management.”

**- RBF cookstoves beneficiary (distributor)**

### **Growth and expansion of distribution networks**

The project contributed to increased market coverage and sales through expansion to new counties, deepening outreach within counties of operation, recruitment and training of field sales agents and group-based promoters, market entry research, awareness creation and marketing including activation of dormant markets, and provision of incentive schemes to enhance sales performance.

With support from the RBF incentives, 14 solar distributors have expanded operations to new counties and an additional 252 distribution outlets and partnerships were established. In addition, 20 cookstoves

distributors have expanded their operations into new counties with at least one active cookstoves beneficiary in each of the 47 counties in Kenya as of 2019 as a result of the project.

### Provision of end-user credits

The Pico PV project incentivised innovative end-user credit mechanisms by enabling longer repayment periods and the bundling of solar products with accessories, bridging the affordability gap for larger, more functional systems. Most of the solar sales were through PAYGO mechanisms (including daily, weekly and monthly payment plans), but also through loans from financial institutions. The project enabled beneficiaries to provide flexible and affordable credit mechanisms for larger solar systems with repayment periods ranging from 4 months to over 30 months. The project rewarded beneficiaries promoting large systems with a high incentive value, and this encouraged them to introduce more large systems in their product portfolio, and bundle solar products with accessories for charging phones, radios and TVs.

“The RBF project significantly improved our sales performance. During the project, we expanded our network from 9 to 16 outlets across Kenya, with presence in Nyanza, Western and Rift Valley regions. Through the RBF project, we managed to invest in monitoring systems, including portfolio monitoring and debt collection, which has improved sales performance and client data capture to meet the RBF data needs. The incentives have also enabled us to introduce larger systems with TVs in our product portfolio; product bundling enabled customers to access solar accessories; and a new flexible pricing scheme that allows a client to select a loan tenure that is most suitable and affordable to them. Additionally, we have recruited additional sales agents and invested in their training that has since enhanced operational and sales efficiency. We also improved the customer care desk services to ensure customer issues are quickly addressed. Lastly, we enhanced the mobility of our staff and boosted sales in remote areas through the purchase of additional motorbikes, bicycles and motor vehicles.”

- RBF Pico PV beneficiary (distributor)

## 5.3 Expected sustainability of project impacts

The RBF projects supported the transformation of the off-grid solar and cookstoves market in Kenya from the initial stage of commercialisation to a self-sustaining level by addressing some of the market barriers hampering the market growth. Providing financial incentives to the private sector provided an additional working capital investment to adopt innovative business models and triggered investments in marketing and awareness creation, staff training, improving the distribution channels, product portfolio diversification and streamlining of management information systems. Customer satisfaction and retention improved through the availability of quality solar and cookstoves products, greater product diversity, financing to bridge the affordability gap, enhanced customer care, and after-sales support services.

The investments triggered by the RBF funds are long-term in nature, with companies using their improved systems and models to further expand their customer base and market penetration, hence sustaining market growth. The RBF projects also demonstrated the potential for solar and cookstoves market development in marginalised and remote rural areas. These markets are expected to mature through subsequent support from the [Kenya Off-Grid Solar Access Project](#). Furthermore, the current

[EnDev](#) Kenya project *Accelerating Access to Energy Services (EnDev III)* includes a follow-up Cookstoves RBF Facility to continue supporting higher tier ICS markets and grant funding to promote solar-powered solutions for small-scale businesses.

### Contribution to systems change

SNV's systems change concept aim to improve further our abilities to achieve and show systemic results by not only creating results for the direct target population, but also focusing on creating impact that sustains over time and grows to reach more people beyond the projects' boundaries.

The Pico PV and Cookstoves RBF projects have contributed to realising SNV's Systems Change concept through:

- leveraging households and private sector investments of Euro 47.3 million in product value;
- kick-starting solar and cookstoves markets in marginalised areas;
- promoting larger solar systems and higher tier cookstoves in the market;
- influencing governments and other stakeholders to adopt RBF approaches; and
- contributing to changing norms in terms of new business practices, emerging rural markets, and increased awareness of energy solutions among end users and stakeholders.

Leveraging finance	Governments and others adopting approaches
<ul style="list-style-type: none"> <li>• Households and private sector investment of Euro 47.3 million (products value)</li> <li>• Private sector leverage ratio of 10:9 and 5:5 for Pico PV and Cookstoves respectively</li> </ul>	<ul style="list-style-type: none"> <li>• KOSAP project adopted RBF approach for private sector delivery of SHS and ICS in marginalised areas, funded by World Bank</li> <li>• RBF approach continues to gain popularity among donors, replication in other countries</li> </ul>
Kick-starting/shifting markets	Shifting new norms, new normal
<ul style="list-style-type: none"> <li>• Quality certified large solar systems and tier 2 stoves now available in target markets</li> <li>• 51 quality solar products and 10 higher tier cookstoves promoted</li> <li>• 18 solar and 21 cookstoves distributors operating in marginalised counties</li> <li>• 14 solar and 20 cookstoves distributors expanded operations to new counties</li> <li>• 1,697,182 people reached with 272,177 solar products &amp; 100,796 improved cookstoves</li> <li>• 4,678 new jobs created, at least 40% women</li> </ul>	<ul style="list-style-type: none"> <li>• Changes in business practices, notably adoption of PAYGO models</li> <li>• Viable business opportunities opened in remote and marginalised areas</li> <li>• Increased awareness of energy access solutions among relevant stakeholders and consumers</li> <li>• Partnerships established between distributors, manufacturers and financial institutions</li> </ul>

## 6. Lessons learned

Several challenges and learnings emerged during project implementation, leading to adjustments over the implementation period. The experiences provide important insights feeding into the ongoing subsequent interventions in Kenya aimed at further accelerating the markets for cookstoves and solar, such as the Cookstoves RBF project under the new phase of [EnDev](#) and the [Kenya Off-Grid Solar Access Project](#) (KOSAP). This section presents the key lessons learned from the Cookstoves and Pico PV RBF projects.

### Types of beneficiaries

Initially, financial institutions were targeted as direct beneficiaries to drive the cookstoves and solar uptake with distributors. However, financial institutions performed poorly in both projects due to several reasons: (a) the renewable energy sector was considered high risk by the financial institutions and they were, therefore, more focused on their core business; (b) energy lending was not a key priority when compared to other credit products, and (c) the financial institutions' credit requirements and procedures were less competitive compared to PAYGO models. Consequently, the projects reviewed their design to include manufacturers, distributors and non-governmental organisations as direct beneficiaries to expand sales.

### Adjustments to the incentive structure

The incentive structures were adjusted on a need basis for both projects during implementation.

The incentive structure for the Cookstoves RBF was changed from county to product-based. The county-based incentive was calculated based on a predetermined incentive rate, which was a percentage of the value of products sold to end-users through the financing scheme proposed by the RBF beneficiary. On this basis, the county incentive rate was lowest in Nairobi County at 7% and highest in Turkana County at 29%. However, due to the low initial uptake of beneficiaries and sales made, the project adopted an incentive rate based on the cookstove tiers ([see Incentive calculation](#)) to encourage sales of more efficient products.

The Pico PV RBF introduced capping measures to ensure the remaining RBF incentives fund will deliver the targeted sales numbers without depleting the funds. These capping modalities were effective in improving overall project results without any additional funding requirements. This included:

**Maximum incentive amount per product:** The project recorded the highest number of lanterns incentivised within the first year of implementation – the market was at a growth stage and the RBF offered a push for sales to take off. Therefore, a maximum incentive amount per product was introduced in July 2018 to consider the capacity of the products in terms of functionality and specifications. The incentive capping ranged from 30 to 90 Euros per product and was graduated based on longer tenure periods and additional functionality (charging, and power other devices radio and/or TV), i.e. the larger the system with longer repayment periods, the higher the incentive. The goal was to reward efforts to transition customers up the energy ladder through the sale of systems with more energy services and improved affordability. This in turn reduced the number of lanterns that could be incentivised under the project.

**Maximum incentive amount per beneficiary:** Incentive amounts were capped at two levels to avoid depletion of funds by larger beneficiaries: (i) a bi-annual limit of Euro 100,000 per beneficiary; and (ii) a cumulative limit of Euro 500,000 per beneficiary.

**Marginalised county capping:** The performance in marginalised counties remained low as most beneficiaries were targeting low hanging fruits with high potential for results in more mature markets. As of July 2018, the project, therefore, introduced capping to reserve at least 30% of the remaining amount of incentives for product sales in marginalised counties to encourage and reward market expansion.

Furthermore, the projects had to cut off sales reporting two months before the project end given the high sales performance and faster depletion of the incentive funds towards the end of the project period. Therefore, the last incentive payments were subjected to proration per beneficiary, as provided for in the project guidelines and beneficiary contracts, to fit claims within the available incentive fund balance.

### Sales data reporting

Data reporting and data quality were recurring issues in both projects. The projects collated product details (e.g. brand, serial numbers, price etc.) and customer-specific data (e.g. name, ID number, county, phone number etc.) which were critical during the phone verification to validate sales. The project sales data was reported on a monthly basis to allow continuous assessment of sales trends. Delayed reporting by some beneficiaries therefore posed a problem for tracking the depletion rate of the incentive funds.

Furthermore, data quality was a frequent issue including incomplete data sets, and duplicated records, especially where organisations had poor data management systems. Lastly, some beneficiaries, especially the regulated financial institutions, had limitations due to regulatory or organisational policies affecting the extent to which they could disclose customer-specific information.

However, the project continuously supported beneficiaries during the implementation of project activities through needs-based support and ad hoc on-site visits as well as periodic beneficiary fora. These activities supported capacity building to enhance data management and reporting based on the gaps identified for each specific beneficiary.

Data quality and reporting improved overtime. Since the payment of incentive was dependent on verifiable sales data, some organisations had to invest in reliable and automated data management systems which enabled them to track and report data in a more credible and verifiable manner.

### High cost of verification process

The verification process was resource-intensive for the implementer, beneficiary and IVA. Not all parties understood the RBF design and therefore additional technical support to beneficiaries and the verification agency was needed to deliver quality reports, leading to delayed completion and late disbursements. Delayed verification and incentive disbursements were highlighted as a major challenge for beneficiaries implementing the project.

### **Working capital constraints**

A lack of working capital was a general challenge across all beneficiaries in both projects. Driving sales and credit provision requires adequate working capital for companies. The incentives disbursement was unpredictable and delayed meaning the beneficiaries could not include them in their cash flow planning and financial projections. Limited working capital resulted in slower growth and/or achievement of desired results, especially for the smaller beneficiaries.

# 7. Recommendations

The following recommendations arise from the experiences and lessons learned during the implementation of both RBF projects:

## Flexible RBF model

Flexibility in the project implementation approach is key from the beneficiary's and implementer's perspectives to leave room for adaptation to dynamic market conditions. The various adjustments made to the projects were highly effective in achieving the desired project results.

## Design of the RBF initiative

- **Incentives should be designed to motivate business growth:** Companies are usually at different market growth stages. While market barriers are in general similar, they affect companies to different degrees. For instance, established bigger companies with already existing networks and larger sales volume enjoy economies of scale and lower expansion costs compared to smaller players. The smaller players may therefore require much more support to achieve the same milestones.
- Subjecting the two business categories to the same competition disadvantages the smaller players as they were already constrained by a lack of working capitals to implement project activities. This can be improved by (a) categorizing beneficiaries by organizational capacity and design different RBF Incentives/approaches for each category type (b) market segmentation whereby smaller players are incentivized to operate in the easier markets and larger players in the more difficult/capital intensive markets.
- **Inclusion of an up-front grant within RBF projects to facilitate initial implementation by beneficiaries.** Providing an upfront grant can provide for partial payments on specific milestones reached before finalisation of the verification exercise to support cash flow challenges for beneficiaries. To ensure sustainability and avoid dependence, higher incentive rates can be provided initially and reduced proportionately overtime. This can address logistical barriers limiting market expansion to marginalised areas. Specialised RBF incentive rates can also stimulate market growth in less attractive areas.
- **Recognise distributors as the key drivers for the sector:** The project had set aside an incentive targeting LMEs to partner with financial institutions to engage in solar distribution businesses. However, there was little to no interest by financial institutions to engage in this and distributors were able to outperform them. This highlights the need to assess the appropriateness of RBF for supporting LMEs and exploring alternative ways of support.

## Verification process

Effective data collection to support monitoring and evaluation through a partnership with a competent IVA is key to support results verification and timely incentive payments. Although beneficiaries were required to pre-finance their activities, delays in verification and incentive disbursements were highlighted as a major challenge by the beneficiaries. A simplified verification process together with

adequate resources to provide technical support is key to ensure a smooth verification and disbursement process.

### **Addition of technical assistance component**

The RBF projects did not allocate resources for technical assistance to beneficiaries, even though this turned out to be a key to complement the RBF incentives, particularly on data management. An appropriate level of technical assistance in addition to mere fund management helps to initiate sustainable transformation in business operations.

# Want to know more?

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