

Results-Based Financing (RBF) for Pico-PV Lighting Applications in the Lake and Central Zones of Tanzania

Impact of RBF on market transformation for pico-PV products in the Lake and Central Zones of Tanzania.

1. Executive Summary

The Global EnDev Results-Based Financing Facility (RBFF) programme is a portfolio of 17 projects in 14 countries and funded by DfID, which aims “to overcome market failures constraining private sector delivery of off-grid renewable energy systems providing modern energy services to the poor”. Commercial market failures are reduced or mitigated by providing financial incentives to the private sector. An external consultant, [Particip](#), was contracted to conduct an evaluation of EnDev’s Global RBF Facility throughout the entire programme period. As part of this, an impact study was commissioned to assess the market transformation effects of one RBF project in more detail - the Results Based Financing (RBF) for Rural Market Development of pico-PV Solar project implemented between 2014 and 2017 by SNV in Tanzania. The impact study conducted by Particip produced the evidence presented in this brief.

The RBF project in Tanzania offered financial incentives to selected suppliers and their retailers for verified sales of small-scale certified solar products in the Lake and Central Zones of the country. These zones were selected following an inception phase, market intelligence survey that identified them as having high demand for solar products but low availability of options. The first phase of the project focused on the Lake Zone with a total budget of EUR 1.4 million, of which EUR 1.06 million was earmarked for RBF incentives. Based on success of the project, a second phase was contracted in 2016 to expand the project to the Central Zone. SNV’s total project budget increased to EUR 3.4 million, of which EUR 2.2 million are reserved for RBF incentives. RBF funds are managed through the state-owned TIB Development Bank.

At the aggregate market level, the project assisted eligible companies to enter or expand their market presence in these localities. As a result, quality product availability rose dramatically. The combination of more companies in local markets, higher sales volumes and eventually more balanced market shares also resulted in more competitive private sector landscape.

At the supplier level, perceived market risks of suppliers have diminished as a consequence of learning about market opportunities and testing of business models. This, together with expansion of retail structures and sales volumes, boosted efficiency amongst participating companies. In the retail chain, market expansion of RBF companies led to relatively stable jobs and adequate individual and system capacities. PAYGO models increased mobility of retailers as they can travel without carrying stock. This is integral to improving the availability of pico-PV products and services in local markets.

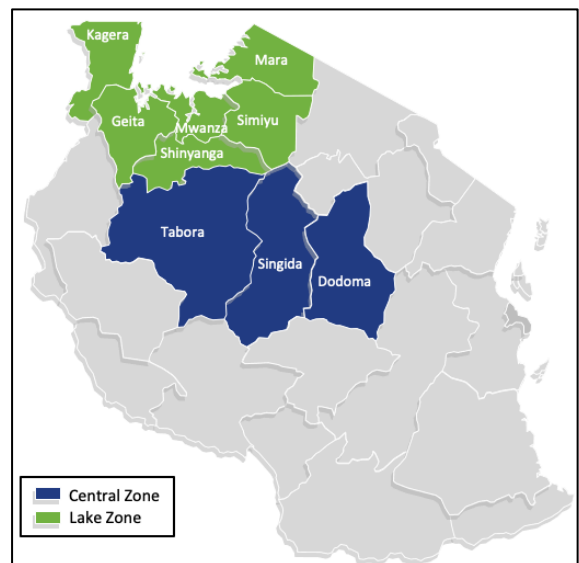


Figure 1: Map of Tanzania showing eligible regions.

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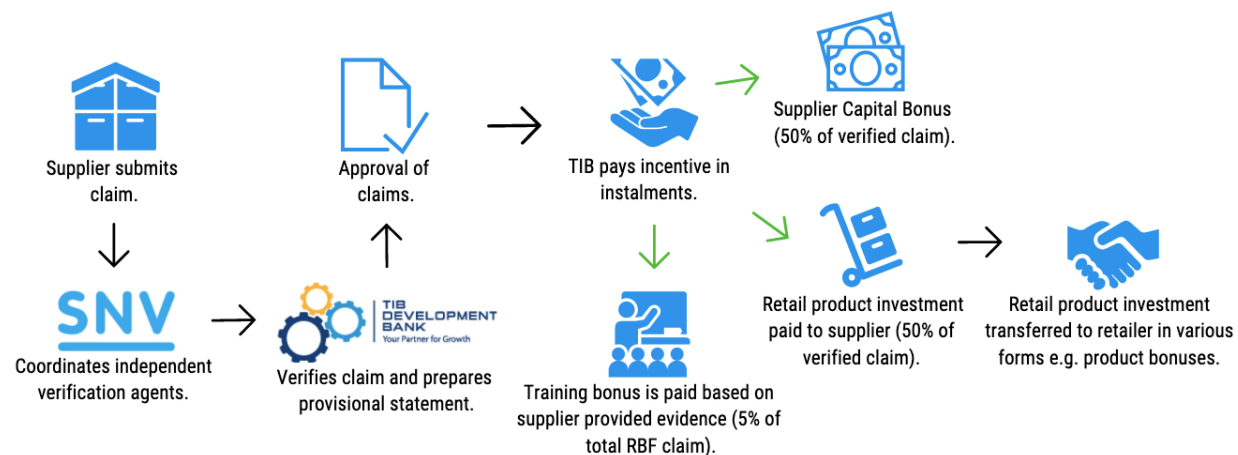
Among consumers, increased product purchases have improved energy access for off-grid households. Market entry of new firms offering a diverse range of certified quality products and increased competition has driven suppliers into more local markets. This has raised consumer awareness of product quality and accelerated transition to larger products including solar home systems.

However, some constraints in the enabling environment have emerged over the lifespan of the project. The RBF has partially compensated negative changes in some external factors (e.g. currency depreciation and deterioration of import and VAT regulations), while other external constraints persisted throughout the evaluation period and have limited the impacts of RBF (e.g. weak solar standards until late 2017, limited offer of affordable solar energy financing for companies). Lessons learned specific to the Tanzania project and other RBF interventions are outlined in this brief, as well as recommendations for improving future RBF interventions.

2. Tanzania RBF Approach

The overall objective of the RBF project in Tanzania is to “improve market access to and use of quality pre-electrification pico-PV devices for poor rural and off-grid households in 6 Regions of the Lake Zone and 3 Regions of the Central Zone via strengthened import suppliers to end retailer distribution”¹. Results-Based Financing is about developing and testing viable business models that employ financing as a performance incentive rather than a traditional lump sum loan payment². The key feature is payment upon delivery and third-party verification of pre-defined results. The project offers financial incentives to selected suppliers and their retailers for verified sales of small-scale³ certified solar products in the Lake Zone and Central Zone of Tanzania. Figure 2 shows the flow of activities in the RBF process and the parties involved. Each activity is dependent on the other to ensure a level playing field for all suppliers participating in the project.

Figure 2: The Tanzania RBF Process⁴.



a) Theory of Change

Figure 3 depicts a simplified version of the theory of change for the RBF project, detailing the intended market transformation mechanisms and the enabling environment for change. The theory of change anticipates that supply-side effects would depend more on the specific financing instrument (RBF) relative to conventional aid in the rural energy sector. Moreover, the knowledge objective of the project is to promote market-based learning among actors in the pico-PV supply chain through formalised business-to-business relationships, new sales strategies and enhanced profit management among retailers.

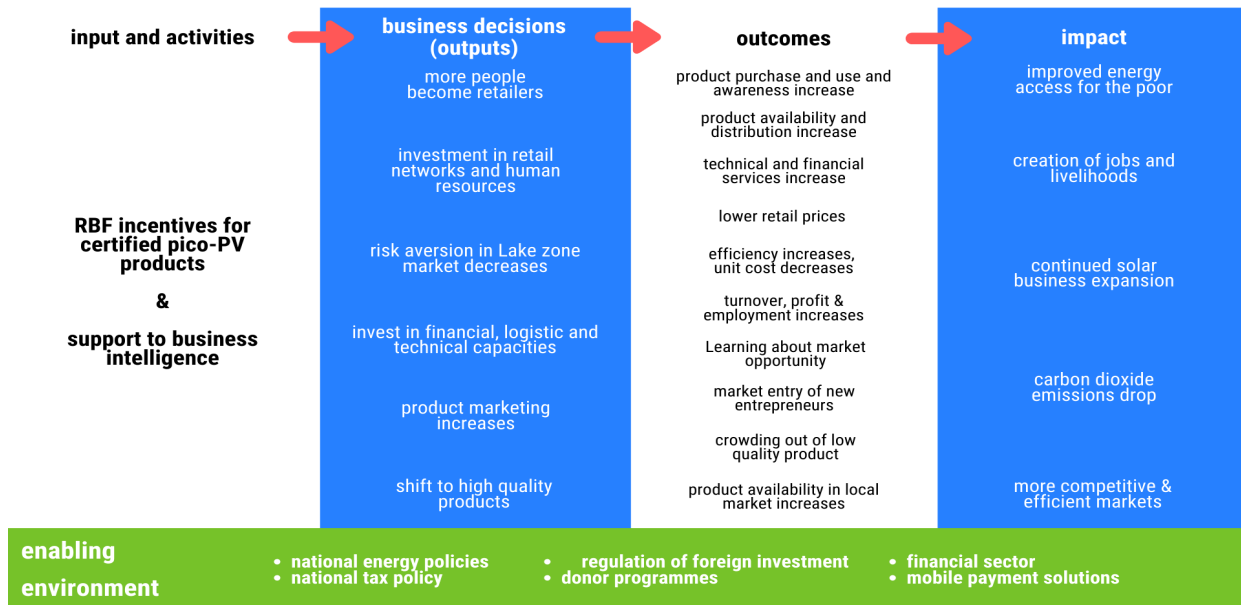
¹ SNV project proposal, September 2016, p.2. The original proposal from April 2013 only included the Lake Zone.

² Endevo Tanzania Operational Guideline for RBF: Rural Market Development of pico-PV Solar, Lake Zone Tanzania, February 2016, p.2.

³ Small scale solar products provide solutions to typically low wattage energy needs of rural households (1-2 rooms, small radio and cell phone).

⁴ Figure 1 is derived from a description of the RBF process in the Endevo Tanzania Operational Guideline for RBF: Rural Market Development of pico-PV Solar, Lake Zone Tanzania, February 2016, p.2.

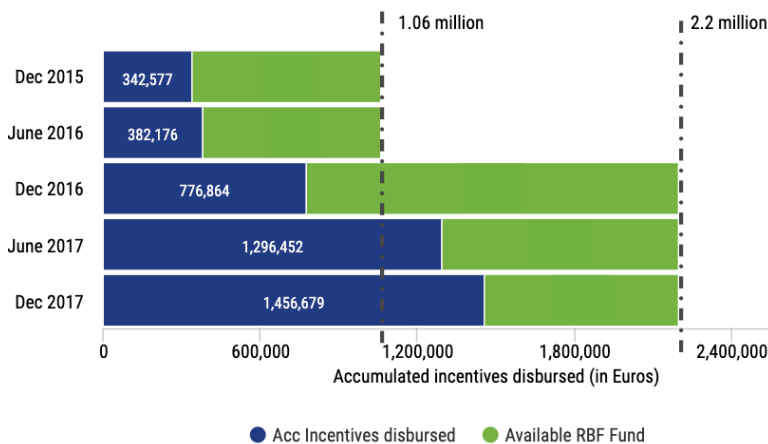
Figure 3: Theory of Change



b) Fund Deployment

A total of 15 solar suppliers were selected for participation in the RBF. Three selection rounds were held, approving five companies each in April 2014, May 2015 and March 2017. Overall progress had been steady and with expansion to the Central Zone in July 2016, incentive disbursements increased significantly. By end of 2017, two thirds of the available RBF fund had been disbursed as can be seen in Figure 4.

Figure 4: Accumulated RBF disbursements compared to available RBF fund.



3. Impact Study

RBF impacts at the level of supply-side actors were assessed through an in-depth study of selected business cases – individual suppliers with their specific business models, products, retailer networks, clients and data. This approach was motivated by the fact that the number of RBF participants is too small for statistical comparisons and business characteristics and models vary widely across companies.



This impact study focused less on the consumer level; however, some analysis at consumer level is included in this brief to fully trace market transformation throughout the value chain.

The evaluation relied mainly on contribution and attribution analysis to understand how results were achieved in the different business cases and in the aggregate market. Key informant interviews, field visits, project documents and data were used to gather evidence on the business cases and evaluation questions. Additional data from a retailer survey conducted by Particip and an existing quantitative consumer survey by EnDev and SNV, the 2016 Energy Market Development Model Assessment (MDA), were used to supplement information provided by participating business cases. PAYGO databases of RBF firms became available at a later stage and were used to revise and complete the analysis.

4. Market Dynamics for pico-PV Products

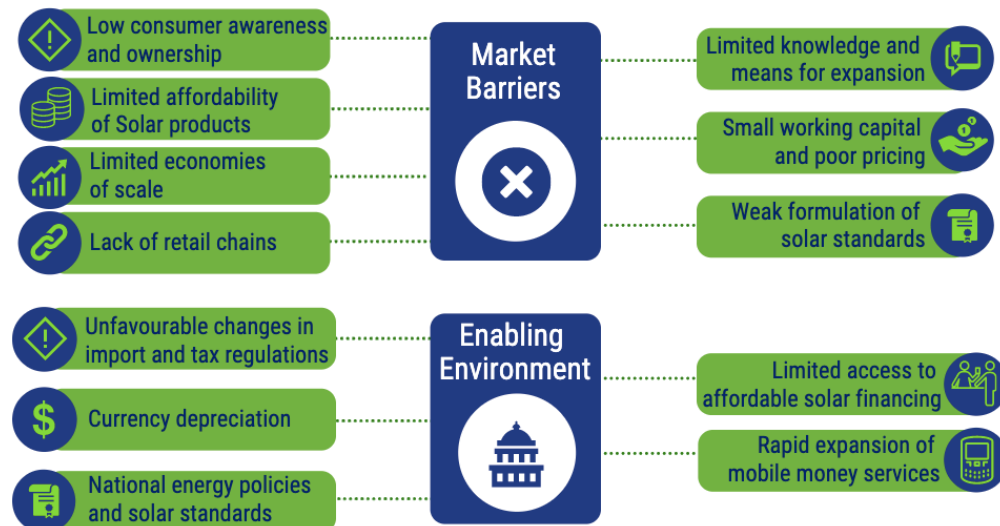
IFC - Lighting Africa (IFC-LA) describes pico-PV as; 'Off-Grid lighting products or systems that are stand-alone, rechargeable and can be installed, assembled and used easily without requiring assistance from a technician. Market intelligence conducted by SNV in 2012 showed strong demand for solar systems with more than 35-40% of Lake Zone rural households indicating solar as their most preferred energy technology option for immediate purchase; however, solar product ownership was identified amongst 3% of the same households. A growing range of IFC-Lighting Global (IFC-LG) approved pico-PV products began their entry to the Tanzanian market at that time. Pico-PV products supported by the RBF project can be broadly characterized into 2 main product groups including (See Figure 5)⁵:

Figure 5: A description of pico-PV products available on the Tanzanian Market.

	
<p>Desk light +/- Charger: Products in this range consist of a portable LED lamp and a small panel separate or contained in the lamp body. Products frequently include a port for charging a phone and can produce 2 watts of electricity for 4-6 hours on a single day's charge.</p>	<p>Small/multi-room lighting +/- phone charging kits: products are equipped to provide overhead lighting via multi-LED lamps and charging for small electronics. All necessary components are contained in the box (panel, wiring, lights) and installation can often be done independently by the consumer. They typically produce 2-15 watts of electricity for a minimum of 2 rooms for 6-8 hours on a single day's charge.</p>

General market trends for pico-PV sales in Tanzania show overall market growth in the country peaked in 2015/2016 and has since then slowed down. This is evident from biannual, self-reported sales data received from companies that sell Lighting Global quality verified products, accounting for roughly one third of the total market. This downward trend was accelerated by unfavourable external changes in import and tax regulations as well as currency depreciation. Figure 6 summarises the market barriers and enabling environment for pico-PV sales in Tanzania.

Figure 6: pico-PV Market Development in Tanzania.



Sales of RBF firms followed similar growth patterns as the overall market. Sales accelerated, reached a peak and then slowed down, even though there was some variation in the timing and intensity of this pattern across firms. Market activities of large PAYGO companies in the Lake Zone typically started around urban hubs at the shore of Lake Victoria and rapidly spread to neighbouring areas in the subsequent quarters, but the geographic outreach and market penetration had its limits. Most of the local markets located further inland remained unsaturated, with still less than 5% of households owning pico-PV products. This is plausible because distribution costs decrease with higher population density.

⁵ See www.lightingafrica.org for the full list of products.

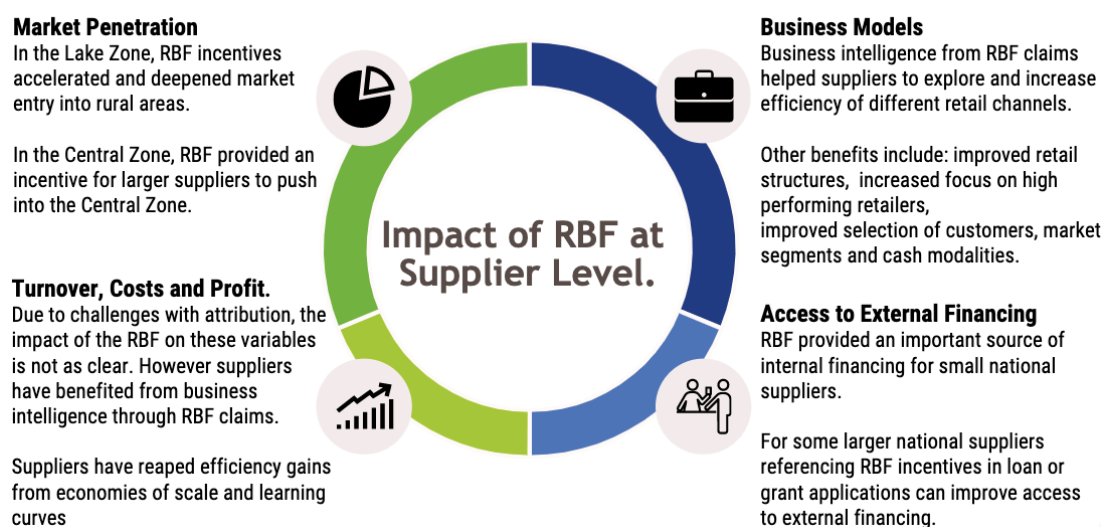
Market penetration of PAYGO firms by population density.

PAYGO firms tended to start their business in the hubs around the regional capital with the most densely populated areas exhibiting the highest market penetration. After rapidly picking these 'low-hanging fruits' within 1-2 quarters, they quickly moved to nearby areas and repeated the process before further extending to rural areas; but sales activities ultimately slowed down everywhere. A large number of wards in the South of the Lake Zone did not experience any 'market entry' peak. This demonstrates the limits of market penetration.

5. Impact at Supplier Level

The impact study provides particularly strong evidence that at supplier level, the RBF boosted market entry and penetration, resulting in more competitive markets, reductions in market risks and learning among market players. RBF further stimulated the testing of business models, expansion of retail structures and sales volumes, altogether leading to efficiency gains. Figure 7 summarises the impact of the RBF at supplier level.

Figure 7: Impact at Supplier Level



6. Impact at Retailer Level

Retailer jobs are relatively stable and generate multiplier effects for further job creation. In terms of geographic outreach, retailers act in line with the market expansion strategies of their suppliers described earlier. Rather than exhausting all remote areas in their base district, they often look for profitable areas in neighbouring districts. Product delivery and installation by RBF companies has become more efficient over time. Nearly two thirds of PAYGO technicians stated that these processes have become faster and easier for themselves and the client.

The impact of the RBF on job creation for retailers cannot be quantified, yet their socioeconomic profile shows that retailers are mainly men (83%) with an average educational level far above the national average. This suggests that any job creation in the retail chain has little direct effect on women and lower-income individuals. In one business case, however, these vulnerable groups accounted for a larger proportion of retailers, suggesting that 'poverty targeting' in job creation may be effective with some RBF firms. Remuneration schemes for retailers have been unified within companies. The RBF product bonuses were delivered to most non-PAYGO agents and the pico-PV business, thus income of most retailers (90%) still substantially fluctuates from one month to another. This is mostly due to the typical seasonality of the business and/or other fluctuations in the number of clients or service tasks. Most retailers have received substantial technical capacity building through training on multiple topics by their companies. However, the financial capacities of sales agents especially for further business expansion remain limited. Lack of access to financing for traditional retail agents presents an obstacle to business expansion. Nonetheless, for some agents the advent of various PAYGO models has bridged the financial gap to some extent.

7. Impact on Consumers

The survey data supports the hypothesis that RBF accelerated transition to high-powered solar products among RBF

consumers compared to other consumers on the market. This is owing to the fact that RBF retailers offer larger and high powered products. Further growth can be expected as clients seek to purchase even larger solar products. Since most users value product quality, but are unable to visually distinguish high-quality from low quality products, RBF plays an important role in promoting the expansion of trusted brands in local markets to generate confidence in certified products among consumers. The diffusion of PAYGO has mitigated affordability and cash constraints for many consumers. RBF has indirectly contributed to better affordability by stimulating the expansion of PAYGO suppliers in the Lake and Central Zones. However, analysis of the MDA consumer survey did not show any evidence that women/female-headed households and low-income groups were better represented in RBF client portfolios than in the general population.

RBF consumers interviewed in the field reported various product benefits. One is cost savings: the investment in a simple solar lamp is usually regained within a few weeks or months through savings on kerosene and fees for phone charging stations. Also, pico-PV products may stimulate economic activity of business owners who work at night by allowing them to work for longer hours. Other benefits reported include lighting for school children to study at night and less eye irritation due to reduced exposure to kerosene fumes from lamps. These benefits are likely to be sustained over time because users eventually own the products.

8. Lessons Learned

This section presents lessons specific to the Tanzania RBF project as well as general lessons which may be relevant to other RBFF interventions.

- Trust of the RBF project in companies, combined with sufficient time, has been essential for them to individually find their specific market and most efficient business models in the Lake Zone.
- The RBF product bonus had the important side effect of delivering highly valuable data for RBF claims, which in turn provided crucial business intelligence to pico-PV suppliers.
- RBF does not directly lead to the inclusion of poor and vulnerable groups, but with increasing competition, the chances increase that some companies identify them as attractive market segments.
- The successful transformation of RBF-supported markets may be substantially influenced by unpredictable external developments in the market and environment (currency depreciation, changes in Tax regulations).
- The willingness of private sector actors to invest in new markets depends on predictable and reliable RBF schemes and certainty on proportionate incentive disbursements.
- Imbalances between the available RBF funds and external pre-financing options may slow down the intended speed of market transformation.

9. Recommendations

The recommendations in this brief were made by Particip based on the specific conclusions and lessons learned from the study. These include:

- Put more emphasis on RBF learning results than on reaching specific states of market transformation, which can only be influenced by the project to a limited extent.
- Make timely and reliable announcements about the availability and design of incentive models and rely on business intelligence for more detailed guidance once RBF is in place.
- Refrain from pushing RBF participants towards specific business models (including PAYGO) but provide framework conditions for business model innovation.
- While the effects of RBF on specific business decisions is not very predictable, business intelligence created through RBF should be used to guide market transformation in more detail.
- Develop strategies to enhance access to pre-financing of RBF operations and access to credit for other actors in the value chain.

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Registered offices: Bonn and Eschborn, Germany
Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany
T +49 61 96 79-0
F +49 61 96 79-11 15
E info@giz.de
I www.giz.de

Contact:

*Energising Development Tanzania
Implemented by SNV Netherlands
Development Organization
Energy Sector
E tz-energy@snv.org*

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