The Vulnerability Access Index (VAI)

A Pro-Poor Approach to Develop Solar Markets in Rural and Vulnerable Areas of Tanzania

Overview

The Results-based Financing (RBF) for Rural Market Development of Off-Grid Solar in Tanzania was part of the global EnDev Results-based Financing Facility (RBFF). From 2013 until 2020, the Energising Development (EnDev) programme piloted RBF approaches to enhance energy access markets with funding provided by the UKaid. The RBFF encompassed 17 projects across 14 countries in Africa, Asia and Latin America covering a wide range of modern energy technologies such as photovoltaic systems, micro-hydropower plants, improved cookstoves, off-grid appliances and biogas digesters. The objective of the RBF project in Tanzania was to provide quality off-grid solar products for low-income rural households in six regions of the Lake Zone and three regions of the Central Zone via strengthened import suppliers to end-retailer distribution[1]. The first phase of implementation from 2014 to 2017, referred to as RBF Stage 1 (RBF 1), was implemented by SNV in Tanzania through the disbursement of financial incentives to selected suppliers and their retailers for verified sales of small-scale certified solar products.

RBF 1 saw participating solar companies start to expand their businesses in the larger centres of the Lake and Central Zones with the more populous regions attracting most sales. Following a rapid expansion in the first six months of the RBF, companies eventually started reaching into the more rural areas. However, sales ultimately slowed down as firms focused on penetrating into peri-urban areas and reached the boundaries of extremely remote parts of these regions. By the close of RBF 1, the project had supported companies to provide access to off-grid solar products to approximately 390,000 people. In 2018, the SNV/EnDev Tanzania team completed a review and analysis of RBF 1. The findings showed that participating companies used the funds to improve business models, optimize operations, re-evaluate cost structures and focus market outreach to ensure long-term viability. With the success of RBF 1, the project now aimed to proactively build upon the maturing private sector to expand market potential in more remote, potentially riskier and more vulnerable rural regions of the Lake and Central Zone.

Design of the Vulnerability Access Index Framework

In the second implementation phase “RBF 2”, which started in 2018, the SNV team was guided by a pro-poor vision and developed the Vulnerability Access Index (VAI). The VAI is an innovative way to value and incentivise companies to reach deeper into more socio-economically challenged and vulnerable regions rather than the status quo of focusing on

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

relatively less challenging markets (for example in peri-urban localities). The Vulnerability Access Index is comprised of two key components:
Socio-Economic Risk Factors (SER) and **RBF Market Performance (RMP).**

Figure 1: The Vulnerability Access Index. Source: EnDev

The SNV team in Tanzania gathered the Socio-Economic Risk Factor data from the Government of Tanzania National Bureau of Statistics (NBS) which included population density, electrification rates, energy access (such as clean cooking), biomass usage, gender, equity (the disparity of female-headed households in literacy and employment), child and maternal health (including infant and maternal mortality rate), and access to water supply and sanitation. The second key part of calculating the VAI is the RMP using historical RBF sales data which is calculated based on two elements: the **Activity** and the **Availability**. The Activity refers to the number of solar companies undertaking operations in a region during the RBF 1 (2013-2018). The Availability refers to the number of years solar products have been available in the region.

The VAI uses a valuation of the SER and RMP data in combination with the actual energy service units (lumen-hours per solar day output) of solar products at peak setting.[2] The VAI Framework distinguished five VAI levels in the Lake and Central Zones with a higher value given to regions with higher socio-economic risk factors and a historically lower level of RBF market activity. In the second implementation phase starting in 2018, higher incentives were provided for regions with a higher VAI level.

[2] Settings as described by Quality Assurance specifications from IFC - Lighting Africa (IFC-LA), now managed by VeraSol

Eligible Regions and Results

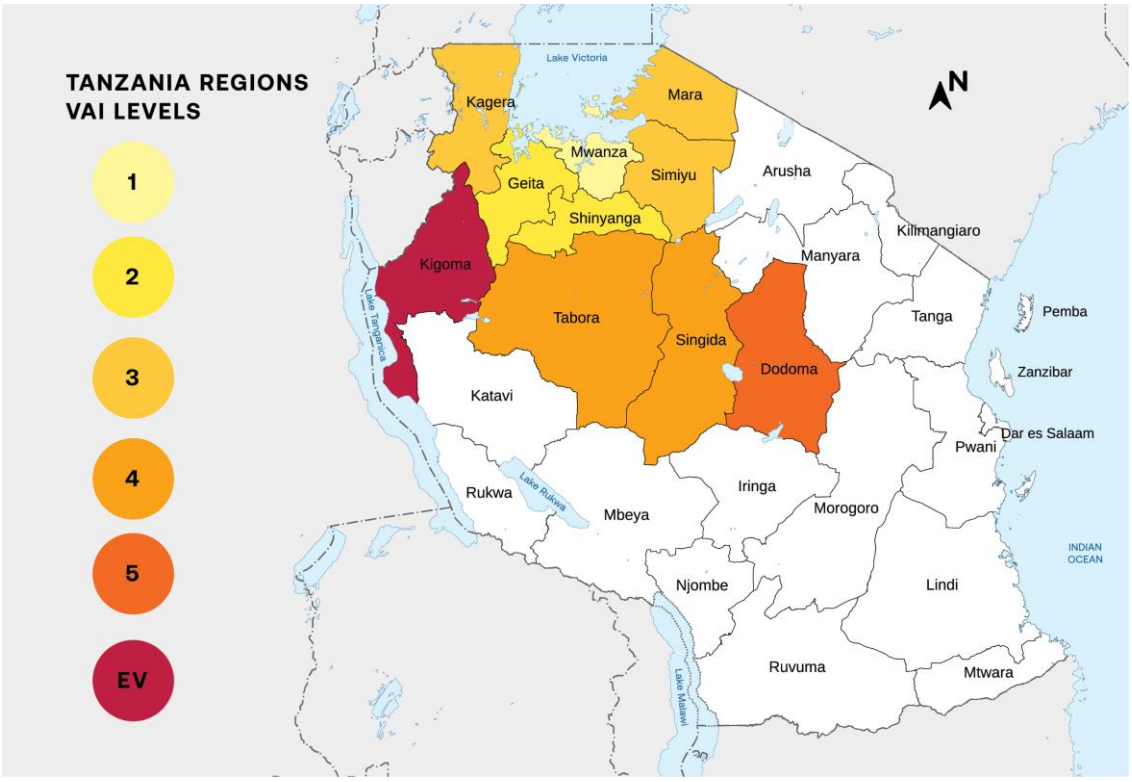
The map below outlines the eligible regions in the Lake and Central Zones with their VAI level. As the VAI incentive scheme was rolled out, the sales started to shift to new geographic regions, illustrating that indeed the approach worked. The incentive was helping to pull sales into areas where the VAI rating was higher (Rating from 1 to 5 and areas with Extreme VAI - “EV”), and companies into communities which were more remote and vulnerable.

Figure 2: Overview of the solar sales after one year of application of VAI in RBF 2.

VAI LEVEL	% Sales of RBF 1	% Sales of RBF 2	Change % Sales RBF 1 vs RBF 2
1	25.96%	13.91%	-12.05%
2	25.49%	13.41%	-12.08%
3	40.43%	45.28%	4.84%
4	5.73%	16.08%	10.35%
5	2.39%	8.52%	6.14%
EV	0.00%	2.80%	2.80%

Application of the VAI in the RBF 2 incentive valuation resulted in a significant shift in sales numbers from lower VAI-level regions to higher VAI-level regions. This is a strong indication of the VAI approach being effective in fulfilling its role as a pro-poor approach. In the table above, this can be evidenced by the negative change in sales in the lower VAI regions and positive change in sales in the higher VAI regions. Overall, the RBF 2 incentivized sales of over 128,000 solar products reaching 570,000 persons with access to solar energy between January 2019 and September 2020.

Figure 3: VAI regions in Tanzania



Lessons Learned

One of the main barriers to pro-poor market development was the energy companies' ongoing search for more appealing markets with lower risk, fewer barriers and assumed higher sales opportunity. To help mitigate this risk, the RBF programme arranged customer surveys in collaboration with the partner 60 Decibels, which provided information on how the participating companies could adjust their strategy and customer service to meet customers' needs in each region. This customer feedback, paired with the VAI incentive valuation, has provided risk reduction to firms encouraging them to engage in riskier markets earlier than they would have without the RBF incentives. The surveys also revealed that, when compared to an East Africa baseline of other off-grid companies, RBF-participating companies were reaching a customer demographic with higher poverty levels.

Anecdotal evidence shared by RBF-participating firms indicates that firms' management did take the VAI ratings into account as they planned their expansion strategies to maximize the incentives they received. Examples of this include firms prioritizing regions with higher incentive values, providing more ground-level trainings to sales agents in the higher VAI regions and even deciding to expand into a new region at an accelerated pace knowing that RBF incentives would de-risk the expansion. RBF incentives were also used to open new retail locations for consumers to view and demo products. These examples demonstrate how targeted incentives based on socio-economic and market data can support reaching more vulnerable markets, as well as accelerating expansion from the solar firms' perspective. One of the limitations of the VAI is that incentives can only provide a certain level of risk reduction for challenging markets – extremely vulnerable markets such as refugee-hosting communities may need more than after-sales financial incentives to accelerate solar sales, such as supply chain logistics support, awareness raising and enabling environment interventions.

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Overall, the use of the VAI in the RBF 2 provided extra incentives to participating solar firms to reach more remote and vulnerable communities sooner, thereby accelerating access to electricity in these areas. Pro-poor RBF models such as the VAI, along with the right market conditions, are indeed able to pave the way for solar energy to reach the most vulnerable households.

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