

# Expanding Electrification to Low-income Households in Rural Ghana with Microfinance



*This learning note is part of a series developed by the Global Partnership on Output-Based Aid (GPOBA) to analyze and showcase experiences where results-based finance (RBF) has been used to leverage private finance through a blended finance approach.*

**Country:** Ghana

**GPOBA Project Years:** 2009-2014

**Project Partners:** Government of Ghana; ARB Apex Bank Ltd; Rural Banks; Global Environment Facility (GEF); World Bank Group; private solar dealers

## Overview

In Ghana, blended finance helped improve affordability for rural Ghanaian household investments in off-grid renewable energy technologies. Local banks extended credit blended with concessional finance from the World Bank to rural low-income households for acquisition, installation and maintenance of solar home systems (SHSs). An output-based aid (OBA) grant was provided to reduce the up-front cost for SHSs, and enhance affordability of the financing package.

## Development Challenge

At the time of project preparation in 2008, the electrification rate in Ghana was relatively high for Sub-Saharan Africa, at 61 percent of the population.<sup>1</sup>

However, in rural and remote areas, where national grid extension is costlier and more challenging in the short-term, access rates were much lower at around 38 percent.<sup>2</sup> In these areas, off-grid renewable energy systems are a more cost-effective alternative for meeting electrification goals, but lack of access to capital for upfront payment of these technologies in addition to low awareness of the potential benefits of solar power remained challenges.

## Background and Enabling Environment

The government of Ghana initiated a National Electrification Scheme in 1990, with the objective of reaching universal access to reliable electricity by 2020. As a result, access to electricity nearly doubled between 1990 and 2008<sup>3</sup>. These efforts focused primarily on extension of power from the grids to meet the growing demand for electricity in Ghana, thereby excluding many rural communities too remote for cost-effective grid expansion.

In rural areas, off-grid renewable energy systems became increasingly viewed as an attractive alternative for meeting electrification goals. Solar photovoltaic (PV) systems have been identified as the lowest-cost technology best suited for delivery of

<sup>1</sup> World Bank. Sustainable Energy for All (SE4ALL) Database. Access to electricity (% of population) World Bank; Washington, DC. <https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS>

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

electricity to these areas. However, at the time of GPOBA project appraisal, renewable energy technologies were not widely used at the rural household level for multiple reasons, including: (i) limited household ability to pay; (ii) limited financial service provider product offerings to improve consumers' ability to pay; (iii) lack of familiarity with solar technologies and skepticism surrounding their quality; and (iv) lack of maintenance services and limited solar PV supplier presence in rural areas of Ghana.

In 2007, the World Bank and the government of Ghana approved the International Development Association (IDA) / Global Environment Facility (GEF)

Ghana Energy Development and Access Project (GEDAP). The project maintained a development objective focused on improving electricity distribution efficiency and broadening electricity access rates, and included a solar PV sub-component to help facilitate increased access to solar electrification products through commercial financing to rural communities. Technical assistance was provided through a GEF grant, which helped build capacity for the solar dealers and rural banks. However, even with the option of long-term credit, many households were still unable to afford the monthly payment for a typical solar PV system.<sup>4</sup>

### Blended Finance Approach

In 2009, a Global Partnership on Output-Based Aid (GPOBA) US\$4.35 million grant was approved as additional financing to the GEDAP project to improve households' ability to purchase and use solar PV systems. ARB Apex Bank Ltd., a government-regulated umbrella-like bank for the country's rural microfinance banks was the implementing partner. Interest-rate margins for Apex Bank are regulated by the government and are therefore significantly lower than other unregulated financial institutions in the country. GEDAP extended a line of credit through Apex Bank to rural banks to facilitate their financing of household loans for solar home systems (SHSs). The line of credit covered 80 percent of the loan and

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<sup>4</sup> Ibid.

<sup>5</sup> GPOBA (Global Partnership on Output-based Aid). (2016). *Lessons Learned: Improving Rural Energy Access through Solar Home Systems in Ghana*. Note 12. Washington, DC: World Bank Group. / William F. Steel, Nana Akua Anyidoho, Frank Y. Dadzie, Richard H. Hosier.

the rural banks contributed the remaining 20 percent of the credit from their own resources.

The microloan was used to pay for an SHS package, which included the hardware, installation, maintenance, and one battery replacement for a one to three-year period with monthly repayment. Available SHS technologies varied in size from 10 watt-peak (Wp) to 50 Wp, allowing flexibility for consumers to choose between different low-cost options. The technology was supplied by participating private vendors pre-approved under the program, who were members of the Association of Ghana Solar Industries (AGSI).<sup>5</sup>

The OBA grant was channeled in the form of a partial subsidy on behalf of purchasers directly to private solar suppliers to cover 50 – 60 percent of the total cost of the SHS package or solar lantern. The household paid for the SHS at this subsidized rate via a 10 percent down payment and the remaining amount in monthly installments through the loan. Loans were not extended for solar lanterns, which were relatively inexpensive compared to the SHSs. The OBA subsidy funding was provided in a tiered structure, whereby smaller solar PV systems and lanterns used by the poorest households received a higher percentage subsidy.<sup>6</sup>

In addition to the technical assistance provided through GEF, awareness building and marketing were also provided for households to familiarize them with the technology, financing options and private providers.

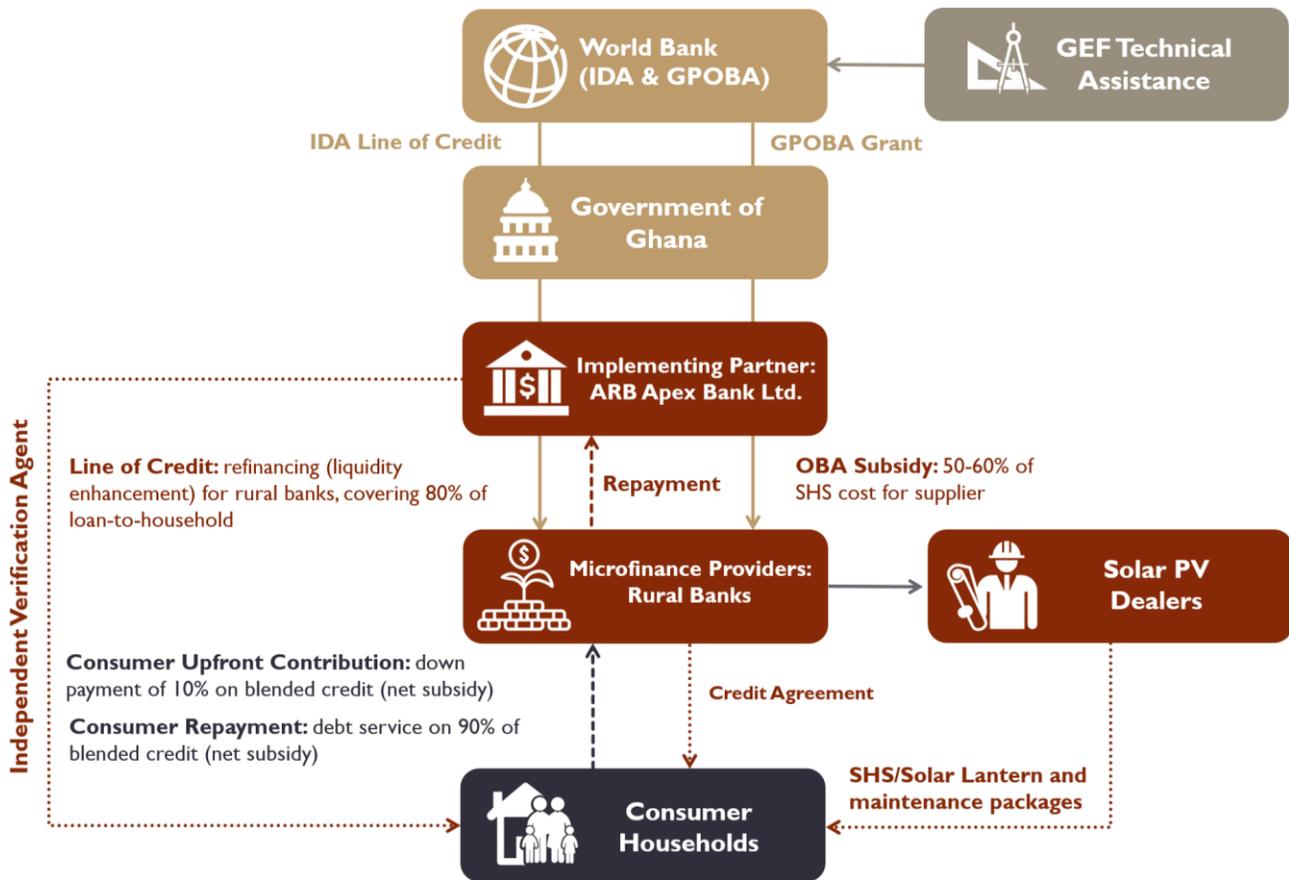
### Results

The overall blended finance lending scheme helped increase accessibility for solar technology in rural Ghana. The IDA-funded line of credit helped the local banks address limited liquidity issues and extend microcredit that allowed for spreading the debt service over one to three years. Further concessional blending was achieved through the OBA subsidy, which effectively reduced the overall loan cost to meet the limited ability to pay of the targeted rural

“Developing rural markets for solar products: Lessons from Ghana.” Elsevier Inc.; *Energy for Sustainable Development* 31 (2016) 178–184.

<sup>6</sup> World Bank. (2008). *Official Documents - Commitment on Solar PV systems to increase access to electricity services in Ghana*. Washington, DC: World Bank Group.

**FIGURE 1. Financial Flows Structure**



consumers. By enhancing affordability, the OBA subsidy added reassurance to the private sector stakeholders – private solar PV suppliers and lenders – through demand generation and market capacity demonstration and strengthening, effectively helping to crowd-in private investment.

Approximately 100,000 individuals benefitted from access to off-grid renewable energy, surpassing original project targets. An estimated US\$1.6 million in loans was provided through 12 participating rural banks, and repayment rates in most districts registered at over 90 percent.<sup>7</sup>

The OBA project is considered a major success and has been used as a model for later renewable energy and microfinance projects, helping to open a market

and increase access to a segment of the population who otherwise would not benefit from national grid access in the near to mid-term future. The program saw additional growth with the quantity of solar dealers increasing from three to seven by project end.<sup>8</sup> The prices of solar panels, LEDs, and solar systems declined rapidly from the time the project began. The continuation of this trend to the present and beyond will mean that future systems will be more affordable and less reliant on subsidies for widespread market uptake.

### Success Factors<sup>9</sup>

The confidence of private sector financiers and suppliers in the market was bolstered during the project by a high willingness to pay for the

<sup>7</sup> GPOBA. (2016). *Lessons Learned: Improving Rural Energy Access through Solar Home Systems in Ghana*. Washington, DC: World Bank Group.

<sup>8</sup> Ibid. / World Bank. (2014) Grant Reporting and Monitoring (GRM) Report. Washington, DC: World Bank.

<sup>9</sup> Additional details surrounding GPOBA project lessons learned can be found in: GPOBA (2016): *Lessons Learned: Improving Rural Energy Access through Solar Home Systems in Ghana*.

technology. Packages offering LED televisions were considered especially desirable by large numbers of rural consumers.<sup>10</sup> The solar PV systems also proved to be readily reclaimable in cases of non-repayment, further increasing the willingness of lenders to take on the credit risk.

Capacity development and market mobilization proved instrumental to project success. GEF funding paid for technical assistance to the banks to familiarize them with lending to households for solar PV systems. At the community level, rural banks utilized Solar Project Officers to help raise awareness about the technology, market the products, support consumers on the administrative hurdles to apply for

a loan, and to recover payments from remote households. These officers also served as a bridge between private dealers and the household clientele in relation to technical questions and maintenance, which was critical for sustainability.

Program sustainability also benefited from the required verification component and importance placed on maintenance, which was crucial for loan repayment. The verification step rested risk and responsibility on the private sector, and guaranteed quality service for installation and maintenance to the households. Well-functioning systems resulted in higher repayment rates.

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## About GPOBA

*The Global Partnership on Output-based Aid (GPOBA) provides innovative financing solutions that link funding to actual results achieved. Our results-based financing (RBF) approaches provide access to basic services like water and sanitation, energy, health and education for low-income families and communities that might otherwise go unserved.*

*By bringing together public and private sector funders to maximize resources, and designing effective incentives for service providers to reach underserved low-income communities, we give people the chance for a better life. Visit [www.gpoba.org](http://www.gpoba.org) to learn more.*

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<sup>10</sup> Ibid / World Bank. (2014). GRM Report.