



# The Gitega Solar Bakery Project

A case study by R20 Regions of Climate Action

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## THE PROJECT PARTNERS

R20 Regions of Climate Action is a coalition of partners led by regional governments that work to promote and implement projects designed to produce local economic and environmental benefits in the form of reduced energy consumption and greenhouse gas emissions; strong local economies; improved public health; and new green jobs. These local actions can help the world achieve our shared global environmental and economic goals.

CIRID's (Centre Indépendant de Recherche et d'Initiative pour le Dialogue) mission is to achieve a lasting peace in Burundi and throughout Africa, through development projects and dialogue.

This project is financed by the Ministry of Foreign Affairs of Finland, the Austrian Development Cooperation and the UK Department for International Development (DFID). The project's implementation is overseen by the Energy and Environment Partnership of Southern and East Africa (EEP S&EA).



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# INTRODUCTION



## Purpose

This case study illustrates the implementation of two solar-powered ovens in a local bakery in Gitega, Burundi. The Solar Bakery project aims to create sustainable employment opportunities, empower female entrepreneurs and reduce their vulnerability to poverty, reduce greenhouse gas emissions and deforestation, and stimulate international investment.

## Climate change, deforestation

The scientific community supports the notion that anthropogenic activities contribute to the earth's changing climate conditions. Deforestation is one activity that is exceptionally harmful to the natural environment, as it results in decreases in biodiversity and increased rates of soil erosion. The clearing of trees also interrupts the natural water cycle, as trees aid in the absorption of groundwater and evaporation of water vapor<sup>1</sup>. Additionally, trees play an integral role in regulating the amount of greenhouse gases in the atmosphere. During photosynthesis, carbon dioxide is absorbed from the atmosphere and stored within the plant body<sup>2</sup>. Deforestation, therefore, results in increased levels of carbon dioxide—the primary greenhouse emitted by humans<sup>3</sup>—in the earth's atmosphere.



## Burundi's Gitega city

The city of Gitega, located in Gitega Province, is the second largest city in Burundi. Gitega has a tropical highland climate, with an elevation of 1,500 meters and average temperature of 19 degrees Celcius. The province experiences an average rainfall of 720mm per year<sup>4</sup>. Agriculture and livestock farming are integral to Gitega's economy. Intensive agricultural activities, however, increase the province's vulnerability to climate change due to the fact that oftentimes, forests are cleared and the land is converted to farmland. Additionally, the agricultural sector in Burundi is responsible for 91.4% of the country's greenhouse gas emissions<sup>5</sup>.

The Burundian civil war, which lasted from 1993 until 2005, was detrimental to the political, economic, and developmental stability of the country. Gitega was especially affected, and the province is still in the process of recovering from the war. For example, many vulnerable groups such as children, victims of sexual violence, widows, the impoverished, and single mothers, are currently present in Gitega as a result of the war. Additionally, the unemployment rate is now relatively high, at 9%.<sup>6</sup> In addition to socioeconomic issues, the civil war was also accompanied by water infrastructure damage, as well as increased rates of deforestation<sup>7</sup>.

## Burundi's response to climate change

Since Burundi entered the Kyoto Protocol in 2001<sup>8</sup>, the country has developed the First (2007) and Second (2010) National Communication on Climate Change, a National Action Plan of Adaption of Climate Change, and a National Policy Strategy on Climate Change. These reports highlight the following:

- Burundi is becoming increasingly vulnerable to droughts, flooding, and landslides;
- Poor socioeconomic conditions hinder Burundi's ability to combat climate change;
- Wood is the most consumed energy resource;
- Renewable energy (solar, wind, biogas) innovations are underdeveloped;
- Hydroelectric power is a promising source of energy; and
- Solar technology implementation would be beneficial and effective.<sup>7</sup>



Fire wood stock outside the old bakery



Indoor wood-fired oven at the old bakery

### Background

The Solar Bakery project is an initiative conceived by R20 and CIRID (Centre Indépendant de Recherche et d'Initiative pour le Dialogue) to supply two solar-powered ovens to a small bakery that employs 13 women who have been marginalized by their communities. R20 was awarded funding for this project through a grant from the Energy and Environment Partnership of Southern and East Africa (EEP S&EA). The bakery is located in the outskirts of Burundi's second largest city, Gitega.

Prior to the arrival of the solar ovens, the bakery relied heavily on fuel-wood to produce baked goods, exposing the bakers to large amounts of smoke, as well as incurring high costs as the price of wood kept rising. Such increases in costs eventually forced the bakery to temporarily shut down and relocate to a busier area.



The bakers



## Project deployment

Once the solar ovens were deployed to the new bakery, a two-week training course was conducted for the bakers on using the ovens, business management (accounting, planning, strategy, etc) and marketing.

The bakers then elected one baker to manage the bakery and keep track of sales and expenses. The CIRID team has been collecting that data and monitoring progress.

The project partners, R20 and CIRID, involved the bakers in the project from the very start by organizing stakeholder consultation meetings to identify their needs and walk them through the plans for the bakery. Ongoing meetings with these beneficiaries allowed the partners to address their concerns as they emerged.



## THE TECHNOLOGY



Villager Sun Oven folded and covered up during rain fall



Installation of the Villager Sun Oven at new bakery site

The technology being used is called the “Villager Sun Oven”, manufactured by a US-based company, Sun Oven International.

The Villager Sun Oven is designed and built for durability and ease of use. It is highly adaptable to changing weather, as it can be rotated to face the sun, and comes with a propane back-up system to be used when it rains. In other words, the oven can be used in all weather conditions. The oven is mounted on a trailer making it easy to transport, and its collapsible reflectors make it secure for storage.





The first batch of freshly baked bread using the solar oven



The women bakers with the R20 and CIRID teams

- Each oven is capable of baking up to 500 bread loaves each day and allows the users to save over 150 tons of firewood each year, which results in the reduction of around 277 tons of greenhouse gas emissions annually<sup>9</sup>.
- In Gitega, the most popular bread produced by the oven is 30% cheaper than regular bread sold elsewhere.
- The findings of a qualitative survey reveal that the bakers are generally much happier to be working in the bakery now that they are no longer exposed to harmful indoor smoke from using a wood-fired oven.
- The bakers also appreciate not having to walk long distances to collect fire wood.
- The bakers earn 30% more than they did when they worked as farm laborers during the temporary closure of the bakery.

## Distribution

The women in charge of sales have to walk 1.5 hours to sell the bread in other villages. The bakery closes in the early afternoon when the women go to sell. This time could be used to produce more bread, but would still require the remaining bakers to walk to other villages to sell later on, which is not so safe to do in the evenings.

### **Solution**

The partners are currently exploring partnership opportunities to provide bicycles to the bakers. This would reduce and ease their commute, as well as maximize production and sales.

## Promotion & marketing

The baked goods are 30% cheaper, but the bakers have not yet begun to fully promote the bakery.

### **Solution**

The partners and bakers are currently drafting a marketing plan and promotional materials.

## Target customers

Selling to individual consumers in other villages has been both time consuming and not sufficiently profitable.

### **Solution**

The partners and bakers are currently revising the business plan and strategy to redirect the business towards bulk sales to restaurants, hotels, grocers and super markets.

## Political climate

The bakery has been operational since March 2015. As of May 2015 the political environment in Burundi has deteriorated and become unstable. As a result, the business has been put on hold until tensions dissipate.

## CONCLUSION

The scope of this project has effectively extended beyond simply delivering solar ovens and reducing local environmental damage (deforestation), to actually improving the health, livelihoods, and contributing to the professional development, of the women employed at the bakery.

Through the business and marketing trainings provided by the project partners so far, the employees have begun to strengthen their existing skills and develop new ones. This will undoubtedly be beneficial to them in the running of this bakery, and in any other form of employment they may undertake in the future.

In addition, by encouraging and supporting the bakers in taking ownership of the bakery's operation, the partners have laid the foundations for a sustainable business that will outlive the duration of the project, which is set to end in July 2015.

## NEXT STEPS

- Recruit an experienced local project manager to provide guidance and support on: day-to-day management; implementing the new sales and marketing strategy; as well as broadening the customer base to cater to commercial clients.
- Organize refresher business management courses for the bakers.
- Replicate and scale up the project to other communities in Africa.





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