

# Bakeries with Efficient Ovens

## UGANDA

<b>Project name</b>	Enlising Development (EnDev) Uganda Promotion of Renewable Energy and Energy Efficiency Programme (PREEEP)
<b>Project region</b>	Uganda, north-western and south-western regions
<b>Lead executing agency</b>	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH Ministry of Energy and Mineral Development (MEMD)
<b>Duration</b>	04/2009 – 12/2014

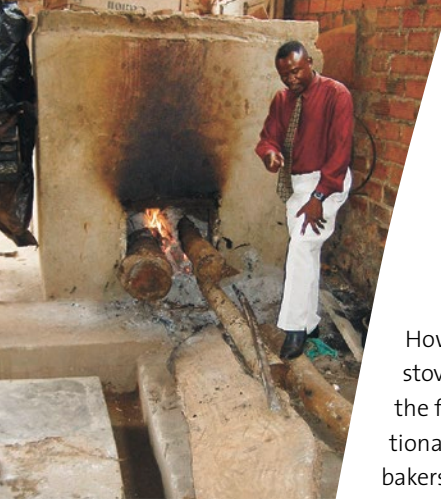
### Productive use of thermal energy

Alongside electricity and mechanical energy, thermal energy plays a key role in processing goods and offering services, particularly in remote areas where biomass and solar radiation are often the only source of energy available. Thermal energy – used for cooking, heating, drying and smoking – is an essential input for production processes in agricultural businesses, small industries and commercial services.

### Baking bread in Uganda

Bread is becoming an increasingly popular snack with many Ugandans, as are bakery products ranging from small buns to large wedding cakes. The bakeries are generally small-scale. The total number of bakeries and ovens in the country is difficult to estimate as most of them operate informally and no government statistical information is available.





However, the introduction of improved stoves means a great potential for reducing the fuel consumption and thus the operational costs in these bakeries. Families of bakers have a source of income which enables their children to go to school and to have the necessary scholastic materials, and also to meet the basic necessities of life for all family members. This income increases when less firewood needs to be purchased. The most important source of energy for those rural small and medium-sized enterprises is biomass. Firewood, charcoal or crop residues fuel the high energy consumption in bakeries.

### Promoting energy efficient baking ovens

The Promotion of Renewable Energy and Energy Efficiency Programme (GIZ PREEEP) has been promoting efficient biomass energy technologies. Using a purely commercialised approach, GIZ has been disseminating the rocket baking ovens to bridge the energy gap, especially for the development of small and medium enterprises in the baking sector. Ovens are produced and sold by private companies without any subsidy. GIZ supported the technology development and the testing process between 2003 and 2005.



Technical training has enabled oven builders to construct and market efficient rocket baking ovens by themselves.

The project also supervises the performance of the installed ovens. So far, 68 improved ovens have been distributed. The project evaluates whether the ovens meet the quality criteria regarding firewood consumption, product quality, smoke emission, and oven construction material choice, etc.

The project promotes efficient baking ovens at various fairs and events throughout the year; e.g. the World Food Day and the annual Energy Efficiency Week organised by the Ministry of Energy. At these events, the technologies attract many people, especially small entrepreneurs.

### Rocket ovens decrease production costs enormously

The firewood rocket baking oven comes in three different sizes: the single deck rocket oven, the double deck rocket oven, and the large-scale commercial rocket oven which is the equivalent of four double deck ovens constructed in modular format. Baking capacity per oven varies between 32 and 256 kg



## Malaika Bakery plans to expand business

of bread in one cycle, or 100 to 800 buns. A baker can save time and money compared to using a traditional baking oven. Preheating time is reduced by at least two-thirds. Firewood consumption is reduced to one-tenth of previous consumption. The rocket oven increases efficiency by 70 per cent because of improved heat transfer. It evenly distributes heat around the baking chamber, thereby producing better quality products. Proper sealing of the baking chamber ensures that the bread is not contaminated by smoke or ash.

Depending on the size of the oven, the entrepreneurs need to invest between UGX 4 and 18 million (USD 1500 and 7000) to purchase an improved baking oven. Big ovens bake 760 loaves of bread at once, small ovens 12-24 loaves. These investments can be financed by future savings because of considerably reduced firewood consumption. One cubic metre of fuel wood costs UGX 20,000 (USD 8).

Mr Patel operates a bakery business in Arua Town, West Nile Uganda, called 'Malaika Bakery'. He owns a large-scale commercial rocket baking oven with eight baking shelves. Four women and nine men work in his bakery. Malaika bakery produces 1,000 kg of bread daily. Mr Patel learnt about the rocket oven two and half years ago after observing a demonstration oven that GIZ PREEEP had constructed in Arua Town. He then contacted the GIZ office, 700 km away, in Kampala for more information.

He obtained technical details of the design and performance as well as a list of trained artisans located in the region who could build the oven for him. The entrepreneur invested USD 7,100 in acquiring the oven. Since then, he has profited from the benefits of the rocket baking oven. The reduced fuelwood consumption leads to less expenditure on wood, resulting in lower production costs and ensuring competitiveness. He states that his income has increased by 20 per cent and expects further increases after completing the process of replacing all his remaining traditional ovens.



Although maintenance and cleaning of the oven entails production downtime and additional costs, the entrepreneur realises that the new oven has been a catalyst for his business development. In the future, Malaika Bakery plans to shift to bigger premises and to construct two new commercial rocket baking ovens. His only concern is the fact that smaller pieces of wood are more expensive.

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