

Project name	Energising Development (EnDev) Ethiopia
Project region	Ethiopia: Oromia, Amhara, Tigray, Addis Ababa, Harar, Dire Dawa, Southern Nations, Nationalities and People's Regional State
Lead executing agency	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
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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.

Injera baking in Ethiopia

Thermal energy applications in Ethiopia are the most important ones with respect to final energy use. The cooking and baking applications of thermal energy in Ethiopia are not limited to households, however. The baking of injera, a thin pancake-like bread about 60 cm in diameter, alone accounts for 50 per cent of primary energy consumption. Traditionally, the baking of injera takes place on a hot metal plate, which is placed on a fire.





Besides restaurants and commercial bakeries, public institutions such as colleges, universities, hospitals, prisons and detention centres are some of the most notable users of thermal energy applications for meal preparation. Although this segment of energy users represents a smaller percentage than households, the actual energy demand is substantial. Biomass is often the only energy source available.

Dissemination of improved stoves

EnDev Ethiopia focuses on institutional strengthening and capacity building for the public as well as the private sector. In order to assure long-term sustainability, the project actively supports strong participation from the private sector and focuses on commercial dissemination of improved stoves and ovens. Raising awareness on fuel efficiency, indoor air quality and general environmental consciousness are also part of the project that aims at improving up-take of efficient stoves by commercial users and by the general public. The Mirt stove allows to cook food while baking injera with no additional fuel. The nearly 600 small-scale producers of energy efficient cookstoves, who have been supported in 310 districts of seven regions of Ethiopia, disseminated more than 505,000 stoves from January 2010 to June

2012. Institutions and small enterprises adopted 2,722 of those stoves.

Mirt stoves: a sound investment that pays off

The Mirt stove is primarily designed for baking injera. The stove is produced from locally available raw materials, mainly red ash (or in its absence, pumice or river sand) mixed with cement. The stove comprises six parts. Four of these make a cylindrically shaped enclosure that is about 66cm in diameter and 24cm high, where the firewood is burned under a baking plate. The remaining two parts sit behind the cylindrical enclosure and facilitate smoke removal and cooking on a pot.

Small holding injera bakers use a single stove for their daily baking. Others, such as cooperative micro-enterprises use different versions of modified Mirt stoves, which cluster two or more stoves so that they use a single chimney, with additional parts for collecting the smoke from the individual stoves.

The stove reduces fuel consumption by up to 50 per cent compared to the traditional three stone open fire and is optimised to burn a range of biomass fuels including firewood, agro-residues and dung.



The current average market price for a single stove is USD 11 and USD 126 for the modified stove with four individual stoves. Thanks to the resultant reduced fuel costs, the stove has a payback period of approximately two months. All components can be replaced if damaged. One of the concrete costs only USD 2, whereas, a new chimney costs around USD 63. Due to the high costs of the spare parts, unfortunately users are often reluctant to repair them immediately.

Injera baking women's association

'Achem, Zewude & their friends share company' is a women's association engaged in mass production and distribution of fresh injera, located in Bahir Dar, northern Ethiopia. They own 76 Mirt stoves and supply about 25,000 injeras every day to the Bahir Dar University Canteen. The association has 80 members and 16 additional employees working in two shifts around the clock.



'Baking with Institutional Mirt stove has many benefits,' said Atsede Sintayehu, manager of the association. 'Considering only the supply of 12,000 injera per day for one campus out of the four, our fuel consumption has reduced by 40 per cent i.e. from USD 150,000 to USD 90,000 per year as compared to an open fire. Besides the financial strength, the health benefits we are getting by avoiding indoor air pollution while using the improved stove are very significant.'

Now the association has paid off a USD 20,500 bank loan that was used for financing the initial investment. Atsede added: "At this rate, no doubt we will be able to ensure the timely delivery of the entire demand for the university in the near future".

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