



## CASE STUDY TITLE

Case Study on the Impact of Implementation of Malawi Standards for Improved Cookstoves which Uses Biomass as Fuel

### SUMMARY

The objective of this case study is to demonstrate how the Malawi Standards on biomass cookstoves have contributed to sustainable development by standardizing cookstoves, which use much less firewood than traditional stoves and is easy and convenient to use helping households to avoid the use of open fires which both pollute the air in and outside the home.

The standards are critical in evaluating the safety of the cookstoves hence promoting commercial success and encouraging regulator and public acceptance. The development of standards is one way of ensuring quality for products. Standards help to make life simpler, increase the reliability and effectiveness of products and services. They increase product image and give the customer a certain guarantee about the quality. Effective standardization promotes forceful competition and enhances profitability. Standards enable a business to take a leading role in shaping the industry itself and open the industry to the global market.

### BACKGROUND

In Malawi, over 89% of energy needs are met by biomass, mainly in the form of firewood and charcoal. Moreover, it is estimated that only 2% of households use electricity for cooking and heating water. Institutions such as schools and factories, typically meet their fuel needs using biomass. It is likely that biomass will continue to meet most of Malawi's energy needs in the near future.

At present, more wood is being used than it is re-growing, and this is leading to depletion of natural resources and increased carbon dioxide in the atmosphere. Fuel efficient technologies can help to reverse this trend and bring about other positive impacts, such as reduced smoke.

### AT A GLANCE

#### COUNTRY

- Malawi

#### LEVEL

- National

#### SDG ADDRESSED

- SDG 7 - Affordable & Clean Energy

In Malawi, nine out of ten rural households use a three-stone fire that is smoky and inefficient. Scarcity of firewood is increasing as people travel further to collect wood and begin to use less-preferred wood species. As such, the pressure on natural resources is mounting.

The Malawi Standards on cookstoves are critical to evaluate the safety of the cookstoves, promote commercial success and encourage regulation and public acceptance of the product.





## STRATEGY

The introduction of the Malawi Standard on cookstoves allows for the cookstoves to conform to the requirements of the standards hence enhancing the acceptability of the products and also the products meet the requirements as the guidelines for producing and operating the cookstoves are standardized.

The Malawi Standards for cookstove in place include MS 155, *Solid fuel cookstove - Type II - Specification*, which specifies requirements for solid fuel cookstoves with a pottery liner intended for cooking and MS 158, *Cookstove solid fuel (Type 1) - Specification*, that specifies requirements for solid fuel cookstoves, which incorporates one or more ovens and has a cooking surface which includes at least one simmering area of sufficient size to accommodate the number of utensils required and operates with minimum smoke emission).

For instance, the improved biomass cookstove (i.e., the Chitetezo Mbaula stove) is produced using local clay. After modelling and baking, the ceramic chamber can be built, which can increase combustion efficiency and retain heat, then reduce the fuel consumption. During use, a single pot rests at the top of the stove.

The Chitetezo stove reaches a thermal efficiency of 34% and consumes approximately 50% less wood fuel than the traditional low-efficient stoves. The clean and fuel-efficient cookstoves distributed in the project activity consume less wood fuel than traditional stoves, such as the three-stone fires. The subsequent reduction in wood fuel consumption positively impacts household air quality and supports woodland conservation efforts. With the support of carbon revenue from the project activity, the improved stoves are affordable and increasingly accessible to households.

With the assistance of development partners, Malawi engaged in the Mulanje and Phalombe project on improved cookstoves. This project sought to increase access of households and communities to improved cookstoves by disseminating affordable, high-thermal efficiency and low-emission cookstoves called Chitetezo Mbaula stoves across the Mulanje and Phalombe districts in Malawi. By using the improved stoves, firewood and charcoal consumed for cooking would be greatly reduced, subsequently reducing carbon emissions. Simultaneously, the improved stoves can provide other benefits to users in the form of relief from high fuel costs, reduced exposure to health-damaging indoor air pollutions, faster cooking, and increased cleanliness and convenience. In addition, reduced firewood and charcoal demand would lead to less forest cutting and a reduction in deforestation.

## RESULTS & IMPACT

Over half the world's population uses solid biomass or coal fuels for basic cooking and heating. Therefore, a number of cooking technologies aimed at reducing high fuelwood usage, at the household level, have been introduced. For the Mulanje and Phalombe project, the number of people reached by the project activity, who have access to and can rely on affordable and clean cookstoves distributed under the project activity, is 45,000 people per year. In one study that was conducted to evaluate the impact of the improved cooking stove (Changu Changu Moto [which means 'Fast Fast Fire'] Cooking Stove) on sustainable forest utilization in Nkhatabay, Malawi, data on the amount of wood used per household per week before and after the adoption of the cooking stove was collected from a hundred households.





## RESULTS & IMPACT

The results showed a statistically significant ( $P < 0.001$ ) difference in mean wood usage per household per week before and after the adoption of the Cooking Stove. Wood usage significantly declined by 59.55 kg (equivalent to 2 bundles) from 89.23 kg (equivalent to 3 bundles) per household per week following the adoption of the cooking stove. This indicates that the Changu Changu Moto Cooking Stove reduces wood usage per household per week by up to 66.7% compared to the traditional three-stone fire method.

## CHALLENGES & LESSONS LEARNED

Despite numerous interventions, the large-scale uptake and sustained use required to address health and environmental problems effectively have not been achieved in Malawi and the southern African region (Stockholm Environment Institute(SEI),2015). The latter followed a shift from subsidy-led to more market-based approaches to stove dissemination since the 1990s, under the influence of the World Bank's energy sector Management Assistance Program (ESMAP) as rising prices sometimes slowed the uptake of improved cookstoves among low-income users.

On the other hand, field observations in one study revealed that maize and cassava residues are also used as other alternative cooking materials for the stove. Therefore, before recommending the large-scale promotion of the technology, the study recommends that the stove should also be systematically evaluated in terms of emissions of harmful pollutants and contribution to the greenhouse gas emissions compared to different cooking materials. Such analysis is essential in developing a complete rationale behind policies for residential energy provision since different combinations between cooking materials and stoves emit different amounts of harmful pollutants and greenhouse gasses.

## POTENTIAL FOR REPLICATION

The improved biomass cookstove standards are essential for the universal application of the specifications. Biomass fuel is used in most countries in Africa for a wide range of purposes especially cooking and heating in most parts of the developing nations. Recognizing the impact of the use of biomass fuels on climate change, regulators, manufacturers and consumers are inclined to consider, accept and support options that lessen the environmental impact of biomass fuels. Malawi Standards on biomass cookstoves make such changes possible.

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