

DEVELOPMENT OF NATIONAL STANDARDS AND LABELING SYSTEM FOR IMPROVED COOKSTOVES DEVELOPMENT

- **92%** of the energy use is from biomass
- **Uganda Renewable Energy Policy, 2007:**
 - Increase use of modern renewable energy from 4% to 61% by 2017.
 - Mass adoption of improved cook stoves from 20,000 to 2.5 million by 2017.
- **2010 household survey** showed uptake of ICS at 8.5% as compared to 69.1% use of the traditional three stone fire and 18.5% use of open charcoal stove.

1.0 Introduction

The Ugandan energy sector is dominated by biomass, accounting for 92% of the energy use, followed by petroleum (6%) and electricity (2%) [1]. The biomass consumption comes from firewood, charcoal and crop residues. Biomass provides all the basic needs for cooking and water heating in rural areas and for most urban households.

According to the *Uganda National Household Survey 2009/10* [2] of the Uganda Bureau of Statistics (UBOS), wood fuels (wood and charcoal) are still used as main sources of energy for cooking by the majority of households (95%). Rural communities mainly use firewood, while charcoal is the major energy source for the urban situation.

The *Renewable Energy Policy for Uganda 2007* has a goal of increasing the use of modern renewable energy, from the current 4% to 61% of the total energy consumption by the year 2017. However, the 2010 survey showed that the uptake of improved cookstoves in Uganda stood at 8.5% as compared to 69.1% use of the traditional three stone fire and 18.5% use of open charcoal stove. This trend does not look promising in any way.

Many organisations have come up to support businesses in clean cooking sector in growing their businesses and disseminating their products widely however their efforts have been met with challenges. One key challenge is the inadequacy of standards on cookstoves performance in Uganda, thus no strong incentive for stove producers to improve on stove quality.

Fuel wood demand is highly dependent on the type of cooking technology used. Improved energy saving stoves are currently being promoted in Uganda as a way of reducing on the fuel wood consumption and deforestation in general. However there is no national standard and labeling system for improved cookstoves in the country. This policy brief provides a rationale for their development, and gives insights into a successful case study as well as steps and actions that need to be taken to develop national standards and labeling system for improved cookstoves in Uganda.

Efforts are currently underway to develop global standards on clean cooking through the ISO TC 285 and the draft standards are available for commenting by the participating members, however, this process will take quite some time. In the meantime, the standards and testing working committee for the Uganda National Alliance for Clean Cooking (UNACC), is working with the Uganda National Bureau of Standards (UNBS) towards defining some guidelines / benchmarks for cookstove performance and labelling. This will provide a base for improvement in the quality manufactured stoves and more user awareness. It will benefit stove producers, users, government, support organisations and testing centres under UNACC.

Quality and Standards in Uganda

1. UNBS US 761:2007 Household biomass stoves

- More of a guide not a standard
- Mainly on material used and workmanship
- Limited scope
- No mention of key performance measures like efficiency, durability, emissions
- Only highlights minimum temperature for stove surface <45°C

2. UNBS US 765:2007- Wood charcoal and charcoal briquettes for household use

- Specifies requirements for charcoal that is derived entirely from wood
- Assesses key composition of fuels

[1] "Country Chapter: Uganda", Dr. Eng. Mackay A.E. Okure, in Renewable Energies in East Africa. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Ed. Pp 1064- 133. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, Germany. 2009.

[2] "Uganda National Household Survey 2009/2010". Uganda Bureau of Statistics, available on www.ubos.org/UNHS0910/unhs200910.pdf. 2010.

2.0 Challenge of Regulations and Standards for Cooking Equipment Technologies

There are several types of stoves that are used for cooking in Uganda. According to the Uganda National Household Survey 2009/10 Report, 70% of Ugandan households use the traditional three-stone open fire stove for cooking followed by the traditional metal charcoal stove (commonly known as *Sigiri*) at 19%. Only 9% of all households used improved charcoal or firewood stoves. However, currently there are a number of projects and/or initiatives underway to promote the use of improved cookstoves in the country as one of the strategies to make the wood fuel value sustainable. The challenge is that the improved stoves in the Ugandan market vary significantly in terms of efficiency, emission reduction, safety, and durability. Efficiency rates for improved cookstoves based on laboratory tests thermal efficiency ranges between 20 to 30%, while in actual practice efficiency of as low as 5% can be experienced (ARC, 2011). The stoves also expose family members to numerous pollutants causing health problems such as acute respiratory infections (Jagger and Shively, 2014).

In Uganda, improved cookstoves are marketed in either wholesale or retail outlets. The trade is dominated by women, with some few men in the wholesale business. There are no deliberately defined national standards and labeling system for improved cookstoves on the market. Hence it is difficult to identify the right quality of stove that uses less wood fuel, has low emission levels, is safe to handle and durable. Subsequently the benefits for promotion and use of improved cookstoves are undermined.

Sustainable biomass usage is a key cornerstone of the energy supply in Uganda. Key to modernization of the biomass sector is the transition by both industry and households away from traditional inefficient stoves to modern efficient devices and to modern fuels derived from bio-mass. The motivation is to reduce demand for wood fuel in tandem with sustainable levels as well as reduce the health and safety risks people are exposed to as a result of using traditional stoves. Therefore, there is urgent need to develop a national standard and labeling system for accelerating the adoption of improved cookstoves in the country.

Case study – Development of standards for improved cookstoves by Government of India

In India, the Ministry of New and Renewable Energy through a Special Project on Cookstove (SPC) during 2009-10 initiated the process of consultations under its Core Group on cookstoves. This was to ascertain the status of various types of biomass improved cookstoves being developed and promoted by various organizations, NGOs, entrepreneurs and industries in the country. The Core group also identified ways and means for the development and expansion of the deployment of improved biomass cook stoves. Nation-wide consultations held indicated that biomass cookstoves did not have the potential to directly address health and welfare concerns of the weakest and most vulnerable sections of society and the cleaner combustion in these devices did not greatly reduce greenhouse pollutants. . . The second step taken by the Government of India was to launch a “National Biomass Cook stoves Initiatives (NBCI)” in 2009 with a primary aim to enhance the use of improved biomass cook stoves. State-of-the-art testing, certification and monitoring facilities were set up with an aim of designing and developing the most efficient, cost effective, durable and easy to use device. Technology and model design of the biomass cookstoves followed. . . It was noted that a biomass cookstove is basically a combustion device which burns biomass fuel more efficiently with reduced emissions and offers cleaner cooking energy solutions. Two biomass cookstoves were taken up; fixed type and portable type, where the portable cookstoves were also in two types; natural draft and forced draft (utilizing fans). The improved cook-stoves modalities for example materials to be used, efficiency levels, design and usage levels were also researched.

The next step encompassed the revision of standards from the earlier National Programme on Improved Chulhas (NPIC) and test protocols. Here the Ministry in consultation with the Principal Investigators of the Test Centers including national and international experts from various institutes and organizations held extensive discussions taking into account previously researched data. After the extensive discussions, revised standards and test protocols for the portable natural draft and forced draft types were developed. The standard was then published in August 2013. . . The following step was then to provide advanced equipment and testing methodologies for carrying out performance testing of cookstoves. All relevant academic institutions in the country and a few leading organizations were then contacted to know the methods being followed for emissions and particulate measurements from combustion of biomass. Technical capacity was built where necessary and required by the government. Currently, the standard and test protocols are being followed for carrying out performance testing of improved cookstoves at test centers. Table 1 below presents India’s stipulated performance parameters that are considered for approval by the Ministry of New and Renewable Energy in India.

Table 1: The approved standard performance parameters in India

No.	Type of Biomass Cookstove	Standard Performance Parameters		
		Thermal Efficiency (%)	CO(g/MJd)	PM(mg/MJd)
1	Natural Draft Type	Not less than 25	≤ 5	≤ 350
2.	Forced Draft Type	Not less than 35	≤ 5	≤ 150

The process of cook stove testing is relatively simple in India. Manufacturers who wish to get their products tested send the complete technical details of their cook stoves including the kind of biomass the cook stove can burn and the procedure for feeding the fuel to cook stove to the Ministry of New and Renewable Energy. The Ministry then directs the manufacturer to send their product with details including testing charges to the respective test centers for performance testing. Within 2 weeks, the test center completes the performance testing and then sends the performance testing report to Ministry for consideration of approval. If approval is not granted, the manufacturer is informed of the results with a suggestion to make appropriate improvement in cook stove designs.

Table 2: UNACC stove Minimum Performance Requirements:

No.	Parameter	Suggested Minimum requirement	Remarks
1.	Thermal Efficiency	- Wood stoves: 25% - Non wood stoves e.g. charcoal, briquettes: 35%	Based on IWA Water Boiling Test
2.	Safety ratings	Good (sum \geq 84)	Based on Biomass Stove Safety Protocol. Stove safety rating of sum \geq 84 (moderate risk for minor injuries and low risk for major injuries)
3.	Emissions ratings	- PM: \leq 8 mg/minute - CO: Work towards reduction in CO emissions ³	Based on Water Boiling Test
4.	Warranty	1 year warranty period	Based on a consensus reached in the Entebbe STC Meeting held on 16 th – 17 th Dec 2014

1. Rationale for developing the guidelines

- Consumer protection: there are several cook stoves on the market that have all been branded and are being marketed as improved cook stoves, without a regulation mechanism, the claims of performance of these stoves is always questionable. UNACC therefore seeks a way of providing consumers with correct information regarding stoves of its members by ensuring that they meet minimum performance standards.
- The need to improve stove quality: Local manufacturers have especially need of these guidelines as a means to help them strive for better performance in regard to efficiency, emission reduction, fuel savings, and durability. With the influx of imported stoves, local producers need work towards nationally accepted stove performance baseline against which to measure their own stove performance.
- A step towards updating UNBS 2007 standard on cookstoves and potential input into the ISO TC 285 standards process.
- Provide a starting reference point on stove performance for all the players in the cookstove sector.
- Provide a basis for increasing awareness on quality clean cookstoves.

3.0 Key Recommendations

Setting of national standards for cookstoves falls under fostering an enabling environment, which is the role of any government. However there is need for broad stakeholder consensus and acceptance in Uganda. The development of national standards should be taken as a multi-stakeholder approach and engagement involving the government, private sector, civil society, academic institutions and NGOs. Expansion of the Uganda National Alliance on Clean Cooking (UNACC) into a strong multi-sectorial working committee that works with Uganda National Bureau of Standards (UNBS) to coordinate the process of standardization is important.

³Carbon monoxide (CO) emissions from stoves are still very high and there is no sufficient data to use for setting minimum requirements for this parameter given that many stoves are performing worse than the traditional stoves. Reduction in CO emissions is as such of very high priority and the minimum requirement will be set at the next revision of this document following improvements in the technology and comparative analysis.

3.1 Other Specific Recommendations:

- i) Expedite the ISO/TC 285 clean cookstoves and clean cooking solutions standards process to pave way for the development of the national standard on cookstoves
- ii) Put in a place a strong stove standard that will propel rapid adoption of improved cookstoves and also stimulate market for cookstoves. This will also encourage business development to manufacture and distribute stoves.
- iii) A labeling strategy has to be in place to protect the producers and buyers of stoves
- iv) A certification process should be established to continuously provide good quality stoves on the market
- v) Marketing strategy should be developed to help the private sector cope with the distribution bottlenecks
- vi) Awareness raising should be carried to provide more information on the different approaches and technologies so that people can access good services and latest technologies
- vii) Testing protocols need to be created to help on harmonized testing ; and testing centers need to be put in place to ease the testing processes
- viii) There is strong need for capacity building and training for those supposed to test the stoves as well as field monitors
- ix) It will be important to carry out a baseline survey to establish the adoption of stoves and the reasons for non-adoption in some areas. This should be supported by continuous surveys
- x) A data bank should be put in place as a continuous reference

References

- i. ARC (2011). Test Results of Cook Stove Performance, Aprovecho Research Center (ARC), Partnership for Clean Indoor Air (PCIA), Shell Foundation, and US Environmental Protection Agency (EPA), Cottage Grove, USA, pp 128.
- ii. FAO (2004). UBET - Unified Bioenergy Technology. FAO corporate document repository (available at <http://www.fao.org/DOCREP/007/j4504E/j4504E00.html>)
- iii. Jagger, P. and G. Shively (2014). "Land Use Change, Fuel Use and Respiratory Health in Uganda." Energy Policy 67: 713-726.
- iv. Global Alliance on Clean cooking (2013), Kenya Country Action Plan (CAP)
- v. Government of India, Ministry of New and Renewable energy, 2015, <http://mnre.gov.in/schemes/decentralized-systems/national-biomass-cookstoves-initiative/> Accessed on 11/09/2015
- vi. IEA (2011). CO2 Emissions from Fuel Combustion: Highlights. International Energy Agency, Paris
- vii. MEMD (2013). Statistical Abstract, Ministry of Energy and Mineral Development (MEMD), Kampala, Uganda PP 12
- viii. UBOS (2010). Uganda National Household Survey 2009/10, Uganda Bureau of Statistics (UBOS), Kampala, Uganda, pp 118
- ix. Wildlife Conservation Society (WCS), 2011. Northern Uganda Energy Efficiency Study.