

# **Modern energy Cooking services (MECS) for Tanzania**

## **Policy issues and options-**

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### **1.0 Introduction**

Modern energy cooking services are crucial to human well-being and to Tanzania's economic development. Cooking remains a central part of energy transition and core to the achievement of the UN Sustainable Development Goal 7 and the Paris Agreement. In Tanzania over 55 million people are without clean cooking services., that is more than 85 % of the population still depend on solid biomass fuels for cooking with 63.5% of households using firewood, followed by charcoal users 26.2%, Only 5.1% use LPG and 3% uses electricity (REA, NBS 2020). Most of the biomass fuels is being burned in inefficient three stone fire place in rural areas and in metal charcoal stoves in urban areas, which in turn affects health and wellbeing of the population through indoor air pollution.

The current unsustainable production and use of biomass fuels contributes to the degradation of the environment and health hazards to the livelihood of people (according to WHO report Indoor Air Pollution document WHO/SDE/PHE/07.01 of 2002 more than 27,500 people die annually in Tanzania due to the inefficient use of solid biomass energy for cooking). Indeed, a silent and slow killer, unlike the current COVID 19 pandemic. The situation also contributes to the fast deterioration of forestry. Degradation of the forestry at the rate of 372,871 hectares per year (TFS: 2015). Transforming cooking energy services for Tanzania is therefore critical to the development of the country and a strategic measure for achieving several SDGs and SE4ALL targets

### **1.1 International initiative on modern energy cooking services**

Relevant international supportive policies of modern energy cooking services that Tanzania has acceded to include; The Sustainable Development Goals (SDGs), Sustainable Energy for All (SE4ALL), and the Paris agreement, among others. Sustainable Development Goal 7 (SDG 7) seeks to ensure access to affordable, reliable, sustainable and modern energy for all. Access to clean cooking services is therefore integral to this goal (SDG 7) (SDGs). The Paris Agreement seeks to reduce global greenhouse gas emissions in an effort to limit the global temperature rise to below 2°C above pre-industrial level (UNCCC, 2020). Tanzania is among the countries that ratified the Paris Agreement by submitting its Nationally Determined Contributions (NDCs) on 18<sup>th</sup> May 2018. The Tanzania NDCs include actions to promote and implement renewable energy options as a measure to adapt to climate change effects and contribute to mitigate greenhouse gas emissions.

Also, we have the Sustainable Energy for All (SE4All), the UN initiative that was launched in 2011 to catalyze major new investments in a bid to accelerate the transformation of the world's energy systems, pursue the elimination of energy poverty, and enhance prosperity. SE4All calls on all stakeholders to take concrete actions towards ensuring universal access to sustainable energy services; double the global rate of improvement in energy efficiency and double the share of renewable energy in the global energy mix,

within the UN timeframe of 2030. Tanzania was among the first countries to sign a commitment to the SE4ALL Initiative and has since developed a SE4ALL Action Agenda, Investment Prospectus detailing actions that the Government intends to carry out to ensure access to sustainable energy for all.

The modern energy services Programme (MECS) supported by UKaid in partnership with ESMAP and managed by the Loughborough University in UK, brings and draws on knowledge and experience from different partners around the world. The programme expects to build on such opportunities and knowledge emerging from the programme to break out of the business as usual approaches and rapidly accelerate the transition from biomass to clean cooking on global scale. TaTEDO is one of the southern partners of this very interesting and promising programme on clean cooking solutions.

## **1.2 Barriers to addressing the situation in Tanzania**

Despite the recognised benefits of modern energy cooking services for health, local environment and climate change, large-scale adoption and sustained use of clean cooking solutions such as electricity and biogas is not succeeding. This is due to a variety of context specific barriers both on the demand and supply side. While financing, lack of appropriate business and delivery models, and poor enabling environment appear to be major constraints for manufacturers and suppliers of the efficient cooking appliances, lack of supportive policies, information, awareness, and cultural barriers dominate demand side. The barriers are further elaborated to include:-

Firstly, on the supply side there is a problem of poor and inappropriate business models for clean cooking appliances, which has led into low rate of adoption of the clean cooking appliances hence stagnation into market growth. There are more other common factors which contribute into market stagnation; these include lack of information on the availability of the clean cooking solutions and poor affordability.

Secondly, appliances are not available due to limited distribution networks as there are no agents and distributors at the local levels.

Thirdly, lack of investment and working capital to start up business is a challenge to most of the small and medium scale suppliers and distributors of the clean cooking solutions. They usually operate in difficult business environments with a low profit margin activity.

In addition, poor enabling environment such as inadequate supportive policies that favours incentives for electricity cooking appliances is another challenge that hinders the market growth. These appliances are imported but lack of incentives in taxes and other legal requirements that can promote and facilitate massive influx and supply of the appliance has led into higher costs of these appliances which are not affordable to end users.

On the demand side, despite the affordable rate of electricity according to REA 2018 evaluation report, majority of the customers still use inefficient biomass cooking stoves due to non-availability and affordability of clean cooking solutions because of the poor cash flow of most end users. Only middle- and upper-income households can afford, majority of the low-income

households still use low quality fuels. Low awareness on available alternative and their purchase options as well as financing mechanisms contributes to this challenge.

An additional challenge on the demand side is that majority of the people have a lack of familiarity and the inability to use clean cooking energy solutions which is hindrance to the uptake. This is also attributed to fear of explosions and lack of spare parts. Thus, it has created fear of been seen ignorant hence contribute into low adoption rate.

Finally, cooking is very much embedded in culture, and due to cultural resistance, it has been difficult to adopt the clean cooking solutions. These cultures which are deeply tradition-based and location-specific are linked to the cooking habits, traditions, cultural appropriateness of the device, and perceptions about the taste of food. Thus, these barriers are limiting large-scale marketing and the potential of alternative scalability.

## **2.0 Tanzanian Policies Relevant to modern energy cooking services**

Within the country, initiatives for addressing the modern energy cooking services situation is compounded by weak institutional and policy frameworks, mainly poor consideration of cooking energy in the energy policy discussions and agendas. Often, electricity for lighting and other uses take precedence while cooking remains a marginalized agenda mainly driven by few NGOs and private actors with limited investment and working capitals. This has meant that clean cooking services is mostly left out in policy decisions that could open up both national and local market and non-market opportunities. It also means that the voices of the majority of the poor who engage in cooking on day to day basis mostly women and girls, are left out of the policy processes, further marginalizing opportunities for transitioning to more inclusive and gender sensitive clean cooking services. Enhancing energy access through clean cooking services therefore requires supportive policies and innovative approaches that catalyze opportunities for sustained and inclusive use and development opportunities

Tanzania has implemented limited national level policies to accelerate the development and adoption of clean cooking services in line with the above efforts. There is the National Development Vision 2025, released in 2000, which envisages Tanzania becoming a middle-income country by 2025; huge achievement, the country has reached this target by 2020. The National Strategy for Economic Growth and Reduction of Poverty, adopted in 2005, proposes strategies for reduction of poverty and raising incomes and improving the quality of life and social well-being, governance, and accountability. The Government supports and encourages innovations, product development, quality and marketing strategies.

Due to such limited policy support for modern energy cooking services in Tanzania, the sector has been dominated by gradual and slow ascent on the energy ladder. However, overtime, as income increases, some people move upwards to modern energy sources (improved cook stoves and LPG) and a few to the use of electricity, in addition, fuel stacking is commonly practiced.

The rate of electrifying households in Tanzania has increased by 6.2 percent. This is a big achievement that was noted in the last five years but less than 0.5 percent of the connected households in Tanzania use electricity for cooking (REA, 2017).

### **3.0 Assessment of modern cooking energy market in Tanzania**

Tanzania modern cooking energy market is underdeveloped and dominated by fuel wood and charcoal burned in inefficient stoves. The Three Stone Fire place remain the most commonly used fuel wood-based stove in 2019 in rural areas where about 95% of the Tanzanians were using this stove. The traditional metal charcoal stoves dominate in urban areas where charcoal is used by the majority for cooking.

The government of Tanzania has set a long-term goal of having 75% of households adopt clean cooking services by 2030. The clean cooking under consideration include LPG, biogas systems, electric cookers, and improved cook stoves to address the current overreliance on inefficient stoves and low-quality fuels. None of the above efforts have produced large scale satisfactory results.

Biogas have not been adopted on large scale due to a number of factors including high initial costs and the required tedious operational practices. Electric hot plate cookers' high initial costs and related high monthly bills have been major barriers to adoption

Some efforts have been devoted to promoting improved cook stoves; however, success has been very limited due to mostly limited financing both for producers and consumers. In spite of such efforts, improved cookstoves are best understood as interim measures, rather than truly long-term, sustainable cooking solutions. In the light of the rapid population growth anticipated in the country, reliant on wood fuels based cooking is likely to become less and less sustainable in the long term simply due to the underlying demographic trends, which will put an increasing burden on forest resources, exacerbate desertification, reduce access to water and put long term prosperity at risky.

LPG which is seen by some policy makers as the clean cooking solution is derived from fossil fuels and is also deemed unsustainable in the long term, first and foremost as it is non-renewable. Beyond the fact that LPG is non-renewable, it is inherently volatile in price as it is linked to oil price, this increases the risk of sudden reversion to wood fuels such as firewood and charcoal. LPG is also exposed to greater geopolitical and other risks, as Tanzania do not produce own LPG, making supply inherently interruptible in light of these and other factors. As such, LPG may be seen as a transitional fuel, its arguably not however, a long-term solution to the challenge of achieving sustainable clean cooking in Tanzania.

Natural gas is available in Tanzania and efforts are ongoing to promote it as a cooking fuel, however, like LPG, it is not sustainable as it is non-renewable. Also, the required high cost of developing its supply and demand infrastructure makes it only accessible to a limited number of populations in the country. There has also been the questioning of the opportunity cost of using natural gas for cooking, as there are higher value products that can be made from the natural gas.

On the basis of the above, there is a need for the country to explore the potential for more transformational solutions that move beyond the above unsustainable fuels-based cooking altogether.

As the country is making major efforts on electrification, all efforts need to be made to link these efforts with sustainable clean cooking. The current technological developments on highly efficient electric cooking appliances such as electric pressure cooker (EPC), bring about a huge opportunity to now link

electrification, not only for lighting, but also for cooking. Depending on the source of electricity, this is now considered by many as the long term ultimate sustainable clean cooking solution for Tanzania.

#### 4.0 What is an Electric Pressure Cooker (EPC)?



An electric pressure cooker (multi-cooker) is simply a highly insulated sealed pot which works on a simple principle, steam pressure. The steam enclosed inside builds up high pressure and temperature thus helping food to cook faster and stay tasty and nutritious. The timer switch and temperature/pressure sensors switch the power off as soon as it reaches the right point in the cooking cycle. The EPCs can carry out various cooking operations such as frying, boiling, steaming, pressure cooking and baking.

The EPC combines several familiar cooking appliances: fireless cooker (insulator), electric hot plate and pressure cooker.

#### 4.1 Advantages of Using Electric Pressure Cookers (EPCs)

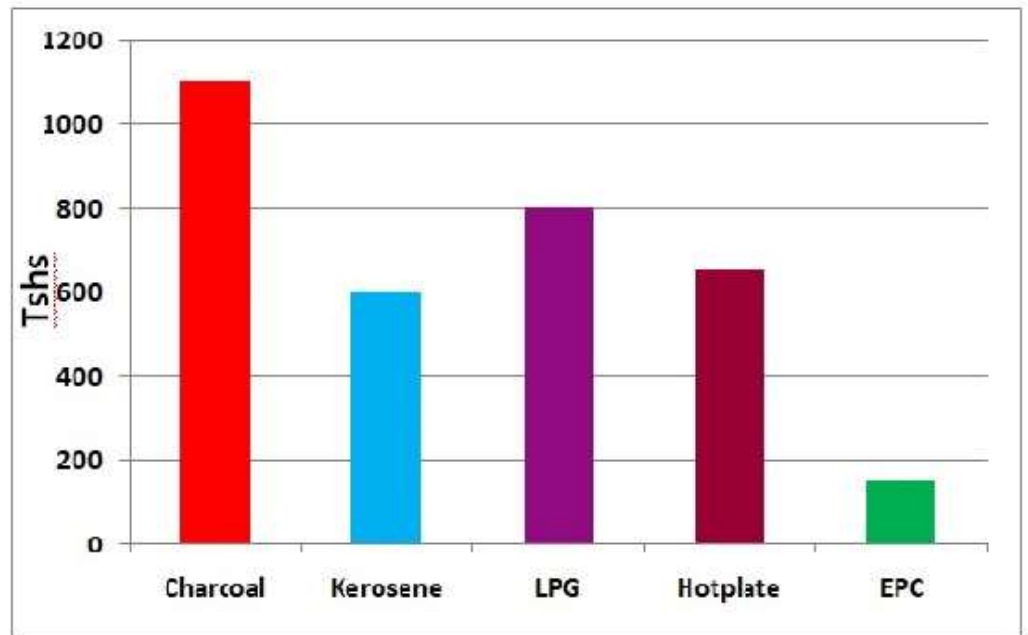
- i. **Saves time** - Cook food in a fraction of the time and it still tastes good.
- ii. Can **boil, fry, steam** and **bake**.
- iii. **Retains nutrients** – No steam escapes hence nutrients are retained.
- iv. **The kitchen is cooler** – Since EPCs are insulated retain the heat and steam so that none of it escapes to heat up a kitchen, if allowed to depressurize naturally.
- v. **It is very convenient** – An EPC is automated, which means that it is very difficult to burn the food as it switches off the power when the temperature in the pot gets too high. Also, once the time is set everything else is auto-regulated sparing precious time to do some other important things while waiting for delicious the meal.
- vi. **Cost saving** - Highly energy-efficient, most dishes can be cooked with less than half a unit of electricity.
- vii. **Better flavors** - Obtained from steam prevented from escaping and locking the flavor inside.
- viii. **Cooks from frozen** – If you forget to defrost frozen food, just cook directly.
- ix. **Consistent results** – Once you figure out the time required to cook a certain type of food, you are guaranteed to cook perfect dish every time.
- x. **Improved health** – Avoid health problems caused by smoke and other hazardous emissions from combustion of biomass.
- xi. **Environmental protection** – Saves forests by helping avoid overuse of green natural resource.
- xii. **Safety** – EPCs have multiple safety features that prevent any unexpected scenarios.



## THE CHEAPEST, FASTEST AND CLEANEST WAY TO COOK IS TO USE EPC

Efforts were made to know if anything could beat an Electric Pressure Cooker (EPC) on cost and time, so we boiled 500g of yellow beans as carefully as we could on charcoal, kerosene LPG, an electric hot plate and on EPC.

All the tricks in the book were applied—lids on the sufarias, turning down to a simmer, just enough water, etc. However, we still couldn't get close to an EPC. Not only was it thirteen times cheaper than charcoal, but it cooked in half the time without any stirring or topping up of water or fuel.



## **5.0 Policy options and recommendations**

For clean cooking solutions to succeed in Tanzania, Government commitment and strong leadership through effective and progressive policies, investment and multi-sector partnerships is required. Electrification and clean cooking are currently seen as two separate domains. The efficient electric cooking (ecook) study partners consisting of TaTEDO, Loughborough University, University of Surrey, Gamos Ltd, Innovative UK and the MECS programme confirmed that there is potential to unite the two. As noted above, to date, progress in electrification has been relatively rapid, whilst clean cooking has lagged behind. Tanzania has a regional leading mini-grid sector and the market for solar home systems is developing rapidly. EPCs presents a transformative opportunity to leverage this encouraging progress to drive forward the goal of ensuring universal access to clean cooking by 2030, in line with the SDGs.

The following presents some recommendations for policy actors and other key decision makers to incentivize the development of a market for EPCs in Tanzania.

### **5.1 Promote highly efficient electric pressure cookers (EPCs) in areas with access to reliable electricity.**

#### **Begin by encouraging suppliers to import quality efficient electrical cooking appliances**

Reduce the import tariff and value added taxes as is applied to LPG and solar PV products.

Bring in financing to support private sector actors, for example through a results-based financing programme.

Test and certify the best quality products. Price, durability, energy-efficiency, service delivery models.

Obtain support from Tanzania Bureau of Standards (TBS).

#### **5.2 Once the market has developed, incentivize local manufacture**

Begin with assembly, building up to manufacture.

Encourage energy service companies to incubate start-ups, e.g. social enterprises such as SESCO and others

#### **5.3 Support the establishment of service networks**

Spare parts and expertise for repairs must be available locally.

Package electric pressure cookers with spare parts such as rubber sealing rings, etc.

Encourage energy service providers (utilities and mini-grid developers) to prioritize delivering cooking services to their customers.

Develop on-bill financing mechanisms that can enable customers to repay the high upfront cost each time they top up their electricity units.

Use local offices as distribution channels to sell and support EPCs.

**5.4 Support consumers to break down high upfront cost into affordable repayments** Longer and more flexible repayment schemes with low interest to reach poorer households Create repayment plans aligned with how people currently pay for charcoal, firewood and kerosene (i.e. daily or even per meal)

**5.5 Support consumers to understand the benefits and lower behavioral change barriers:**



Package (or repackage international models) with: Advice on how to cook local foods e.g. stickers on appliance indicating cooking time for beans rice beans mixed with maize ( maharage, makande, wali na ugali,) etc.

Advice on energy efficient cooking practices. e.g. recipe book, community cooking demonstrations

Include electricity (in particular efficient electrical cooking appliances) in clean cooking social marketing, focusing on: How to save even more time and money by cooking efficiently Now Cost – cheaper than charcoal and even gas and Convenience – more time to do other things

#### **5.6 Carry out piloting of battery-supported EPCs in weak- and off-grid regions**

Widen access to consumers in weak-grid (frequent blackouts & unstable voltage) and off-grid regions by supporting the import of lithium ion batteries and piloting of battery-supported electric cooking systems”:

Reduce the import tariff and VAT on lithium ion batteries sized for cooking (0.1-3kWh).

Offering grants to carry out prototyping and piloting of battery-supported cooking systems.

Test and certify best quality products through TBS efforts.

