Electric Pressure Cooker Selection Guide

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With support from many other colleagues, for which we are thankful.

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This document is an outcome of a series of inter-related projects (see Annex 1: Funders and implementers of this research to date).
1 Introduction

This document aims to guide entrepreneurs looking to commercialise electric pressure cookers in targeted development interventions to select efficient, user friendly, affordable and robust models. It contains guidance on where to source electric pressure cookers and which design features to look for.

This document is an outcome of a series of inter-related projects (see Annex 1: Funders and implementers of this research to date). It is based upon the experience of researchers and users during the cooking diary studies, which have to date involved 80 households in Myanmar, Kenya, Tanzania and Zambia. This required purchasing over 50 electric pressure cookers at retail outlets across the four countries.

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2 Where to buy

Local retail outlets known to sell electric cooking appliances are a good place to start, notably large supermarkets in big shopping centres or smaller hardware stores that tend to be grouped together in the city centre. In Zambia, Myanmar and Tanzania, it was very easy to find a variety of models in such outlets, however in Kenya, selection was restricted to a few overpriced models in some big supermarkets or a limited supply of low quality models in small hardware stores.

Online retail outlets, such as Amazon.co.uk (UK) and Jumia.co.ke (Kenya) also stock electric pressure cookers. The former has a wide variety, whereas the latter has a very limited supply. In particular, the Bestek 6L 1000W electric pressure cooker\(^1\) from Amazon.co.uk is recommended, as it embodies many of the desirable features described in the next section. Several units have been purchased and used in households and a very similar model (sold under the brand name Nikai) was also used extensively in the Tanzania study.

Alternatively, for larger volume distribution, electric pressure cookers can be sourced directly from the factory using channels such as AliBaba: https://www.alibaba.com/showroom/electric-pressure-cooker.html. Annex 2: Alibaba quotes for Chinese EPC suppliers shows a small selection of the 7,500

\(^1\) https://www.amazon.co.uk/BESTEK-Mechanical-Electric-Pressure-Control/dp/B06VVY5SG9/ref=sr_1_4_sspa?ie=UTF8&qid=1543995736&sr=1-4-spons&keywords=bestek+electric+pressure+cooker&psc=1
products currently listed as electric pressure cookers on Alibaba.com. With the exception of Tesga Power’s DC EPC, all other EPCs purchased by the authors have been bought in country. As a result, we have no hands on experience with any of the models shown in the appendix and cannot verify the quality of the products, nor the experience of working with factories that produce them. They were merely selected to show a range of what is on offer (range of sizes, button type vs rotary dial type, cheap vs. expensive, etc.).

3 Key features

3.1 Electric pressure cookers and multicookers

An electric pressure cooker is often called a multicooker because it can perform multiple cooking operations: frying, boiling, steaming, pressure cooking and baking. However, other devices with multiple cooking functions that do not include pressure cooking are also called multicookers. If in doubt, look for the pressure release valve – if it doesn’t have one it cannot pressure cook.

Electric pressure cooker (or multicooker)  Multicooker

Pressure release valve

2 https://bestelectricpressurecooker.co.uk/charles-jacobs-large-8-litre-7-in-1-pressure-cooker/
3 https://www.jumia.co.ke/st-mc9194d-multi-cooker-maroon-saturn-mpg10571.html

This protocol is an outcome of a number of projects. See Annex 3: Funders and implementers of this research to date
3.2 Price

Retail prices range from 50 to several hundred USD, however around 70 USD seems to be the sweet spot for a reasonable quality 5-6 litre model with basic functionality. At the lower end, it is often possible to find older models from small shops with limited supplies. At the higher end, better quality models with additional functionality (e.g. yoghurt making, slow cooking), but often a confusing amount of buttons that require reviewing a lengthy user manual.

Factory gate prices on AliBaba.com seem to start at around 15 USD, however at the time of writing, only models purchased through retail outlets have been tested.

3.3 Energy efficiency

No comprehensive tests have yet been conducted to evaluate the energy-efficiency of different models of electric pressure cooker, however insulated lids have been identified as a key energy saving feature. From initial tests, insulating the lid can reduce energy consumption by up to half, with more impact on longer cooking dishes. Whilst virtually all models will insulate the sides and bottom of the pot, many do not insulate the lid.

Uninsulated lid

Insulated lid
In terms of power rating, AC electric pressure cookers tend to range from 700W to 1,200W, with the capacity of the pot usually the key determinant in power rating. Lower power models may be more desirable for mini-grids, where peak loading may be an issue, but higher power models are likely to be slightly more energy-efficient, as they will cook faster, so there is less time for the heat to escape from the pot. Frying is possible, even with just a few hundred watts, so lower power models are not constrained in the range of cooking functions they can perform.

### 3.4 Usability

#### 3.4.1 Rotary- vs. Button-type

Electric pressure cookers can be classified by their user interface and control system into ‘button-type’/‘electronic pressure cookers’ or ‘rotary-type’/‘mechanical pressure cookers’. Fundamentally, they are both ‘electric pressure cookers’, as they contain a resistive heating element and a pressurising chamber.

Models with a rotary timer switch are easier for new users to understand how to operate. The rotary dial is simply a timer switch, meaning that to cook, the user simply selects how long they want to cook for by turning the dial to the appropriate number of minutes.

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https://www.amazon.co.uk/BESTEK-Mechanical-Electric-Pressure-Control/dp/B06VWY5G9F/ref=sr_1_20?keywords=bestek

Research@gamos.org | PV-ecook.org

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In contrast, models with a button interface are generally much more difficult for new users. The buttons on each model are laid out differently and usually require the user to read the manual to find out what they do. Many of the buttons are designed to cook specific foods, however these are often not the foods that local people want to cook (e.g. a Zambian is unlikely to have any idea what congee is, making this button useless). Fundamentally though, most of the buttons simply set the time in different ways, but working this out can be challenging, especially for users with low levels of formal education who have never cooked with electricity before.

‘Button-type’ models also seem more prone to failure. Faulty circuitry can lead to a barrage of error messages preventing cooking from taking place and forcing the user to read the manual to find out what might be wrong. If they are lucky, they may be able to correct the problem, if not, they will have to use another appliance until the error message goes away. The only failures to date with ‘rotary-type’ models have been a cracked rotary control knob, which is easily fixed with superglue.

One key advantage of ‘button-type’ models is that their timers only start counting down when they reach temperature/pressure. Although this can initially be confusing for some users, it means that regardless of the quantity of food they are cooking, they will always set the timer for the same amount of time. In contrast, the timers on the ‘rotary-type’ generally start to count down straight away. As a result, larger quantities of food will take longer to get to temperature/pressure and therefore the timer must be set for
a larger amount of time. This also means that recommendations for cooking times for local foods are in general not transferrable between ‘button-type’ and ‘rotary-type’ devices.

If there is a power cut, ‘rotary-type’ models will continue cooking when the power comes back on, but if the power cut is longer than 10-15 minutes, the timer will need to be increased, as it is mechanical so it keeps ticking even if there is no power. The ‘button-type’ will need to be completely by the user when the power comes back as it will have forgotten everything. It should be noted as long as the power goes off after it has pressurised, any electric pressure cooker will keep cooking during a power cut, as they are all insulated on the sides, so the contents will likely remain above 100°C for over half an hour, especially if it is a model with an insulated lid.

3.4.2 Extra pot

Some models come with an extra pot, which is especially useful as you can only use the pots supplied with the electric pressure cooker. Some households prefer to heat water in a separate pot to prevent the taste of food getting into the water and many will find it convenient to be able to cook a dish in the electric pressure cooker, put it aside and then cook another without having to scoop out the contents and wash the pot.

3.4.3 Capacity

Capacities usually range from 2.5 to 6 litres, although it is possible to find larger models, targeted at institutional users or restaurants. 2.5 litres is big enough for a small household of 2-4 people, but 5 or 6 is better for bigger households of 6 or more, or those that regularly cook batches of ‘heavy foods’ like beans.

3.5 Durability

3.5.1 Pots

Pots are generally made of non-stick coated aluminium, however stainless steel is a more durable option. Non-stick coatings are very effective when brand new, especially for very sticky foods like ugali (maize meal) and matoke (bananas). Not only do they prevent food wastage by stopping food sticking to the bottom and burning, but they also make the pots much easier to clean. However, as soon as the non-stick coating gets scratched, it will start to deteriorate. This means that only wooden or plastic utensils can be used to stir/serve food and only sponges/cloths can be used to clean the pots. Many poorer households or house helps will be accustomed to using metal utensils and cleaning pots with steel wool. In contrast, stainless steel pots are almost as ‘unsticky’ as non-stick coated pots, but are not harmed by metal utensils or steel wool.
This protocol is an outcome of a number of projects. See Annex 1: Funders and implementers of this research to date.
3.5.2 Housing

It is difficult to judge the durability of the housing without seeing the model in person, so obtaining a sample is important. It should be stable (for dishes that require vigorous stirring, like ugali) and rigid to prevent denting/cracking during use or cleaning. Some models feel obviously flimsy, whilst others feel much stronger.

3.6 AC or DC

At the time of writing, we are aware of only one supplier offering DC electric pressure cookers, although it is likely that many more will become available in the near future.

https://www.alibaba.com/product-detail/12v-dc-electric-pressure-cooker-2_60759854009.html?spm=a2700.9099375.35.9.bdb0cb6cKojQo
Annex 1: Funders and implementers of this research to date

The concepts, data and key learning points presented here result from a series of inter-related projects:

- **Gamos Ltd.**’s early conceptual work on eCook (Batchelor 2013).
  - The key **CONCEPT NOTE** can be found here.
- Initial technical, economic and behavioural feasibility studies on eCook commissioned by **DfID (UK Aid)** through the **CEIL-PEAKS Evidence on Demand** service and implemented by **Gamos Ltd., Loughborough University** and **University of Surrey**.
  - The key **FINAL REPORTS** can be found here.
- Conceptual development, stakeholder engagement & prototyping in Kenya & Bangladesh during the “**Low cost energy-efficient products for the bottom of the pyramid**” project from the **USES** programme funded by **DfID (UK Aid), EPSRC & DECC (now part of BEIS)** & implemented by **University of Sussex, Gamos Ltd., ACTS (Kenya), ITT & UIU (Bangladesh)**.
  - The key **PRELIMINARY RESULTS** (Q4 2018) can be found here.
- A series of global & local market assessments in Myanmar, Zambia and Tanzania under the “**eCook - a transformational household solar battery-electric cooker for poverty alleviation**” project funded by **DfID (UK Aid) & Gamos Ltd.** through **Innovate UK’s Energy Catalyst Round 4**, implemented by **Loughborough University, University of Surrey, Gamos Ltd., REAM (Myanmar), CEEEZ (Zambia) & TaTEDO (Tanzania)**.
  - The key **PRELIMINARY RESULTS** (Q4 2018) can be found here.
- At time of publication (Q4 2018), a new **DfID (UK Aid)** funded research programme ‘**Modern Energy Cooking Services**’ (MECS) lead by **Prof. Ed Brown** at **Loughborough University** is just beginning and will take forward these ideas & collaborations.

This material has been funded by UK aid from the UK government; however the views expressed do not necessarily reflect the UK government’s official policies.
Annex 2: Alibaba quotes for Chinese EPC suppliers

These quotes were obtained on the 8th March 2019 using the search string “electric pressure cooker” on Alibaba.com.

<table>
<thead>
<tr>
<th>Product Features</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Order Quantity</td>
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<td>Zhongshan</td>
<td>Zhongshan</td>
<td>Zhanjiang, China</td>
</tr>
</tbody>
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Quick Details

- Certification: CB/CE,EMC,LFGB,ReHS,CE/EMC,EMF6516,F/B/UL/ULS/ULR,CE/EMC,EMF6516,F/B/UL/ULS/ULR |
- Function: Cooking Time, Presetting, LED Display, Overheat Protection, Pressure Release Device |
- Outer Pot Material: Stainless Steel |
- Material of Inner Pot: Non-Stick Coating |
- Type: Electric Pressure Cooker |
- Color: Silver |

Supplier Features

- Business Type: Manufacturer, Manufacturer, Manufacturer Trading Company |
- Payment Terms: L/C, T/T, L/C, D/A, D/P, T/T, Western Union |
- Supplier Location: China (Mainland), China (Mainland), China (Mainland), China (Mainland) |
- Main Products: Induction cooker, electric kettle, rechargeable fan, sauna, outdoor gas oven, electric pressure cooker, electric pressure cooker, Induction cooker, Rice Pressure Cooker, Slow Cooker, Electric Pressure Cooker |
- Number of Employees: 51 - 100 People, 301 - 500 People, 101 - 200 People |

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