



Bangladesh eCooking Market Assessment

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Lead author: Melinda Barnard-Tallier

With contributions from:

MECS Bangladesh Team: Rezwhan Khan (UIU) / Uttam Kumar Saha & Sabbir Ahmed (Practical Action)

MECS Workstream Leads: Jon Leary, Matt Leach, Simon Batchelor

EnDev eCooking Team: Gregor Brömling, Simone Fehrenbach, Verena Brinkmann

EnDev/GIZ Bangladesh Team: Henrik Personn, Zunayed Ahmed, Sen Sajib

EnDev/MECS eCooking Market Assessments

- Part of a series of publications produced jointly by Energising Development (EnDev) and the Modern Energy Cooking Services (MECS) Programme.
- Strategic insight on the current state of electricity access and clean cooking, identifying the key opportunities and challenges to the scale up of eCooking in 8 countries across sub-Saharan Africa and South Asia.



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Overview

- Summary of the opportunity for eCooking in Bangladesh
- Clean cooking & electricity access
- Deep dive into:
 - Enabling environment
 - Consumer demand
 - Supply chain
- Recommendations for strategic interventions

Summary

- Bangladesh became a lower-middle-income country in 2015 and is one of the most densely populated countries in the world with over **160 million people** (64% of which live in rural areas).
- The country has made rapid progress towards universal electrification - **99% of the population have access to electricity**.
 - **Grid electricity** is very **cheap**, but still **unreliable**. Despite surplus electricity on the grid as a whole, several regions still experience load shedding, and only **2% is renewably generated**.
 - Bangladesh has world leading **mini-grid and off-grid scenarios** (ranked 8th and 4th respectively on the MECS eCooking GMA).
- **77%** still lack access to clean cooking, yet it is not currently prioritised by the national government and doesn't connect with electrification policy. **Biomass (fuelwood) remains a popular cooking fuel choice**, especially in rural areas.
- Gas (both PNG and LPG) are already widely adopted and **eCooking is gaining in popularity**, but mainly as a complimentary rather than primary cooking option.

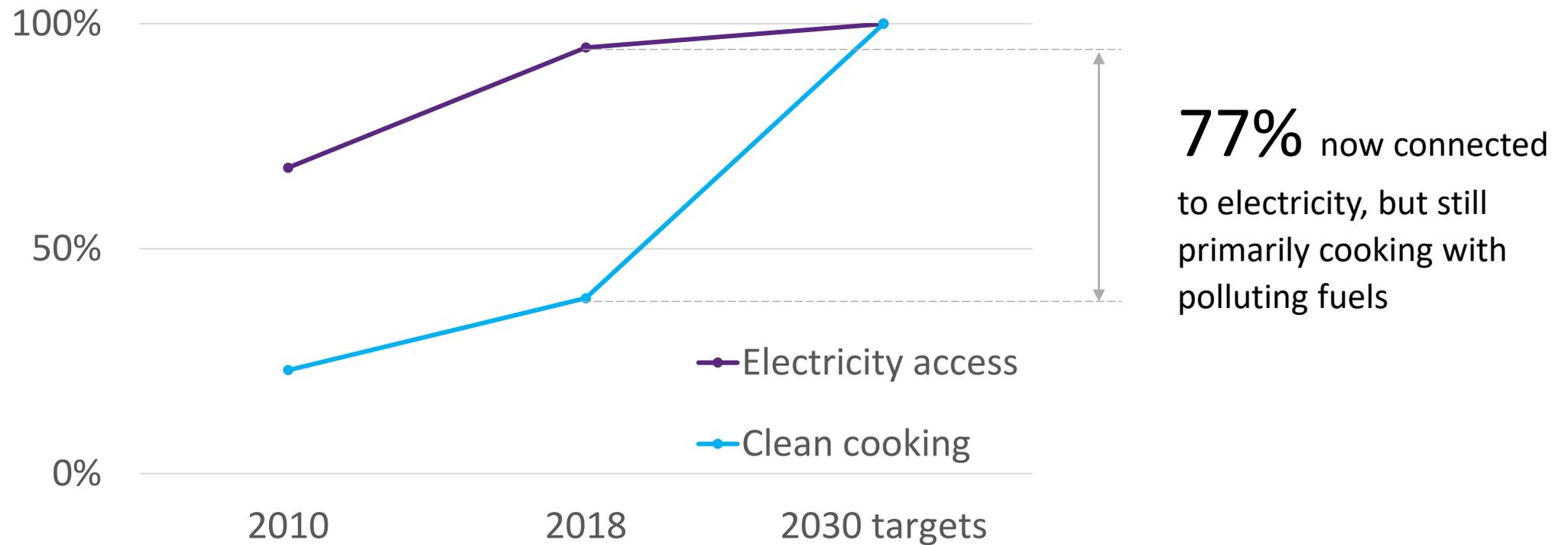
The clean cooking challenge

- Clean cooking – and cooking with electricity (or eCooking) specifically – is not supported at policy level and a multiplicity of barriers to uptake have been identified at both supply and demand ends.
- Bangladesh has the lowest access to clean cooking fuels and technologies in SE Asia with around [77%](#) of the population lacking access to clean cooking.
- Bangladeshi people have in the past been hesitant to make the shift due to socio-cultural perceptions, lack of awareness and concerns around affordability.
- Fuel stacking is fairly common with around 75% of household across Bangladesh stacking firewood with other biomass fuels (62.4% in urban hh; 77.5% in rural hh).
- Issues around the unavailability of after sales services (repair and maintenance) persist.
- Bangladesh is highly vulnerable to the effects of climate change (ranking [76th out of 77](#) countries in terms of climate resilience) while forest loss is also an issue with [50% of wood fuel harvested being unsustainable](#).

The opportunity for eCooking

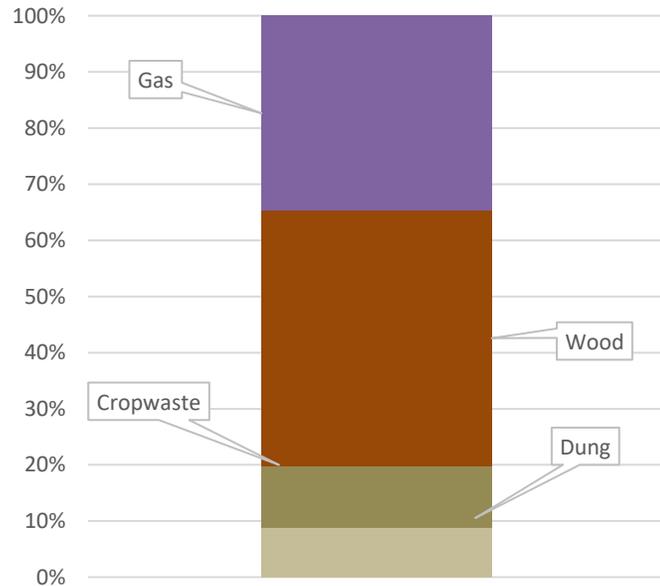
- **Sustainable and Renewable Energy Development Authority (SREDA)** currently updating the **National Country Action Plan for Clean Cooking (2020-2030)** to promote **100% clean cooking** systems by **2030** – **ecooking accounts for 8%**.
- Local companies are committed to **addressing poor perceptions** of eCooking appliance sector by reducing prices of appliances and making them more accessible.
- Research by [UIU, funded by MECS](#) found the following the **cost of electric cooking for a family of 6 in Bangladesh is lower** than that of LPG and firewood based cooking: around BDT 600 (GBP 5.45) per month vs BDT 800 (GBP 7.27) per month.
- Additional [research](#) showed that if it is possible to implement **low-cost integration of solar photovoltaic (PV) in households**, monthly costs could be further reduced to BDT 350 (GBP 3.25).

Clean cooking and electricity access in Bangladesh



Cooking energy

0% cook primarily with electricity

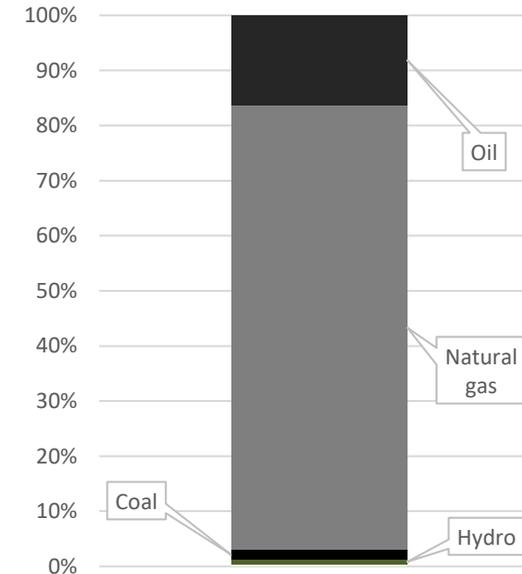


0% cook primarily with commercialized polluting fuels

66% cook primarily with polluting fuels

Electricity generation (on-grid)

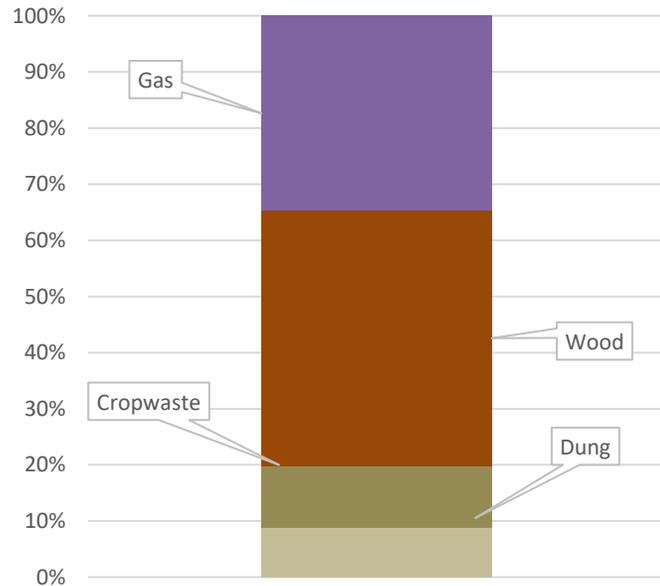
1.5% renewable



40-45% surplus power generation
Variable Reliability: Across 17 districts, users face load shedding between 1-8 hrs p/day

Cooking energy

0% cook primarily with electricity



0% cook primarily with commercialized polluting fuels

66% cook primarily with polluting fuels

Electricity generation (off-grid)

World leading mini-grid & off-grid sectors:

- 174,000 mini-grid customers
- 38 mini-grid developers
- 13m off-grid lighting/appliance customers

MECS eCooking GMA viability scores/rankings

- GMA = Global Market Assessment
- Scored all low- & middle-income countries using international indicators for:
 - economics (clean fuels, market size, financial sector strength)
 - human (policy, health, gender, development, business environment)
 - infrastructure (electricity access, reliability, RE share)
- MECS.org.uk/GMA

Bangladesh	Overall: 6th/130	On-grid eCooking: 0.48 – 77th/130	Mini-grid eCooking: 0.49 – 8th/130	Off-grid eCooking: 0.53 – 4th/130
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Key opportunities

- Development of National Action Plan for Clean Cooking is underway which has ambitious goals of 100% clean cooking by 2030;
- Highly active mini-grid and off-grid energy sectors;
- Recent expansion of national grid and installed generation capacity will have a negative economic impact on the power generation companies if the consumption of electricity does not increase within a short period of time.

Key challenges

- eCooking is actively discouraged by policymakers as it is popular opinion that ecooking would overload existing power lines and require more generation;
- Policy interventions are needed to ensure product standardization and labelling to ensure quality and energy-efficient appliances reach users;
- Cultural practice or habits are not easily shifted regardless of the availability of alternatives;
- Constrained financial resources among households;
- Weak national grid infrastructure;
- Low existing use and awareness of electric cooking;
- Prevalence of low-quality electric cooking appliances;
- Private sector participation currently lacking.

Potential impacts of scaled uptake in most viable market segment

If 40% of Bangladesh's grid-connected firewood users (25m ppl, 5m HHs) switched to eCooking, the [WHO's BAR-HAP](#) tool suggests that:

77,578 DALYs/yr avoided

12.7m tonnes/yr CO₂eq emissions reduced

6m tonnes/yr reduction in unsustainable wood harvest

1,640m hrs/yr of women's time saved

(329hrs/HH/yr)

12 months payback for eCooking appliances

(\$80/HH upfront cost, \$73/HH/yr savings on fuel energy costs – assuming the firewood

purchasers transition, rather than collectors)

3,277 GWh demand for electricity stimulated

- Electricity prices are low and firewood prices relatively high.
- If govt implemented, would cost \$147/HH for equipment and programme costs, but would save HHs several times that in reduced energy bills over the ten years.
- 21% of current unsustainable wood harvesting would be avoided and greenhouse gas emissions from the national cooking sector would reduce by more than 22%.
- Power generation mix is almost 100% fossil fuel, but natural gas dominates and most firewood is assumed to come from unsustainable sources.



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Enabling environment

Enabling environment

- **eCooking policy outlook:** Clean cooking – and specifically electric cooking – is not encouraged at the policy level. It is popular opinion, at policy maker level, that electric cooking may overload the existing power lines and may require more power generation. So, significant capital investment may be required if electric cooking is encouraged at the policy level.
- **Key policy stakeholders include** SREDA, Clean Cooking Alliance, Practical Action, UIU, SNV, University of Southampton, GIZ, USAID, World Bank.

RISE (Regulatory Indicators for Sustainable Energy) scores:

81%	61%	44%	44%
Electricity Access	Clean Cooking	Renewable Energy	Energy Efficiency

eCooking cuts across all 4 pillars

Targets:

Electricity access
100% electricity access by 2030
(grid/off-grid)
40,000MW renewable grid
electricity by 2030

Clean cooking
100% clean cooking access by 2030
40% modern energy cooking access
by 2030

Key government/NGO programmes creating the enabling environment in which eCooking can scale

- To help increase the adoption of clean cooking solutions, the Bangladesh Country Action Plan for Clean Cookstoves (CAP) was launched in 2013 by the Power Division of the Ministry of Power, Energy and Mineral Resources.
- Successful implementation of the priority interventions in CAP aligned to the government's priorities and vision of smoke-free kitchens by 2030.
- Based on CAP, new National Action Plan for Clean Cooking in Bangladesh (2020-2030) is currently under development.
- The National Action Plan aims to prioritise clean cooking in order to achieve 100% clean cooking access by 2030 in Bangladesh – with **cooking for electricity targeted at 8%**.
- EnDev are beginning the second phase of project promoting the productive use of solar energy and clean cooking technologies.
- Clean Cooking Alliance have launched behaviour change campaigns to reach consumers.

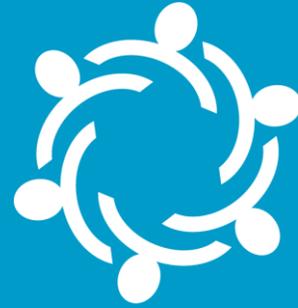
Key barriers/drivers in the enabling environment

Drivers

- Significant efforts by government and nodal agencies (such as SREDA) to encourage a clean cooking agenda;
- The National Action Plan for Clean Cooking in Bangladesh 2020-2030 (previously CAP) has revised targets to disseminate clean cooking solutions as follows: LPG (60%), NG (13%) and electric cookstoves (8%);
- Sustained human and economic growth trend shows increasing purchasing power;
- Highly active mini-grid and off-grid energy sectors.

Barriers

- eCooking is actively discouraged by policymakers as it is popular opinion that ecooking would overload existing power lines and require more generation;
- Government KABITA programme promotes ICS for free which often negatively affects commercial viability of other technologies;
- Weak national grid infrastructure resulting in frequent load shedding/power failures (especially in summer);
- Private sector participation currently lacking.

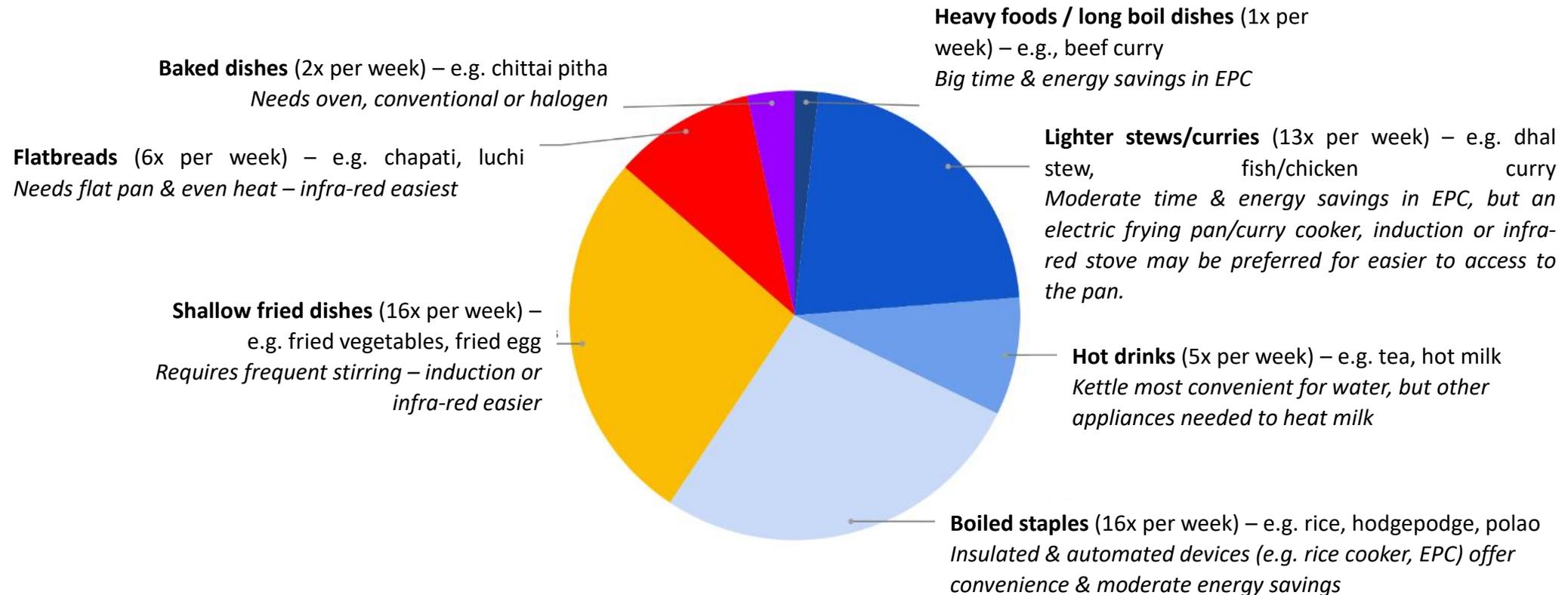


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Consumer demand

Consumer demand

- In an average week, a typical Bangladeshi household might prepare:



Popular meal combinations in Bangladesh

- A typical Bangladeshi meal includes an assortment of *dhal* (yellow lentil soup) and curry (fish, chicken, beef, egg, mutton, or vegetables). Rice and sometimes, *bhaji* (fried vegetables) or *shuk* (fried greens) will accompany the meal.
- Rice cookers have an important role to play as boiled rice is the major staple in Bangladesh, and in rural areas is eaten three times a day (ie. including for breakfast).
- Noodles, which migrated to Bangladesh from China, have become a popular mealtime choice in many homes. The Bangladeshi style is to fry the noodles with spices, onions, and vegetables, so access to the pan is required for stirring, making an induction/infra-red stove a popular choice.
- *Chapati* is a common breakfast item in Bangladesh, and the making of *chapati* is an energy-intensive process. Chapati is a flatbread that requires a flat pan with even heating, meaning that an infra-red stove is best, but an induction stove with a thick-bottomed pan can also work.
- Most meals are prepared at home, and most dishes take on average 20-60 minutes to prepare each.

Key market segments

- *Firewood* – Around **45.6%** of Bangladeshi households rely on firewood for cooking, with the majority of rural households relying on wood fuel (**58.1%**).
- *Other biomass fuels* – the mix consists of **dung/animal waste (9.2%)**, **crop residue** and **other biomass (10.6%)**.
- *Clean fuels* – Approximately **34.6%** of households in Bangladesh use clean fuels – specifically liquified petroleum gas (LPG), piped natural gas (PNG), biogas and electricity.
- Of the 34.6% above, PNG is the fuel choice of the majority (81.7%) of households and **electricity** accounts for under **1%** of this!

Key demand side barriers/drivers

Drivers

- Improved health due to reduced HAP;
- Cleaner pots and kitchens due to reduced smoke/soot;
- Less time spent on fuel collection means increased time spent on other activities (whatever they may be);
- Shortened cooking time (instant heat for cooking) and increased convenience.

Barriers

- Cultural practice or habits that cannot be easily changed regardless of the availability of alternate options;
- Low existing use and awareness of electric cooking and its cost benefits;
- Constrained financial resources among households prevents uptake.



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Supply chain

Supply chain

- **Key domestic eCooking appliance manufacturers:**
 - Pran-rfl, Walton, Hamko, Kiam, Miyako, Nova, Jamuna, Singer.
- **Key eCooking appliance distributors:**
 - Vision Emporium, MS. Brothers Electronics, Best Electronics, Marcel (Ahna) Electronics, Walton Plaza.

Innovative eCooking pilot projects

MECS: Country Partners: *UIU and Practical Action*

- [Cooking Diary and Appliance Testing Bangladesh](#)
- [Cooking Performance of Modern Clean Cookstoves: Household Survey](#)
- [Market Mapping of modern energy cooking appliances, Bangladesh](#)
- ***Collaboration with ENDEV***: [Solar PV integrated clean cooking for grid connected areas: a field implementation](#)
- MECS-ECO: University of Southampton / UIU / SNV: *Ecooking in Urban Slums: Benefits and Barriers to Implementation (A pilot study)* [underway]

Key supply side barriers/drivers

Barriers

- Market is flooded by poor/low quality electrical appliances causes distrust in products due to a lack of policy interventions to ensure product standardization and labelling;
- High import duties;
- Poor after sales service (i.e. poor access to repair and maintenance);
- Constrained financial resources among households;

Drivers

- Manufacturers and importers have already established supply chains and an electrical cooking appliance market;
- Based on the above, market actors have potential to capitalize on the opportunity by implementing electrical appliances.

Popular appliances in Bangladesh today

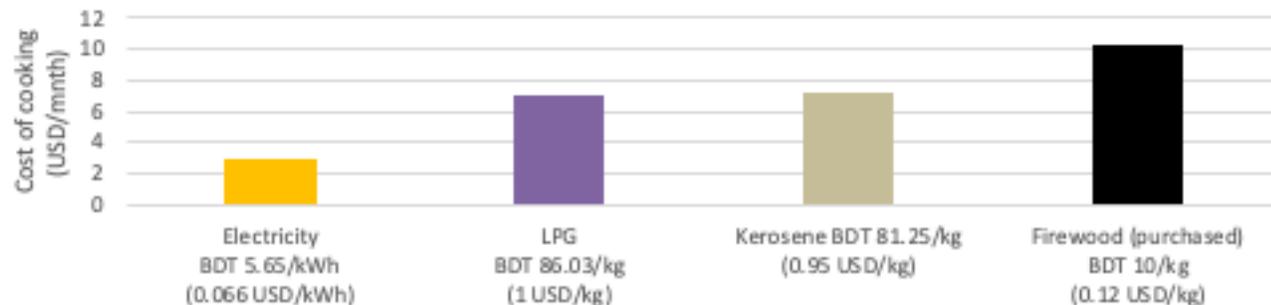
- microwave ovens
- electric oven
- electric kettle
- toasters
- induction and infrared cookstoves
- auto-fire and mechanical gas stoves
- hot plate
- multicookers
- rice cookers

Relative cost of eCooking vs. popular cooking fuels

- eCooking is perceived to be unfeasible by policy makers - the belief is that the increased demand would put too much pressure on the grid;
- However, [MECS-UIU undertook a Cooking Diary and lab testing study](#) and found that the cost of eCooking is comparable with that of LPG and firewood:

Monthly cooking energy cost for a family of 6	Firewood	LPG	Electricity
	800 BDT	784 BDT	552 BDT (avg)

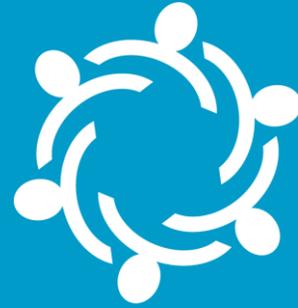
- The same study found that consumers were willing to buy ecooking appliances if there were an opportunity for monthly instalments.



Avg Grid electricity tariffs:
BDT 5.65 (0.066 \$ /kWh)
Isolated Mini-grid tariffs (2015):
BDT 29 (0.37 \$/kWh)



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Recommendations for strategic interventions

Recommendations

	Current status	Recommended interventions
Market segments	On-grid Recent expansion of national grid and installed capacity of generation will have a negative economic impact on the power generation companies if the consumption of electricity does not increase within a short period of time. Reliability and quality of wiring still a major challenge.	Pilot battery-supported eCooking devices to mitigate unreliability in grid electricity.
	Mini-grid IDCOL financed 17 solar mini-grid projects in remote areas (river and sea islands) and plans to finance a further 200 solar mini-grid projects by 2025.	Support IDCOL to integrate eCooking into the planning for forthcoming solar mini-grids and leverage carbon financing to offer reduced tariffs for cooking and/or subsidise appliance costs.
	Off-grid (SHS) World leading off-grid sector, with over 13m SHS, but most designed for lighting. Innovative low cost solar electric cooking technology being developed by UIU.	Support Bangladesh's established SHS sector to venture into cooking, in particular: <ul style="list-style-type: none">• direct drive DC solutions under development by UIU• swarm electrification (e.g. SolShare) to enable existing SHS to pool their generation/storage and potentially support eCooking

Recommendations

	Current status	Recommended interventions
TToC dimensions	<p>Supply chain</p> <p>Manufacturers and importers have already established supply chains and a domestic eCooking appliance market. However, influx of low-quality appliances and poor after sales service or access to repair & maintenance deters consumers.</p>	<p>Lobby government for policy interventions around product labelling and standardization to ensure high quality energy-efficient appliances are on the market.</p> <p>Targeted local capacity building in rural areas offer after sales services for electric cooking outside cities.</p>
	<p>Consumer demand</p> <p>eCooking appliance market has rapidly grown since 2018. Majority of cuisine can be cooked on electricity. Affordability (both upfront and monthly) is the main barriers to uptake especially in rural areas. Cultural beliefs/perceptions are not easily shifted, especially in an environment where there is a lack of awareness not only on the benefits of eCooking and available appliances.</p>	<p>To support wide scale dissemination of ecooking solutions across rural & low-income groups:</p> <ul style="list-style-type: none"> investigate viability of incentive-based programmes and consumer financing for ecooking appliances. set up country-wide campaigns to increase awareness of ecooking as a clean cooking option. address consumer concerns on safety and usability of ecooking – potentially through training campaigns.
	<p>Enabling environment</p> <p>Current policy does not recognise the importance of clean cooking and does not take an integrated approach to electrification and clean cooking.</p>	<p>Support National Clean Cooking Strategy currently being developed by CCA by raising awareness of key findings from completed and ongoing electric cooking projects from MECS and other development organisations.</p>



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Find out more

Visit www.MECS.org.uk or <https://endev.info/> for:

- The full Bangladesh eCooking Market Assessment
- The full set of 8 country studies
- Cross-country comparison
- Impact modelling methodology
- Guiding framework

