

# **The role of Biomass as energy storage**

## **The case of cooking**

**Cooking requires a high amount of energy during a short time of the day – Biomass is the traditional solution for this – for over 2 billion people**



# Cooking with biomass can be significantly improved both in efficiency and emissions



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advanced combustion technology  
based on gasification



**Processed biomass**



Foto: Ekasi Energy





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## **The Cleanest, Most Efficient, Best Performing Biomass Stove.**



61% thermal efficiency



Meets the WHO definition of clean



Automatic temperature control



IoT native for all Digital MRV



Lifetime Warranty



95% cleaner, half the cost of charcoal, and uses zero trees



Bildschirmfoto

# Comparing the storage of electric energy and biomass energy



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**= 30 x**



**600g = 1,5 kWh delivered  
12-18 USD cent**

**6,7 kg  
approx. 600 USD**

# Cost of conversion to electric cooking and modern biomass cooking for Rwanda

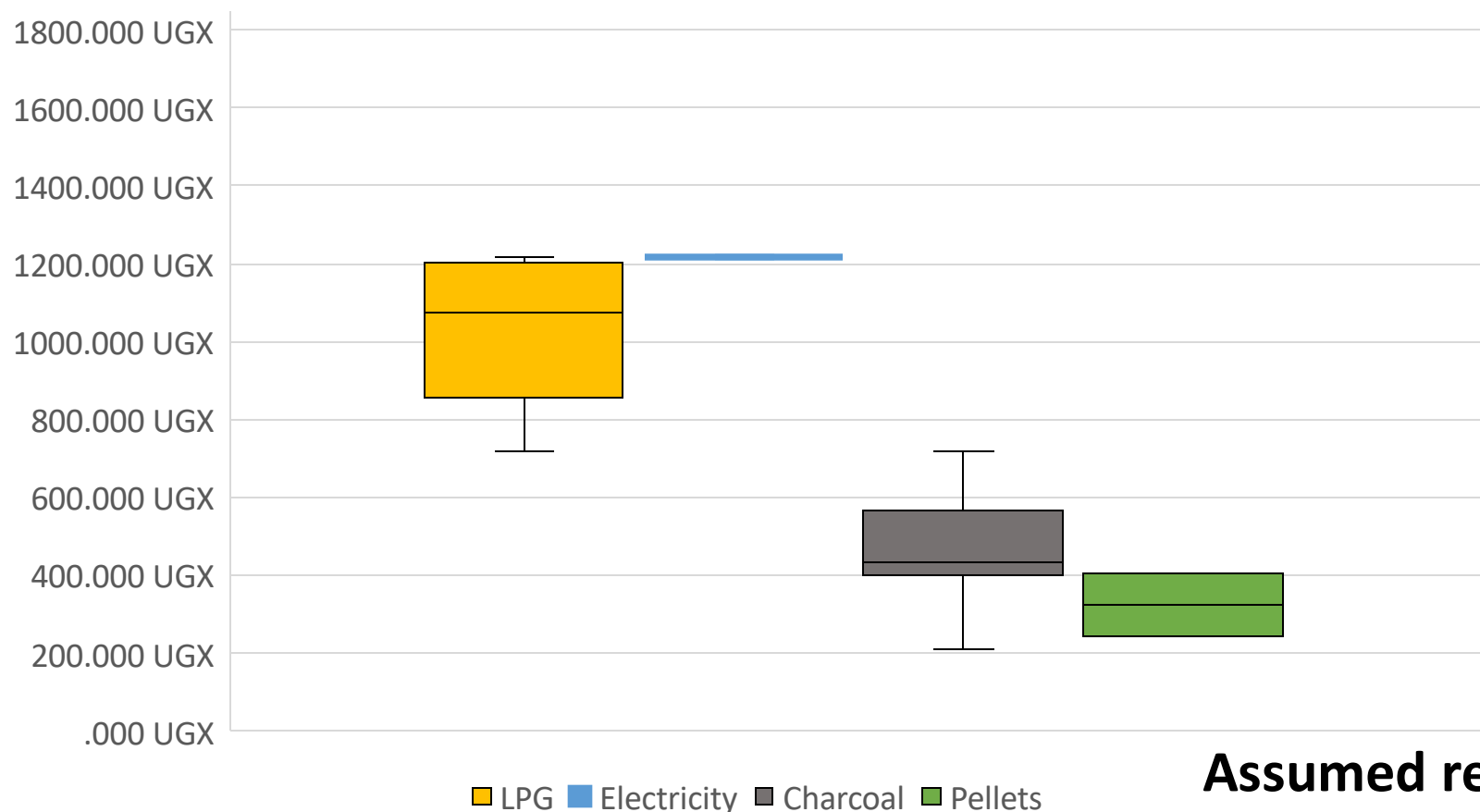


- Study of MIT, Princeton & Rwandan researchers: cost of adding 1 kW of capacity: 1245 \$
- For a household of 5 persons approx. 2 kW would be needed for cooking: 2.490 \$
- A pellet plant providing fuel for 50.000 households will cost 2 - 5 Million \$ – approx. 40 - 100 \$ per household
- The pellet cookstove stove will cost approx. 50 \$

# Cost per energy delivered



Kampala - UGX/kWh delivered



Assumptions of this calculation

Fuel	kWh/kg (or l)	Therm. Eff.	kWh/kg delivered	Sources
LPG	13,6	0,57	7,752	Environmental Science & Technology 55 (22): 15333–42. <a href="https://doi.org/10.1021/acsc.est.1c03390">https://doi.org/10.1021/acsc.est.1c03390</a> .
Charcoal	8,3	0,38	3,154	
Pellets	4,6	0,497	2,2365	
Electricity	1	0,74	0,74	ESMAP Papers. Washington DC: World Bank. <a href="http://hdl.handle.net/10986/38418">http://hdl.handle.net/10986/38418</a> .

**Assumed retail pellet price: 150-250\$/t**

Data source: survey by Vestal Energy Consultants, Aug. 2023

## Conclusion

- **The possibility of biomass to release high amounts of stored energy in a short period of time is a great advantage for cooking needs**
- **Cost advantages in terms of needed investment are larger than an order of magnitude**
- **Cost advantages of running costs are approx. a factor of 3**



# Thank you for your attention!

Feel free to contact me!

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