

Thinking Complex about Energy Transitions: Lessons from the Implementation of LPG Gas Bottles in Kenya

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Abstract

In the informal settlement of Langas, Kenya, access to domestic energy for cooking is a complex and multifaceted issue. Political and infrastructural efforts have promoted LPG gas bottles as a cleaner and more efficient alternative to traditional fuels like firewood and kerosene. However, residents demonstrate a diverse set of contextual concerns that challenge gas bottles' uptake and prompt questions about how straightforward these energy transitions can be. The ethnographic study I conducted in Langas reveals a significant gap between the way energy transitions to clean fuels are imagined by energy policies and stakeholders and how these are experienced by end-users. While energy policies often reduce energy transitions to mere technological shifts, local communities show that access to energy is a social rather than a technical issue and requires a more inclusive, context-specific, and culturally sensitive approach so that energy solutions appropriate and responsive to their needs can be developed.

Keywords

Kenya; Energy Transition; Energy Policies; Social Anthropology

Nancy and I had been busy cooking with Corinne all morning. Her house, a precarious mud hut at the edges of Langas, was far from any shop and we had to walk for over two miles to buy some firewood. Once back with a few logs and a packet of kindling, our host embarked on the task of lighting the three-stone fire, a traditional cookstove made of three stones arranged around a flat central hearth (Figure 1). The rain of the past few days, however, had made the kitchen, a small and dark room built next to the main house, incredibly damp. The firewood, sitting on the muddy ground, became wet and only caught fire when Corinne poured some drops of kerosene on top of it. With a thick column of smoke arising from the fire, we realized that the simple procedure of preparing *ugali*, a paste of flour and water considered the main staple food across Kenya, was way more complex than we had anticipated.

Figure 1. Examples of three-stone fires

Corinne had told us that her husband opposed the idea of buying a *meko*, the 3kg LPG gas bottles that had become common to cook across the settlement. They were too expensive to refill, and the household had other financial priorities. While we were waiting for the water to boil, Nancy, who had been accompanying me through Langas as a local fieldworker, took the chance to involve Corinne in some calculations. That morning, we had paid 50 shillings to buy firewood. Multiplied for the days of the month, they summed up to over 1500 shillings. With the cost of a 3kg LPG gas bottle refill at 800 shillings, Nancy wanted to prove that even if she had to refill her *meko* twice a month, the overall cost would be nearly the same. That solution would remove the burden of daily runs to the firewood retailer, the struggles of lighting the fire, and the annoyance of the smoke. Yet, Corinne counterargued saying that even if gas was cheaper, she would still use it only in the mornings and light the fire in the evenings to cook the main meal. She was concerned that her neighbors would accuse her of being a lazy wife if she relied upon the convenience of a modern cookstove.

We had several conversations like that in Langas, the peri-urban informal settlement on the outskirts of Eldoret, the fifth largest city in Kenya, where I was conducting my ethnographic study for my PhD dissertation. I was interested in investigating how access to domestic energy for cooking was experienced, perceived, and signified by the residents of Langas, in the attempt to contextualize and assess the potential for LPG gas bottles to offer an alternative solution to local energy practices. LPG gas bottles are considered a major asset in promoting domestic energy transitions (Figure 2). Sturdy and compact, they are easy to transport and refill, thus able to overcome the institutional, infrastructural, and logistical obstacles that long hampered access to modern sources of energy in the Majority World (Schwittay 2014; Redfield 2012). They rely upon Liquefied Petroleum Gas (LPG), which is released straight from the bottle by turning a handle. LPG burns quickly and effectively, with

no emission of particulate matter and other hazardous products of incomplete combustion. It is therefore considered clean and efficient and, currently, the most easily scalable option to address the health, environmental, and social concerns associated with reliance upon traditional energy practices.

Figure 2. A pile of 3kg LPG gas bottles, locally known as *meko*



The term “traditional energy practices” has gained prominence in narratives of those involved in driving changes toward energy transitions and refers to those energy behaviors that rely on kerosene and solid fuels (firewood, charcoal, sawdust) burnt in rudimentary stoves to procure energy for cooking, lighting, and heating household spaces. According to the International Energy Agency (2022), traditional energy practices are currently employed by over 2.4 million people, mostly in the Majority World. The combustion of traditional fuels generates household air pollution (HAP), the second environmental risk factor in the global burden of disease (Murray et al. 2019). HAP leads to over 3.2 million premature deaths a year (World Health Organization 2022) through associated cardiovascular and respiratory diseases (Smith et al. 2014) and kills more people than HIV/AIDS and malaria (Health Effects Institute 2019). Reliance upon traditional fuels has further effects. It impacts the environment, as collecting firewood and charcoal for domestic energy purposes accounts for 40% of global wood harvest (Food and Agriculture Organization 2018) and cooking with

them releases almost one-third of total black carbon emissions, a score comparable to the emission of the aviation industry (Bailis et al. 2015). Gender equality is another pertinent issue in this context. Women bear the brunt of tending to domestic energy needs. They spend more time close to HAP sources and, as a result, have poorer health (Ellegard 1996; Bruce et al. 1998). Collecting firewood in rural areas exposes them to physical injuries, snakebites, and sexual harassment (Khamati-Njenga and Clancy 2003; Cecelski 2005). Furthermore, being time-consuming, domestic energy tasks prevent them from accessing educational and job opportunities, with consequences for their financial and personal independence (Petrova and Simcock 2021; Sullivan 2018).

Efforts to ensure energy transitions in the Majority World have accelerated since the Sustainable Development Agenda set “clean and affordable energy for all” as the 7th imperative goal to reach by 2030. In Kenya, this goal materialized through a set of interventions to make LPG more accessible and affordable. In 2016, LPG refills were made VAT-exempt and retail licenses, once a monopoly of petrol stations and big supermarkets, were liberalized. The LPG value chain was strengthened through the building of a new terminal for the import of LPG at the port of Mombasa, the construction of refilling plants across the country, and the enforcement of more stringent regulations to the market, that curbed the threat of parasite refillers who long made a living from stealing, refilling, and selling at low prices gas bottles from legitimate companies. On the other hand, the use of traditional fuels was fought on various fronts. An extra tax was placed on kerosene, a moratorium was enforced on logging activities, and a ban was placed on the production and sale of charcoal. These interventions were underpinned by the idea that by making traditional fuels expensive and scarcely available and LPG affordable and accessible, people would naturally transition to the latter.

While President Ruto recently announced a plan to convert all public institutions to LPG by 2025 and achieve universal clean cooking by 2028, domestic energy transitions still fall short of what is expected to achieve the 2030 targets (World Bank 2020). The ethnographic fieldwork I conducted in Langas, indeed, proves that households’ energy behaviors and choices do not follow predicted patterns, nor can be understood in terms of a linear cause-and-effect relationship uniquely motivated by affordability and accessibility. Rather, people’s energy practices are implicated in a set of contextual concerns seldomly accounted for by the “thin simplification” of state policies (Scott 1999). Most residents employed the practice of stacking, intended as the combination of traditional and modern, polluted and clean, time-consuming and efficient energy technologies. Manuel, who was a

bachelor man living alone, found LPG convenient to rewarm or prepare quick meals. However, he could not imagine his mom cooking ugali with anything else but firewood, believed to confer it a unique flavor. Most people used LPG only for short tasks and considered it unsuitable to cook “hard foods,” such as meals that require long boiling times. Scared by the possibility that the refill would be exhausted too quickly, they were furthermore intimidated by LPG gas bottles as unfamiliar devices that did not belong to the local socio-technical system. They were concerned about mishandling them and questioned their safety upon the historical reputation that LPG gas bottles could explode. For those living in rental properties, like Mary, this was a substantial concern that triggered worries around the potential scenario of having to pay for damages to the landlords. Intersecting issues of social desirability and gender were enhancing people’s ambivalence toward LPG technology. *Mekos* were both desired and confined within households. On one hand, they were status symbols, proof of the enhanced socio-economic status of the family. They provided a quick and efficient solution, which minimized waste of time and fuel. On the other, women were concerned that their reputation would be impacted if they relied upon a modern cookstove. The risk of being labelled as lazy wives went hand in hand with the belief that these “technologies from the West” (Robert, see details on the poster) would make traditional stoves, practices, and knowledge expendable. Finally, LPG adoption was subjected to complicated decision-making processes, with an unbalanced relation of power between females and males leading to women being subjected to what their husbands classed as a priority.

In these respects, the ethnographic accounts I collected in Langas help to understand household energy’s use as a complex concern informed by several contextual factors, that the energy transitions anticipated by the policies’ design did not account for. They highlight that a fracture exists between the ways in which energy interventions are planned and imagined by energy stakeholders and how those are received, understood, and experienced by final energy users. Such fracture, also known as “social gap” (Batel and Devine-Wright 2015), is underpinned by several criticalities. Despite the increased awareness that effective energy policies urge to reflect the needs and incorporate the points of view of the communities involved (Lennon et al., 2019; Sloot et al., 2018), their development is still delegated to technical experts external from the contexts of implementation. The danger of “expertism” in the energy field has long been proved to conceal the social dimension of “people’s energy problem” (Nader and Milleron 1979; Shove and Walker 2014) and, with it, the contextual factors that come to interfere with domestic energy use. Energy policies are

often guided by a “rational plan” (Suchman 2007) elaborated in abstract and detached places. They account for local uses of domestic energy as uniform across social contexts, disowning the extreme variability of energy experiences and values (Frigo 2017). In these respects, they often support the implementation of a one-fits-all solution and account for final energy users as passive and diligent recipients of such proposed alternative. This approach has far-reaching implications, as it places excessive trust in technological solutions (Morozov 2014) and, in turn, oversimplifies energy transitions as mere technological shifts. This technicist orientation disowns the social and cultural dimensions of local energy practices, concealing the much broader arrangements in which they are implicated. The expectation that users would embrace the given technology and follow its script (Woolgar 1991; Akrich 1992) also enforces a deterministic change in energy practices (Wyatt 2008), not negotiated with the communities involved and rather imposed through the imperative of energy transitions, assumed to be universally shared. This approach has political implications and can be understood as a symptom of those “energopolitics” that exercise power over local populations by means of the ways in which energy is delivered and accessed (Boyer 2014).

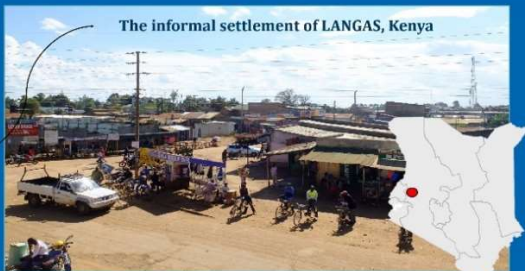
We have learnt that in Llangan people resist energy transitions for several, different reasons, showing that the energy practices they adopt do not follow any economic, health, or environmental logic. While reliance upon traditional fuels and technologies remains a substantial global public health, social, and environmental concern, accusations of NIMBYism are quickly debunked by the evidence that there are often good reasons to oppose energy transitions (Grubert and Hastings-Simon 2022). As argued by Suchman (2007, 70), “every course of action depends in essential ways on its material and social circumstances.” Llangan residents, who are confronted daily with indeterminant energy concerns (Rittel and Webber 1973), adopt a mix of modern and traditional energy practices based on which fuel and stove better respond to their contextual needs. In these respects, attention to the situated action of energy users and a more nuanced understanding of their needs and priorities can help question, challenge, and reframe the ways in which energy transitions have been imagined and are urged to develop more effective energy policies and interventions to address the concerns with which traditional energy practices are implicated.

UNDERSTANDING DOMESTIC ENERGY PRACTICES AS SITUATED SOCIAL PHENOMENA IN KENYA



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The informal settlement of LANGAS, Kenya



THE ISSUE OF HOUSEHOLD AIR POLLUTION (HAP)

Domestic energy practices relying upon **biomass fuels** (wood, charcoal, sawdust, etc) and **kerosene** burnt in rudimentary stoves & not ventilated spaces release pollutants (particulate matter, black carbon, carbon monoxide) that are **harmful** for people in the surroundings and **detrimental** for the environment.

- Around **2.4 billion people worldwide** use **polluting fuels** - of which 76% of Kenya's population.
- Main health impacts include increased risk of stroke, ischaemic heart disease, chronic obstructive pulmonary disease and lung cancer.
- HAP killed over 3.2 million only in 2020—23,000 Kenyans. HAP makes **more victims than malaria and HIV**.
- Harvesting firewood and charcoal for domestic energy purposes accounts for 40% of global wood harvest.
- Cooking with solid fuels release **1/3 of total black carbon emissions** - comparable to the emission of the aviation industry.

ENERGY TRANSITIONS to clean fuels & technologies (LPG, biogas, solar, electricity) are needed **urgently**.

ETHNOGRAPHY CONDUCTED between March and September 2021

- Curfew after 7 pm
- Covid rates still high in UK & Kenya
- Travel & visa disruptions
- Very strict risk assessment
- Covid related Health and Safety face to face data collection

To study DOMESTIC ENERGY PRACTICES (especially COOKING)

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UNDERSTANDING CLEAN ENERGY TRANSITIONS (in reference to the potential of LPG for clean cooking practices)

It is often assumed that if MATERIAL AND ECONOMIC BARRIERS to access clean energy sources are removed, people will naturally transit to use clean energy



However, domestic energy practices are enmeshed in the COMPLEXITY OF THE CONTEXT and in its SOCIAL AND CULTURAL DYNAMICS

LACK OF SKILL POSTCOLONIALITY	COPING PRIORITIES GENDER	FOOD TASTE FAMILY SIZE	PERCEIVED RISK RESIDENTIAL SPACES	GENDER OCCUPATION
				
<i>We are surrounded by this technology from the West, but I do not feel comfortable with it - Robert</i>	<i>Even if it costs less and we can spare money, my husband would rather use them for something else. He does not know what is going on in my kitchen - Lucy</i>	<i>Gas its practical, I live alone. But food doesn't taste good. I would never buy it for my mom, I cant spoil her ugal! - Manuel</i>	<i>I bought this improved jiko, it uses coal, it was expensive. Gas? No, I can't use that in a rental property! - Mary</i>	<i>I would still only use it in the morning, when I am in a rush with kids and I have to go to work. In the evening, I'll set on the fire or people will say I am a lazy wife! - Corinne</i>

CONCLUSIONS

The ethnographic data suggest that structural political interventions are not enough to foster clean energy transitions. Appropriate solutions need to resonate with the context, to take into account the specificity of harnessing energy in situated spaces and to be co-designed in agreement with local communities.



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