



Policy Brief

No. 2, 2026

Clean cooking energy in Tanzania: Current status, prospects and policy implications

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Abstract

- In May 2024, the Government of Tanzania launched the National Clean Cooking Strategy (2024-2034) (NCCS) with the objective of ensuring that 80 percent of Tanzanians use clean cooking solutions by 2034. To inform decision-makers on the solutions that are most scalable, reliable, equitable, accessible and affordable in different contexts, this study examined the five most commonly used clean energy sources: electricity, liquid petroleum gas (LPG), solar, natural
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gas and biogas. It found that all five sources show progress and challenges; no single clean cooking solution is a panacea. Rather, to achieve the goal of the NCCS, a systems approach is required that moves beyond isolated interventions to address supply-side constraints, such as infrastructure, distribution networks and regulatory frameworks, reduce demand-side barriers, such as affordability, and foster a supportive environment for market growth.

Introduction

Access to clean cooking energy remains one of the world’s most pressing development challenges. Globally, nearly 2.1 billion people continue to rely on traditional biomass energy such as firewood, charcoal and agricultural residues for cooking, exposing them to household air pollution that contributes to an estimated 3.2 million premature deaths annually (WHO 2025).

Based on national census data, over 80 percent of households (approximately 11.3 million households) in Tanzania still rely on firewood and charcoal for cooking (URT 2024b). As a consequence, Mainland Tanzania is estimated to be losing close to 500,000 hectares of forest annually [URT 2017; Food and Agriculture Organization (FAO) 2020]. If this rate continues, Tanzania’s forest cover could be completely depleted within the next 50 to 80 years [European Commission (EC) 2025]. Moreover, deforestation threatens biodiversity, degrades land and contributes to climate change through increasing carbon emissions [EC 2025; URT 2018; International Monetary Fund (IMF) 2023].

Recognising these interlinked challenges, in May 2024, the Government of Tanzania launched the National Clean Cooking Strategy (2024-2034) (NCCS) with main objective of ensuring “that 80 percent of Tanzanians use clean cooking solutions by the year 2034” (URT 2024a, p. 15). The strategy emphasises the country’s transition toward cleaner energy, aligning domestic policy with global commitments under United Nations Sustainable Development Goal 7 (SDG 7) and its Nationally Determined Contributions (NDCs) under the Paris Agreement.



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Study framework and methodology

The current study assessed the five most commonly used clean cooking energy sources in Tanzania—electricity, solar, liquid petroleum gas (LPG), natural gas and biogas¹—against the following five dimensions:

Affordability, which is based upon the calculation of total cash outflows incurred by households for using clean cooking energy over a period of 10 years (including upfront, annual maintenance and recurrent costs) discounted to present value.

Scalability, which considers the potential for mass adoption without major barriers (see ESMAP 2023; Coldrey et al. 2023; Hosier et al. 2017) through the analysis of trends in adoption rates of energy sources, supply availability, the distribution network and infrastructure requirements.

Reliability, i.e., the consistent and predictable supply of energy, which was assessed against available data of service interruptions or outages.

Equitability, which assessed whether the rates of adoption of clean cooking energy are inclusive across regions, genders (e.g., male versus female-headed households) and locations (rural versus urban areas), ensuring no group is left behind.

Accessibility, which covers two aspects concurrently, i.e., the availability of clean energy sources (for example, in the case of electricity whether the grid is available to households) and connectivity (whether households are actually connected).

Thus, the study informs decision-makers on the clean cooking energy sources that are most scalable,

reliable, equitable, accessible and affordable in different contexts. It also examines investment priorities to address bottlenecks in supply chains, distribution networks and enabling infrastructure for each energy source, and regional targeting strategies that identify underserved areas requiring urgent intervention.

Data collection involved a document review, including census data provided by the National Bureau of Statistics (NBS), reports of government agencies and international organizations, and academic and grey literature that informed the study’s analysis. In addition, key informant interviews (KIIs) were conducted with representatives of three state stakeholders in the energy sector: Tanzania Electric Supply Company (TANESCO), Energy and Water Utilities Regulatory Authority (EWURA) and Tanzania Petroleum Development Corporation (TPDC).

¹Electricity, LPG, natural gas, solar and biogas are classified as clean cooking energy sources due to their low release of toxic and hazardous pollutants (URT 2024a). In addition, their use often provides higher technical performance, including reduction in stove preparation and cooking times, with the potential to lower the overall energy consumed. The other three fuels and technologies identified as clean by the NCCS 2024-2034 are bioethanol, improved cookstoves and briquettes with standards acceptable by the Standards Regulatory Authority.



Photo credit: Coffee and Climate

Key findings

As shown in Table 1, all five clean cooking energy sources show progress and challenges.

LPG is the dominant driver of recent gains in adoption of clean cooking energy, particularly in urban areas, but faces affordability and equity barriers for low-income households and requires major investments in infrastructure to scale up access. The Government’s intent to establish a Clean Cooking Energy Fund through the Rural Energy Agency (REA) will be a significant step toward addressing scalability challenges, particularly in supporting the expansion of the natural gas distribution network. The current policy of offering free household connections to the network has helped increase uptake, but without this subsidy, connection costs would be prohibitive for most low- and middle-income families.

Electricity has high grid reach--almost 80 percent of households had access to the national electricity grid by 2019/20—yet persistent disparities in reliability between regions underscore the need for equity-

focused investments in regions most affected by interruptions. Demand-side challenges are also present; many households with access to the grid are not connected to electricity, and few connected households use electricity for cooking, highlighting affordability as a further constraint.

Solar is the most affordable option with minimal maintenance and no recurrent energy cost, but adoption is constrained by high initial investment, technological limitations for local cooking practices and a lack of large-scale promotion. Solar cooking appears more accessible in grid-limited areas, suggesting potential for targeted incentives in remote regions.

Biogas ranks highest in equitability and affordability of the monthly recurrent costs but remains out of reach for most low-income households due to high upfront costs, resulting in universal under-adoption.

TABLE 1: SUMMARY OF FINDINGS

Dimension	Electricity	LPG	Natural Gas	Solar	Biogas	Highlights
Scalability	Medium to high	High	Medium	Low	Medium	LPG market growing rapidly; electricity expansion limited by last-mile connectivity; solar and biogas constrained by cost and niche contexts.
Affordability	Medium to high	Low	Medium	High	Low to medium	Solar is most affordable with no recurrent energy cost; electricity moderately affordable; natural gas medium; LPG least; biogas high upfront cost.
Accessibility	Medium	High (urban-biased)	Low to medium	Low	Low	LPG is widespread in cities but has limited rural reach; grid access for electricity is improving but connection lag persists; solar and biogas adoption rates are less than 3 percent.
Reliability	Medium	High	NA	Low	Medium	LPG supply stable; electricity grid improving but unstable in rural areas; solar depends on weather and technology.
Equitability	Low	Low	Low	Low	Medium	LPG and electricity concentrated in urban, higher-income areas; solar limited by technology and awareness; biogas potential in livestock-rich zones but minimal outreach.

Policy recommendations

To achieve the national target of 80 percent use of clean cooking solutions by 2034 requires an unprecedented acceleration in progress. This necessitates a systems approach that moves beyond isolated interventions to simultaneously address both supply-side constraints (infrastructure, distribution networks, regulatory frameworks) and demand-side barriers, such as affordability, and foster a supportive environment for market growth.

Such an approach will need to consider the full clean cooking process and the interaction between cooking technologies (the combination of stove and energy), behaviour (such as what, how and how often households cook), housing conditions (such as the presence of a kitchen) and policy reforms that facilitate an enabling environment for the clean cooking market. Reforms could include targeted incentives, market innovation, regulations that promote market entry and competition, and the development of localised solutions.

It is important to recognize that income is a fundamental determinant of adoption. Low-income households often face a short-term affordability

trap, ending up choosing costlier long-term energy due to limited upfront capital. Therefore, the clean cooking transition must be viewed not solely as an energy sector goal but as an overall outcome of broader national efforts to promote inclusive economic growth and rural development. The pronounced rural-urban gap in clean cooking energy adoption calls for comprehensive approaches, including incentives for LPG appliances and electric cookers to reduce upfront costs in rural areas.

While working to increase the adoption rates of clean cooking energy, transitional policies also need to address the current biomass economy by strengthening support to sustainable charcoal production initiatives and efficient charcoal cooking technology, enforcing forestry regulations to curb illegal and unsustainable wood harvesting, and promotion of alternative livelihoods for those engaged in charcoal trading.

Specific recommendations under each of the study's five dimensions are as follows:

1 Reliability
To enhance reliability, the study recommends prioritising investments in electricity grid infrastructure in regions with weaker results for reliability indicators. High-performing areas like Ilala and Dodoma could serve as benchmarks, and national reliability indices can be compared against regional peers.

2 Accessibility
The Government needs to maintain the policy of free connection to the natural gas network, while expanding pipeline infrastructure to high-density areas and designing future natural gas networks to incorporate multiple exit points. The upcoming Clean Cooking Fund could support pipeline expansion as well as aiding local governments in planning LPG supply zones. Tax incentives could be extended to components associated with the full package of clean cooking energy solutions, such as cookers and accessories, not only for LPG, but also for biogas and solar technologies, coupled with mechanisms to prevent misuse of exemptions.

3 Scalability
To enable scalability of cleaning cooking energy sources will require increased public investment in expanding last-mile infrastructure (such as transformers and service lines) to improve actual household electricity connections. Incentives can also be considered to support LPG distribution in rural areas, including retail expansion and investment in refilling plants and delivery logistics. The absence of large-scale national strategies to promote solar cooking, unlike LPG or electricity, represents a missed opportunity that could be addressed through hybrid cooking models combining solar with LPG for flexibility. Public-private partnerships (PPP) are recommended to increase LPG import and storage capacity, especially by expanding port facilities.

The Government should review licensing requirements for LPG importers to allow for shared or rented storage infrastructure, lowering entry barriers for new players. Import standards for LPG accessories and installations also need to be enforced to reduce accidents and improve public confidence, and the Government should continue with public awareness campaigns to counter safety misconceptions, particularly around LPG.

4 Equitability
To enhance equitable access to clean cooking energy, targeted interventions are required in underserved regions, particularly in southern and western Tanzania. These interventions should address both supply-side challenges, such as infrastructure and reliability, and demand-side constraints like affordability. Reviewing and adjusting subsidies could support equitable expansion for electricity-based cooking. In the case of solar energy, further investment is needed in research and pilot projects, especially in areas with low uptake, to better understand cultural, social and technical barriers. Equally important is the need to focus on pilot projects to get the available technologies to users. It may also be advantageous to develop area-specific clean cooking strategies, for example, LPG in urban areas and biogas in livestock-rich zones. For biogas, scaling up of existing technology is key, particularly in agricultural and pastoral areas.

5 Affordability
As part of the system approach to support uptake of clean cooking energy, there is a need to extend financial relief on upfront costs for biogas, solar, LPG and electricity. Such measures, for instance, in the case of LPG would support the scaling up

of recently introduced pay-as-you-go initiatives by the private sector.

Based on the data collected, the study found that ensuring connection to electricity is insufficient on its own. To maximise impact on adopting electricity for cooking, it needs to be complemented by measures that address affordability. In addition, large-scale energy switching in rural areas is unlikely until rural economies grow substantially or significant public subsidies support the transition.

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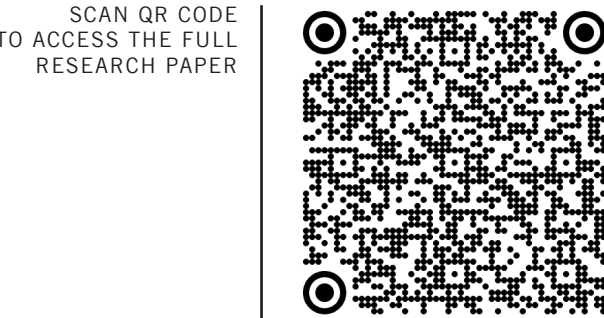


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