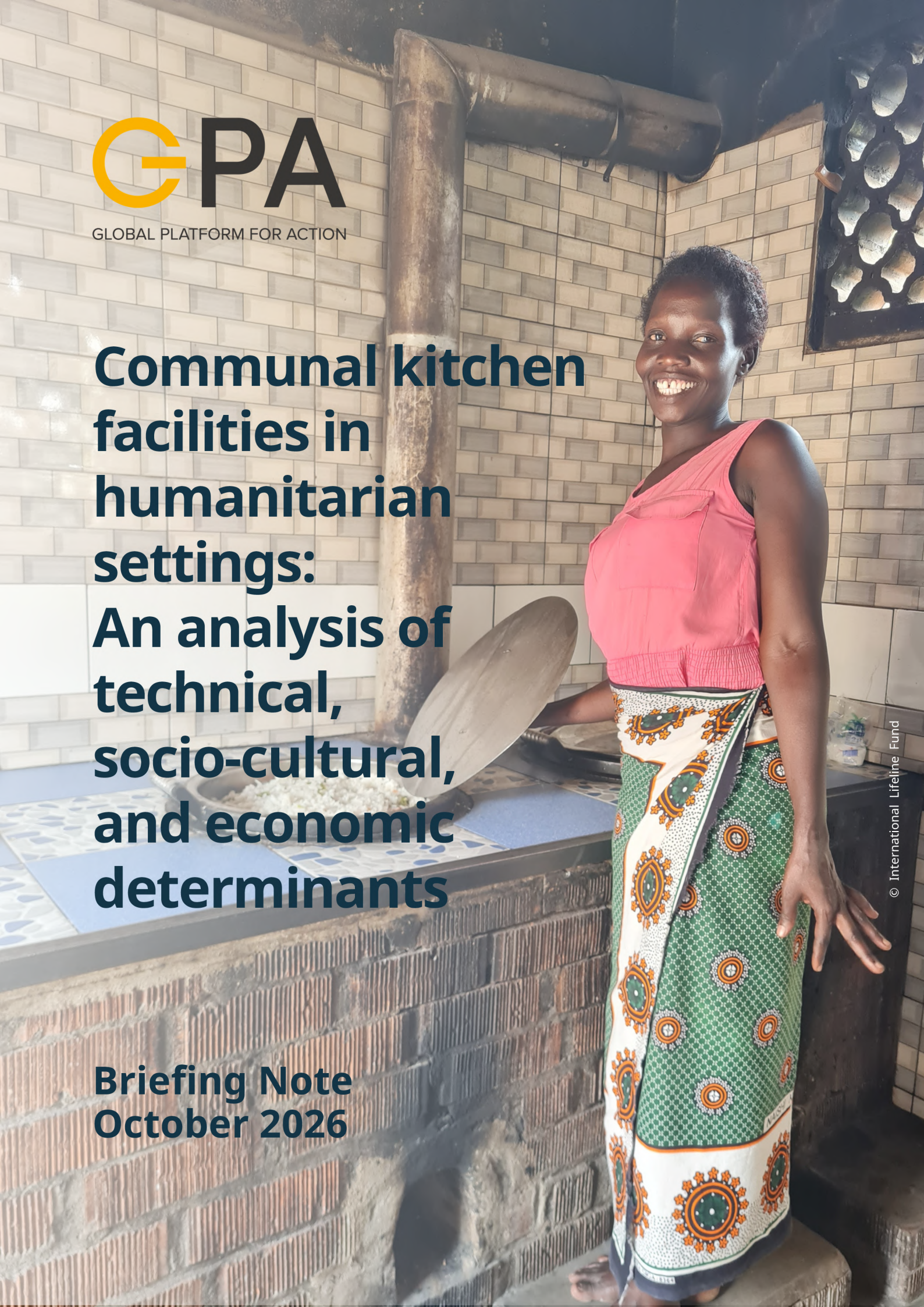
GPA

GLOBAL PLATFORM FOR ACTION

Communal kitchen facilities in humanitarian settings: An analysis of technical, socio-cultural, and economic determinants



© International Lifeline Fund

Briefing Note
October 2026

Executive Summary

This briefing note examines the technical, socio-cultural and economic factors shaping the adoption and sustainability of communal kitchens in humanitarian and displacement settings. Drawing on experiences from Bangladesh, Uganda and Rwanda, alongside emerging models and supporting evidence from other contexts, it explores how cooking preferences, household autonomy, privacy, protection concerns and operational constraints influence their effectiveness. It considers alternative service models and financing approaches, including multi-service energy hubs, carbon finance and results-based financing. The brief provides practical recommendations for humanitarian agencies, donors and policymakers on designing and managing communal cooking facilities as voluntary, context-specific services within broader clean cooking strategies, while safeguarding the dignity and choice of displaced households.

Acknowledgements

Authors: Dr Iwona Bisaga (GPA, NORCAP), Ms Carine Buma (Mercy Corps)

The authors gratefully acknowledge the individuals and organisations whose expertise and contributions informed this briefing note. Particular thanks are extended to Mohammad Sijanur Rahaman Robin of NGO Forum for Public Health, Todd Wofchuck, IOM consultant, Dinah Nabaweesi of CARE Uganda, and Dorothy Otieno of Nyalore Impact for their valuable peer review and technical insights. We also thank Mariana Soto, Mark Gibson and Aimee Jenks for their support through the GPA Coordination Unit. The authors further acknowledge the humanitarian partners, practitioners and displaced communities across Bangladesh, Uganda, Rwanda, Kenya and Greece whose experiences, evidence and perspectives provided the foundation for this analysis.

GPA Secretariat support: Mariana Soto, Mark Gibson, Aimee Jenks

Suggested citation: Bisaga, I. and Buma, C. (2026). Communal kitchen facilities in humanitarian settings: An analysis of technical, socio-cultural, and economic determinants. Briefing note. UNOPS. Geneva, Switzerland.

Table of Contents

Executive Summary 2
Acknowledgements 2
1. Introduction 4
1.1. The global humanitarian energy landscape and the concept of centralisation 4
2. Evidence from the Rohingya response in Bangladesh 6
2.1. The biogas communal kitchen experience 6
2.2. The rejection rate and socio-cultural considerations 7
2.3. Economic viability vs. social friction 9
2.4. Operational challenges 9
3. Comparative evidence from Uganda 10
3.1. From communal to individual 11
4. The hypothetical case of Mahama camp, Rwanda 11
5. Technical factors and the scheduling dilemma 12
5.1. The 1-hour mechanism 12
5.2. Maintenance and deterioration 12
5.3. Socio-cultural dynamics 12
5.3.1. The dimension of dignity and autonomy 12
5.3.2. The need for privacy 13
5.3.3. Protection and Gender-Based Violence (GBV) 13
6. Alternative models 14
6.1 The eJikoni solar-powered hub model 14
7. The Role of Carbon Finance and Subsidies 15
7.1. Monetising Reduced Biomass Consumption and Methane Capture 15
7.2. Advantages of Centralisation for Digital Monitoring, Reporting, and Verification (dMRV) 16
7.3. Institutional Initiatives and Market Precedents 16
7.4. Coordination with Existing Carbon Credit Programmes 17
7.5. Critical Operational Risks and Limitations 17
8. Key Operational Lessons and Best Practices 18
9. Actionable Recommendations for Practitioners & Policy Makers 20
Conclusions 22
About the GPA 23

1. Introduction

The delivery of modern energy for cooking within humanitarian contexts remains one of the most significant logistical and social challenges in the displacement sector. As humanitarian crises become increasingly protracted, the initial emergency response mechanisms - often based on the distribution of limited rations of firewood - are proving insufficient to meet the long-term needs of displaced populations while preserving environmental and protection standards. In this landscape, the concept of communal kitchen facilities (see Box 1 for definition) has been proposed as a strategic intervention to centralise infrastructure, mitigate fire risks, and reduce the per-capita cost of transitioning to clean and modern fuels such as biogas, LPG, grid electricity, or solar-powered electric cooking. However, the implementation of these facilities across diverse geographic regions, including Bangladesh, Uganda, Rwanda, and other refugee-hosting settings, reveals a stark divergence between theoretical efficiency and practical community acceptance. This report evaluates the evidence regarding the success and failure of communal kitchen models, examining the interplay of cultural autonomy, technical limitations, and the economic frameworks necessary for sustainability.

Box 1: What is a communal kitchen?

In humanitarian and development contexts, a communal kitchen (also referred to as a shared kitchen facility) is defined as a centralised space equipped with shared cooking infrastructure such as stoves, fuel supplies, ventilation, and water access, where individuals or families from different households can prepare their own meals.

While the term can apply to various community-living setups (such as co-housing, student dormitories, or municipal centres), in humanitarian displacement settings, communal kitchens are typically established by agencies as strategic energy interventions.

1.1. The global humanitarian energy landscape and the concept of centralisation

The humanitarian sector currently supports millions of forcibly displaced people - estimated at over 120 million globally - of whom a vast majority remain dependent on traditional solid fuels [1]. In rural and camp-based settings, approximately 85% of residents rely on three-stone fires or basic biomass stoves, a practice that contributes to high rates of respiratory illness, significant carbon emissions, and environmental degradation around the camps and settlements, including the host communities [2]. Over the last few years, and given the diminishing humanitarian funding, there has been a shift from fuel distribution to the provision of sustainable cooking services.

One of the options under this shift is the concept of communal facilities. The logic for centralisation is often rooted in the "energy-health-protection nexus." By removing open flames from high-density, flammable shelters and consolidating cooking in professionalised or monitored spaces, agencies aim to reduce the frequency of camp fires and minimise the health impacts of indoor air pollution, while

[1] GPA, 2026. Summary Brief: The sustainable energy access gap amongst forcibly displaced people.
[2] Bisaga, I., 2025. Clean Cooking in Displacement Settings: An Imperative to Act.

also reducing the cost associated with installing individual solutions at household level [3]. Furthermore, communal models are frequently the only viable pathway for advanced technologies like biogas (which requires integrated waste management) or grid-connected e-cooking (where individual shelter connections are often prohibited by host governments) or solar mini-grid-supported e-cooking [4].

The evidence on communal kitchens in humanitarian settings is limited. This Knowledge Brief aims to fill this gap by analysing 4 examples where communal kitchens have either been implemented or considered for implementation. The analysis suggests that cooking at home (or within one's shelter) remains the preferred way for the majority of displaced households, creating a significant acceptance gap that must be bridged through co-design and innovative governance. However, where other options become unviable, best practice should be applied to boost the acceptance and chances for widespread uptake of cooking in communal spaces. Section 9 provides key best practice recommendations for humanitarian practitioners, as well as other humanitarian and development partners supporting efforts to achieve universal access to clean cooking in humanitarian and displacement settings.



© Sakib Pratyay / IUCN

[3] Tran, A., Bisaga, I. & To, L.S., 2021. Landscape analysis of modern energy cooking in displacement settings.

[4] SCCCM, 2024. Sector Lessons Learned & Best Practice Updates - Rohingya Refugee Response.

2. Evidence from the Rohingya response in Bangladesh

The Rohingya refugee camps in Cox's Bazar represent perhaps the most documented environment for the study of communal energy systems. With over a million refugees living in 33 congested camps, the demand for fuel is immense [5]. While the primary response has successfully scaled Liquefied Petroleum Gas (LPG) distribution to over 95% of the 249,000 Rohingya refugee households in the camps, the chronic nature of fuel shortfalls - where 97% of households experience periods (8 - 15 days on average) of running out of LPG before their next refill, and over 66% of these revert to raw biomass for fuel- has necessitated the search for supplemental or alternative pathways [6].

2.1. The biogas communal kitchen experience

Biogas communal kitchens were introduced as early as 2016 in the Nayapara and Kutupalong Registered Camps in Cox's Bazar and subsequently in Bhasan Char ahead of the LPG roll-out programme in 2018. In many cases, these systems were designed as part of a circular economy approach, utilising faecal sludge as the primary feedstock to solve both sanitation and energy needs[7]. For example, the Bhasan Char island settlement, constructed by the Bangladesh Navy, integrated biogas systems into its cluster housing as a core infrastructure element [8].

However, the operational reality of these systems in camps like the Rohingya camps in Cox's Bazar has been fraught with challenges. Recent field assessments indicate that of the original 60 cooking stations installed in the two registered camps [9] only 14 remain in active use [6]. This dramatic decline is attributed to a combination of technical mismanagement, lack of maintenance in some of the biogas facilities, a sharp drop in usage in 2018 when LPG was introduced, and a failure to account for user routines. The biogas units require consistent feedstock and specialised maintenance that often falls between the mandates of WASH units and energy providers, leading to inconsistent gas pressure and user frustration[7].

The typical biogas kitchen facility measures roughly 4 m^2 and is built with metal sheet walls, with a raised concrete platform housing one or two single-burner biogas stoves. Facility layout depends directly on biodigester size: for instance, a larger 2-stove kitchen in Teknaf is connected to a sanitation block of 15 toilets, whereas smaller 1-stove kitchens connect to about 5 toilets. Allocated user groups average 10 regular households for 2-stove kitchens (~5 households for 1-stove kitchens), operating on community-managed wall-posted rosters of two 1-hour slots per household daily (morning and late afternoon), though actual usage remains flexible to accommodate non-listed households during low-demand windows, or reduce cooking duration to accommodate other users [10].

---

[5] Buma, C. 2025. Feasibility of E-Cooking Transition in Rohingya Refugee Camps and Host Communities: Summary.

[6] Woffchuck, T. 2026. Research on Cooking Energy Diversification for Rohingya Refugees in Cox's Bazar. *(Upcoming)*

[7] Ali, M. and Shahreen, T. Innovative sanitation solutions: evaluating the performance of faecal sludge treatment plant in humanitarian settings: A case study from Rohingya camps in Bangladesh.

[8] GPA, 2026. IOM survey on communal kitchens in Rohingya refugee camps in Cox's Bazar.

[9] Registered camps are official government-recognised camps with formal UN documentation, while unregistered areas are makeshift settlements provided by the UN agencies, lacking full legal status.

[10] Mercy Corps, 2026. Notes from visits to shared biogas kitchens in Kutupalong & Nayapara registered camps, Cox's Bazar, Bangladesh.



A biodigester (left) powering one of the communal cooking facilities in the Kutupalong registered camp. © GPA-UNOPS

2.2. The rejection rate and socio-cultural considerations

Quantitative data from a recent (2026) IOM study[6] in Cox's Bazar provides a granular view of why centralised cooking systems have had mixed long-term results. A survey of 450 households found that 62% of refugee households would not use a communal kitchen even if it utilised their preferred fuel.

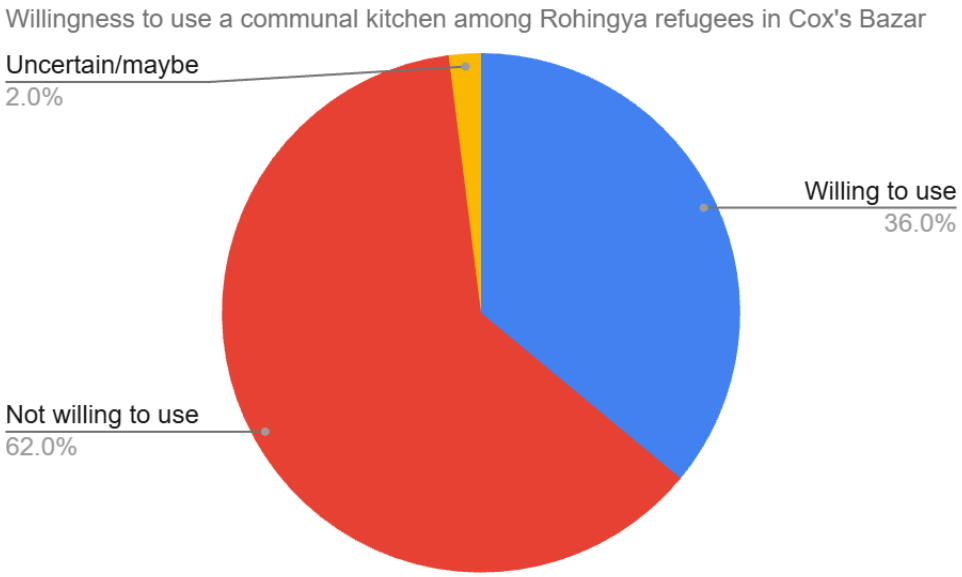


Figure 1: Willingness to use communal kitchen among Rohingya refugees in Cox's Bazar.

The qualitative drivers of this 62% rejection rate are embedded in the socio-cultural preferences of the Rohingya community. The research identifies that the primary concerns are not logistical (distance or fuel type) but are instead related to the loss of domestic autonomy.

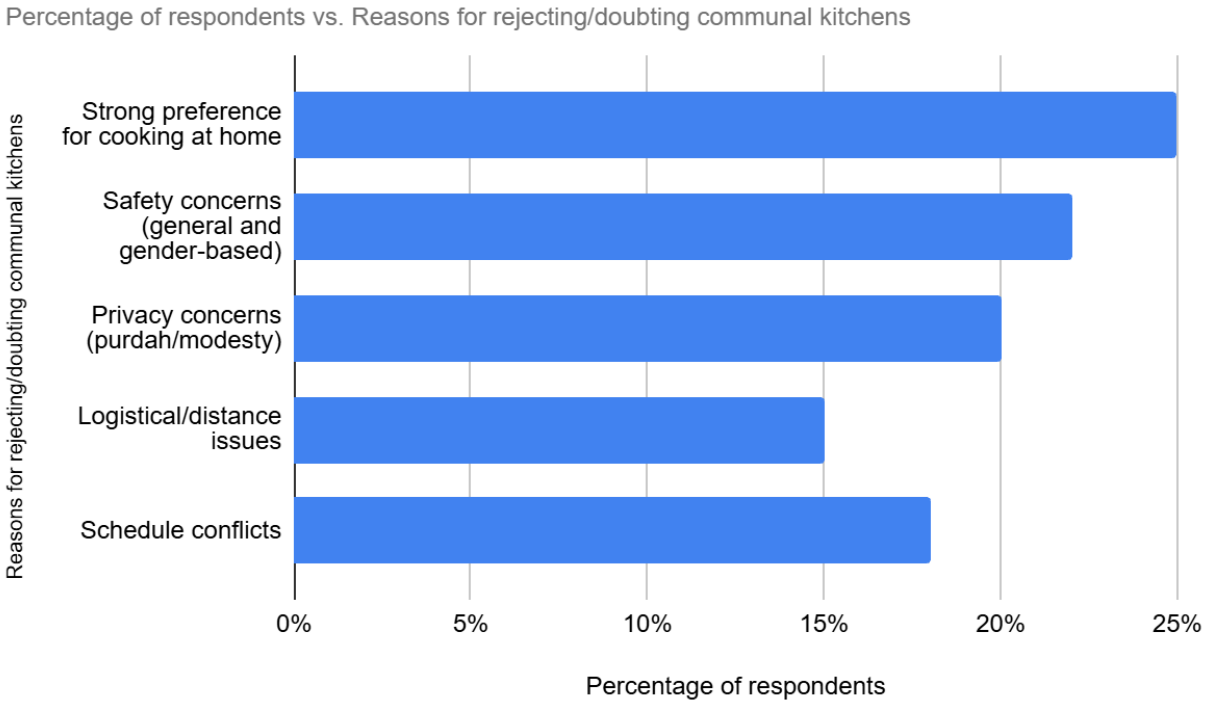


Figure 2: Percentage of respondents vs reasons for rejecting/doubting communal kitchens.

Focus group discussions (FGDs) with Rohingya women highlight that cooking is central to their identity as caregivers and acts as an anchor of the household routine. Participants described communal cooking as a (potential) source of constant social friction, citing "quarrels over cooking schedules, portion sizes, food types, and cleaning responsibilities"[6]. The perception of the kitchen as a public space directly contradicts the cultural requirement for "purdah" - the screening of women from male outsiders. One resident noted that carrying raw foods and utensils to a distant kitchen was inconvenient and exposed women to harassment from men sitting at street corners [11].

Users also detailed severe structural and environmental issues, including sharp metal wall edges that pose injury risks to children, open ventilation gaps that allow rainwater ingress during monsoons, flooded access paths, lack of artificial lighting (rendering night and early morning cooking unsafe), and petty theft of utensils due to a lack of padlocks [9]. Furthermore, carrying heavy pots across long distances creates severe physical strain for elderly residents, pregnant women, and persons with disabilities (PWDs) [9].
However, users explicitly reported that awareness of biogas being derived from human faecal waste did not act as a barrier to usage; residents noted they were equally unaware of the exact production origins of LPG and accepted biogas as a clean, viable fuel [9]. However, users did note a distinct smell from the biogas-fueled stoves which they considered unpleasant.

[11] Mim, S.J., 2020. Religion at the Margins: Resistance to Secular Humanitarianism at the Rohingya Refugee Camps in Bangladesh.

2.3. Economic viability vs. social friction

In Cox's Bazar, grid-connected e-cooking, including in communal kitchens, would represent the lowest-cost clean cooking pathway available, estimated at USD 0.0315 per Megajoule (MJ), compared to USD 0.0911/MJ for solar-powered communal systems[6]. However, current Government of Bangladesh regulations restrict grid access within the Rohingya camps primarily to authorised government and institutional facilities, preventing its immediate use for household or communal cooking. This should be understood as a regulatory barrier rather than an indication that grid-connected e-cooking is technically or economically unviable. Given its significant cost advantage, humanitarian and development partners should initiate structured engagement with the Government of Bangladesh to explore whether grid access could be authorised specifically for communal cooking facilities. If such access is secured, grid-connected communal facilities should initially be positioned as a complementary cooking option for households willing to use them, especially during LPG shortages, rather than as a universal replacement for household cooking. However, communal kitchens remain a necessity in the eyes of planners. The current consensus among partners like IOM, NGO Forum, Danish Refugee Council and Mercy Corps, all carrying out research on possible clean cooking diversification in the camps, is that these facilities should be designed as a complementary safety net specifically for the 36% of households who are willing to use them - primarily those in acute fuel poverty- rather than a primary replacement for the 62% who reject them [6].

2.4. Operational challenges

The Mercy Corps assessment highlighted key operational realities governing the economic and practical viability of shared biogas kitchens [9]:

- Gas Depletion & Stove Inefficiency: Daily biogas volume is frequently insufficient for allocated household numbers. Biogas is typically available in the morning but fully depleted by afternoon, forcing families to only cook part of their meals on biogas or fall back on firewood for lunch or dinner. Furthermore, high gas flow pressure observed at the burners creates a perception that biogas cooks faster than LPG, but this uncalibrated flow causes rapid fuel depletion through old, inefficient stoves.
- Maintenance Downtime & Odour: Routine cleaning of solid faecal sludge from biodigesters occurs every 3 to 5 months. During these maintenance periods, biogas production halts or drops significantly for approximately 3 weeks while the system regenerates, accompanied by strong, unpleasant odours and forcing complete reliance on firewood as a fallback option. The resulting treated sludge is converted into compost for agricultural use by sector partners and community members.

Despite these challenges and the clear preferences for home cooking, refugee households strongly value shared biogas kitchens as a vital fallback during LPG shortages, effectively allowing them to stretch their monthly LPG refills over longer periods and avoid cooking with firewood, which is costly, inconvenient and unhealthy.

The modelled evidence from IOM’s recent study indicates that communal biogas can supply approximately 213 MJ per household annually, equivalent to only about 7.7% of estimated household cooking-energy demand. Biogas is therefore a supplementary rather than primary cooking pathway.

When combined with persistent cultural acceptance barriers, land constraints, variable gas availability and specialised maintenance requirements, this limited contribution does not support further expansion of household-facing communal biogas kitchens in Cox's Bazar. Future biogas investment should prioritise institutional facilities, such as schools, health centres and camp management points, where feedstock, space, cooking demand and system management can be more effectively controlled. Existing communal biogas kitchens may be improved to continue to provide an efficient and useful fallback when households run out of LPG.



© International Lifeline Fund, Uganda

3. Comparative evidence from Uganda

The experience in Uganda, particularly in the Kyangwali and Nakivale settlements, provides a different narrative of technical pilot and adaptation. In Kyangwali, a community kitchen pilot implemented by CARE Uganda and ECOCA East Africa initially aimed to provide a shared electric cooking service. The users, however, reported an overall poor experience [12].

The primary complaints in the Uganda context were similar to those in Bangladesh: fears of food poisoning or contamination when cooking in close proximity to others, and the social tension caused by food jealousy - where some families could afford higher-status foods than their neighbours, leading to resentment within the shared space. Crucially, the convenience factor was the ultimate deal-breaker; users found it significantly easier to maintain a three-stone fire next to their own shelter than to carry pots and water to a central hub [13].

[12] Outsight, 2023. Community Solar Kitchens / Care International.
[13] GPA, 2026. ECOCA East Africa and CARE Uganda survey on communal kitchens in Uganda refugee settlements.

3.1. From communal to individual

The failure of the communal model in Kyangwali led to a course correction; the project managers made the decision to take down the communal units and distribute the cooking systems to individual households [12].

Outcome of individual distribution in Uganda	Impact observation
System maintenance	Households took better care of the units when they had sole ownership.
Operational continuity	Families were more willing to troubleshoot issues rather than reverting to biomass.
Sustainability	A commercial model, where households contributed a small fee for ownership, proved more viable.

Table 1: Outcomes and preferences regarding individual stove ownership (as compared to communal kitchens).

This transition highlights a fundamental insight: while centralised infrastructure is easier for agencies to manage, decentralised ownership increases the longevity of the hardware because it aligns with household motivations for autonomy, ownership and convenience. However, ECOCA and CARE Uganda noted that communal cooking did work well in one specific area: reception centres. In these environments, where residents are temporary and have not yet established domestic routines, nor do they have proper kitchen spaces, the administrative efficiency of a shared kitchen is more acceptable, although it still required a lot of monitoring to ensure users abided by handling guidelines[12].

4. The hypothetical case of Mahama camp, Rwanda

In the Mahama camp in Rwanda, research conducted by Alight (formerly American Refugee Committee) explored the feasibility of implementing shared kitchens for groups of four households [14]. Despite the smaller scale of sharing (4 households per shared facility), the pushback from the predominantly Congolese and Burundian refugee population was significant.

The primary reasons for the rejection in Rwanda included:

- Visibility: A cultural aversion to being seen while preparing food.
- Convenience: The physical burden of carrying containers for both fresh ingredients and cooked meals.
- Freedom of timing: Staple foods in Mahama, such as pulses and maize, require variable cooking times that do not fit into rigid administrative windows.

As a result of this pushback, the idea of household-replacement communal kitchens was abandoned by Alight in Mahama, Rwanda.

[14] GPA, 2025. Interview with Alight.

5. Technical factors and the scheduling dilemma

One of the most persistent technical failures of communal kitchens in humanitarian settings is the time-based scheduling model. Many agencies attempt to manage high-density usage by assigning one-hour intervals to each family.

5.1. The 1-hour mechanism

The analysis of meal preparation in displacement settings indicates that a one-hour window is fundamentally insufficient for staple cooking. For example, a typical meal involving pulses (beans/lentils) and grains requires significant time for both boiling and simmering. When a one-hour slot is assigned, the user must also account for the cleaning of the station and the time required to heat the cooking surface (especially with electric hot plates, which are slower to heat than gas) [15].

- Gross slot time: 60 minutes.
- Cleaning/transition time: 15-20 minutes.
- Net cooking time: 40-45 minutes.
- Impact: insufficient to cook even a single dish of beans, forcing users to skip meals or revert to cooking at home (even if it means cooking on charcoal or firewood).

Furthermore, communal kitchens often require people to cook at inconvenient times. The peak demand for cooking tends to fall at 7:00 AM, 12:00 PM, and 5:00 - 7:00 PM. A facility that can only accommodate a fraction of the population at these times creates a situation where those assigned to mid-morning or mid-afternoon slots face food security risks or must consume cold, unappetising meals, or are left with the need to find ways of reheating food cooked during the slots, which would not typically be preferred by households [16].

5.2. Maintenance and deterioration

Communal kitchen facilities often lack a dedicated budget for cleaning supplies and professional maintenance, relying instead on communal ownership, which rarely translates into sustained hygiene. Evidence from reception centres in Greece and Cyprus (e.g., the Kofinou Reception Centre) shows that communal equipment deteriorates rapidly under high-intensity use. In Kofinou, shared kitchens deteriorated to the point of being a health hazard, with only two out of six stoves functioning months after launch, and leaking water pipes leading to black mould [15].

5.3. Socio-cultural dynamics

The reported evidence from Cox's Bazar and Uganda reveals that the kitchen is not just a place of energy consumption, but a site of social negotiation.

5.3.1. The dimension of dignity and autonomy

For many refugees, the loss of a home and a homeland is compounded by the loss of control over the smallest details of daily life: what to eat, when to eat, and how much to give to one's children[6]. Communal kitchens represent another layer of administrative control. The preference for cooking at home is a claim for everyday autonomy and the preservation of parenting and family life[6].

[15] Inter-Sector Working Group Strategy: Communal Kitchens In Refugee and Migrant Sites of Greece, accessed May 8, 2026.
[16] Kofinou Reception Center: Observational Report - KISA, accessed May 8, 2026.

5.3.2. The need for privacy

In Kyangwali, Uganda, social friction emerged from the visibility of different economic statuses[10,12]. In a private shelter, a family that cannot afford meat can eat their meal without the psychological burden of comparison. In a communal kitchen, the disparity in diets becomes visible to all, leading to jealousy, tension, and a sense of shame for the poorer households or households with different food preferences. This aspect has been observed as a significant deterrent to the use of shared spaces.



Institutional cookstoves used at the Angelina Jolie School. © Nyayow Deng Chuol/GPA

5.3.3. Protection and Gender-Based Violence (GBV)

While communal kitchens are intended to reduce the protection risks of firewood collection (SGBV during fuel gathering), they introduce new risks. In both Greece and Bangladesh, women reported discomfort using communal areas at night due to poor lighting and the presence of male outsiders[9,14]. For a communal kitchen to be successful, it must be located in a well-lit, high-visibility area, yet it must also offer enough screening to satisfy the requirements of "purdah"[6]. This creates a design tension between "visibility for safety" and "enclosure for privacy."

6. Alternative models

The high capital expenditure (CAPEX) and operating expenditure (OPEX) of modern energy systems in camps necessitate innovative financing. The proposed eJikoni project in Kakuma, Kenya, puts forward a market-driven "Cooking-as-a-Service" (CaaS) model of a communal kitchen [17].

[17] Nyalore Impact, 2026. eJikoni Concept Note.

6.1 The eJikoni solar-powered hub model

Nyalore Impact's eJikoni model attempts to solve the sustainability problem by integrating multiple revenue streams and services into the kitchen hub.

Pillar of eJikoni model	Implementation strategy
100% solar power	Reliability for cooking, lighting, and device charging.
Cooking-as-a-Service	Pay-per-use model (KSh 15 per kg/liter) to avoid high upfront appliance costs.
Food preservation	Solar refrigeration service for fish, vegetable, and milk vendors.
Skills training	Employment of youth/women chefs and appliance repair technicians
Carbon finance	Using IoT data to generate carbon credit revenue for long-term subsidies

Table 2: Key pillars of the eJikoni (hypothetical) model for Kakuma, Kenya.

By adding refrigeration, eJikoni addresses one of the major drivers of food insecurity in hot climates like Kakuma and Cox's Bazar: food spoilage and diarrhoea caused by lack of cooling[6,16]. This transformation of the "kitchen" into a "hub" changes the value proposition for the user. A family may be willing to walk to a communal facility if it also offers a way to keep their milk fresh or charge their phones.

The transferability of the eJikoni hub model to Cox's Bazar is constrained by extreme population density, limited open space and no ability for refugees to pay, due to existing government restrictions on income generating activities. After accounting for shelters, pathways and WASH infrastructure, average usable open space within residential blocks is estimated at less than 0.5 m^2 per household. Multi-service hubs requiring cooking areas, solar arrays, batteries, refrigeration and training spaces are therefore unlikely to be widely replicable as standalone facilities. In Cox's Bazar, the model may be feasible only at selected institutional sites with dedicated open space or where services can be integrated into existing community infrastructure.



© International Lifeline Fund

7. The Role of Carbon Finance and Subsidies

Grant-based humanitarian budgets are notoriously volatile, short-term, and prone to rapid donor fatigue during protracted displacement crises. To achieve long-term operational sustainability, communal and shared cooking facilities must transition toward blended finance architectures. Among these, carbon finance - specifically Voluntary Carbon Markets (VCM) and Article 6 mechanisms under the Paris Agreement - presents a transformative opportunity to bridge the energy sector's capital deficit.

7.1. Monetising Reduced Biomass Consumption and Methane Capture

Communal kitchens are uniquely suited for carbon monetisation compared to scattered household stoves because they aggregate fuel consumption at a single, measurable point:
Displacement of Non-Renewable Biomass (fNRB): Transitioning hundreds of cooking events from firewood to biogas, solar e-cooking, grid-powered e-cooking, or institutional LPG dramatically reduces carbon dioxide and black carbon emissions. Because communal stoves run almost continuously, their baseline emissions displacement per stove unit is significantly higher than household-level stoves.
Methane Abatement via Waste-to-Energy: Institutional biogas systems in the Rohingya refugee camps like Kutupalong and Nayapara capture fugitive methane (CH4) emissions that would otherwise off-gas from untreated human faecal sludge in open pit latrines or oxidation ponds. Under carbon accounting frameworks (e.g., Gold Standard for the Development of Assets or Verra VM0025), capturing methane yields high-value carbon offsets due to methane's global warming potential (GWP) being 28-36 times greater than CO_2 over a 100-year timescale.

7.2. Advantages of Centralisation for Digital Monitoring, Reporting, and Verification (dMRV)

Historically, household clean cooking projects in displacement settings have faced severe scrutiny and carbon credit devaluation due to over-crediting risks, inaccurate usage reporting, and lost or damaged stoves. Communal facilities eliminate much of this verification friction:

- Automated IoT Data Capture: Centralised facilities can simplify the direct measurement of gas or electricity consumption because monitoring equipment can be installed at a limited number of supply points. High-grade IoT flow meters, digital pressure sensors, and smart meters can be permanently installed on centralised biogas digester manifold lines or electric cooking circuits. This enables tamper-proof, real-time logging of exact Megajoules (MJ) consumed, eliminating the need for the more intrusive, higher-error household surveys, or more costly IoTs for household-level systems
- Predictable Baseline Auditing: Third-party auditors can easily verify centralised infrastructure, reducing transaction costs and unlocking high-integrity, premium-priced credits.

7.3. Institutional Initiatives and Market Precedents

The institutional landscape is actively shifting toward structural carbon integration in displacement contexts:

- UNHCR's Refugee Environmental Protection (REP) Fund: Launched at COP30, the REP Fund represents a precedent-setting carbon finance initiative. Operating in locations such as Bidibidi and Kyangwali (Uganda), Kigeme (Rwanda), and the Rohingya refugee camps in Cox's Bazar (Bangladesh), the fund aims to leverage carbon credits generated from clean cooking and landscape restoration to create a self-replenishing financial stream that reinvests directly back into refugee community operations, green jobs, and infrastructure upkeep. However, current plans solely focus on household-level solutions.
- Cooking-as-a-Service (CaaS) Monetisation: Emerging (though not yet implemented) pilots like the eJikoni model in Kakuma, Kenya, combine carbon credit revenue with micro-tariffs (e.g., pay-per-minute or pay-per-kg cooked via mobile money). The carbon revenue subsidises the base tariff, making clean cooking cheaper than buying charcoal for the refugee, while end-user fees fund day-to-day site managers and basic spare parts. However, this model can only be viable where refugees are able (and allowed) to pay for services.

Similar models could be explored to support the scale-up and operations and maintenance of communal kitchens where they hold promise to either replace or complement current cooking solutions.

7.4. Coordination with Existing Carbon Credit Programmes

Where multiple clean cooking interventions operate within the same humanitarian setting, carbon-finance arrangements must be coordinated to ensure that emission reductions are accurately attributed and not claimed by more than one programme. A carbon-credit programme associated with the LPG response in Cox's Bazar is currently under development. Diversification interventions, including e-cooking and communal cooking systems, may change household fuel-use patterns and affect the emission reductions attributable to the LPG programme. Developing separate carbon mechanisms without coordinated baselines, programme boundaries and monitoring systems could

create overlapping claims, double-counting risks or unintended reductions in the crediting potential of the wider LPG programme.

Agencies should therefore engage with the LPG carbon-credit programme before developing independent crediting arrangements for communal or alternative cooking interventions. A unified, nested or otherwise complementary accounting structure should be explored so that LPG (or any other fuels currently used in a given setting) and diversification technologies can be monitored as components of the same cooking-energy portfolio. The selected structure must clearly define baseline fuel use, ownership of emission reductions, programme boundaries, data-sharing responsibilities and benefit-sharing arrangements.

7.5. Critical Operational Risks and Limitations

While carbon finance provides a viable revenue model, relying on it introduces distinct operational vulnerabilities:

- High Upfront Capital Costs: Carbon finance is inherently results-based - revenues flow after emissions reductions are generated and verified (typically 12-24 months post-commissioning). Humanitarian agencies cannot build communal kitchens with carbon revenue alone; they require initial philanthropic, grant, or concessional debt capital to build the facilities.
- Price Volatility in the Voluntary Market: Fluctuations in carbon credit prices can destabilise operational budgets. If offset prices drop, the revenue generated may fail to cover complex O&M costs, such as biannual desludging or electronic repairs.
- The "Suppressed Demand" Paradox: Carbon methodologies calculate savings against baseline fuel use. In extreme humanitarian contexts where refugees may skip meals due to limited fuel access, baseline emissions are artificially low. Current carbon methodologies must properly incorporate suppressed demand factors to ensure displacement settings are not financially penalised for their extreme energy poverty.



© SOLCO Partnership

8. Key Operational Lessons and Best Practices

Field data from Bangladesh, Uganda, and Rwanda - alongside other contexts, such as Greece and Kenya demonstrate crucial lessons for clean cooking planning in humanitarian settings:

Lesson 1: Target Specific Demographic Niches, Not Universal Replacement

Attempts to replace individual household cooking entirely with communal kitchens consistently fail due to resistance rooted in domestic autonomy. Communal facilities succeed when framed, built, and operated as specialised community resources or complementary safety nets. Prioritise implementation in reception centres, transit facilities, and for specific sub-groups such as single-headed households, or those living in high-density areas with extreme fire risks where in-shelter cooking is technically impossible.

Lesson 2: Evolve from Cooking Spaces to Multi-Services Energy Hubs

Where sufficient land, user demand and supporting infrastructure are available, communal cooking facilities may achieve greater value by operating as multi-service energy hubs rather than standalone cooking spaces. A standalone room with stoves is rarely enough to drive sustained community adoption. Modernising facilities into a "Hub Model" -such as the eJikoni concept- transforms a basic kitchen into a holistic utility centre. Integrating value-added services such as (solar-powered) refrigeration for food preservation, Productive Uses of Energy (PUE) like phone charging or small appliance repair, and structured employment opportunities for a trained refugee workforce creates strong economic and social incentives for daily usage.
In severely land-constrained settings such as Cox's Bazar, hub functions should be prioritised selectively and, where possible, integrated into existing facilities rather than requiring new standalone structures.

Lesson 3: Address the Inter-Cluster Coordination Gap

Biogas and waste-to-energy kitchens frequently suffer operational neglect because they sit in an administrative vacuum between sector mandates. Decisions on communal infrastructure must be co-led by the energy, WASH, and protection sectors. When WASH teams treat biodigesters purely as waste management assets rather than energy assets, desludging operations lead to 3-week gas outages, severe odours, and site abandonment, as is sometimes the case in Cox's Bazar. Joint governance ensures feedstock, sanitation, and safety requirements are simultaneously met. For facilities using fuels other than biogas, there should equally be clarity of responsibilities in terms of maintenance, fuel replenishment, community engagement and other critical activities to ensure uninterrupted functioning of the provided facilities.

Lesson 4: Adopt Flexible Technical Standards (Ratios, Slot Durations & O&M Stipends)

- Stove Ratios: Lower user-to-stove ratios and stronger governance may improve the usability of existing communal kitchens while allowing families to cook during natural peak meal windows without triggering interpersonal conflict.
- Net Cooking Time: Longer cooking slots (of at least 90 minutes) should be provided to accommodate the preparation of slow-boiling traditional staples (e.g., pulses, beans) as well as post-cooking cleaning.
- O&M Stipends: Facilities require dedicated, permanent stipends for paid refugee maintenance staff built into the project budget from Day 1 to avoid the severe hygiene-hazard failures and rapid degradation seen in unmaintained sites globally.

Lesson 5: Pressure Regulation and High-Efficiency Stoves (for gaseous solutions)

Observed instances of rapid biogas depletion are frequently caused by improper gas pressure regulation and the use of worn, low-efficiency stoves rather than insufficient digester production. Uncalibrated high pressure creates a high flame velocity that wastes gas and depletes digester reservoirs prematurely. Installing pressure-regulating valves and modern, high-efficiency biogas burners could extend gas availability into late afternoon cooking windows, especially for the Cox's Bazar case.

However, these improvements address operational inefficiencies and not the underlying limitations of household-facing communal cooking. Investments in rehabilitating existing facilities should therefore be proportionate to their demonstrated use and fallback value, while new biogas development should focus primarily on institutional applications.

9. Actionable Recommendations for Practitioners & Policy Makers

For humanitarian agencies, donors, and camp management authorities, the following phased framework should guide intervention design:

1. **Feasibility, Demographics & Institutional Coordination**
   - Shift Target Demographics: Do not design communal kitchens as a universal solution. Map and prioritise reception centres, transit sites, single-headed households, and areas with severe fire risks. Quantify household willingness-to-use before committing capital; if general camp rejection exceeds 50%, restrict communal facilities strictly to these high-need niches, leveraging existing facilities to minimise cost.
   - Bridge the Inter-Cluster Coordination Gap: Formalise cross-sector management across the energy, WASH, and protection clusters from day one. If deploying a biogas solution, ensure biogas projects have a guaranteed water supply and a minimum ratio of connected latrines

per stove (10–15 well-used toilets per burner) while maintaining clear operational Service Level Agreements (SLAs) between sanitation teams and energy managers.
- Initiate Government Engagement on Grid Access: Given that grid e-cooking is usually a lower-cost clean cooking pathway, convene relevant government authorities, electricity providers, camp management actors and humanitarian energy partners to assess the regulatory and technical requirements for permitting grid-connected e-cooking in selected communal facilities.

2. **Value-Added "Hub" Design & Protection**
   - Transition to the Multi-Service "Hub" Model: Where viable, expand facility utility by co-locating solar-powered refrigeration for perishables, PUE services (phone charging, micro-business power), and structured employment models (e.g., social enterprise kitchens employing local refugees).
   - Enhance Protection & Privacy Features: Respect cultural requirements (such as purdah) by installing modular screening, partitions, and designated women-only zones. Mitigate GBV risks by integrating overhead solar PV lighting inside the kitchen and along all primary access pathways leading to the facility to guarantee safe usage during early morning and late evening hours.
   - Scale for Micro-Groups: Construct smaller, modular kitchen units designed for 4 to 5 simultaneous cooks (targeting a 1:8 stove-to-household ratio) rather than large, institutional halls. This reduces waiting times, noise, and interpersonal friction.

3. **Operational Governance and Flexible Technical Standards**
   - Establish Female-Led Governance Committees: Operational rules, cleaning rosters, and dispute resolution must be co-designed and managed directly by elected female refugee leadership.
   - Enforce Flexible, Extended Cooking Slots: Ensure net assigned cooking slots are reasonable and flexible to allow adequate time for pulse preparation, boiling, and thorough cleaning without fear of eviction by subsequent users.
   - Guarantee Permanent Maintenance Budgets: Build dedicated, recurring stipends for refugee O&M staff into project budgets from day 1 and ensure emergency clean fuel provisions during maintenance downtime.
   - Conduct a Land and Infrastructure Assessment: Before proposing a multi-service hub, assess available land, access routes, drainage, safety distances and opportunities to co-locate services within existing facilities. In settings like Cox's Bazar, where available land is below 0.5 m^2 per household, standalone hubs are unlikely to be widely replicable.

4. **Leverage Carbon and Results-Based Financing (RBF)**
   - Deploy Digital IoT Monitoring: Leverage the centralised nature of communal hubs to embed IoT gas flow meters and smart electricity circuits directly into the supply network.
   - Tap into Carbon Markets & RBF: Utilise tamper-proof dMRV data to unlock carbon financing and Results-Based Financing (RBF). Reinvest carbon yields and RBF payouts directly back into the facility to cross-subsidise fuel costs, ensuring the communal hub remains the most affordable, accessible, and high-integrity clean energy option in the camp.
   - Coordinate Carbon Accounting Across the Cooking-Energy Portfolio: In a case like Cox's Bazar, where the LPG carbon credit registration programme is ongoing, other partners doing related

work in the camps should engage early with the LPG carbon-credit programme under development before establishing separate crediting arrangements for communal kitchens or other diversification pilots. Explore a combined or nested accounting framework covering different clean cooking alternatives, with clear programme boundaries, data-sharing arrangements, ownership of emission reductions and safeguards against double counting. Carbon and RBF revenues should support the overall affordability and resilience of clean cooking services rather than individual technologies in isolation.

By treating the communal kitchen as a specialised, multi-service community resource rather than a blanket administrative mandate, the humanitarian sector can protect the dignity and autonomy of displaced populations while advancing universal clean energy access. The path forward lies in modular, co-designed energy hubs that respect personal preferences while providing the modern, climate-resilient infrastructure required for a sustainable response.

Conclusions

The evidence reviewed across Bangladesh, Uganda, Rwanda and Kenya, with supporting evidence from Greece, demonstrates that shared and communal kitchens are not universally appropriate substitutes for household cooking. Although centralised facilities can lower infrastructure costs, support access to cleaner fuels and reduce fire and indoor air-pollution risks, their success depends on more than technical and economic efficiency. Cooking practices are closely connected to household autonomy, dignity, privacy, cultural identity and caregiving responsibilities. Models that overlook these factors often experience low uptake, conflict over access, poor maintenance and eventual abandonment, even where the cooking technology itself performs well.

Communal kitchens are therefore most appropriate when designed as voluntary, complementary and context-specific services. They may offer particular value in reception and transit centres, institutions, areas where cooking inside shelters is unsafe or prohibited, and as fallback facilities during household fuel shortages. In such settings, their effectiveness depends on meaningful user participation, flexible cooking arrangements, accessible and protection-sensitive locations, female-led governance, adequate land and infrastructure, and sustained budgets for operation, cleaning and maintenance. Where feasible, integration with refrigeration, productive-use services and livelihood opportunities may strengthen their value, although multi-service hub models must be adapted to local affordability, regulatory and spatial constraints.

Technology selection must similarly respond to the conditions of each setting. The experience in Cox's Bazar illustrates that existing household-facing biogas kitchens may retain limited value as fallback services, but their low contribution to household energy demand and persistent operational and acceptance barriers do not support widespread replication. Future biogas investment may be better suited to institutions with predictable demand, controlled feedstock and dedicated management. Conversely, grid-connected communal e-cooking should remain under consideration where it offers a cost-effective pathway, even if regulatory engagement is required to unlock access. These findings reinforce the need to assess each fuel and delivery model independently rather than treating all communal cooking systems as a single intervention type.

Finally, long-term sustainability will require coordinated financing and monitoring. Carbon finance and RBF mechanisms may help support infrastructure and operating costs, but they should complement rather than replace upfront grant or concessional funding. Where several cooking-energy interventions operate in the same location, their carbon-accounting arrangements must be coordinated to avoid overlapping claims and ensure transparent benefit sharing. Overall, the strongest pathway is not the blanket expansion or rejection of communal kitchens, but their careful deployment within a diversified clean cooking strategy that protects household choice while providing reliable, affordable and well-managed alternatives where shared facilities offer clear and locally demonstrated value.

About the GPA

The Global Platform for Action (GPA) on Sustainable Energy in Displacement Settings is a global initiative aiming to ensure SDG 7—access to affordable, reliable, sustainable, and modern energy for all—is inclusive of humanitarian and displacement contexts. The GPA Secretariat convenes a global network of over 100 partners working collectively toward this shared objective. It is financially supported by the IKEA Foundation and the European Union's Civil Protection and Humanitarian Aid Operations (DG ECHO), and receives in-kind support from NORCAP and the UK Foreign, Commonwealth & Development Office (FCDO) through the Transforming Energy Access (TEA) platform.

The GPA Impact collective members:

Co-funded by:

Supported by:

Connect with us: energy.gpa@unops.org | www.humanitarianenergy.org | www.unops.org