# A Review of Cooking Solutions for Humanitarian Settings

## A Practical Action Consulting Toolkit for the Moving Energy Initiative

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Goudoubo refugee camp in Burkina Faso, pictures taken by Arvil Gonzalez, 2015

GVEP International
PRACTICAL ACTION Consulting
NRC NORWEGIAN REFUGEE COUNCIL
UKaid from the British people
UNHCR The UN Refugee Agency
CHATHAM HOUSE The Royal Institute of International Affairs

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# Classification of cookstoves

- International cookstove standards have been developed based on laboratory tests for efficiency and emissions. A draft set of performance tiers was endorsed in 2012 through an International Workshop Agreement (IWA) that rates devices against four indicators (efficiency, indoor emissions, total emissions and safety), each along five tiers.
- Practical Action (2014) has proposed minimum levels of energy delivery to achieve modern household cooking and water heating.
- More comprehensive standards for 'modern energy access' go beyond the cooking technology to also consider convenience, cost and fuel availability: ESMAP has developed a Global Tracking Framework (GTF) for modern cooking solutions that rates access on a scale of zero to five against seven factors. Under the GTF system, the affordability and convenience of the cooking device receive as much prominence in defining a modern cooking solution as efficiency and emissions.
- A recent WHO guideline (2014) for indoor air quality concludes that significant health benefits can never be delivered by solid fuel stoves, and that these can only be achieved by a switch to cleaner energy sources such as biogas, ethanol, LPG, natural gas and electricity.
- While solid fuels may never be as clean-burning as liquid and gaseous alternatives, they will continue to dominate household cooking, making the development of better performing solid fuel systems an important intermediate priority for contexts where clean-burning alternatives are not a yet a feasible option.
- An accompanying report in the MEI series by Chatham House (2015) presents energy scenarios for the humanitarian situation in which the cooking-related emissions from refugee camp and non-camp settings under different energy mixes are compared, on a continuum from total firewood dependency to the dedicated use of LPG. The report notes that the firewood scenario remains by far the most dominant in displacement situations.

# REVIEW OF AVAILABLE COOKING SOLUTIONS

# Categorisation of available cookstoves

| | Improved | | | Clean | |
|---|---|---|---|---|---|
| | Legacy and basic ICS | Intermediate ICS | Advanced ICS | Modern fuel stoves | Renewable fuel stoves** |
| **Key features** | Small functional improvements in efficiency over baseline technologies; typically artisan manufactured. | Rocket* style designs with significantly improved fuel efficiency and moderate gains in combustion efficiency; some manufactured with high-end materials. | Fan jet or natural draft gasifiers with high fuel combustion efficiencies; may require processed pellets/briquettes. | Use fossil fuels or electricity; high fuel efficiency; very low CO & PM emissions | Energy from renewable sources |
| **Typical technologies / fuels** | • Legacy biomass & coal chimney<br>• Basic efficiency charcoal stove<br>• Basic efficiency wood stove | • Portable rocket<br>• Fixed rocket chimney<br>• Highly improved charcoal stoves | • Natural draft gasifier (Top-lit up-draught or side-loading).<br>• Fan gasifier / fan jet<br>• Char stoves | • LPG & dimethyl ether (DME)<br>• Electric / induction<br>• Natural gas | • Biogas<br>• Ethanol<br>• Methanol<br>• Solar ovens<br>• High-efficiency biomass stoves with managed fuel supply |

** A rocket stove burns small diameter wood in a combustion chamber that contains a vertical chimney*

*** The term 'renewable' is context-specific; it can equally apply to solid biomass if the source is sustainably managed*

*Source: ESMAP & GACC, 2015.*

# Cookstove design considerations

Operational and cultural factors have always played an important role in the adoption of cookstoves. Some of the design considerations *other than cost and efficiency* that need to be taken into account when developing an improved cookstove are:

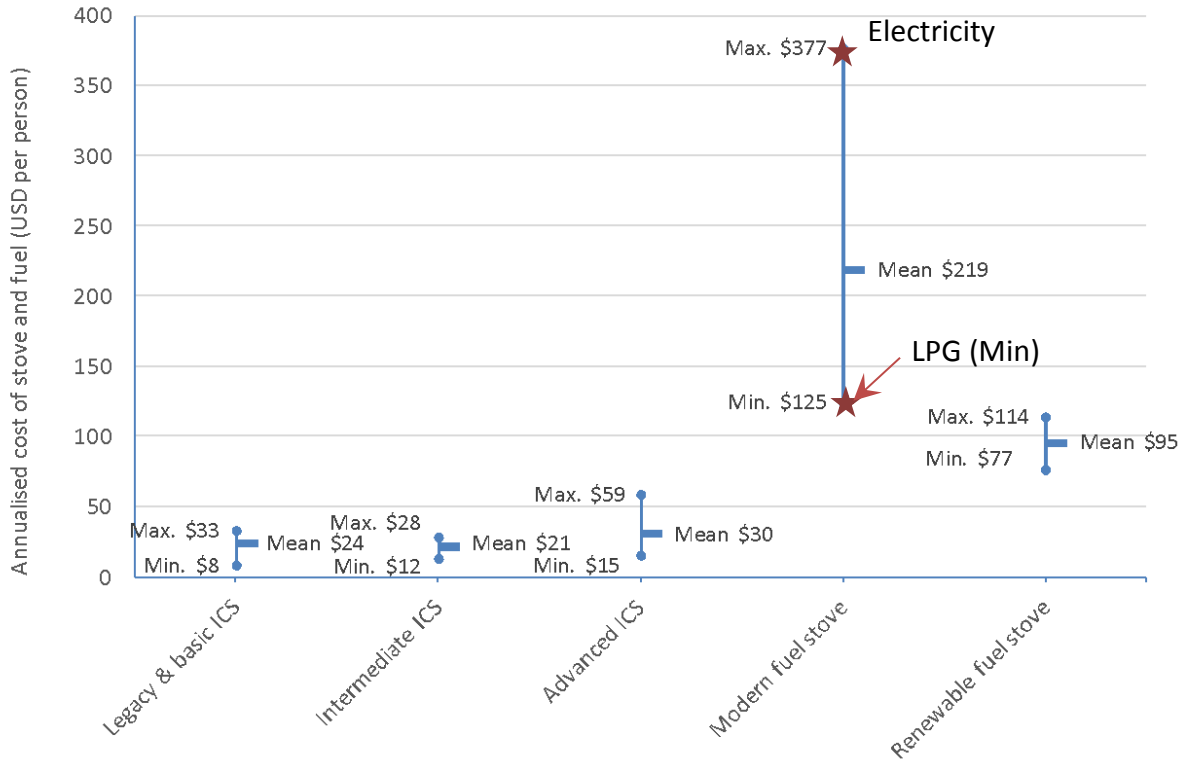
| | |
|---|---|
| **Durability** | to withstand heat, pot weight and wear and tear |
| **Stability** | to ensure safety and usability, especially for foods that require vigorous stirring |
| **Ease of lighting** | for convenience and speed |
| **Ability to use familiar fuels** | unfamiliar fuels may need special stoves, which will present additional barriers |
| **Portability** | to allow outdoor cooking depending on the season or the weather. |
| **Heat output** | where the stove may be needed for house-warming in cold weather |
| **Fit with existing utensils** | so that new pots are not needed |
| **Visual attractiveness and build quality** | so users find the stove appealing and worth investing in |
| **Clean-burning performance** | to reduce HAP (noting, however, that not all users dislike smoke as it repels insects, waterproofs thatch and ripens some foods) |

# Cookstove design considerations

Experiences from humanitarian settings and development initiatives show that it is clearly important to move beyond the technological aspects of stove performance to provide an integrated, modern cooking solution that consumers find attractive, functional, appropriate to their needs and – most importantly – a measurable improvement on the system they currently use.

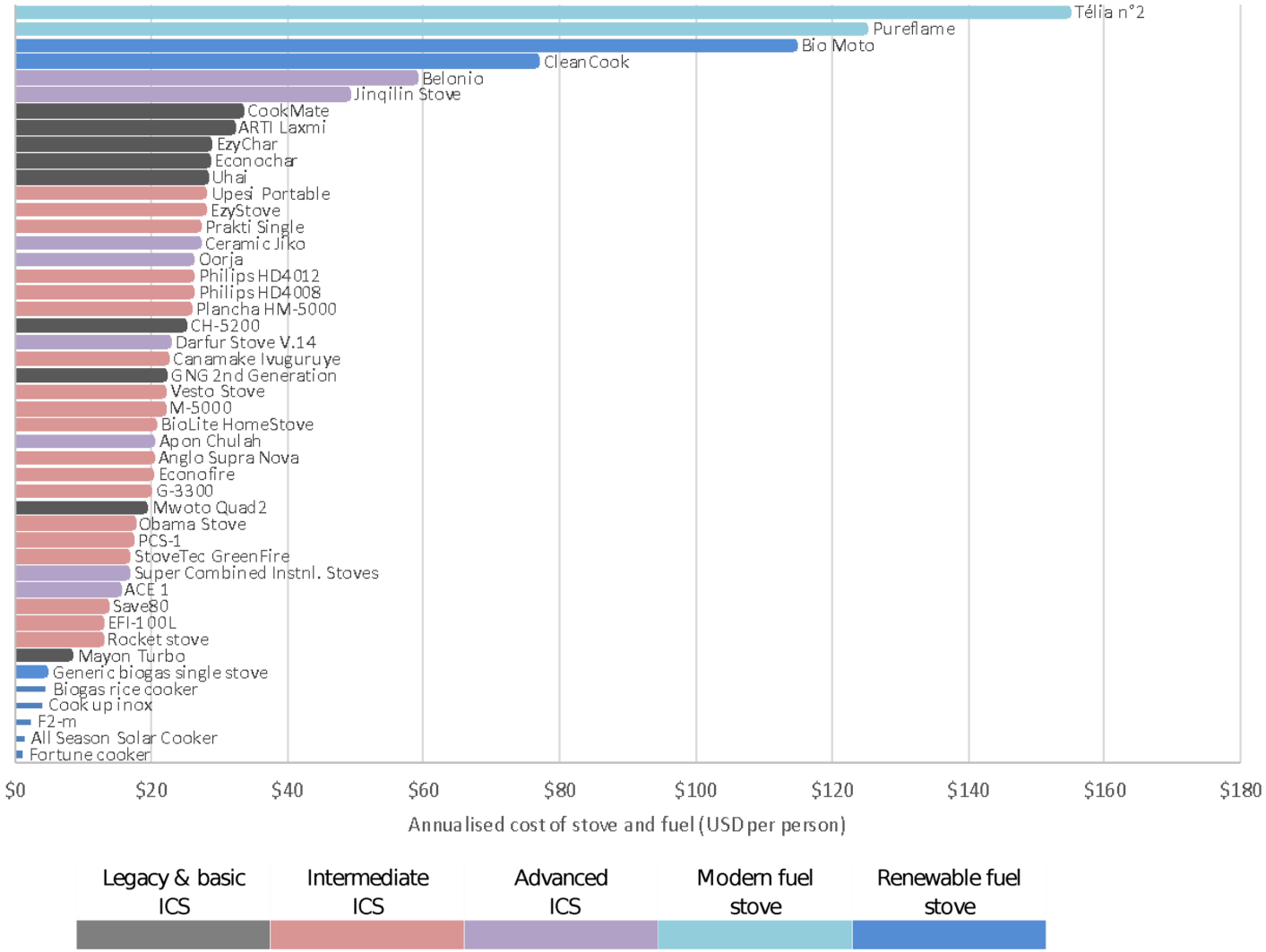
# Cooking technology costs

Based on data from the GACC stove catalogue, HEDON stove database, UNHCR reports, GIZ, USAID, Chatham House, and manufacturer websites, 47 cookstoves were reviewed against this typology . The sampled cookstoves vary widely in price, fuel type, efficiency and lifespan. One way to compare them objectively is to apply the standardised measure of total annualised cost of cooking for one person. This takes into account the purchase price of each stove, which can be annualised according to its expected lifespan, added to the cost of fuel for one year's individual cooking




*Note:*
*(i)Solar and biogas stoves, which fall under the 'renewable fuel' category, have been excluded as they are supplementary options rather than replacements.*
*(ii) This analysis doesn't take into account other relevant factors such as non-adoption, failures/breakages, drop-off in use or in performance, use as secondary/supplementary devices rather than replacements, local variations in stove and fuel prices, etc.*
*(iii) See Annex D of the report for data and methodology.*

# Cooking technology costs




The chart presents the annualised operating costs for each of the sampled stoves

*Note: excludes Prestige Induction Cooktop, with an annualised cost of $377, as this very high value would skew the chart significantly and make the lower readings difficult to interpret.*

# Cooking technology costs

Although all the values from the cost comparison need to be contextualized, the two charts suggest important aspects relevant to the promotion of modern cooking solutions, particularly in humanitarian operations:

- It costs between approximately $12 and $59 per person per year to buy and operate an intermediate or advanced cookstove (averaging $21 for the former and $30 for the latter).
- Most intermediate or advanced cooking solutions have an annual cost implication in the $25 to $30 range, while stoves for 'modern' and renewable fuels are in a higher price bracket.
- The analysis includes three institutional stoves, all in the 'intermediate' category . Their annualised cost is at the lower end of the range ($13 to $16;). Most families are nevertheless unwilling to sacrifice individual control over cooking for a mass catering alternative, and this remains an option best suited to institutions such as hospitals and schools.
- Ethanol ($95) is the cheapest amongst the clean fuel stoves (modern and renewable), followed by LPG ($138) and electricity ($377).
- The very cheapest options appear to be solar and biogas systems, but solar is only viable as a supplementary option while biogas is suitable only for institutional use, and both face significant barriers to adoption because of user resistance.
- The highest grade solutions may not be achievable without a step-change in expenditure, and the focus in many cases will therefore need to be on intermediate and advanced options.
- There are various economic factors that also need to be considered, such as the loss of natural resources from potential over-harvesting of woodfuel, medical care and lost work-days resulting from HAP-related ailments, sexual and gender-based violence against women and girls collecting firewood, and house fires started by open flames. Chatham House (2015) has begun to quantify some of these wider costs in its accompanying MEI paper *Heat, Light and Power for Refugees: Saving Lives, Reducing Costs*.

# Cookstove financing

- The public sector has long financed cookstove initiatives to generate social impact and kick-start enterprise.
- The last decade has also seen an increase in commercial financing, especially from social impact investors. A private sector approach ultimately promises to build more durable capacity that can sustain permanent cookstove supply chains.
- Market-led initiatives have struggled because they are undermined by cut-price products and services. Rather than use public funds for the direct subsidy of stoves to consumers, such funding is generally best directed towards supporting functions such as product development, market research, sales promotion and customer tracking and analysis, or to provide risk capital for credit schemes.
- In Africa, many savings and credit groups exist and can offer short-term consumer financing for cookstoves. Other credit options have been developed through commercial banks, micro-finance institutions and pay-as-you go (PAYG) schemes via mobile money systems.
- Carbon funds are also widely used to support clean cooking technologies, often to subsidise cookstoves at the point of sale. This can be disruptive to the unsubsidised private sector.

# Cookstove distribution models

Cookstove have been distributed in many different ways. This categorization (SNV, 2015) from researched cookstove marketing in Asia, Africa and Latin America, identified three distinct models employed by promoters.

| Model | Description | Advantages | Challenges |
|---|---|---|---|
| Village Level Entrepreneur (VLE) | The promoter works through micro-distributors at local level, taking advantage of their knowledge and networks to sell goods door-to-door and provide customers with advice and hands-on demonstration. The Franchise Dealer Model is a variant in which a chain of franchisees distribute standardised products, e.g. Living Goods. | · Low investment costs<br>· Entrepreneurs have direct knowledge of customers<br>· Scalability | · Difficult when product is new or unknown<br>· High financial risk<br>· Limited control and oversight<br>· Limited scope for branding or product diversification<br>· Difficult to set up consumer financing and after-sales service |
| Piggy-backing | Suppliers try to overcome the costs of 'last mile' distribution by teaming up with other delivery partners such as supermarkets, hardware stores or microfinance institutions. | · Low investment costs<br>· No need for additional infrastructure<br>· Reduced time to establish markets<br>· Network builds on prior consumer trust<br>· Scope for consumer finance | · Network actors need to be committed and engaged to the new product(s)<br>· Potentially limited market can rapidly become saturated (depending on market reach of the partner)<br>· Limited control and oversight |
| Proprietary sales network | An entirely new distribution channel is set up using the promoter's own distributors and sales team. Elements of the VLE or piggyback models may also be applied. | · Full control and oversight<br>· Avoids middlemen and their mark-ups<br>· Enhanced opportunities for branding<br>· Facilitates consumer financing and after-sales service | · Costly upfront, with high financial risk<br>· Difficult to reach customers in remote areas, given costs |

# Cookstove distribution models

Additional learning from cookstove distributors include:

- Awareness creation through mass media can be effective in reaching large audiences quickly, but one-on-one marketing is still often required to fully convince households to take up an unfamiliar technology.

- Marketing messages need to be reinforced by respected figures within the community such as health workers or teachers. Men must be included in sensitisation efforts as they are most often the decision-makers for new household purchases.

- Successful marketing focuses on direct personal benefits such as income or time-saving, rather than less tangible outcomes such as environmental protection or health improvement.

These important lessons are transferable to the humanitarian setting, where the accompanying GVEP report on *Private Sector Engagement* highlights the role commercial actors could play in alleviating challenges associated with scaling or optimising energy access, given their skills in providing appropriate, market-tested energy products and services.

# REVIEW OF AVAILABLE COOKING SOLUTIONS

## Lessons transferrable to displacement situations

- A successful cookstove programme must consider design aspects, costs of purchase and operation, financing options and promotional approaches.
- The stove design is especially important, and should consider cultural and operational factors, in addition to efficiency and emissions.
- The average annualised cost of a stove plus fuel varies from $21 per person for intermediate devices, $30 for advanced devices, $95 for ethanol stoves, $138 for gas stoves and over $300 for electric stoves. Intermediate and advanced options for solid fuels will therefore often represent the most realistic option.
- A step-up in investment is needed to move to cleaner cooking options which would meet acceptable standards of WHO health guidelines.
- Private sector investment builds durable capacity to sustain cookstove supply chains. Public funds have been most often been successful when directed towards supporting functions rather than acting as a direct product subsidy.
- Successful marketing focuses on direct personal benefits such as saved money or time, rather than less tangible outcomes such as environmental protection or health improvement.
- Cookstove promotion in more conservative communities (e.g. poor or rural) requires personal visits and one-on-one marketing, in addition to marketing via mass media.

# CLEAN COOKING IN THE HUMANITARIAN SETTING

# Experiences with cooking improvements in humanitarian settings

- The increasing sophistication and quality of cookstoves in the global market has been mirrored by developments in the humanitarian sector.
- Early interventions to promote improved cooking in displacement situations entailed supporting refugees to build their own cookstoves using local materials.
- Attempts were also made to promote alternative fuels, with mixed results.
- From the 2000s onwards, cookstove designs have been more elaborate, bringing industrial manufacturers and social enterprises into partnership with humanitarian actors. The variety of woodfuel stoves introduced to the humanitarian sector has grown enormously as a result
- New technologies have also been developed for cleaner-burning fuels

# Contrasts with non-displacement settings

- Many of the challenges and opportunities that drive the cookstoves sector in the stable, developing country context are equally relevant in displacement situations. Others are unique to the humanitarian context and require different approaches.
- As host communities and displaced populations live in the same environment, the introduction of clean, modern cooking solutions has the potential to benefit both groups.
- However, displaced people are clearly not in the same situation as non-displaced people. Cooking solutions must recognise and respond to the differences between the two populations.

# Contrasts with non-displacement settings

| Difference | Implication | Possible approaches |
|---|---|---|
| Displaced people have limited access to finance because they are not allowed to work, cannot find work or are paid less | Limited spending power restricts their ability to buy better cookstoves and fuel (e.g. in south Sudan, refugees were selling firewood and charcoal for cash, but not buying efficient stoves because of cost) | · Investigate bulk stove purchase to cut costs, perhaps providing credit to incentivise commercial distributors to set up nearby<br>· Distribute vouchers to help families acquire basic goods<br>· Explore carbon finance to reduce stove costs |
| Displaced people may be restricted from accessing local energy sources by host communities or government regulations | Reliance on purchase of fuel or risky self-sourcing affects both the affordability and cost of fuel. | · Establish or strengthen community management structures that permit access to resources within a controlled framework (specific days, locations and harvesting methods) |
| Displaced people may feel dependent on humanitarian agencies for meeting basic needs. Their feeling of dependency may be perpetuated by hand-outs | Dependency means that solutions are constrained by humanitarian budgets. This results in low prioritisation of modern cooking. Far from being a burden, refugees have the potential to create diverse economic opportunities (Betts et al, 2014). | · Encourage commercial activities by displaced people and interaction with the markets and economy of the host country<br>· Re-assess cooking in the humanitarian context as an integrated package involving food, fuel and cooking appliances, with budgets to match |
| Encampment policies that prevent displaced people from moving to procure materials and merchandise, or to sell their products, undermine commercial and productive activities | Movement controls further increase dependence on external support and reduce opportunities for self-reliance | · Engage in high-level dialogue with host governments to highlight missed opportunities arising from encampment policies and tight controls on movement |
| Local people and host governments resent efforts that see displaced people receiving better stoves and fuels than host communities | Where local people use solid fuel in inefficient appliances, it may be politically difficult to introduce improvements for the displaced population | · Develop integrated programmes supporting both displaced people and host communities. Avoid high-tech solutions unless they are equally accessible to local people. |
| Relief agencies seem reluctant to develop market dynamics in their projects (Bellanca, 2014). Perhaps recognising displaced people as a potential resource and market opportunity indicates an unwelcome sense of permanence. | Without market dynamics, humanitarian operations will remain dependent on donations and subsidies, which are unsustainable | · Market led solutions such as PAYG, micro-enterprise and outsourcing labour from camps offer a stronger basis for sustainability (Bellanca, 2014) |

# Policy and support

- Despite the clear differences between the humanitarian context and the situation in stable communities, it is important to avoid treating the two populations dramatically differently
- This risks creating tensions and accusations of inequitable treatment
- It is therefore important, where possible, to integrate humanitarian situations in ongoing national processes for the promotion of clean cooking solutions
- One example of this would be to extend the Global Tracking Framework promoted by SE4All also to cover cooking fuel and technology usage in humanitarian settings

# Policy and support

- Expanding ongoing clean cooking programmes to humanitarian settings may be appropriate and realistic in countries with a well developed clean cooking sector.
- If on the other hand, the host country is characterised by inefficient, polluting cooking systems and has no significant clean cooking initiatives underway, then it would be incongruous and unsustainable to promote very different approaches in the humanitarian context.
- The cooking priorities of displaced people may also not correspond with those of the humanitarian agencies who support them. Displaced people are less likely to see emissions as a significant problem, for example, so the difference for them between an 'improved' stove and a 'clean' stove may be irrelevant.
- Lastly, while a humanitarian agency may focus on particular stove technologies, the concerns of displaced people are likely to be much broader and will encompass the integrated components of the food, fuel and cooking systems.

# CLEAN COOKING IN THE HUMANITARIAN SETTING

## Lessons from cookstove experiences in humanitarian operations

- The increasing sophistication and quality of cookstoves in the global market has been mirrored by developments in the humanitarian sector.
- Many of the challenges faced in stable communities and displacement situations are similar, and it is important to transfer best practice where possible, building particularly on experiences from the private sector around demand-creation and commercial sustainability.
- However, some challenges and opportunities are unique to the humanitarian context and require different approaches. Key differences include limits on access to finance, controls on movement and resource use, a governance dichotomy between displaced people and hosts, and a dependency culture that inhibits self-reliance and constrains market-based solutions.
- Such differences may require new approaches from the humanitarian community and host governments, particularly in facilitating engagement with local and national economies.

# IDENTIFYING APPROPRIATE SOLUTIONS FOR HUMANITARIAN SITUATIONS

# Frameworks and delivery models

- A number of agencies have developed tools for carrying out situation-assessments around cooking and energy-use.
- A prominent example are the Safe Access to Fuel and Energy (SAFE) Strategies adopted by leading humanitarian agencies in the course of the last years.
- Energy Delivery Models for humanitarian situations have been proposed by the accompanying GVEP report for MEI on *Private Sector Engagement*
- The importance of integrating cooking solutions with the markets and processes that already exist within the host country and region has been highlighted.

# Market systems for cooking solutions in displacement situations

- A Market-Systems framework for analysing how energy services and goods are provided within the larger 'ecosystem' of a market has been developed by the European Union Energy Initiative Partnership Dialogue Facility (EUEI-PDF) and Practical Action (2015).
- This tool for understanding energy market systems and designing relevant interventions has been adapted for use in displacement situations. It is hoped that it will inform the design of better and more sustainable cooking solutions that link to existing national markets for fuels and cookstoves.
- The first stage entails the mapping of the energy market system to identify relevant actors, their roles and interactions. The second stage is to identify the main challenges and opportunities within each level, and design supporting interventions to overcome them.

# Market systems for cooking solutions in displacement situations

**Level 1** includes all the actors involved in the market chain (from manufacturers to consumers), as summarised in the examples in this table.

| Cooking technology | Market chain category | Manufacturing | Distribution | Retail (mostly donation in refugee camps) | Consumers (refugees / host communities) |
|---|---|---|---|---|---|
| Improved cookstoves | International manufacturer | Out of country | Import and / or local stove assembly | Local retailers<br>CBOs<br>NGOs | · Households<br>· Enterprises<br>· Institutions |
| | Local manufacturer – centralised | In-country | n/a | | |
| | Local manufacturer – decentralised | In-country, different areas | Stove distributors | | |
| LPG | LPG – international / regional / country | LPG stove manufacturer (often out of country) | LPG stove distribution (in country) | Local retailers | · Households<br>· Enterprises<br>· Institutions |
| | | LPG fuel producer (often out of country) | LPG fuel packaging (in country) | | |
| Biogas | Biogas supplier (parts) (international) | | Companies may have regional/ local offices | Local masons/ technical experts | · Households<br>· Institutions |
| | Biogas aggregator companies (local) | Biogas installation companies | Companies may have regional/ local offices | Local masons/ technical experts | |

Examples of barriers and potential interventions at the market chain level:

| Stage 1 | Barriers | Interventions |
|---|---|---|
| **Cookstoves** | ▪ Poor quality of available stoves<br>▪ Lack of effective business models for distribution and retail in humanitarian setting, where ability to pay is low<br>▪ Low prioritisation by displaced people of improved cooking technologies | ▪ Tendering for higher grade devices<br>▪ Technical and financial assistance to develop distribution models suited to the humanitarian setting (e.g. vouchers, stoves for work, stoves as part of food provision)<br>▪ Technical and financial assistance to raise awareness, create campaigns |
| **LPG/ Biogas** | ▪ Lack of effective business models for distribution and retail of biogas stoves and LPG<br>▪ Low demand for biogas systems / LPG from displaced populations | ▪ Financial assistance to LPG fuel and stove companies to develop supply chain<br>▪ Voucher scheme for displaced population<br>▪ Technical assistance to raise awareness to increase demand<br>▪ Innovative financing to open up market |

# Market systems for cooking solutions in displacement situations

**Level 2** – Inputs, Services & Finance**:**

- **Inputs:** The most important input for *cookstoves* is invariably the energy source with which to fuel it. Labour and materials for manufacturing stoves at the right price is also needed.
- **Services:** Services for *cookstoves* include testing facilities and know-how for marketing, R&D and after-sales support. It is important to find out whether there are sales agents or manufacturers already offering these services.
- **Finance:** Each actor along the market chain needs funding in order to deliver quality products and services. Financing for fuels and stoves in humanitarian settings often faces a challenge in that there is a lack support for direct cash provision to displaced populations. For displaced people living with host populations, consumer financing may be an option.

Examples of barriers and possible interventions at Level 2:

| Barriers | Interventions |
|---|---|
| Lack of sustainable and efficient supply of biomass (local entrepreneurs and farmers) | Technical and financial assistance to biomass producers (wood and charcoal) to allow sustainable production including efficient transport through formal networks |
| Low access to financial services for stove producers / LPG suppliers / biogas installers | Support to financial service companies for developing financial products for energy companies, potentially seed financing such as guarantees, marketing support to entrepreneurs |
| Lack of financial assistance available to consumers | Design of assistance packages for displaced populations – cash vouchers, different sizes for LPG cylinders etc. |

# Market Systems for cooking solutions in displacement situations

**Level 3** requires analysis of the **enabling environment**, which establishes the conditions in which the market chain operates, including political, regulatory, social, cultural, financial and economic factors

Examples of barriers and possible interventions for Level 3:

| Barriers | Interventions |
|---|---|
| Lack of clear household cooking component in national energy policies may indicate weak establishment of markets | More support may be needed to ensure supply chains are established in humanitarian settings (financing, logistics etc.) |
| Omission of displaced people and refugee camps from laws, regulations and mainstream governance, including census counts | Dialogue with host government to extend national laws, institutions and processes to encompass displaced populations, acknowledging their likely longevity |
| Cooking practices of displaced populations are inconsistent with improved or clean cookstoves and fuels | Raise awareness, provide appropriate alternative solutions, support marketing for entrepreneurs/ market chain |

- The **Market System Mapping** methodology can be used in the humanitarian setting to understand the dynamics of the external environment and design interventions accordingly.
- Analysing the socio-cultural influences of using particular cooking technologies and fuels, the delivery market chain and the various supporting services applicable can enable those interventions to be designed more sustainably and appropriately for the needs of the displaced population and impacted communities.
- Mitigation measures such as increased budgets for raising awareness, subsidies in the delivery chain for clean cooking technology interventions or setting up refuelling stations or voucher systems for stoves and fuel, are examples that could become part of an appropriate intervention package.

# CONCLUSION

# Conclusion

- Cooking is central to human survival and family wellbeing, and will continue to be an integral element in any context where the mass displacement of people is taking place.
- If cooking is neglected by the humanitarian community, then the default option for displaced populations is likely to be unsustainably sourced solid fuels that are burned in inefficient, unhealthy appliances or open fires, with negative impacts on their health, wellbeing and security.
- Clean, modern cooking solutions available from the vibrant international cookstoves sector have the potential to deliver positive benefits for displaced people and the wider economy.
- This requires a shift in approach that may, in part, need higher budgets. The annual cost of clean, modern, efficient cooking has been estimated in this report at a cost of around $30 per person with advanced solid fuel stoves costing up to $138 per person for modern fuels (LPG), though these prices could drop if a more consistent and consolidated approach promoting modern cooking was taken across humanitarian operations.
- Cleaner cooking options which would meet acceptable standards of WHO health guidelines can be pushed as complementary solutions (solar and biogas) or as primary cooking options (ethanol or LPG). These would, however, would require high investments in countries where the fuel supply infrastructure is not in place.
- A new perspective requires the integration of humanitarian operations and displaced people into mainstream development policies and into respective national economies, minimising dependency and isolation.
- The preferable alternative is to include displaced people in local and regional economies and energy markets, to build upon and extend national clean cooking initiatives to cover camps and settlements where displaced people live, to capitalise on their skills and labour to energise local economies, and to promote clean cooking solutions among both displaced people and host communities with equal commitment.
- As far as possible, private sector approaches should be transferred to the displacement setting, with displaced people empowered to become economically productive consumers, limiting subsidies and donations that are ultimately not sustainable.

# Conclusion

Key considerations for the introduction of integrated, modern cooking solutions in humanitarian operations are summarised in this diagram.

# Thank you

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