

IRAQ: Cooking Stoves Information Note

v01

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This document aims to provide information to agencies delivering cooking stoves, both kerosene and butane or propane, to conflict-affected communities in camps and out-of-camp situations in Iraq to help preserve their health, safety and well-being. Different geographical areas and particular local situations may require different solutions to ensure that the cooking stove needs are met sufficiently. It is still essential to ensure that the durability and quality of selected cooking stoves meet the needs adequately, are fit for purpose, and that the selected fuel type is easily available locally. The Iraq Shelter Cluster strongly recommends agencies accompany distributions with clear guidance and/or training to ensure the safe and proper usage of the cooking stoves. Prior consultation and approval for distributions from local authorities and communities, as well as coordination with other humanitarian actors are highly recommended. The information below has been compiled from the generous input provided by a variety of shelter cluster partners.

Introduction

While in the US or in Europe kerosene cooking stoves (and heaters) are considered almost obsolete and “Liquefied Petroleum Gas” (LPG, propane/butane) stoves are used almost exclusively largely due to the fact that they burn much cleaner and require less maintenance, in Iraq the choice is not so simple due to a verity of factors. The main factor is the availability of the fuel type in particular locations since this varies considerably due to distribution networks as well as government and military regulations. For example, the Kurdistan Region Government (KRG) recently imposed restrictions on the export of kerosene purchased in KRG due to perceived shortages, while some of the military forces make it difficult to take butane gas cylinders across check points. This is since the cylinders can relatively easily be used in vehicle based improvised explosive devices (VBIED).

Below is a brief introduction to both kerosene and LPG and a table that compares the fuel types across several areas.

Kerosene

Kerosene, also known as paraffin, lamp oil and coal oil, is a combustible hydrocarbon liquid that is derived from petroleum and commonly used as a cooking and lighting fuel in industry and households. To prevent confusion between kerosene and the much more flammable and volatile gasoline, some jurisdictions regulate markings or colourings for containers used to store or dispense kerosene.

Liquefied Petroleum Gas

Liquefied Petroleum Gas (LPG) or Liquid Petroleum Gas, including butane and propane, are flammable mixtures of hydrocarbon gases used for heating or cooking among other uses. LPG comes from natural gas processing and oil refining and is first isolated, then liquefied through pressurisation, and stored in pressure vessels (gas cylinders).

Cooking Stove Type Fuel Type	Kerosene	LPG (Butane/Propane)
	https://en.wikipedia.org/wiki/Kerosene	https://en.wikipedia.org/wiki/Butane
Energy content (kWh per litre)	9.8 http://www.nottenergy.com/energy_cost_comparison	7.97 http://www.nottenergy.com/energy_cost_comparison
CO ₂ emissions (kg of CO ₂ per kWh)	0.296 http://www.nottenergy.com/energy_cost_comparison	0.242 http://www.nottenergy.com/energy_cost_comparison
Cost of stove in Iraq (Source: UNHCR)	Approximately USD 32.00	Approximately USD 60.00
Stove maintenance	Regular maintenance is required	Minimal maintenance is required
Fuel cost in Iraq (Gov. official fuel price)	150 IQD/L, but will vary depending on location	<ul style="list-style-type: none"> • 330 IQD/Kg, but will vary depending on location • New cylinder with gas is 25,000 IQD • Refill/exchange of cylinder is 7,000 IQD
Fuel storage	Relatively easy in barrels or jerry cans	Heavy pressure vessels (gas cylinders)
Fuel Availability	<ul style="list-style-type: none"> • Generally easily available, but depends on the area and associated logistical constraints • Possibly free MoMD distributions to IDPs 	<ul style="list-style-type: none"> • Generally available, but depends on the area and associated logistical constraints. • Gas stoves comes with a 2 kg bottle, making it instantly usable in settings like Sinjar, where kerosene is sometimes impossible to get. It is,

		however, considered a “one-shot” throwaway item as fuel replenishment is extremely difficult.
Fuel uses	Heating and cooking	Mainly used for cooking, but heating appliances are available
Fuel amount used	Standard stove should use around .3 litres per hour	Butane has 12% more energy than Propane per volume
Boiling/flash point	<ul style="list-style-type: none"> • 46.0 °C flash point 	<ul style="list-style-type: none"> • -104 °C flash point • Butane needs at least 0 degrees Celsius to be used with a stove as it needs to be in a gaseous state (not liquid). Propane boiling point is lower at around minus 41 degrees Celsius
Fuel Safety	<ul style="list-style-type: none"> • High flashpoint • If mixed with gasoline it becomes highly explosive • Clearly mark jerry cans: “Kerosene only” • Toxic if inhaled (carbon monoxide) or ingested • Ventilation is a must • Irritating odour, sooty smoke 	<ul style="list-style-type: none"> • Pressurised gas cylinder = explosion risk • Toxic if inhaled • Usually has odour added to indicate gas leak or low content • Require ventilation
Fuel Storage	<ul style="list-style-type: none"> • Kerosene barrels shouldn’t be stacked higher than 3 metres. In case of fire, use foam/powder or water vapour. Using water directly can cause explosion. Risk of electrostatic ignition if stored 	<ul style="list-style-type: none"> • Special care must be taken with the storage of kits containing gas cookers. They come with a 2kg bottle, and 2000 kits for an example means a

	<p>inside in large quantities. Avoid storing kerosene in basements or underground facilities, bunkers, etc.</p>	<p>concentration of more than 4 tons of flammable gas.</p> <ul style="list-style-type: none"> • The bottles should be kept isolated from other items (preferably outside or in a room with industrial grade ventilation), storage facilities clearly marked with type and amount of gas (to warn firefighters and first responders), and care exercised with handling of the boxes (loaders like to throw them, and a jolt can loosen the safety valves enough to cause leakages).
Fuel Environmental impact (emissions)	<ul style="list-style-type: none"> • High emissions, especially if not properly maintained • Spilled fuel evaporates slowly 	<ul style="list-style-type: none"> • Burns almost clean • Canister disposal if throw away canisters are used
Other advantages	<ul style="list-style-type: none"> • The Kerosene is a probably the safer solution when heating in harsh conditions like Iraq • More sustainable due to subsidization • Government preference 	<ul style="list-style-type: none"> • High heat output • Can be useful in remote locations with throw away containers for short term solution where kerosene is not available
Other disadvantages	<ul style="list-style-type: none"> • Drum disposal • Possibility of fuel spills – ground pollution • Possibility of unintended fire is high • Indoor pollution can become a gender/child protection issue 	<ul style="list-style-type: none"> • Usually higher cost (especially when considering the subsidized/free fuel from MoMD) • Needs replenishment strategy which can be logistically challenging and expensive • ISF/military forces dislike due to possibility of being weaponized

	<ul style="list-style-type: none"> • Import of kerosene is a source of political dispute with Iraqi Government imposing regulations on where kerosene can be imported from or to. For Mosul, its likely to have to be imported from Baghdad via the Tikrit supply line, making it costly and logistically challenging 	
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The following precautions are recommended when using any kerosene or gas stove/heater:

- Avoid using older models that do not have built in safety systems (like electric starters)
- Never refuel a stove/heater inside the tent/home. Fill the tank outdoors, away from combustible materials, and only after the heater has been turned off and allowed to cool
- Do not fill the fuel kerosene stove/heater tank above the “full” mark. The space above the “full” mark is to allow the fuel to expand without causing leakage when the heater is operated
- Operate the stove/heater in a tent/room with a door/window/vent slightly open to allow ventilation
- Always operate your heater according to the manufacturer’s instructions
- Do not go to sleep for the night with the heater on
- Do not use regular gasoline or a mixture in a kerosene heater
- There have been several incidents of children mistaking unmarked kerosene cans with water and getting poisoned. Cans should be clearly marked by the vendor. IOM also offers stickers (or templates for non-ECHO partners) to mark the cans.

WHO have some remarks on the issue of indoor heating, seen from a Health perspective: <http://www.who.int/mediacentre/news/releases/2014/indoor-air-pollution/en/>

In summary, the general consensus emerging from the received inputs is:

While LPG gas is a better solution if managed correctly from an environmental, health, and protection standpoint, the more sustainable solution appears to be kerosene for most areas in the current circumstances. If LPG gas stoves are distributed they need to be accompanied by a thorough market assessment that ensures continued fuel availability to the beneficiaries or a strong fuel replacement / voucher system to make the distribution sustainable.

Additional information on household and shelter construction support items, including mobile and basic Emergency Shelter Kits (MESK and BESK), Emergency Sealing-Off Kits (ESOK), as well as technical guidance on 'Non Food Items' (NFI) and Fire Safety information can be found on the Iraq Shelter Cluster website (<https://www.sheltercluster.org/response/iraq>).