Collecting energy data

This guidance is meant to provide an overview of key concepts, terms and typologies used when collecting energy data. It aims to provide basic material for field officers and enumerator training for energy-related assessments. It complements other resource materials developed by IMPACT, especially the MSNA indicator bank energy modules.

This guidance was produced by IMPACT jointly with the Global Platform for Action for Sustainable Energy in Displacement Settings (Homepage | Global Platform for Action | Global Platform for Action (humanitarianenergy.org)).

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Key concept – clean energy

It is important to understand that the concept of clean energy sources as understood by energy practitioners in humanitarian and development sectors focuses mostly on household air pollution exposure and the impact of such exposure on health outcomes.

In 2014, WHO published a first set of guidelines on energy use in the home: "Guidelines for Indoor Air Quality: Household Fuel Combustion".[1] The guidelines provide recommendations on emission rate targets for particulate matter and carbon monoxide emission, as well as on specific fuels and devices that are clean, safe, and pose minimal risks to health.

According to WHO, clean fuels and technologies include:

- For cooking: solar, electric, liquid petroleum gas (LPG) or cooking gas, natural gas, biogas, and alcohol / ethanol.
- For space heating: central heating, solar air heaters, electricity, natural gas, LPG / cooking gas, biogas, and alcohol / ethanol.
- For lighting: Electricity (including solar panels), solar-powered lantern or flashlight, rechargeable flashlight, mobile, torch, or lantern, battery powered flashlight, torch or lantern, biogas lamp, and LPG lamp.

The location of the appliance and proper ventilation (e.g. the presence of a chimney or a simple ventilation fan) while heating and cooking can help reduce the exposure to pollutants. However, these considerations do not affect the classification of the fuel / technology as clean or not clean. A cooking or heating solution is only categorized as clean if the emissions will be safe for health in all conditions and locations.

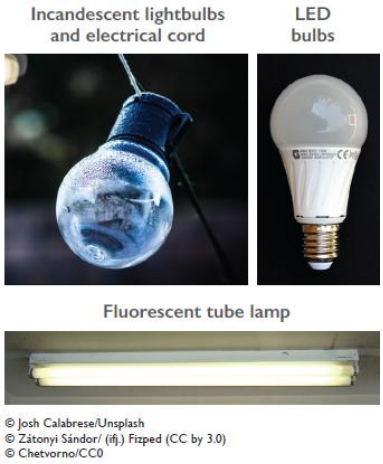
/!\ Clean energy sources refer to sources of energy that are not harmful to the household, rather than to the environment. Clean energy is thus more focused on public health than it is on the environment, although some indicators can give an idea about environmental depletion as a result of the use of specific energy sources.

[1] WHO Guidelines for indoor air quality: Household fuel combustion

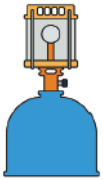
Typology of lighting sources

The table below describes the typical sources of lighting with associated pictures and classification as clean / not clean.

Table 1 - Typology of lighting sources

Term	Description[2]	Picture (as example)	Clean / not clean
No light source at all	The household does not possess any of the lighting means described below.	NA	NA
Electricity (including solar panels)	Electricity is a form of energy that is carried through wires. Electricity can be generated outside of the home and distributed to the home through a grid or micro-grid. It can also be generated at home by, for example, a fixed or portable generator or a solar home system. The types of light bulbs used with electricity include incandescent bulbs, halogen incandescent bulbs, fluorescent bulbs, and light emitting diodes (LEDs).		Clean
Solar-powered lantern or flashlight	A solar lantern uses photovoltaic cells and rechargeable batteries to provide power for a single light, and, in some cases, phone charging. Solar lanterns differ from solar home systems in that they are portable.		Clean

[2] Descriptions and pictures are taken from the LSMS Guidebook "Measuring Energy Access – A guide to collecting data using the core questions on household energy use", 2021. Available here: Measuring Energy Access: a Guide to Collecting Data Using the Core Questions on Household Energy Use (worldbank.org)

Rechargeable flashlight, mobile, torch or lantern	A flashlight, or torch, is a handheld, portable electronic device. The light source is usually a small incandescent light bulb or light-emitting diode (LED). Flashlights in this category can be recharged either by a hand crank or other external power source such as electricity. They may use batteries for power, but these are only rechargeable and not disposable.	Rechargeable crank flashlight  © Robert J. Fluegel/U.S. Navy  © Darekm135 (CC by SA 3.0)	Clean
Battery (dry-cells) powered flashlight, torch or lantern	A flashlight is a handheld, portable electronic device. The light source is usually a small incandescent light bulb or LED. Flashlights in this category are powered by one or more disposable batteries.	Battery-powered flashlight/torch  © Rfc1394 at English Wikipedia	Clean
Biogas / LPG lamp	A biogas lamp is an appliance that uses biogas to produce light. Most biogas lamps require a mantle or cloth-like material containing mineral elements, to provide light via incandescence. An LPG lamp uses liquified petroleum gas (LPG) or cooking gas to produce light. The fuel is supplied from a pressurized canister attached to the lamp.	Biogas lamp:  © SuSanA Secretariat LPG lamp:  © Konovalov Pavel/AdobeStock	Clean
Gasoline / kerosene / paraffin / oil lamp	These types of lamp use gasoline (diesel), kerosene, paraffin or oil to produce light. They're not necessarily similar but they fit in the same category of products and are grouped here for simplification purposes. Gasoline is a transparent, petroleum derived liquid used mainly as fuel for internal combustion engines. Some gasoline	Gasoline lamp:  © Eddie Willers/Public Domain	Not clean

	contains varied amounts of ethanol as an alternative fuel for economic or environmental reasons. Kerosene is a product of crude oil, and mainly consists of a mixture of hydrocarbons. Kerosene is a colorless liquid, although it can be yellow over time. Lamp oil is a liquid fuel that burns with less odor than kerosene. A wick is usually used to draw the fuel from the reservoir to the flame.	Kerosene lamp with wick, made from a tin can  © Steve Terrill/ AFP/Getty Images Kerosene lamp with wick (hurricane lamp)  © Jordan Davis/Unsplash © Amber Wolfe/Unsplash © Olga Ernst (CC BY-SA 4.0) Traditional oil lamp  © Charu Chaturvedi/Unsplash	
Candle	A candle is made up of an ignitable wick embedded in wax or another flammable solid substance, that provides light.	 © Christian Wiedi/ Unsplash	Not clean
Open fire / three-stone stove	These are similar options. Open fire is not contained in an oven or stove, it is exposed to air on at least three sides. Stones are usually positioned to support the pot, or a circle of stones is placed besides the fire itself to keep the fire from spreading into the environment and to keep wind away from the fire.	Three-stone stove  © Zoriah Miller/Dollar Street Open fire  © Golam Op/ Unsplash	Not clean

Typology of cooking stoves and fuels

Cooking stoves

For cooking stoves descriptions and pictures, please refer to: Measuring Energy Access: a Guide to Collecting Data Using the Core Questions on Household Energy Use (worldbank.org), pages 56-59

In addition to the descriptions and picture available on the above link, the table below provides a classification of clean vs. not clean cook stoves.

Table 2 - clean vs. not clean cooking stoves

Cook stove type	Clean / not clean
Solar thermal cooker (thermal energy, not solar panels)	Clean
Electric stove or appliance (hot plate, coil, induction plate, pressure cooker, rice cooker, etc.)	Clean
Biogas / Gas / LPG / cooking gas stove	Clean
Clay / Mud / Brick cookstove	Not clean
Solid fuel stove	Depends on fuel used
Liquid fuel stove	Depends on fuel used
Moveable firepan	Not clean
Three stones stove / Open fire	Not clean
None (meals are provided / not cooking in the home)	NA

Cooking fuels

For cooking fuels description and pictures, please refer to: Measuring Energy Access: a Guide to Collecting Data Using the Core Questions on Household Energy Use (worldbank.org), pages 60-63

In addition to the descriptions and picture available on the above link, the table below provides a classification of clean vs. not clean cooking fuels.

Table 3 - clean vs. not clean cooking fuels

Cooking fuel type	Clean / not clean
Electricity	Clean
Biogas	Clean
Kerosene / Paraffin / Gasoline	Not clean
Alcohol / Ethanol	Clean
Wood	Not clean
Charcoal	Not clean
LPG	Clean
Agricultural or crop residue / grass / straw	Not clean
Animal waste / dung	Not clean
Garbage / Plastic	Not clean
Briquettes / Pellets	Not clean

Typology of electricity sources

Table 4 - Typology of electricity sources

Term	Description	
Private generator	A generator used by the household only, typically powered by diesel or gasoline. Generators can come in many sizes and power generation capacities. Sometimes known as a "genset".	 Example of a 6.5 KVA generator. Sizes could range from lower to higher depending on energy consumption/demand.
Neighborhood generator	A generator used by many households or other users in a local area and connected to the same network, typically powered by diesel or gasoline. Generators can come in many sizes and power generation capacities. Sometimes known as a "genset".	 Example of a 10 KVA generator. Sizes could range from lower to higher depending on energy consumption/demand.

Main network / grid	A connection to the national grid network. Electricity is generated by large power plants and transmitted over long distances by wires to the user. Nearby infrastructure (distribution networks, poles, overhead wires, etc.) may have been installed by the national utility company or similar entity. Connections could be official	 Example of a local distribution line which a building or household could be connected to.
Mini-grid (solar, diesel, hybrid)	A local power network typically composed of a central power generation source and a distribution network to deliver electricity to nearby consumers. It can be powered by any electricity source (solar, diesel, etc.) or more than one ("hybrid"). Mini-grids usually have batteries to store electricity. The systems vary widely in scale, serving just a few households or many hundreds.	 Example1 of a grid-tied solar mini-grid, providing power to Zaatari refugee camp, with a capacity of 12.9 MW. In refugee settings, it's likely the capacity would be smaller. 

		 Example 2 of a 50 kWp solar mini-grid powering a health clinic, ~100 solar street lights and 180 households with 2 lights and a charging port. Batteries pictured are lead acid based on local market availability and recyclability.
Solar home system (bought as a kit of battery + panel + inverter + appliances)	A household-scale system usually composed of a solar panel, a central unit (containing electronics, a battery, and potentially an inverter and payment tracking system), and appliances such as bulbs, phone charging ports/wires, or entertainment devices. Sold as a single integrated system part of a manufactured product for a consumer to buy or lease from a company.	 Example of a standard solar home system kit, sold by off-grid solar company BBOXX.
Solar home system (built and	A household-scale system usually	

assembled by someone in the household)	composed of a solar panel and a battery, connected by wires. It could be connected to appliances such as bulbs, phone charging ports/wires, or entertainment devices. Components could have been acquired separately and combined by someone, rather than bought together as part of an integrated kit from a company.	
Portable solar lantern	A small portable integrated unit composed of a light source, solar panel, battery, and sometimes phone charging ports.	
Battery	An electricity storage device which can provide power to electronic devices. It could be small (e.g. AA, D, 9-volt batteries, such as for powering handheld torches) or large (e.g. car or solar batteries for powering larger	

	appliances). It could be rechargeable (typical for larger batteries) or non-rechargeable.	
No source of electricity	No electricity is available in the household.	No electricity source observed.