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Efficient cookstoves & cooking energy for a healthier living

Frequently asked questions around cookstoves and fuels

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The document is intended for those who wish to gain an initial overview of cooking systems.

For more detailed information, we recommend our *Cooking Energy Compendium on Energypedia* and our website www.giz.de/hera,

where you will also find our latest publications and factsheets.

If you have any further questions, please contact GIZ HERA directly by sending an e-mail to hera@giz.de.

Popular Questions on Cooking Energy

Why is cooking energy still a relevant topic?

Most food is not consumed raw but needs to be cooked for human consumption, thus cooking energy is crucial for preparing meals for human survival. Worldwide, around 3 billion people rely on firewood, dung or coal to heat their meals. They mostly use traditional cookstoves, which consume a lot of energy and produce harmful emissions. This negatively affects the health and the economic situation of the families as well as the environment. Although there have been many programmes and initiatives over the last 30 years to tackle these problems, little progress has been made in terms of technologies and broader dissemination. Only recently, within approximately the last five to ten years, has a wider dissemination of improved cookstoves been achieved. This is a result of technological improvements, commercial approaches and the use of stoves that match people's needs, aspirations and economic capacity.

What is an improved cookstove?

Improved cookstoves can take many shapes: they can be made of different materials such as metal or clay; they can be portable or installed as a fixed part of a kitchen; they can have different sizes; they can use different fuels, mainly in the form of woodfuels; and they come with or without a chimney. All these stoves have one thing in common: their combustion is much more complete and efficient than traditional stoves or open fires. This means that improved cookstoves save fuel and produce less harmful emissions.

How much energy does an improved stove save?

This depends on various factors such as the baseline stove, the technology, the construction quality and the materials used. Usually, laboratory tests of improved stoves show greater savings of energy than under real life conditions as the proper use of the stove plays an important role. For stoves using fuelwood, savings of 40% to 60% per stove per household are realistic, and for institutional stoves savings as high as 80% have been measured, if used correctly. With improved charcoal stoves savings of around 30-40% compared to traditional charcoal stoves are quite common.



Why is clean / improved cooking energy so important?

Cooking on an improved stove has many advantages. It decreases the exposure of women and children to toxic smoke, thereby helping avoid respiratory diseases, and can lower household expenses on medicines. It saves energy, so less money has to be spent on fuel, and it decreases the burden on women and children for collecting firewood. Last but not least, it protects the environment by emitting less CO₂ and other climate-damaging particles and gases and requiring less or no woodfuels.

How can I distinguish a traditional from an improved/modern stove?

This is not always easy. For example, a very 'traditional' looking stove made of clay can in fact be very modern in terms of efficient combustion and lower emissions. Important is also the traditional or prevailing stove model: compared to an open fire, every stove with an appropriate combustion chamber is already an improved one. Over time, improvements in existing stoves are also quite common as technologies are developed further. Furthermore, a very modern and fancy looking stove might be very inefficient. One way to distinguish between such stove models would be to compare efficiency and emissions through stove tests.

Why do so many people still cook on open fires?

Open fires, also called 3-stone fires, have been used for centuries all around the world. They can easily be set up, fit all pot sizes, and the heat from the fire can be quickly increased or reduced. An open fire also provides warmth, light and a sense of comfort. In many cultures the 3-stone fire traditionally forms the centre of the household and often holds cultural value. Furthermore, open fires make use of firewood, agricultural residues or dung, which in rural areas are often the only available, accessible and affordable fuels for families.

How do traditional cookstoves affect the health of the cooks/families?

Traditional cookstoves and cooking practices are often very inefficient and produce high levels of pollutants such as particulate matter and carbon monoxide. In poorly ventilated kitchens, smoke inside and around the home can exceed acceptable levels for particulate matter a hundredfold. Women and children are particularly affected by this so-called indoor air pollution (IAP). Acute and chronic respiratory diseases, e.g. pneumonia, and lung cancer are very common. According to WHO, 4.3 million people per year die from exposure to household or indoor air pollution. This means, that every year smoke from traditional stoves kills more people than malaria.

What are the different types of stoves?

There is a wide range of stove types around the world due to the huge diversity of available fuels, climatic conditions and local cultural preferences. Stoves can be classified according to many different criteria, one of the most important of which is the type of fuel, for example charcoal, firewood, LPG, ethanol or plant oil. They can also be classified according to the number of pots able to be used at one time, their transportability, the existence of a chimney, or the different user groups such as households, social institutions, and enterprises.

Is there a perfect stove?

No, due to the nearly endless diversity of cooking around the world there is no 'one size fits all' solution. Different food and cooking methods, cultural habits and preferences as well as climatic conditions and available fuels determine what the best stove is for a given local setting. Even well-engineered stoves that have proven to be very efficient and clean burning in a laboratory may fail in real life conditions.

How much does an improved cookstove cost?

Stove prices vary greatly depending on the material, size, number of pot-holes, construction time, and labour and transport costs. An improved household cookstove for two pots made of local materials such as mud and constructed by a local artisan in Uganda costs around 3 €, while a similar model made of burnt bricks with a metal chimney costs up to 40 € in Peru. Simple yet efficient portable ceramic stoves can cost from 1 to 5 €. A portable metal stove made by a local producer may cost around 3 to 40 €. Prices for large institutional stoves used in school or hospital kitchens range between approximately 35 and 190 €, depending on pot size (e.g. up to 120 litres) and construction material.

Prices of imported or industrially produced improved cookstoves may depend on duties, taxes, ordered quantity and shipping costs.

Which fuels are usually used?

Fuel selection depends on factors such as availability, accessibility, cost or storage options. In rural areas, people often use fuels that are locally available and easily accessible at no or little monetary cost. These can be, for example, firewood, animal dung or agricultural residues. In periurban and urban areas people might prefer charcoal, liquefied petroleum gas (LPG) or electricity if available and affordable. However, fuel selection also depends on the cookstove used and the meal to be cooked. Very often people don't use only one single fuel and stove but rather different fuels and stoves for different purposes. In Ethiopia, for example, they may use a firewood or electric stove for baking traditional injera flatbread, which is usually made from fine, iron-rich teff flour, and use a charcoal stove for roasting coffee.

Which fuels are best?

This depends on local circumstances, which the target group is and what the goals are. Do you want to reach many people or a small defined user group with special needs? Are you looking for the cleanest burning fuel, the cheapest one, or the easiest to transport? Once an analysis has been performed of the stoves that already exist and the fuels that are available, affordable and reliable for your target group, the right improved stove type can be chosen for promotion.





Why do people not simply cook with solar energy?

On one hand, solar cookers might be too expensive or simply unavailable in rural areas. On the other hand, cultural aspects also can play a role: the sun is not always shining when people are cooking; not all traditional dishes can be prepared with solar energy; and in regions where people are accustomed to cooking inside, solar cooking might not be an option. However, where there is a lot of sunshine, the air is clear, staple foods can be prepared and no other fuels are easily available, solar cooking can be very effective. Additionally, the use of insulated baskets, also called fireless cookers or hay boxes, can supplement the use of solar cookers. Overall, experience has shown that solar energy can be a useful additional cooking energy option, but cannot replace traditional stoves and fuels completely. So, over the year on average, fuel savings amount to roughly 30%-40%.

Why don't people simply cook with electricity?

Accessibility, affordability and reliability are crucial determining factors for cooking with electricity.

In many rural, semi-urban and even urban regions, poor and even middle-income families are either not connected to the grid at all or they simply don't have the money to pay bills and buy an electrical stove. Furthermore, in many countries power cuts are quite common, making electricity an unreliable source of energy. So even people with an electrical stove still possess and use other cookstoves as backup systems in these situations.

Why are stoves still being developed and further improved?

First, as scientific knowledge progresses, stove technologies are likewise further developed taking into account new findings or even new construction materials. Second, not one stove model fits all user needs and practices all around the world. Stoves need to be adapted to local circumstances to meet people's cooking habits and objectives. In order to successfully disseminate stove models more broadly, the purchasing power of the different target groups also needs to be considered and changes in design or materials may sometimes be necessary. Third, the optimisation of production processes can result in further stove developments and improvements.

Why don't we develop one very good stove model and disseminate it all over the world?

There will never be one single cookstove model that can suit the different cooking practices all over the world, or sometimes even in one household. Some families also have a toaster, a water kettle, a coffee machine, a rice cooker and so on. Different fuels, foods, cooking habits, climatic conditions etc. require different stove types. However, the 'rocket stove principle', involving a special type of efficient combustion chamber for firewood or any woody stick-shaped fuel, is currently being used around the world with diverse types of stove models.

Popular Questions on Cooking Energy (continued)

Why don't you distribute the stoves for free to reach as many people as possible?

Experience over the last decades has shown that programmes involving massive free distribution of stoves bring no lasting impacts. Stoves given away for free do not always meet the needs of the people as someone else is deciding what is 'good' for them. Furthermore, once people get used to receiving a free stove, they might ask for or expect another stove at no cost if the first one breaks. Unless there is an organisation or government body able and willing to meet these expectations, a sustainable supply of improved cookstoves is not possible. In contrast, if people are willing to spend money on the new device, they are more likely to make proper use of it and appreciate any advantages. Over the long run, building up local cookstove markets has proven to be much more successful in sustainably meeting people's needs, while also creating job opportunities and income for artisans or stove dealers.

What motivates a person to buy a new modern and improved cookstove?

There are different reasons why people buy improved stoves and these vary greatly depending on local circumstances and awareness levels. In some regions people buy improved stoves primarily to save money on fuel or when woodfuels are scarce and difficult to obtain. In others, the most decisive factors are to reduce harmful smoke and radiated heat or to improve safety. For some people, the advantages of the improved stoves are most important, such as that they cook much quicker, are easy to handle and more convenient, or because they can heat two pots at the same time. Finally, some are just convinced by the modern and appealing look or because neighbours possess one, too.

What concerns and questions regarding improved cookstoves do users have?

The most important concern of users is: 'Will I be able to cook my regular meals in an easy and convenient way?' Other important questions concern taste, cooking time, stove and fuel handling, safety, stove maintenance and repair, and costs.

What is a fireless cooker?

A fireless cooker is an isolated container, where food is placed after a short boiling time in order to continue cooking. Since the insulated container prevents most of the heat in the food from escaping into the environment, no additional energy is needed to complete the cooking process. Using fireless cookers along with standard stoves or solar cookers can greatly reduce energy consumption. Fireless cookers are particularly suitable especially for food that does not require any stirring, e.g. potatoes, cassava or rice. Furthermore, food can be kept warm for up to 6 hours. Fireless cookers are also called heat retention bags, heat retention boxes, food warmers, hay boxes, or hot bags.

Why is acceptance of energy efficient stoves a difficult barrier?

Introducing an energy-efficient stove requires a behavioural change, especially in communities who are accustomed to a three-stone fire. This adaptation takes time. Cooking is a very personal activity that is deeply embedded in the cultural behaviour of the individual user. Customs are only changed if the user perceives advantages of the new technology over a prolonged period of time.

If the stoves really are so beneficial, why does their use not spread by itself?

When people have very little money – which is the case for the lower income groups in most developing countries – scarce financial resources are used to satisfy more pressing needs such as buying food, clothing and medicine or for paying school fees. Thus, purchasing an improved stove is not a top priority unless they see its advantages.

Does it make sense to support the use of wood stoves instead of switching to gas and other modern energies?

Although most people would prefer to change to ‘modern’ energies like gas or electricity, they often cannot afford to do so, either because they currently gather fuelwood free of charge or because the stove is too expensive. Furthermore, ‘modern’ fuels are often not available, particularly in rural areas. Worldwide, the number of people using biomass is not expected to fall until 2030. In particular the growing low-income population will remain dependent on wood, charcoal and other biomass fuels for cooking, baking or heating in the years to come. Due to factors of affordability, availability and the mere scale of the issue, woody biomass needs to be part of a realistic strategy aimed at improved cooking energy usage. Improved wood stoves offer a proven and successful technology. Furthermore, using gas as fuel could eventually lead to scarcity.

Why not subsidise the stoves and supply whole countries and regions at one time?

There are valid arguments for using subsidies to speed up dissemination but there are also important arguments against it. Perhaps the most important reason is that subsidies expire after a while and there is a danger that the whole system will collapse. This has happened in several countries. It is important to develop sustainable market mechanisms to ensure a continuous supply of improved stoves. For this to happen, a balance between demand and supply must be found. Initial subsidies are important, but they should be provided primarily for promotion, training of producers, and certification or quality control, while the stove itself should be sold without subsidy.



How can I find the most suitable stove model for a region?

If you plan to promote improved cookstoves you first need to find out which types of fuel are available and second which stove models exist in your specific area. Further considerations include the type of food cooked, prevalent cooking habits, the type and number of pots, whether cooking occurs indoors or outdoors, and the financial constraints of your target group. If the stove is to be produced locally, you need to determine the availability of materials and craftsman. If the stove or the fuel is to be imported or at least transported from another region, you will need to check possible supply chains and retailers.

Most important, you should ask potential users how their ideal stove should function and look. Once you have narrowed down your list of possible stoves, conduct a cooking test with the users to see which stove model(s) are the most acceptable to your target group.

Some examples: if the staple food is a maize porridge that needs to be stirred heavily, your stove needs to be more stable than a stove used only for simmering rice. If cooking is done outside or inside depending on weather conditions, then a portable stove will be more appropriate than a fixed one installed in the kitchen. Pots with round bottoms require other types of stoves than pots with flat bottoms. If people also use frying pans with handles besides pots, then a stove model with sunken potholes will be inappropriate. In a region with a long pottery tradition, the introduction of clay stoves might be easier than metal stoves.

Can poor people afford improved stoves? If they cannot, what can be done?

In many countries, even poor people can afford improved stoves, as there is a huge variety of such stoves and very often stove promotional programmes select those technologies that are adapted to the financial capabilities of poor families. Nevertheless, if this is not the case, there are other means of making improved stove models affordable, such as through micro financing or local savings groups. Another approach would be to subsidise the stoves, but this can have negative impacts on the sustainability of emerging stove markets.

What is the difference between the cooking situation in cities and in rural areas?

Whereas cooking in rural areas is very often done using local fuels like firewood, agricultural residues or dung, people living in cities rather prefer charcoal, gas or electricity. This is due to the availability and costs of different fuel types, transport issues, space for storage and the financial means of families. For instance, a rural family might collect firewood for free, making wood its first fuel choice. In an urban setting, a family might not be able to collect firewood and thus buys charcoal in small amounts or bigger bags depending on its financial situation. As charcoal is much easier to transport and store than wood, it is very common in many cities of developing countries. Where LPG is available and affordable, it plays an important role, too.

GIZ & Cooking Energy

What are GIZ's objectives in the field of cooking energy?

We aim to build up sustainable cookstove markets in developing countries to meet the cooking and baking needs of poor households, social institutions and small businesses in a sustainable manner while avoiding risk to people's health and the environment.

Furthermore, we want decision-makers to appreciate and consider the relevance of cooking energy for fighting poverty and hunger, health diseases and climate change.

How is GIZ accomplishing this?

We are partnering with a number of organisations and institutions in the field of cooking energy. On the international level, GIZ is a founding member of the Global Alliance for Clean Cookstoves and we work together with Energia, Energypedia, FAO, GERES, HEDON, Practical Action, SNV and others to promote the appropriate and sustainable use of cooking energy. On the regional and local levels, we are working closely with a number of governmental bodies, NGOs, research institutions and the private sector to support the dissemination of improved cookstoves.

Together with our partners we train and support local artisans in the production and marketing of efficient and clean burning cookstoves, and facilitate the development of cookstove markets. We also sensitise people to and raise awareness about the benefits that efficient and cleaner cooking offers for addressing the problems caused by traditional cooking energy.

Furthermore, we raise our governmental and local partners' awareness for the topic of cooking energy and lobby for this on the international agenda.

In which countries is GIZ active within the field of cooking energy?

In the field of cooking energy, GIZ is currently active in over 30 countries in Africa, Asia and Latin America. Africa: Ethiopia, Kenya, Uganda, Malawi, Mozambique, Burundi, Senegal, Burkina Faso, Benin, Liberia, Nigeria; Asia: Bangladesh, India, Nepal; Latin America: Bolivia, Peru, Honduras, Nicaragua; July 2015).

Please find more detailed information on cooking energy in our Cooking Energy Compendium (https://energypedia.info/wiki/GIZ_HERA_Cooking_Energy_Compendium) on energypedia and on our website www.giz.de/hera, where you will also find our publications and factsheets.



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