



# Smoke hoods:

Saving lives by reducing smoke

**PRACTICAL ACTION**  
Technology challenging poverty



## Indoor smoke is lethal

**Nearly two million people die each year as a result of inhaling lethal smoke from kitchen stoves and fires.**

Most of these deaths are a result of respiratory infections. Most victims are women and children under five.

More than three billion people worldwide depend on fuels such as wood, dung and coal to meet their basic energy needs of cooking, boiling water and heating.

Burning these fuels on rudimentary stoves or three stone fires creates a dangerous cocktail of pollutants. It is the poor who rely on the lowest grades of fuel and have the least access to clean energy.

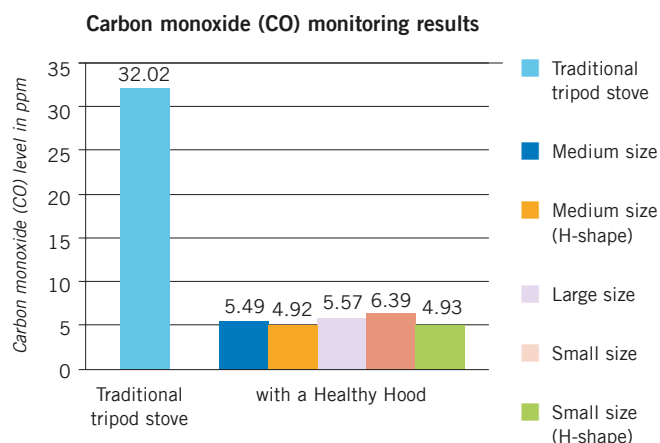
But solutions are available.

## Smoke hoods clear the air

Practical Action, an international development organisation, has worked with families who suffer from the effects of this toxic smoke. It was found that a simple smoke hood could be fitted to a fire to vent smoke out of the kitchen. This typically reduced smoke levels by 82%.

Practical Action has now joined forces with Bosch and Siemens Home Appliances Group (BSH) to create a computer-aided design (CAD) system to enable development professionals to design customised smoke hoods. In Nepal, they worked with Practical Action to test the different smoke hoods, assessing their effect on pollution levels in the home and fuel consumption.

This graph shows the reduction in carbon monoxide levels as a result of using the new Healthy Hood.



## Smoke facts

- **3 billion people** cook on open fires using wood, animal dung, crop waste or coal as fuel
- **Each year 2 million people** die prematurely from disease caused by inhaling smoke from indoor fires
- **Half the deaths** from pneumonia of children under five are attributed to indoor air pollution
- **Over 1 million people** die each year from Chronic Obstructive Pulmonary Disease (COPD), again attributed to exposure to indoor air pollution

*Statistics from the World Health Organization*

*A woman with her baby cooking on an open fire which is filling the house with lethal smoke*



# The Healthy Hoods project

**Practical Action and BSH aimed to develop an improved smoke hood and to promote the benefits of Healthy Hoods.**

The Healthy Hood was installed in 32 homes in the Gorkha district of Nepal. In this cold area it is important that a fire provides heat for the home, as well as for cooking.

The Healthy Hood is a fireplace with three sides made of sheet metal. The base consists of an iron frame which rests above the stove. The sides of the Healthy Hood can be left open to make it easy to dry meat and vegetables.

Three sides of the base are insulated with stone and mud and an area at the front is left open to make it easy to feed the fire. A bar across the front of the stove improves air flow. Smoke from the fire passes through a vertical flue and through a chimney out of the roof. If people want to smoke food to preserve it, racks can be built into the hood on which to rest the food. The current design, in steel, is for use in cold regions, and will give out enough heat to keep people warm.

Several different sizes of stove were tested for different sizes of home and different cooking and heating requirements.

**The new Healthy Hoods system has many advantages over traditional stoves:**

- 82% reduction in indoor air pollution
- 30% reduction in firewood consumption

## Case study

*“I run a teashop, which is my family’s only source of income. I spend most of my days in the kitchen making tea for my customers. Before Practical Action’s intervention, I struggled with the smoke inside my shop. I coughed a lot and my eyes would itch and water all the time.*



Practical Action/K. Sharma

*Since I had a smoke hood installed, I have less headaches and my eyes itch a lot less. I am saving almost NPR 100 (£0.80) per month which I used to spend on medicine. I am also saving fuel wood, because the stove is more efficient with the smoke hood. I am thankful to those who helped me associate my health problems with smoke in my kitchen and for providing a solution!”*

**Khem Bhatta, Gorkha, Nepal**

- Cooking time reduced by an average of 14 minutes per day
- More efficient heat storage and radiation keeps kitchens warm
- Kitchens become cleaner and safer, with less risk of burns; children are better protected from fire

*Installing a chimney at a house in Shrinath, Nepal*



Practical Action Nepal

## Interactive toolkit



With the use of computer aided design (CAD), Practical Action, BSH and the Bundeswehr University Munich have developed an interactive toolkit that other organisations and development practitioners can use to design smoke hoods to meet specific needs.

## Easy to use system

Once you have put in details such as location, family size and the type of stove being used, the system uses in-built design criteria:

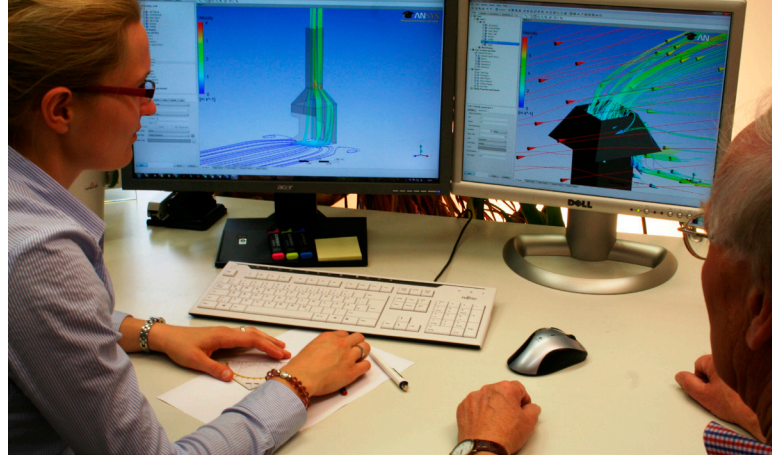
- The size of cooking pots dictates the size of the hood.
- The opening through which air enters the system has to be large enough for the cook to reach the cooking pot, but small enough not to allow smoke out into the room.
- The size of the smoke hood's opening depends on the size of the flue.

In this way the system designs the ideal hood.

## Meeting local needs

While the interactive toolkit will create the best possible technical solution, development professionals still have a vital role to play in making sure that it really is the most appropriate smoke hood, to ensure that the communities will use it. The design needs to be developed to meet local needs.

Communities also need to be willing to install this new technology in their homes. They must



Using the interactive toolkit to design a smoke hood

like the look of it and understand the benefits it can bring. Finance schemes may also be needed to make it affordable.

Without sacrificing the age-old practices of cooking on open fires, we can encourage families to use both improved stoves and a smoke hood. Together, these will increase their safety by reducing the dangers of scalds and burns, create cleaner air in the home and save women and children from spending many hours collecting wood.

We know that more people die of prolonged smoke inhalation in their own homes than die of malaria. Healthy Hoods are a major contribution towards improving the health and wellbeing of some of the world's poorest people.

## Use our toolkit

If you are a development practitioner or work with an NGO and are interested in using the Healthy Hoods toolkit, contact us at [healthyhoods@practicalaction.co.uk](mailto:healthyhoods@practicalaction.co.uk)

More information on Healthy Hoods can be found here [www.healthysmokehoods.org](http://www.healthysmokehoods.org)



### BOSCH AND SIEMENS HOME APPLIANCES GROUP

Carl-Wery-Straße 34  
D-81739 München  
T: +49 89 45 90-01  
F: +49 89 45 90-23 47  
W: [www.bsh-group.com](http://www.bsh-group.com)

**BSH is one of the world's largest home appliance manufacturers.**

**Front cover photo:** Woman cooking using her new Healthy Hood (Practical Action/Upendra Shrestha).

**1 E 5/2012 BSH/smokehoods**



### PRACTICAL ACTION

The Schumacher Centre, Bourton on Dunsmore, Rugby, Warwickshire, UK  
T: +44 (0) 1926 634400  
W: [www.practicalaction.org](http://www.practicalaction.org)  
E: [practicalaction@practicalaction.org.uk](mailto:practicalaction@practicalaction.org.uk)

**Practical Action uses technology to challenge poverty in developing countries.**

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