



World Health  
Organization

# Urban Health Initiative

a model process for  
catalysing change

## Clean cooking for health

Clean and sustainable household energy and appliances, for cooking, heating and lighting can improve health, increase productivity, reduce poverty and protect the environment while addressing air pollution.

### Clean household energy is vital to health

Cooking is a basic activity for sustenance and is uniquely human – it binds us together as families, cultures and even religious groups, and in its highest form is considered an art. How people cook can also contribute to achieving the Sustainable Development Goals (SDGs) for good health and well-being (SDG 3), gender equality (SDG 5), affordable and clean energy (SDG 7), sustainable cities and communities (SDG 11) and climate action (SDG 13).

Globally, exposure to smoke from cooking fires causes **3.8 million premature deaths each year**.<sup>1</sup> Burning fuels such as dung, wood and coal in inefficient stoves or open hearths exposes primary cooks and other household members to health-damaging pollutants, including particulate matter (PM), and is a major contributor to ambient air pollution.

Several disease outcomes are linked to air pollution, including lung cancer, stroke, heart attacks, chronic obstructive pulmonary disease, pneumonia and asthma. Members of households that rely on polluting fuel and stove combinations also suffer a higher risk of burns, poisonings, musculoskeletal injuries and accidents.

### Clean household energy and equity

Women and children disproportionately bear the greatest health burden from polluting fuels and technologies in the home, typically being responsible for collecting firewood and spending more hours at home, increasing time exposed. The use of clean, safe, efficient household energy – particularly clean cookstoves – could greatly benefit their health, safety and livelihoods by reducing exposure to harmful smoke and freeing up time traditionally spent collecting firewood, for more opportunities for education, income-generation and other activities.

### Health and climate change co-benefits

Strategies to promote clean household fuels are a major step towards mitigating climate change while improving health. Household cooking and domestic heating are major sources of significant contributors to global climate change like carbon dioxide, and short-lived climate pollutants (SLCPs) including: methane and black carbon. Cleaner fuels can also significantly improve health and quality of life and create additional economic benefits.

<sup>1</sup> Household air pollution and health: key facts. WHO, 2018 (<https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>, accessed 13 April 2021).

## PILOT PROJECT

## CLEAN HOUSEHOLD ENERGY FOR HEALTH IN ACCRA, GHANA

The Urban Health Initiative (UHI) process in Accra assessed the health impacts and potential health and economic co-benefits of household energy policies by: coordinating existing information; mapping existing household energy related policies; developing alternative policy scenarios; modelling the air pollution and health impacts of those scenarios; and communicating those impacts. Through this process, decision-makers can assess the potential health gains from different policy scenarios, inform action plans and develop capacities.

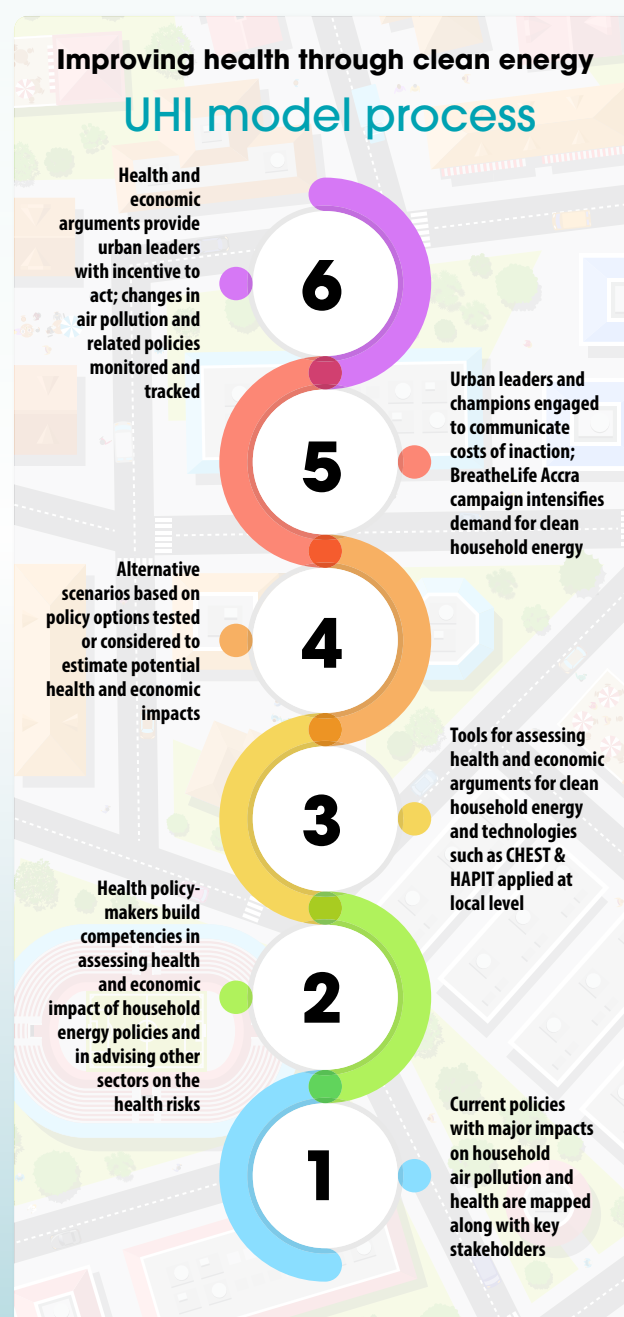
Household air pollution is a major contributor to air pollution in the Greater Accra Metropolitan Area (GAMA) region and resultant health impacts, accounting for an estimated 45% of outdoor air pollution in Accra, during the non-Harmattan season (April to October) when there is less desert dust.

- **In Ghana, household air pollution alone led to 20 988 premature deaths in 2016**, mainly from cooking with polluting stoves paired with fuels like charcoal or firewood.<sup>1</sup>
- More than 21 million people in Ghana relied on polluting fuels and technologies to cook food in 2014.
- In GAMA, charcoal and liquefied petroleum gas (LPG) are the primary household fuels. Affordability, accessibility and local perceptions of associated risks are factors challenging uptake of clean household energy.
- Most households use a mix of household fuels and technologies. **Only 11% of households exclusively use clean cooking fuels and technologies.**<sup>1</sup>
- Short-term air monitoring efforts in specific locations in Accra have found, after adjustment for other factors such as smoking or meteorology, living in a community where all households use biomass fuels is associated with exposure to 1.5 to 2.7 times higher PM levels.<sup>1</sup>
- In the Greater Accra Region, estimates indicate between 160 and 477 premature deaths annually related to ischemic heart disease are expected due to the use of polluting household fuels.<sup>1</sup>

### Burns are a hidden health burden

Limited data are generally available on the causes of burns, but 2009–2013 data from the Komfo Anokye Teaching Hospital (in Kumasi – Ghana's second largest city) found that open fires used for cooking were the main cause of burns and scalds. The number of burns in children caused by fire or flames from solid fuel was almost double that caused by flames from LPG use. The prevalence of past burns in children in Ghana has previously been estimated to be 6%, using scar prevalence. Most burns occurred in the kitchen or elsewhere in the home compound.

<sup>1</sup> Evidence-based strategies to reduce the burden of air pollution in Accra, Ghana. WHO Urban Health Initiative. Geneva: World Health Organization; 2018.



Ensuring access to affordable, clean household energy solutions for cooking, heating and lighting can reduce air pollution and improve health.



## PILOT PROJECT IN ACCRA, GHANA

## CURRENT POLICIES AND PLANS

Household energy programmes in Ghana can be categorized into three intervention areas: clean cooking, electrification and energy efficiency, with the objectives of addressing issues of deforestation, socioeconomic development and climate change. The Ghana greenhouse gas inventory in 2014 cites shifts from biomass use to LPG in the residential sector resulting in reduced methane emissions. Cleaner fuels can also significantly improve health and quality of life and create additional economic benefits. Key current policies include:

- The national LPG promotion programme was introduced in 1990, with the aim of promoting substitution of LPG for firewood and charcoal by distributing free LPG cylinders to the public, and improved LPG distribution and delivery.
- Launched in 2013 with the support of the United Nations Development Programme and the Global Alliance for Clean Cookstoves, the Ghana Sustainable Energy for all (SE4ALL) Action Plan provides the current framework for household energy.
- The draft 2018 energy policy aims to address institutional and market barriers to LPG uptake. Targets in the draft policy include increasing adoption of efficient cookstoves by 20% by 2020, and increasing LPG use from 18% to 50% by 2020.

## ASSESSING THE IMPACTS OF POLICY INTERVENTIONS

In partnership with local and international experts, the UHI Household Energy Group applied tools to model the current state of household energy use based on available data, air pollution and health impacts, and provide resources for planning and monitoring programmes and policies. The policy scenarios developed represent a strong shift toward a cleaner mix of fuels (particularly LPG) with reductions in the use of kerosene, firewood and charcoal by 2030.

The following scenarios suggest that changes in household fuel use can have substantial effects on exposure and health impacts of air pollution, with the greatest improvements seen in the most aggressive policy scenarios.

## Fuel combinations for modelled scenarios

Stove/fuel combination	Time allocation	Baseline	BAU	Moderately progressive	Aggressive
Charcoal only	100	19.5%	11.5%		
LPG only	100	10.5%	10.5%	23.0%	67.0%
Wood + Charcoal	100	0.8%	0.8%		
LPG + Charcoal	65; 35	42.2%	54.6%	54.6%	
LPG + Charcoal	87; 13				17.6%
Charcoal + LPG	80; 20	19.5%	13.0%	13.0%	
Charcoal + LPG	55; 45				4.0%
LPG + Electricity	80; 20		3.3%	3.0%	
LPG + Electricity	60; 40	0.6%			5.0%
Kerosene	100	0.6%			
None	100	6.4%	6.4%	6.4%	6.4%

Notes: Time allocation refers to the relative use of each fuel with the primary and secondary fuels listed first and second, respectively. None refers to no reported cooking in the home.

Source: Evidence-based strategies to reduce the burden of air pollution in Accra, Ghana. WHO Urban Health Initiative. Geneva: World Health Organization; 2018.

**Baseline scenario:** 80% LPG use was assumed to be mixed with secondary use of charcoal; 50% charcoal use was assumed to be with secondary use of LPG; and homes with electricity use also had secondary use of LPG as a result of increased electricity prices.

**Business-As-Usual (BAU) scenario:** consistent with current trends, modest decreases in charcoal as a primary fuel and charcoal with LPG as a secondary fuel is projected. LPG as the main fuel with secondary use of charcoal increases by about 30%. Kerosene as a primary cooking fuel will be eliminated.

**Moderately progressive scenario:** unprocessed biomass and household use of kerosene were eliminated as primary cooking fuels. Charcoal remained as a primary and a secondary fuel with LPG use. LPG use as a primary fuel increases to approximately 80%, premised on the government policy of increasing LPG penetration to 50% nationwide by 2030, translating to a deeper penetration in the GAMA area.

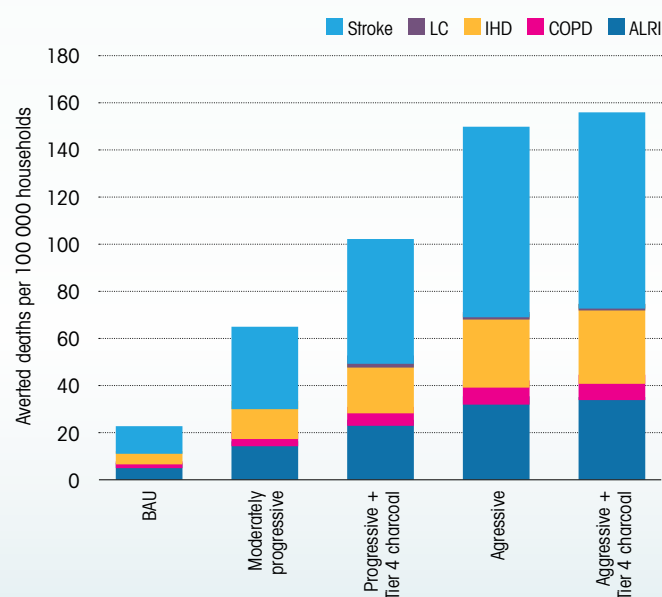
**Aggressive scenario:** primary use of charcoal was dramatically reduced with only 4% remaining with secondary LPG use with reduced time allocation. The number of households using charcoal as a secondary fuel was reduced, along with the time fraction of secondary charcoal use. Finally, there were modest increases in electricity use premised on price structures to promote greater use in households.

## CHARTING A WAY FORWARD FOR HEALTH, SOCIOECONOMIC AND HEALTH CO-BENEFITS FROM CLEAN HOUSEHOLD ENERGY IN ACCRA

Using the HOMES tool in the WHO Clean Household Energy Solutions Toolkit (CHEST), exposure concentrations for the primary cook were estimated for each stove and fuel combination, and subsequently weighted by the prevalence of each combination in the GAMA region to estimate average population exposures.

The Household Air Pollution Intervention Tool (HAPIT), developed by the Clean Cooking Alliance, was used to estimate disease impacts from the various household energy scenarios.

### Deaths averted from changes in household energy policy



Notes: ALRI – acute lower respiratory infection; COPD – chronic obstructive pulmonary disease; IHD – ischaemic heart disease; LC – lung cancer.

Source: Evidence-based strategies to reduce the burden of air pollution in Accra, Ghana. WHO Urban Health Initiative. Geneva: World Health Organization; 2018.

The analysis found over 1900 averted deaths under the most aggressive household energy policy scenario – the addition of cleaner burning Tier 4 charcoal cookstoves to the moderately progressive scenario had important benefits but made a small difference to outcomes in the aggressive scenario. A reduction of 35% in personal exposure can be expected from the most aggressive policy scenario modelled.

Promotion of cleaner fuels and technologies such as LPG, biogas or electricity as substitutes for wood and charcoal, whilst also addressing the institutional and market constraints that hinder sustained adoption are critical to a successful energy transition. Other suggested policy interventions include:

- Systematic monitoring and evaluation of the health impacts from household energy use.
- Marketing campaigns to dispel myths on taste preferences with traditional fuels and encourage use of clean cooking.
- Behaviour change campaigns to promote the benefits of clean liquid and gaseous fuels (e.g. LPG) use in homes, and dispel any safety concerns (explosions, burns) of these cleaner alternatives.
- Modelling LPG and electricity pricing structures as well as other incentives to identify effective mechanisms to increase penetration and uptake of clean cooking.
- Promoting the government-led actions to improve the safety of LPG use via the LPG cylinder recirculation model and expanding piping of natural gas to residential communities.

Further data on the mix of household fuels, disease incidence in Accra, burns and poisonings related to household energy, and population projections, are needed to improve the accuracy of the modelling results.

### Partners in action

Household energy use is a cross-cutting issue, related to

WHO has led the UHI Accra project in collaboration with

预览已结束，完整报告链接和二维码如下：

[https://www.yunbaogao.cn/report/index/report?reportId=5\\_23860](https://www.yunbaogao.cn/report/index/report?reportId=5_23860)

