

# Increasing Access to Clean Cooking through Subsidies

## Risks and impacts of cooking with polluting fuels

Around 3 billion people cook using open fires or simple stoves that burn polluting fuels like wood, charcoal, animal dung, crop waste, coal, and kerosene. Exposure to household air pollution (HAP) from polluting stoves contributes to millions of deaths every year from diseases like stroke, heart disease, respiratory infections, chronic lung diseases and cancer [1]. Many of the pollutants from household fuels also contribute to climate change. Wood and charcoal, when harvested unsustainably, can also contribute to forest degradation, which adds to climate impacts and more localized environmental problems.

In 2014, the WHO introduced Guidelines for indoor air quality and household fuel combustion for residential cooking, heating, and lighting, providing information to encourage transitions to clean energy options like electricity, liquefied petroleum gas (LPG), ethanol, solar thermal cookers, and certain types of biomass/pellet stoves [2]. To help countries achieve the Guidelines, WHO developed the Clean Household Energy Solutions Toolkit (CHEST), which includes a Household Energy Policy Repository highlighting examples of policies supporting cleaner fuels and technologies. The Repository includes dozens of state-led actions such as fuel bans, awareness raising, standards and labelling, and financial instruments like subsidies on stoves and/or fuels. The Repository also includes independent evaluations of a subset of policies providing insights into the policies' impact. Financial instruments like subsidies appear frequently in the Repository. This factsheet describes examples of the ways that subsidies have been used, and synthesizes lessons from several independent evaluations.

A woman cooks with wood over a traditional open fire in rural Uganda.





A government worker promotes Ecuador's induction cooker program in the city of Guayaquil. César Muñoz/ANDES

## Subsidy policies

Subsidies are common policy instruments through which government funds are transferred or revenue is foregone to reduce the cost and increase the consumption of specific goods or services [3]. Subsidies are implemented for multiple reasons: to gain political favour, provide basic needs and alleviate poverty, or to reduce negative “externalities” (impacts caused by an economic transaction that affect people not directly involved in the initial sale) [4, 5]. Independent evaluations indicate that subsidy policies introduced to reduce upfront and/or recurring costs of clean stoves and fuels can increase access to clean cooking options. However, they are challenging to implement for several reasons:

- Targeting – funds intended for poor households are often “captured” by non-poor [6, 7]. Accurate targeting is possible but requires significant effort (see example from India).
- Cost – subsidies can put stress on government accounts, particularly when fuels traded internationally are subsidized (see examples from Indonesia and Ecuador)
- Politics – subsidies gain strong political support among the constituencies that benefit from them, which make them difficult to reduce or eliminate.

## Subsidies supporting electric cooking

There is a long history of subsidising grid extension and electricity consumption. The early stages of grid expansion in the US and Europe were heavily subsidized [8]. This practice continues today in many low- and middle-income countries (LMICs). Some charge a “lifeline” tariff in which the initial units of consumption are provided below cost or for free [9]. For example, South Africa has historically provided large subsidies for electricity and, in 2003,

the country introduced a policy providing 50 kWh per month for free to all qualifying households [10]. In India, where utilities are run at the state-level, many states subsidize the first 30-50 kWh of monthly consumption [11]. Access to small blocks of subsidized electricity helps reduce consumption of fuel-based lighting, which contributes to household air pollution. Small amounts of subsidized electricity also provide other quality-of-life improvements like entertainment and connectivity.

Data from household surveys conducted in dozens of LMICs show that cooking with electricity is rare [12]. Typically, the amount of free or discounted electricity is insufficient, the cost of additional units of electricity is too high, and/or quality of service is too poor to support daily cooking with electricity. South Africa is an exception; in 2015, 77% of households reported using electricity as a primary cooking fuel [12]. Electric cooking is popular in South Africa because of historic low tariffs and the free block of “lifeline” electricity initiated in 2003. However, recent reforms have removed most subsidies and resulted in higher residential electricity rates. This may decrease the number of households cooking with electricity in the future.

Ecuador provides another example of subsidy policies supporting cooking with electricity. Ecuador has had LPG subsidies in place since the 1970s. By the 2010s, the subsidized price of LPG was just USD 1.1/kg which was nearly 90% below international prices. As the number of users increased, the cost of the subsidy grew to 7% of GDP, which placed a severe burden on national accounts [13]. In response, the government introduced the “Programme for Efficient Cooking” [14], a voluntary program offering favourable financing towards the purchase of an electric induction stove plus up to 80 kWh of free electricity per month. The plan initially aimed to reach 3.5 million households by 2018, but after reaching just 740,000 by 2017, the target was extended to 2023. One reason that uptake was slower than intended is that the subsidies for LPG remained in place (contrast this to Indonesia's approach described below) [14].



## Subsidies supporting LPG

LPG burns cleanly, is simple to use, and does not require large investments in infrastructure like pipelines or power grids. However, upfront and recurring costs for users are higher than the costs of common polluting fuels like wood, kerosene, and charcoal. Subsidies can encourage LPG adoption by reducing upfront stove costs and/or recurring fuel costs for cash-constrained consumers. The WHO's Household Energy Policy Repository includes examples of LPG subsidies from various countries, a few of which are described below:

### Indonesia

Indonesia has subsidized petrol, diesel and kerosene for many years [12]. In 2006, Indonesia implemented a "megaprogram" to induce a large-scale transition from kerosene to LPG, in order to reduce government spending on kerosene subsidies. At that time, kerosene was used by 90% of the population, and subsidies cost the country USD 3–4 billion/year [15]. Moreover, subsidies were not reaching their intended target. Kerosene was often diverted for industrial and commercial applications. Some was smuggled to neighbouring countries where kerosene was more expensive. The program introduced a phased withdrawal of the kerosene subsidy (contrast with Ecuador's electrical induction stove program where the original subsidy on LPG remained in place) and invested in LPG infrastructure, domestic cylinder production, and consumer awareness [15]. By 2012, 93% of the target had been reached and LPG consumption had grown by nearly 350% [16,17]. The program largely achieved its objective of reducing both kerosene consumption and government expenditure. However, many people living outside urban centres continued using solid fuels alongside LPG, and rural households using wood as their

main fuel have not adopted LPG at the same rate as people who used kerosene. [16].

### India

In India, LPG access increased through the early 2000s [12], but LPG was not reaching most poor families. To boost access among the poor, the Indian government introduced the Pradhan Mantri Ujjwala Yojana (PMUY) Scheme. Through PMUY, India's Oil Marketing Companies (OMCs) provide subsidies to reduce the cost of both LPG connections and cylinder refills to women in households classified as Below Poverty Line (BPL). The cost of a connection was about INR 3200 in 2016 (USD 48) and included the first full cylinder (plus deposit), deposit for a regulator, an LPG stove, and administrative fees [18]. The subsidy for the initial connection covered about half of the total cost. The scheme's targeting and financing were key to its success. Enrolment is limited to BPL households, beneficiaries are all issued biometric ID cards and must have a bank account linked to the ID, which minimizes fraud. OMCs also offer loans to help beneficiaries pay for the portion of the connection costs not covered by the initial subsidy.

Beneficiaries pay fully for cylinders upfront and receive the subsidy as a rebate deposited directly to their bank account. OMCs providing loans for the unsubsidized portion of connection costs are repaid by withholding the rebate on future cylinder purchases. By mid-2019, seven months ahead of schedule, PMUY provided LPG access to 80 million households [19]. However, despite success, evidence indicates many beneficiaries continue to use polluting fuels for some or all of their cooking [20]. Even with the subsidy, LPG may be too costly for BPL households. Additional research suggests that some vulnerable groups like scheduled castes and tribes and female-headed households face greater challenges in accessing the scheme [21].



Bicycle cart with propane gas tanks in Chandi Chowk Market, Old Delhi. Melissa Kopka / Alamy Stock Photo

## Ghana

Ghana has both a national LPG policy and a policy targeting LPG for rural areas [22]. The national policy aims to provide LPG access to 50% of the population by 2030 through a market-driven cylinder recirculation model. In this approach, cylinders are standardized across different retailers so that consumers can exchange cylinders with any company. Retailers ensure that cylinders are returned to their original marketer, inspected, maintained, and refilled or scrapped if they are compromised in some way [23]. This allows flexibility for consumers while ensuring safety and accountability from companies. Ghana's rural program was established to accelerate LPG penetration in unserved rural communities by fully subsidising LPG access for rural households. The program provided each beneficiary with one free 6 kg LPG cylinder, a single burner stove, and accessories, thereby stimulating demand and incentivising private marketing companies to start businesses in rural areas. However, a 2017 study found that 58% of households had not refilled their LPG cylinders at all nine months after the delivery of their first cylinder, and that only 8% were still using LPG 18 months after distribution [24]. Cost and distance to filling stations were the main reasons that people did not refill or regularly use LPG.

## Key lessons from clean cooking subsidy policies

Subsidy policies included in the WHO Household Energy Policy Repository have led to increased access to clean cooking options, but some have fallen short of their intended targets. The following lessons can be drawn from subsidy policies and policy evaluations included in the Repository:

- *Withdrawal of support for the fuel that is targeted for phaseout can accelerate transition.* Dialling back support for kerosene boosted uptake of LPG in Indonesia, but the failure to rollback LPG subsidies hindered the uptake of electric induction stoves in Ecuador.
- *Targeting can reduce costs and improve efficiency.* India's PMUY scheme minimized "subsidy capture" by limiting eligibility to BPL households, validating enrolment with a biometric ID card and paying subsidies in the form of a rebate transferred directly to beneficiaries' bank accounts.
- *Achieving equitable outcomes requires investment beyond subsidies themselves.* Existing electricity and LPG supply networks favoured better-off populations in India and Ghana. Without investing in expanded supply and distribution, as well as consumer awareness campaigns as in Indonesia, subsidies will not reach marginal and vulnerable populations.
- *Improving access to clean fuels is a necessary step but does not guarantee that beneficiaries will transition completely away from polluting fuels.* Many recipients of subsidized LPG in Ghana and India as well as other countries with policies included in the Repository continued using their traditional fuels rather than LPG due to affordability and accessibility barriers. Larger subsidies, behaviour change messaging, or other efforts may be necessary to achieve more complete transitions to clean fuel use.



Flame of LPG burner Neelesh Thakare / Alamy Stock Photo

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Email [householdenergy@who.int](mailto:householdenergy@who.int)

WHO's CHEST Toolkit <https://www.who.int/tools/clean-household-energy-solutions-toolkit>

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