



POLICY BRIEF

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Ujjwala 2.0 From Access to Sustained Usage

Edited by

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Summary of recommendations

Kirk R. Smith¹ and Santosh Harish²

By September 2019, some 80 million poor households will have been connected to LPG since 2015 through the national programme, *Pradhan Mantri Ujjwala Yojana* (Ujjwala). This is in addition to “normal” growth in LPG connections amounting to approximately 40 million households. By any account, this is a remarkable achievement, bringing total households with LPG connections from about 60% of the country early this decade to some 95% by the beginning of the next.

Connection, however, does not mean full usage and many new Ujjwala households and others continue to use significant amounts of biomass fuel, with consequent impacts on the health of village populations from the smoke. In addition, it is now well established that smoke from household biomass use is the largest single source of outdoor air pollution in the country, although of course not the only one.³ Its continued use thus is a problem for all Indians.

How to continue to fulfill the promise of Ujjwala in its second phase, here called Ujjwala 2.0, is an important policy discussion in the country. Three essential tasks remain: **extend** connections to the entire country, now requiring work among some of the most remote, poor, and disenfranchised groups; **enhance** usage among all users to complete the national household energy transition; and further **extinguish** fuel subsidies among the middle class to keep taxpayer costs from rising as efforts are enhanced to assist the poorest.

The Collaborative Clean Air Policy Centre solicited suggestions as to what Ujjwala 2.0 might consider incorporating into its plans from nine major research groups that have been working on assessments of the current Ujjwala programme. Most have conducted recent field studies and have or are in the process of publishing their results. These commentaries are reproduced below.

In addition, we convened a meeting at which these groups discussed their findings and recommendations with representatives of the Ministry of Petroleum and Natural Gas (MoPNG), and NITI Aayog.

Here, we summarize these discussions and link recommendations to individual commentaries from the groups, where possible. We first divide the suggestions into three major categories below: subsidies, supply reliability, and information campaigns, and then address opportunities for collaboration with other national programs and suggestions for future research.

1. Subsidies: how much, for whom, what quantity, how long

There was general agreement that the government should explore differentiated subsidies, with enhanced financial support for poorer consumers, and multiple suggestions on how the subsidies could be targeted, and phased out. There were also suggestions on additional support targeting specific barriers or vulnerable groups.

1.1 Enhanced subsidies for the poor as a social investment

One option could be differential subsidies for two broad household tiers. *Tripathi and Sagar* (commentary **I**) recommend increased subsidies to all Ujjwala beneficiaries, perhaps at half the current subsidized price (i.e. INR 250), and removing subsidies for the rest. Because it relies on Ujjwala customers who have already been identified, this is perhaps easiest to administer, but may miss some deserving households.

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3 The Contribution of Household Fuels to Ambient Air Pollution in India: A Comparison of Recent Estimates, Collaborative Clean Air Policy Centre, Policy Paper, CCAPC/2019/01, May 2019 (authors: S Chowdhury, ZA Chafe, A Pillarisetti, J Lelieveld, S Guttikunda, and S Dey). <https://ccapc.org.in/policy-briefs/2019/5/30/the-contribution-of-household-fuels-to-ambient-air-pollution-in-india-a-comparison-of-recent-estimates>

Gupta and Vyas (A) recommend a three-tier approach, building on the framework of the National Food Security Act. They suggest that the poorest 10% households (Antyodaya) receive LPG at nearly free rates, and 'high priority' households (accounting for another 75% of rural households) receive increased subsidies; others, including the urban middle class, could receive no subsidy. More broadly, *Kar et al. (D)* also make the case for why other households beyond Ujjwala beneficiaries need to be provided support for sustained use.

Finally, since willingness to pay for LPG among the poor is not well understood, *Patnaik and Mani (F)* recommend running pilots at different subsidy levels to determine optimal price points.

1.2 Rolling back subsidies for the middle class

LPG subsidies carry a high fiscal cost, which will grow substantially with the increase in consumers, and as usage grows over time. For limiting fiscal expenditure and better targeting of support to those who most need it, much more of the middle class needs to exit the subsidy cover. To make the case for subsidy removal, the government could emphasise how increasing LPG use among the poor reduces ambient air pollution. A well-to-do, urban LPG owner giving up their subsidy thus helps a poor family directly, and helps themselves and their neighbors through improvement in air quality.

Removing subsidies for a large group of consumers can be challenging to implement. *Josey et al. (B)* recommend a switch to an opt-in approach from the current opt-out national program ("Give it up"). An opt-in design has been shown to greatly reduce uptake of subsidies by those who do not need them. *Parikh (E)* also suggests limiting the subsidy eligibility to a specific period since connection, say 20 years, to focus on younger families with children and to signal that subsidies are not designed to be never-ending.

1.3 Targeted support for vulnerable groups, and to address specific barriers

Provide free LPG for pregnant women: *Roy et al. (G)* argue that giving free or nearly free fuel during pregnancy maximises usage during the most vulnerable period, and encourages long-term behavioural change. This would require cooperation between oil and health sectors and coordination through PHCs, and could perhaps be taken up as a national programme.

Cover the one-time costs of stove and first refill: *Josey et al. (B)* suggest that MoPNG should increase Ujjwala outlay to cover the stove and first refill rather than the no-interest loan. This extra, one-time cost would eliminate one major complaint (C) about the current program.

Summer vouchers: *Kar et al. (D)* describe how usage dips in the summer due to low cash in hand, and suggest the use of summer vouchers to help ensure continued use.

1.4 Better utilization of fiscal support

Limit subsidies to nine cylinders: Multiple submissions (B, E, I) recommend that subsidised LPG be restricted to a maximum of 9, not 12, cylinders per year, which better fits current information about maximum need for most households.

Standards for stove efficiency: For better utilization of fiscal support, *Josey et al. (B)* also recommend mandatory standards and labeling for LPG cookstoves, and investing in improved efficiency, thereby reducing consumption, and subsidies needed.

2. Supply reliability, and distributor accountability

For first-time LPG consumers, ensuring reliable supply is critical to promote the appeal of LPG, and avoid consumers going back to the use of solid fuel. There were several recommendations on improving supply reliability in rural areas.

Second cylinder for improved reliability: *Roy et al. (G)* underscore the importance of providing easy access to second cylinders to improve supply reliability, while prioritizing areas where refills are difficult to fill quickly. Available research has shown that six of seven households are willing to pay for the second cylinder after a free trial shows them the value

in improving reliability. This will also help reducing timeline pressures and costs to distributors.

Promote awareness about grievance redressal, and consumer rights: Joshi (C) stresses on the need to improve the first experience for new consumers, as poor service inhibits future uptake. One option to do this is to integrate grassroots organizations and local self-help groups on grievance redressal options.

Make rural LPG distributors more viable: Rural distribution, as it exists, is often not a viable business, which in turn may affect quality of service. Josey *et al.* (B) suggest that MoPNG find mechanisms to make rural distribution more profitable, or provide performance based differential commissions for rural distributors. MoPNG could consider diversifying services and products offered by rural distributors.

Make LPG distributors more accountable: LPG marketing guidelines is a good starting point, but can be made stronger on various processes with clear timelines, and escalation in case of issues. Josey *et al.* (B) stress the need for greater transparency, and suggest that MoPNG could publish statistics quarterly on performance of distributors.

3. Information campaigns on health benefits

While LPG subsidies are likely to be the most important factor determining usage, they will not be sufficient to push households towards abandoning solid fuels. Increasing awareness about the health impacts of smoke from chulhas should complement the other initiatives.

Since cultural contexts could differ even from village to village, the content and mode of messaging will need to be varied. Multiple commentaries (D, G, H) emphasized the need to experiment with a range of messages targeting different audiences, and build in evaluations to identify the most effective ways to message.

ASHA workers could be an important channel to disseminate the benefits of LPG access and usage (H). This will need inter-ministry coordination at the centre, improved centre-state coordination to engage the state health departments, and better local interaction between the distributors and the ASHA workers. The health impacts in children should naturally be a focus, but it is also important to talk about impacts on both adult women and men.

Multiple commentaries (A, E, F) felt the need for these campaigns to influence the household decision makers—usually men and older members of the family. Besides health benefits, campaigns also need to address common misconceptions and traditional preferences that inhibit further take up of LPG.

Roy *et al.* (G) propose campaigns asking households to disable the chulha (destroy, fill with rocks, or move out of the house). While chulhas are easy enough to rebuild, disabling them has high symbolic value and has been shown to be effective. Disabling can be linked with other benefits, for example, the loan of a second cylinder.

4. Ideas for linking Ujjwala 2.0 to other schemes

- Incentivise LPG take-up by offering a few additional days to women in the rural employment guarantee schemes
- Incentivise LPG take-up by reducing health insurance premiums for those who adopt Ujjwala in Ayushman Bharat.

5. Research questions, and suggested inputs from researchers to policy process

Some ideas came up during the discussion on questions and inputs that researchers could focus efforts on to contribute to the policy discourse.

- Experiment with different health messages. Not enough is known about what works.
- Develop and further disseminate proposals and arguments for LPG targeting and pricing

- Develop standard methods to monetize health impacts at the national level
- Propose a continuous monitoring template, both to track progress in the transition and for distributor accountability.
- Develop indicators of progress for Ujjwala 2.0—this should likely be based on refills (for example, annual refills per capita at the district level). Currently, smokeless villages (or districts) are based entirely on connections, and need to move to refills as the basis in the future.

Transitioning the millions of households that use solid fuels for cooking and other purposes is should be an important priority from the standpoints of modern energy access, the health of vulnerable populations exposed to smoke indoors, and for mitigating ambient air pollution in India. The commentaries that follow reflect years of research from these different groups in understanding barriers to usage, and offer helpful recommendations to the decision makers in designing the next phase of this important programme.

Commentary A

Communicating harms, reducing prices, and challenging inequality should be central to a redesign of the Ujjwala program

Aashish Gupta and Sangita Vyas⁴

When we introduced ourselves to Dubey Ji, a respondent in our 2018 *Survey of Rural Sanitation and Solid Fuel Use*, he remembered that we had come to his home four years ago. In a pucca house with green stone flooring, he sat on his narrow bed, wearing glasses. He was thin and coughed often. A half-read newspaper was nearby. On the shelf above him were books neatly wrapped in saffron cloth. Dubey Ji had recently received an LPG cylinder and stove through Ujjwala. His family could afford labourers which cut wood for them, and they used the gas stove only to make chai. Dal, sabzi, roti, chawal – all were made by Dubey Ji's daughters'-in-law on the chulha. Dubey Ji believed that food cooked on a chulha was healthier and tastier. In contrast, *gas ki roti gas karti hai* – rotis cooked on gas cause indigestion. He thought that cooking with solid fuels was healthy for the person cooking too – fumes purified the eyes because they caused tears, and in blowing into a traditional stove, a woman did *kasrat* – exercise. Clearly, Dubey Ji had never cooked anything on anything.

In another part of the same village in Madhya Pradesh, we met Rajni Bai, a dalit woman who had also gotten a cylinder, a stove, a regulator, a pipe, and even a lighter through Ujjwala. Rajni Bai's household did not own any land or animals. She did not have access to dung or agricultural produce to burn in a traditional stove. She had appreciated the cylinder and the gas stove immensely. The cylinder lasted her two and a half months. She had used it "carefully," supplementing it with wood collected from the nearby forest. But when we interviewed her, the cylinder had been sitting empty for fifteen days. Rajni Bai could not afford a refill. The rains had made the wood wet

and harder to burn, but she made all the food, including the *kali chai* they drink in her family, on her *mitti ka chulha*.

Rajni Bai and Dubey Ji are at opposite ends of the chart below, from our co-authored working paper, "*Persistence of solid fuel use despite increases in LPG ownership: New survey evidence from rural north India*." In the poorest decile of households in rural north India, the 2018 survey found that more than 60 per cent used a traditional chulha only. Slightly more than 20 per cent used both a traditional chulha and a gas stove to cook yesterday. Among the richest households, like those of Dubey Ji, these figures were lower, but only slightly. More than 60% of the richest had either exclusively used chulha yesterday, or had used both chulha and gas stoves.

Using cleaner fuels such as LPG is essential to reducing rural air pollution and improving population health. What can public policy do to achieve exclusive use of clean fuels in rural India? Three strategies seem worth investigating: communicating the harms of solid fuels and the benefits of cleaner fuels; reducing the cost of LPG cylinder refills in rural areas; and finally, promoting gender equality within households, particularly in cooking and related tasks.

Like Dubey Ji, 92% of the respondents in the survey said food cooked on a chulha tastes better than food cooked on gas, and more than 86% believed that food cooked on chulha is healthier. Fortunately, only about 22% agreed with Dubey Ji's third statement, that cooking food on chulha is better for the health of the cook than cooking food on gas. Even among those believing that cooking on a chulha harms health, the health harms most often invoked by respondents were not respiratory, but to the eyes of the person cooking. A large campaign communicating the respiratory impacts of solid fuel use, hopefully something at least as big as communication campaigns against tobacco, may change these beliefs. Similarly, advertisements and demonstrations that food cooked on gas can be as tasty and healthy as food cooked on chulha would be helpful.

Reducing LPG prices, particularly in rural areas, where residents are poorer and solid fuels are easier to access, would also be helpful. One relatively simple way is to build on the experience of the National Food Security Act. Under this act, 75% of rural households are classified as priority households and entitled to subsidised rations. Another 10% of extremely poor households have been identified as Antyodaya households, eligible for higher

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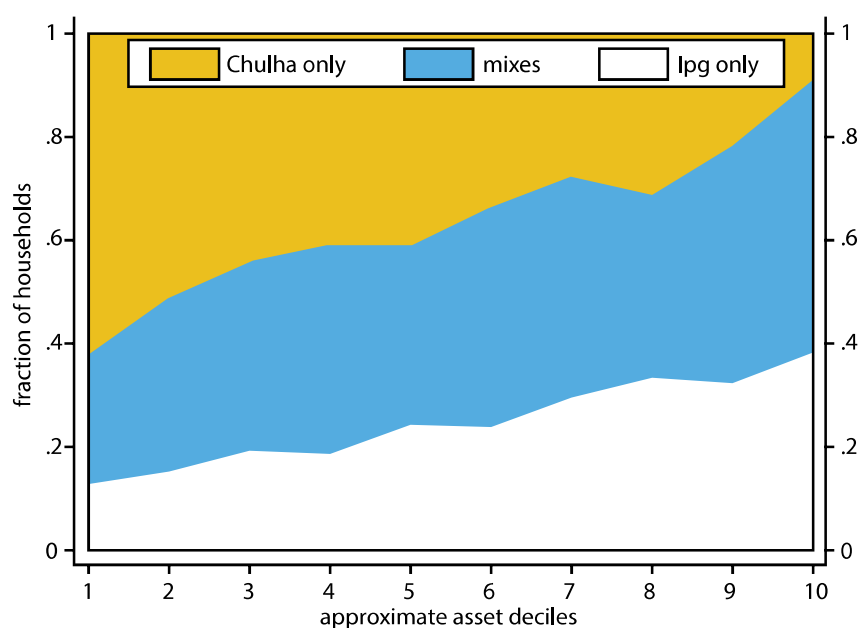


Figure 1: Substantial chulha use yesterday among households owning LPG

Note: Estimates use sample weights. Source: 2018 Survey of Rural Sanitation and Solid Fuel Use.

grain amounts at even lower prices. If priority households could become eligible for even higher subsidies in a revamped LPG pricing regime, and Antyodaya households could become eligible for cylinders at prices close to zero, exclusive LPG use would likely be higher.

Finally, public policy must recognize that in households such as Dubey Ji's, if Dubey Ji was doing his share of the cooking, a complete transition to LPG would have happened already. Our survey asked questions on who

cooks food, who makes dung-cakes, and who collects wood in rural households. We found hardly any men who contributed to cooking or making dung-cakes. Current Ujjwala messaging, which focuses on the benefits of clean fuels for women, reinforces this inequality. Advertisements that show that gas is so good that even men can cook with it will challenge both misinformation on LPG and gender inequalities in household tasks.

Commentary B

Beyond Ujjwala: Ideas to enhance LPG use sustainably

Ann Josey, Ashok Sreenivas, Ashwini Dabadge⁵

The *Pradhan Mantri Ujjwala Yojana* (PMUY) has been successful in providing LPG connections to nearly every household in the country. However, LPG consumption by PMUY beneficiaries and other poor households is quite low. For example, in 2017-18, the average consumption of LPG by a PMUY household was only 3.4 cylinders per annum in contrast with 5.5 cylinders by an average rural household and 7.4 by an average urban household. As a result, the larger objectives of the programme regarding improving health outcomes for rural women and children remain unmet. This calls for interventions that can help increase LPG consumption by poor and rural households.

The primary barrier that needs to be overcome for this is the affordability barrier. In order to achieve this, a set of measures are proposed as follows:

- i. The current loan scheme under PMUY forces households to buy cylinders at unsubsidised prices until the loans are repaid, thus discouraging them from purchasing refills. Therefore, this should be phased out. This will only involve a one-time cost.
- ii. An increased and graded subsidy may be provided to PMUY and poor consumers which can be tapered off over a period of, say, four years. Providing such a subsidy will encourage them to consume greater quantities of LPG, and over time they are more likely to be willing to pay the normal subsidised price. This will require recurring expenditure for at least some years.
- iii. There are concerns about subsidy amounts being deposited into customer accounts with some delay, which can be a concern for poor consumers with cash-flow challenges. Digital technology can easily be

leveraged to address this and ensure prompt subsidy credit to consumer accounts. This will promote digital transactions in addition to addressing cash-flow challenges.

Adopting such measures would result in increased financial burden, which is also a social investment by the government. Some measures to ameliorate this increased subsidy are suggested such as:

- i. The number of subsidised cylinders per annum provided to households can be reduced from the current 12 to 9, which would be sufficient for most households.
- ii. It is possible to increase the efficiency of LPG stoves by more than 10 percentage points, by introducing mandatory standards and labelling for LPG stoves, and expediting a market transformation to efficient stoves. This would reduce LPG consumption significantly, thus not only reducing subsidy but having additional benefits such as reducing India's import bill and saving on GHG emissions.
- iii. The subsidy net is currently cast wide, with over 85% of customers being subsidised. There is room to improve targeting of subsidy and thus reduce subsidy requirements. Measures to do this include gradually moving to an opt-in rather than opt-out mechanism for most non PMUY and poor consumers, and by using other wealth indicators to weed out those who need not be subsidised.
- iv. The financial burden of subsidy can be shared with other ministries (such as the Health ministry) and state governments, since they also gain from improved usage of LPG. Moreover, their expertise and field presence can also be leveraged for the purpose of encouraging LPG usage.
- v. A nominal 'smokeless kitchen' cess could be considered to raise further revenues if required. Estimates indicate that a cess that is about 3% of the currently levied cesses would be enough to raise the required revenue.

A combination of the above measures can generate the resources required for the extra subsidy for encouraging sustained use of LPG. However, this is possible only if rural distributors are viable and accountable for their quality of service. Some suggestions are provided to enable this as follows.

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- i. Rural distributors can be given a performance-based incentive, based on refill sales to poor and PMUY consumers. This will encourage them to provide good quality of service and supply to their consumers.
- ii. Rural distributors can also be encouraged to diversify their revenue streams, rather than depending solely on commissions from sales of LPG refills. This will make their overall business viable and hence increase the chances of their providing quality service and supply to rural consumers.
- iii. The ministry should define a detailed document on standards of performance for distributors as well as oil marketing companies, which includes minimum service requirements, penalties and escalation mechanisms. Data about the performance of distributors and oil marketing companies on the

parameters defined in the standards of performance document should be publicly available. This can be augmented by public accountability mechanisms for distributors.

The measures outlined above attempt to address the variety of challenges currently preventing greater LPG uptake. These include issues of affordability by consumers, financial requirements to address the affordability challenge and increasing viability and accountability of rural LPG distribution. We believe that a combination of these measures can go a long way in increasing LPG uptake by poor consumers on a sustained basis, and help address the severe health and gender challenge associated with use of solid fuels for cooking in Indian households.

Commentary C

Converting Access to Enhanced Usage: Improving LPG Uptake, Affordability, and Supply Security for Rural Households in India

Madhura Joshi⁶

The *Pradhan Mantri Ujjwala Yojana* (PMUY) LPG programme was launched by the Government of India in May 2016 to provide five crore LPG connections to women from BPL households by 2019. One of the more popular schemes of the Government, the target of the Ujjwala scheme has been revised to cover 8 crore households by 2020.

PMUY has expanded the initial list of beneficiaries identified using the Socio-Economic Caste Census (SECC) data, to include additional beneficiaries such as all SC/ST households with BPL cards, and beneficiaries of the Pradhan Mantri Awas Yojana Gramin (housing scheme for rural households). This increase in scope helps addresses some of the challenges of relying solely on SECC data,⁷ and helps reach people who were left out in the initial target.

Access to an LPG connection, however, does not determine usage. Field research shows that there are several aspects that determine whether LPG is used more frequently – upfront connection costs, recurring costs, service delivery and supply security at the household-level, geography (determining ease of access to traditional biomass or solid fuels), behavioural and cultural factors (taste, tradition, type of cuisine – rice or roti), and availability of appropriate domestic infrastructure for safe usage (such as a kitchen platform and ventilation). While each of these factors are important, I discuss three important ones – upfront costs, recurring

costs, and household supply security – based on village consultations in Rajasthan, Gujarat in 2018 & 2019, and Maharashtra in 2017.⁸

PMUY addressed the first factor of upfront connection costs by providing a subsidy of INR 1,600 as the cost of connection. However, households still have to pay for the cost of stove and the first refill. PMUY also provides for an interest-free loan of INR 1,600 from the Oil Marketing Companies (OMCs) to enable consumers to meet these costs (the EMI option). OMCs in return are supposed to recover this loan through the subsidy payment for subsequent LPG cylinder refills ordered by the consumer. While connection subsidies are a reasonably good idea, the repayment of the loan, as we shall examine below, has a huge impact on recurring costs of consumers.

The second factor, recurring costs, i.e. payment of subsequent refills of LPG cylinders, are a critical determinant of LPG usage amongst low-income households. Several studies, including the one commissioned by the government also highlight this. PMUY doesn't account for the importance of recurring costs sufficiently. Even though LPG cylinders are subsidised there are three challenges to wider uptake.

First, households opting to use the EMI option under the Ujjwala scheme, end up realising the benefits of the refill subsidy only after the loan is paid off. For example, the subsidised cylinder cost in Delhi, as of July 2019, is INR 494.35, while the non-subsidised cost is INR 637. This amounts to a subsidy of about INR 142. Assuming prices remain constant, consumers end up paying the full cost of the LPG cylinders for around the first 11 refills, or at least two years (average LPG consumption is reported between 3 and 4.87 refills per annum per PMUY customer).⁹ Given that the non-subsidised LPG rates have fluctuated between INR 600-1,000 in the last two years, the burden of high recurring costs is a deterrent for consumers ordering refills. Discussion with households in the village in Rajasthan and preliminary survey analysis show that while several had LPG connections, their average usage was less than two cylinders per annum.

6 Madhura Joshi (mjoshi@nrdc.org) is with the Natural Resources Defense Council. Views expressed are personal.

7 Saxena, N. C. "Has It Ignored Too Many Poor Households," *Economic and Political Weekly*, Vol. 50, Issue No. 30, July 2015. <https://www.epw.in/journal/2015/30/commentary/socio-economic-caste-census.html>; Srinivas, A, "The Targeting Challenge in India's Welfare Programs," *Live Mint*, 08 May 2019, <https://www.livemint.com/politics/policy/the-targeting-challenge-in-india-s-welfare-programs-1557294982507.html>

8 Discussions in 2017 in Maharashtra were undertaken during the author's work for the Centre for Policy Research, Delhi.

9 Ministry of Petroleum and Natural Gas (MoPNG), "Pradhan Mantri Ujjwala Yojana (PMUY)," Lok Sabha Unstarred Question No. 1537, 01 July, 2019, <http://164.100.24.220/loksabhaquestions/annex/171/AU1537.pdf>. However, news reports quoting OMC officials suggest that 3 refills per annum is the average, Narayan, S, "5 kg LPG refill to Power Ujjwala Scheme Under Modi 2.0," *Live Mint*, 28 May 2019, <https://www.livemint.com/news/india/5-kg-lpg-refill-to-power-ujjwala-scheme-under-modi-2-0-1559050401777.html>.

The second issue regarding recurring costs is that many beneficiaries are not intimated or are unaware about the subsidy transfer in their bank accounts. For example, when asked how much does an LPG cylinder cost, most households in the group discussions responded with the upfront non-subsidised payment amount, and not the subsidised cost. In the absence of paid messaging service about deposits and withdrawals offered by the banks, a customer will be able to see the subsidy entry only when they update their passbooks. But even with a passbook entry, the subsidy entry can be missed. Thus, despite the subsidy, households often perceive that they are paying the full cost of the cylinder.

Lastly, the price point of even the subsidised cylinder is often high for the target beneficiaries of the PMUY scheme. According to the analysis in the study commissioned by the Petroleum Planning and Analysis Cell (PPAC), the average reported willingness to pay across states was around INR 350 per cylinder. This is similar to the range reported – INR 220 – 350 per month – during structured field discussion in five villages in Junnar block, Pune district, Maharashtra.

While recurring costs are a big burden for low-income households, solutions can be deployed to overcome this challenge. For instance, reducing and delaying the level of loan re-payment for PMUY customers; increasing the subsidies offered on LPG cylinders for low-income households coupled with awareness campaigns about the subsidy transfer and removing LPG subsidies for high income groups; and encouraging parallel transition of urban households to piped-natural gas or induction-based cooking can help.

Finally, the third factor, supply security plays an important role in household decision-making. The government and OMCs have worked on improving the time taken to supply a refill to around two working days. However, field discussions in all three states suggest that time taken to supply a refill cylinder can range from a few days to over two weeks. In addition, doorstep or even village-level delivery is rare in rural areas. Hence, customers often have to bear the cost of a return journey – both for themselves and the cylinder. Often, this also requires the woman to be more reliant on male members in their families to get the cylinder, especially in societies where women are not allowed to travel on their own. Supply insecurity because of variation in the waiting period for a refill cylinder,

additional expense required for transporting the cylinder, and, sometimes, reliance on male members, can deter women from using LPG.

The recent government notification restricting LPG distributors to delivery to only those customers who fall within 15 km will only add to distribution delays. Higher share of customers with low-refill rates are also deterrents to opening new distributorships. In addition, there are also delays in allotting distributorships, though these are being addressed.¹⁰ Exploring community-led or local distribution centres, incentivising timely delivery, and penalising delays which are in the distributors control can help in improving service and the refill rates under PMUY.

The Government has made a good start by recognising clean cooking as a public health necessity and providing LPG connections to a large number of households. However, to convert mere LPG access to more substantive uptake and utilisation, requires urgent attention and solutions to the other two important issues – reducing recurring costs and improving service delivery.

¹⁰ Ministry of Petroleum and Natural Gas, "LPG Distribution," Lok Sabha Unstarred Question No: 1454, 1 July 2019, <http://loksabhaph.nic.in/Questions/QResult15.aspx?qref=1570&Isno=17>; Jacob, Shine, "Distribution Handicaps a hurdle for Centre's LPG Ujjwala Scheme," Business Standard, 12 July 2019, https://www.business-standard.com/article/economy-policy/distribution-handicaps-a-hurdle-for-centre-s-lpg-ujjwala-scheme-119071201429_1.html

Commentary D

Ujjwala 2.0 Needs to Also Include Non-Ujjwala Rural LPG Consumers

Abhishek Kar, Shonali Pachauri, Rob Bailis and Hisham Zerriffi¹¹

Much of the focus on Ujjwala has been on its success in bringing in new liquefied petroleum gas (LPG) consumers and its challenges in terms of translating their LPG adoption into LPG usage. However, this framing glosses over the fact that there are millions of general (non-Ujjwala) LPG users in rural India who have LPG connections but also require further incentives under Ujjwala 2.0 to increase their usage. This is based on our recently published research in the *Nature Energy* journal titled “Using sales data to assess cooking gas adoption and the impact of India’s Ujjwala programme in rural Karnataka”.

We used LPG purchase records of 25,000 consumers going back up to five years to assess the use of LPG in rural Koppal (Karnataka). We found that 50% of general (i.e. non-Ujjwala) LPG users purchased four or less (14.2 kg) LPG cylinders in the first year of ownership. Moreover, counter-intuitively, we find that experience (familiarity with LPG) does not lead to any consistent increase in LPG use. Roughly 30% of general users actually reduce LPG consumption in their second year. This suggests that about half of LPG users that paid the full amount (~INR 5,000) for an LPG connection (unlike PMUY beneficiaries) only use LPG as a secondary cooking fuel. So, while there is a growing consensus to focus on increasing use by PMUY beneficiaries in Ujjwala 2.0, these general LPG consumers in rural India, who also rely heavily on solid fuels like wood, crop residues and dung, should not be forgotten.

This poses a challenge to implementers. How should greater LPG use be promoted and incentivized for two

very different target audiences living side-by-side in rural India. One, the socio-economically marginalized PMUY beneficiaries who did not invest to get the LPG connection, with ~20% never returning for a refill. Two, the comparatively better-off and/or more motivated general LPG consumers who paid the steep LPG connection cost upfront (equivalent to three times an average rural family’s monthly per capita expenditures). It is admittedly a tough question to answer but there are policy options that could target each group effectively.

The government and oil marketing companies (OMCs) have been mindful and responsive to the critique of low PMUY refills and already took two major corrective actions. First, they launched small size (5 kg) cylinders to ameliorate the challenge of high one-time cost of refills. Second, they conducted thousands of LPG Panchayats to increase awareness about the benefits of switching from solid fuels to LPG. The 5 kg cylinders need not be limited to PMUY consumers and the Panchayats reached all in the village.

We suggest three additional initiatives. First, introduction of seasonal vouchers to increase sales in the summer (sales in Koppal dropped ~10% relative to the monsoon period). In areas of rain-fed agriculture, summer means less cash-in-hand and more available crop residue right after the harvest. The voucher’s value and any differentiation between PMUY and general rural consumers would need pilot-testing in order to arrive an efficient and equitable level.

Second, there needs to be targeted promotion of LPG based on consumer profiles. The OMCs have a wealth of data on consumers (PMUY vs. general, single vs. double-cylinder connection, and connection date). Most importantly, they have their LPG purchase history. This dataset should be leveraged beyond mere record keeping and accounting purposes; for example, OMCs could send out auto-generated customized audio/text messages based on consumers’ profiles and their last date of purchase. After all, the message to a PMUY customer who received her connection in 2018 but has not refilled a single cylinder should be quite different from a general customer with an LPG connection since 2016 using 4 cylinders per year. A multitude of different behavior change communications linked to the available consumer/purchase records should be field tested (including, though not limited to, randomized control trials) to arrive at the most effective content in terms of encouraging use.

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Third, location-responsive micro-sales outlets should be considered. The location of consumers at the village/hamlet level is already known to the OMCs. Geo-spatial analyses can flag consumer clusters where transportation to the local dealer is difficult while traditional home-delivery is also not cost-effective for distributors. One option for the government is to train and permit local and active self-help women groups to keep a small stock of cylinders for easy access. Replenishing this stock periodically would be more economically feasible for the

distributor, while it would be a new income source for rural SHGs and make it convenient for the end-users to purchase.

Of course, some parts of the solution lie outside the Ujjwala program. Without wider education and employment opportunities for women, the opportunity cost of women's time will always remain low, making it difficult for freely available biomass to compete effectively with alternatives that require a monetary/ cash payment. This will be true for both PMUY and general customers.

Commentary E

Ujjwala 2: A Way Forward for Sustainable LPG Supply

Jyoti Parikh¹²

Ujjwala 2 may be more difficult than Ujjwala 1 because the easier to access households are already covered under the first scheme. The focus now is on the remaining households that are poorer, far away and challenging to reach and shift to LPG. The concern raised by some that approximately 7 million PMUY households took 3 or less refills is also to be addressed.¹³ Household surveys show that it takes time to change old practices. Similar results have been observed for electricity uptake, which is also slow, where the journey starts with one or two bulbs before the households are fully electrified with various amenities.

Our study¹⁴ showed that the extent of transition correlates positively with income levels, negatively with distance from LPG Distributors, availability of plentiful and free biomass and intra-household gender attitudes. From our research, we have been able to understand the situation and issues that slow down the transition to LPG. These observations and understanding may be useful in developing a targeted approach to increase LPG usage and ensure transition in multiple districts of India.

Therefore to make Ujjwala 2 a success, we need to work on three major goals and understand what to do for each goal:

- The first goal is to extend the reach of Ujjwala to remaining households
 - i. Since the next lot of households may be poorer than Ujjwala 1, availability and option of 5 kg cylinders depending on affordability to reduce one-time cost will be useful.

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13 PMUY LPG Refill Data, Up to 03.06.2019, Retrieved on 22.07.2019 <https://pmuy.gov.in/registereduser.html>

14 Sharma, A., Parikh, J., and Singh, C. (2019). Transition to LPG for cooking: A case study from two states of India. *Energy for Sustainable Development*, [online] Volume 51 (ISSN 0973-0826), Pages 63-72. Available at: <https://www.sciencedirect.com/science/article/pii/S0973082619302947> [Accessed 22 Jul. 2019].

- ii. Increase the number of LPG distributors to reach faraway places. This will require higher expenses and increase in commissions for distributors to compensate for higher transportation costs and low density of consumers.
 - iii. Give an upfront subsidy of INR 1600/- for cylinders as in U1, but instead of adjusting the full amount of subsidy deduction for every cylinder upfront, adjust the price in small monthly installments of say INR 50/- or INR 100/-. Currently, when they pay the full cost for cylinders they worry that they are not getting a subsidy
 - iv. Encourage NGOs to approach men and senior women to explain the benefits and plead for freeing their women from drudgery and address the intrahousehold gender differences to improve male attitudes
- Second Goal is to increase the low uptake of the cylinders among Ujjwala 1 beneficiaries
 - i. The suggestions made above may also be useful to increase uptake of Ujjwala 1 households. However, the role of NGOs and local organisations explaining the benefits need to be stepped up. We have seen in the case of toilets that changing attitudes is necessary.
 - ii. Some household surveys need to be carried out, and best practices need to be compared across oil companies and districts to understand what works.
 - The third goal is to reduce subsidy burden so that the scheme should not blow up subsidy burden excessively. That may threaten the long-term sustainability of the scheme.
 - i. High-end consumers need to be excluded from obtaining subsidy. Increasing digitization would make it easier to identify such households. These households may be convinced and explained how if they give up their subsidy it could help others who are in actual need.
 - ii. Another simple way to reduce the subsidy is to stop subsidy to all customers who enjoyed it for 20 years or more. This information can be obtained from the customer registration database. A large chunk of people can be dropped at one

go by dropping subsidy for all the customers who received it for 20 years and beyond. In the subsequent years there will be those who got it after the year 2000 and so on

- iii. Ujjwala 2 consumers can be similarly phased out by 2040, and the nation can look forward to other challenges of development. LPG can join petrol and diesel as an unsubsidised commodity.
- iv. Another suggestion is to reduce the quota of 12 cylinders (14.2 kg) at a subsidised cost to 9 cylinders per household per year

Apart from these three goals, Ujjwala should develop ties with Saubhagya and benefit from increased electrification to promote electric cooking where LPG is difficult and costly to distribute. Electricity, if it comes from renewable energy, such as solar, wind, or hydro, can lead to low or no carbon solutions to India's cooking fuel problem.

Thus, goals for Ujjwala 2 should be to cover more households, ensure more uptake of cylinders per household where necessary, lower the subsidy burden, eventually remove the subsidy and withdraw government intervention.

Commentary F

Realising the Ujjwala dream

Sasmita Patnaik and Sunil Mani¹⁵

Over the last three years, the *Pradhan Mantri Ujjwala Yojana* has captured global attention owing to its ambition and pace of implementation. Under the scheme, almost 75 million subsidised LPG connections have been provided as of 18 July 2019. However, the typical rural Indian household still continues to stack LPG with biomass for its cooking needs. Indoor air pollution due to continued biomass use negates the health benefits of using LPG for households.

In 2018, the Council on Energy, Environment and Water (CEEW), in collaboration with National University of Singapore and Johns Hopkins University conducted a panel survey (ACCESS) of more than 9,000 rural households across the six major energy-access-deprived states, to understand the change in access to energy among households in the last three years. We found that while the proportion of rural households with an LPG connection increased two-fold, from 22 per cent to 58 per cent in 2018, 81 per cent households continue to use biomass for cooking. So, going forward, PMUY needs to focus on addressing affordability of use, ensuring home delivery of LPG cylinders, navigating the intra-household gender dynamics impacting the use of LPG and exploring linkages with livelihood opportunities for women.

Affordability of LPG

Affordability remains one of the biggest barriers to the sustained use of LPG, especially among the PMUY households who are socio-economically marginalised. Our research found that PMUY households use four cylinders per year (median) while the non-PMUY households with an LPG connection for the same amount of time use six.

As per the poverty line estimates by the Rangarajan Committee, almost 56 per cent of PMUY beneficiaries are below the poverty line, against 37 per cent in case of non-PMUY households. When we compare the monthly

median spending on cooking fuel, PMUY households spend INR 204 a month whereas non-PMUY households spend INR 325. This disparity indicates that PMUY households would require a greater level of financial assistance than non-PMUY households. A differential subsidy mechanism that weans away well-to-do household from the subsidy net and provides greater support to low-income households would be essential to support the sustained use of LPG. It would, therefore, be timely to design and conduct a set of pilots to determine the threshold level of subsidy at which various households are gradually able to use LPG exclusively. While exclusive use of LPG is necessary to eliminate indoor air pollution, the short-term interventions of the government should aim for primary use of LPG, defined as a certain number of refills by family size per year. Based on a case study by Institute of Economic Growth and University of Zurich, the average willingness to pay for an additional cylinder among households in Bikaner was about INR 350. Using this as the base, we could set a subsidy amount where a PMUY household's out-of-pocket expenditure is limited to INR 350. The process could be iterative to test how many households shift to primary use (approximately six refills a year) based on the subsidy provided. The remaining households could be provided additional incentives, depending on what is the barrier for them, to nudge them towards a similar use of LPG.

The other dimension of affordability is cash flow, which is an equally strong barrier for many PMUY households. To address this, the Ministry of Petroleum and Natural Gas (MoPNG) is allowing households use 5 kg and 14.2 kg cylinders interchangeably. In addition, reducing the amount adjusted against the loan under PMUY to INR 50 per refill to be recovered over a longer time period would help. Further, extending support to households through staggered payments and direct debit of subsidised refill amount from the linked bank account of the customers could be ways to address the challenge of cash flows. This would need to be accompanied by greater financial inclusion in practice by improving access to mobile money.

Availability of LPG

Our research shows that the reduction in the distance travelled to procure the cylinders increases the likelihood of households to use more LPG. However, despite the improvement in the number of households receiving

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home deliveries since 2015, it remains at 41 per cent in 2018, and the median distance to procure LPG stands at 4km one-way.

The number of distributors has also increased in the last three years. But low density of customers in rural areas, lower refills rates, and higher transport costs, mean that rural distributors need higher incentives or margins to be economically viable. The incentives could be a function of a few factors such as the average distance covered to deliver a cylinder, difficulty of terrain, quality of roads, number of refills per day, etc. to create an index of differentiated incentives. In addition, more cost-effective and decentralised distribution models through partnerships with self-help groups, farmer cooperatives, and local civil society organisations that have worked with communities, must be explored to improve LPG availability.

Influence the household decision makers

Socio-economic interventions are strongly influenced by the pre-existing social relations. Though PMUY provides connections in the name of the adult women of the household, only in one-third of the surveyed households women decide when to order an LPG cylinder; and only in 14 per cent of households, women place the order for the cylinder. Sustained use of LPG remains strongly influenced by the decision-making authority in the household prioritising household expenses. To achieve

sustained use, it would be prudent to also sensitise the primary decision-makers or the influencers in the households such as elder members and spouses of PMUY beneficiaries through platforms such as LPG Panchayat. Learning about the access to and use of LPG subsidies by the primary beneficiaries of PMUY - women of the households - could be useful to understand their agency in decision making as well the impact of such subsidy mechanisms in enabling the use of LPG. Based on current decision-making patterns, interventions could be designed to ensure the financial support to use LPG reaches the intended beneficiaries.

Income generating opportunities for women

Use of LPG for cooking would save women's time in cooking, cleaning and collection of biomass. Women could spend this time on productive activities. This would further provide them the economic independence to gradually transition to exclusive use of LPG. To enable this, the Ministry should partner with livelihood programmes to create opportunities in the LPG value chain for women, particularly in states with low refill rates.

Soon enough the LPG penetration in India would be at 100 per cent. Now, the goalpost must shift towards sustained use of the cleaner fuel, with requisite monitoring. Only targeted efforts for different customer segments at the institutional, community, and household level would lead to a smoke-free kitchen in every Indian household.

Commentary G

Health Benefits of PMUY: Challenges in Effective Implementation and Possible Solutions

Sudipto Roy, Rutuja Patil, Ajay Pillarisetti, Stephen Harrell,

David Levine, and Sanjay Juvekar¹⁶

Smoke from cooking with biomass fuels kills approximately four lakh people each year in India. PMUY took the first step towards universal clean cooking by enabling LPG connections. But avoiding these deaths also requires that these households stop using indoor *chulhas*. Thus, the next phase of the program should now focus on ending *chulha* use and transitioning to near-exclusive LPG use.

In our research, people generally like LPG stoves. They appreciate it as a modern appliance that cooks more quickly. However, most poor households with a new LPG stove continue to use *chulhas*. Most people are unaware of the serious health effects of *chulhas* and habits are difficult to change. Importantly, people have no choice but to use *chulha* when they run out of LPG. Many rural households typically require a day or more to book new cylinder and up to a week for the distributor to deliver it.

We recently conducted a few small studies of different strategies for encouraging clean fuel use. All of the studies were in a remote, tribal region of Pune district. One strategy we employed to shift households away from indoor *chulha* use worked surprisingly well. We selected 60 households who already had a single cylinder LPG connection and provided them with health messages on the health effects of *chulha* use. We offered these households a four-month free trial of a second cylinder. To participate, the household had to disable the *chulha* – that is, fill it in, destroy it, or move it outdoors. After the

trial period, 84% purchased a second cylinder in order to keep using it. None rebuilt their indoor *chulha*.

This success follows a prior study that provided a more generous LPG package (including a free stove and a second cylinder on loan) targeted to pregnant women. We targeted pregnant women because they are a particularly vulnerable group, because they benefit the most from clean indoor air, and because they already receive government benefits if they attend antenatal care checkups and deliver in a facility. In one arm of this study, we provided an additional benefit during pregnancy – one cylinder per month of free fuel until delivery. Women in this arm switched almost exclusively to LPG use, with *chulha* use on only 10% of measured days.

That study included several other arms that received health messages, a free stove, a free cylinder, and a loan of second cylinder. We also advised (but did not require) disabling the indoor *chulha*. Nevertheless, the majority of households did so. Finally, we also offered to sell participants the second cylinder we loaned them; the majority chooses to purchase it.

These findings lead us to recommend for future efforts:

- **Offer health messages and a loan of a second cylinder to households that currently own one cylinder.** To ensure large reductions in household air pollution, this free trial should be contingent on disabling any indoor *chulha*.
- **Provide an LPG connection and free fuel to any pregnant woman in India who still cooks on an indoor *chulha*.** This combination protects a vulnerable group and provides substantial health benefits at a relatively low cost. It also builds upon pregnancy-related benefits provided by Janani Suraksha Yojana.
- **Publicize the health risks of a smoky indoor fire.** These messages should go both to those using biomass and to others who have already transitioned to clean fuels. These messages should stress that the health benefits of LPG require that households disable any indoor *chulha*.
- **Increase logistical and financial support to rural distributors** in order to offset the increased costs of providing remote, rural homes with LPG refills.
- **Enable paying the distributor the LPG subsidy directly, so households pay only the subsidized**

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cylinder price. LPG has a subsidy, but it arrives after the fuel purchase. Many households find the unsubsidized lump sum cost of refills challenging.

- **Build in mechanisms to enable rapid evaluations** to assess the program's impact. Potential data sources include distributor sales records and rapid assessments of chulha use (by visual inspection when cylinders are delivered, for example). Building in continuous learning will permit India to move more quickly to safer cooking.

PMUY has provided LPG connections to millions of households. Now, the task is to transition all households (PMUY or otherwise) to near-exclusive LPG use and end chulha use. Our recommendations will create benefits beyond direct beneficiaries. Smoke from chulhas causes a large share of ambient air pollution. Thus, interventions that move households to near-exclusive LPG use may be among the most cost-effective means to improve the health of all Indians.

Commentary H

Raising awareness for clean cooking

E. Somanathan¹⁷

A recent comprehensive study (Global Burden of Disease – Measuring Air Pollution Sources) has confirmed once again that the single largest source of *outdoor* air pollution in India is not industry or transport, it is the cooking fires of households that use wood, dung, crop residue, or other solid fuels. The smoke from cooking fires does not magically stay indoors! Since 2016, the *Pradhan Mantri Ujjwala Yojana* (PMUY) has made tremendous progress in bringing access to LPG to over 70 million lower-income households. Such households have about 5 members on average, so the program has reached 350 million people, a number larger than the entire US population, in just a little over 3 years.

As part of a study I am conducting in rural Madhya Pradesh together with Professors Farzana Afridi of the Indian Statistical Institute and Sisir Debnath of IIT-Delhi, we surveyed 3000 households and found that those who have recently got connections under the PMUY are consuming about 3.5 cylinders of LPG annually. This is a considerable increase from nothing, but it is less than the average consumption of about 6 cylinders of previously connected users. These data are roughly consistent with figures given earlier by the government in Parliament. It is more or less what one would expect, since Ujjwala users are poorer on average than those who had got connections earlier.

An LPG consumption level below 8 cylinders per year shows that people are not using LPG exclusively but continue to rely heavily on smoky and polluting solid fuels. This “stacking” of a modern fuel on top of a traditional fuel that continues to be used is a very common practice that is seen in rural areas all over the developing world. Despite the greater trouble and longer cooking times, the older fuel continues to be used for various reasons – habit, cost, and the taste of some foods cooked over a fire.

Our survey found that very few, only 13%, of people knew that air pollution has long-term effects on health. In fact, it increases the risk of very common and deadly illnesses such as heart disease, pneumonia, strokes, asthma, lung cancer, and chronic obstructive pulmonary disease. This suggests that if people were more aware of the long-term health effects of cooking with solid fuels, then the practice of fuel-stacking may be considerably reduced. We are presently in the process of conducting a randomized controlled trial in which a randomly selected set of households is given information about the health effects of cooking smoke. We will be monitoring LPG uptake by these households as well as in a “control” group that did not receive the information campaign. By comparing the change in LPG uptake between the two groups, we will be able to measure the impact of the health information campaign.

Another reason that LPG use may be limited is that people may not be aware that they are getting a subsidy for each LPG cylinder. This is because they pay the full market price at the time of purchase and receive a transfer in their bank account for the subsidy amount after two or three days. The oil marketing companies have an automated system that send a text message to the phone linked to the account when the transfer has been made. But this number is not always updated and messages are in English, so it is possible that many people remain unaware of the direct benefit transfer they are getting with each cylinder purchase. In our study, we add this information to a third group of households in order to see how much of an effect this has on LPG uptake.

About a third of the households we surveyed still did not have LPG connections. We will be measuring whether the information campaigns induce such households to get connections or to buy electric induction stoves, another non-polluting cooking option.

Our information campaign is being done through household visits by village health workers (ASHAs) who have credibility. In addition, mass media such as TV and radio should also be used on a large scale to spread awareness of the dangers of cooking with polluting fuels.

Electric cooking is spreading in India as the electricity supply network expands and quality gradually improves. Induction stoves are now a cheap option. To further help disadvantaged households eliminate their reliance on polluting solid fuels, it is important for the government

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to promote electric cooking. This can be done by reimbursing the electricity bill for poor consumers upto a limit of 100 units per month, and by subsidizing cooking appliances such as induction stoves. The consequences

of air pollution are huge and tragic – over a million Indians die every year because of it. All avenues to reduce it quickly should be explored.

Commentary I

Ujjwala 2.0: What should be done next?

Alok Tripathi and Ambuj Sagar¹⁸

Stopping the use of wood and other solid fuels for cooking and other household uses is the single most important step we need to take to mitigate air pollution and its staggeringly high health impacts in India. In addition to its ill effects on the households themselves, it accounts for 25-30% of exposure to outdoor particulate matter pollution in the country. The health costs are enormous: about 480,000 premature deaths annually due to direct exposure of the households, and another 270,000 due to 'indirect' exposure outdoors. The bulk of this could be attributed to cooking with fuels like firewood, dung, and agriculture residue. Any government effort that effectively reduces the use of solid fuels in cookstoves should hence be recognised as an important pollution control and public health initiative.

Launched in May 2016, the *Pradhan Mantri Ujjwala Yojana* (*Ujjwala* henceforth) is the world's largest programme to provide access to clean cooking energy to poor people. Under this scheme, a financial assistance of INR 1,600 was provided to each eligible household under the Socio Economic and Caste Census (SECC) list to underwrite an LPG (liquefied petroleum gas) connection with one of the Oil Marketing Companies. A budgetary provision of INR 80 billion was initially made to cover 50 million households under the scheme. Having already achieved this initial target, the government revised the target to 80 million to be achieved by 2020.

Although the government has been successful with its ambitious effort to provide LPG connections to the poor, the beneficiaries' inability to afford sustained use of LPG cylinders remains a concern.

There are three main barriers to access of LPG by poor households: accessibility facilitated by LPG distributorship networks, affordability in terms of high upfront cost and high refill cost, and awareness about the impact of

use of LPG. *Ujjwala* primarily tackles access, and partly affordability as it takes care of upfront expenditure making a new connection affordable and convenient. However, access is only the first step towards regular usage of LPG – it is a necessary, but not a sufficient, condition to bolster usage. To ensure sustained use of LPG by poor households requires additional interventions – an *Ujjwala* 2.0.

The affordability issue is particularly salient for poor communities since they have access to free fuel (wood, dung, crop residues) and will switch back to such fuel if LPG prices are too high for them. But addressing this issue requires the government to walk the fine line between providing LPG at a cost that the poor can afford and its budgetary constraints. The latter is especially of concern since more than 50% of the country's LPG requirement is met through imports. Any solution has to make LPG affordable to poor without increasing the financial burden on the government.

The provision of universal subsidy to all LPG consumers reduces the subsidy rate, since the overall amount available for subsidy is shared across a large number of beneficiaries. The reduced subsidy rates are also regressive: LPG remains unaffordable for the poor, while the benefits accrue to the relatively wealthy.

We propose that *Ujjwala* 2.0 should have a two-tier, differential pricing for households: LPG at subsidised price for identified poor households, and at the unsubsidised price for other consumers. In order to achieve our objective, the subsidy rate for the identified poor households should be based on their willingness and ability to pay. Our analysis of the National Sample Survey (NSS) data suggests that households should be willing to use LPG as the primary cooking fuel, if the fuel costs are within 4% of their total monthly expenditure. Subsidies could be calculated to ensure the prices that households face meet this condition. The quantity of subsidised LPG could be restricted to 126 kg, or nine cylinders, per annum. The delivery of the subsidy would continue to be through conditional cash transfers (the existing PAHAL scheme), minimising risks of diversion of subsidies to non-intended beneficiaries.

LPG subsidy should not be seen as a financial burden, as provision of LPG results in improved health outcomes for poor households, especially women and children. Access to LPG also results in improved economic productivity of the household, due to reduced time spent in cooking.

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The government expenditure on the health system also reduces with the reduction in diseases attributed to household air pollution. Thus subsidy provision for the poor to ensure regular use of LPG for cooking should be seen as a social investment by the government.

There still remains the third barrier discussed above, namely, awareness. The government had in the past launched the 'Give It Up' campaign, requesting well-off people to give up their LPG subsidy voluntarily and to create awareness among them about the benefits to the poor households switching to clean fuels. The scheme

was a huge success, as more than 10 million consumers gave up their LPG subsidy entitlement. Under *Ujjwala* 2.0, the government must include intensive education campaigns sensitising the general public about the need for targeting the subsidy to the poor only, myths about the taste of food cooked using LPG, and safe handling and conservation.

Such an approach for *Ujjwala* 2.0 has the potential to take the outstanding success of the *Ujjwala* programme to the next level, and help the poor gain from the benefits of the transition to clean cooking energy.



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