Promoting Clean and Affordable Cooking
Smarter Subsidies for LPG

ALOK TRIPATHI, AMBUJ D SAGAR, KIRK R SMITH

The health effects of cooking with biomass and coal are now well-recognised. Although more people use LPG, the number of those using biomass and coal has remained static for nearly 30 years. While LPG subsidies have played an important role in expanding access to this cooking fuel, directing the subsidies to the poorest and the most vulnerable remains a fraught matter. This article proposes that consumers opt in for the subsidy by self-certifying that their household income is less than an amount set by the government, instead of the opt-out approach followed today.

Cooking with biomass and coal in India is now recognised to cause major health problems with women and their young children in poor populations facing the greatest risk. The recent Global Burden of Disease Study estimates that there are more than 10 lakh premature deaths each year from household air pollution due to these polluting cooking fuels with another 1.5 lakh due to their contribution to general outdoor air pollution in the country (Lim et al 2012; Chafe et al 2014). Although the fraction of the Indian population using clean cooking fuels, such as LPG, natural gas and electricity, is slowly rising, the number using polluting solid fuels as their primary cooking fuel has remained static for nearly 30 years at about 700 million. This has been termed “India’s Chulha Trap” and indicates that simply waiting for development to solve the problem has not been effective (Smith and Sagar 2014).

These health estimates compare the pollution exposures and consequent health impacts of using solid fuels with those of people using the most prevalent clean cooking fuel, liquefied petroleum gas (LPG)—which, essentially, is the gold standard for household cooking energy both for reasons of convenience. Thus, enhancing the availability of, and access to, LPG has been the primary way to reduce the premature deaths due to household air pollution caused by polluting dirty cooking fuels since the health impacts of solid fuels could just as well be termed the health impacts of not using LPG.

Status of Household LPG Today

Many countries, including India, have been making significant efforts to enhance the use of LPG for household cooking in their populace.

Consumption of LPG in the country was about 16 million metric tonnes (mmt) during the financial year 2013-14 (mopng 2014). Out of the total LPG sales in the country, around 90% is for household use and rest for non-household sectors such as glass-cutting industries and petrochemical industries. Although the Government of India (goi) has allowed the sale of LPG in the household sector by private companies (known as parallel marketers), their share in total LPG sale is minuscule in comparison to the share of the three government oil marketing companies (omcs): Indian Oil Corporation, Bharat Petroleum Corporation and Hindustan Petroleum Corporation. This is because the goi provides subsidy to every LPG consumer of the country, if he/she is registered with omcs.

The omcs market LPG in the household sector through a network of 15,267 distributors spread across the country (mopng 2015). At present there are two types of distributorship models in the country. Regular distributors are appointed to sell LPG primarily in urban and semi-urban areas. In order to increase LPG coverage in rural areas, the government launched a smaller distributorship model in 2009 known as the Rajiv Gandhi Gramin LPG Vitaran Yojana (rgglvy). As on 31 December 2014, just 4,058 rgglvs (or Rajiv Gandhi LPG Gramin Vitaran) had been commissioned across the country (mopng 2015), with another 5,000 rgglvs at various stages. As a result of these and other efforts undertaken by the goi, LPG coverage has increased substantially. There are over 170 million LPG connections in the country, covering almost two-thirds of households (mopng 2015), although in many cases, this LPG may be used alongside other traditional—and cheaper—options such as biomass, which is referred to as cooking fuel “stacking.” Indeed, the 2011 Census indicates that only 29% of households (11% of the rural, 65% of the urban) use LPG as their primary cooking fuel. Everyday more than three million LPG cylinders are delivered throughout the country making it one of the largest LPG delivery networks in the world. However, the use of LPG as the...
primary fuel in rural area is still low, especially in less-developed states such as Uttar Pradesh (UP), Bihar, Chhattisgarh and Odisha where LPG coverage is merely 6%, 3%, 2% and 3%, respectively.

The traditional system of providing gas cylinders at subsidised cost has an unfortunate side-effect: a significant fraction of the cylinders has been diverted for non-household uses since the subsidised price is much lower than the market price of LPG.

Streamlining and Tightening

On 1 January 2015, the Ministry of Petroleum and Natural Gas launched the Direct Benefit Transfer (DBT) scheme called Pahal in the entire country. As of that date, all LPG cylinders sold at market price and any subsidy will be transferred directly to the consumer in his/her bank account. (The difference between the market price and the subsidised price in January was Rs 288.) Although the main objective of this scheme is to reduce the leakage of the subsidy for unauthorised use, it was also expected that a small percentage of LPG consumers would not join the scheme and thus would be excluded out of subsidy regime.

It is expected that the Pahal scheme would reduce the Rs 50,000 crore annual LPG subsidy burden by 10%–15% (that is Rs 5,000–Rs 8,000 crore); partly from reduction in diversion to non-household purposes and partly due to some people not participating and thus purchasing at full market price. A hefty sum indeed.

The Pahal scheme is a big step forward in that it can help staunch the flow of subsidies to non-household LPG consumption. Now the next important issue to be addressed is the targeting of LPG subsidies in the country. As the 2012–13 Economic Survey noted (MoSPI 2013), in rural areas, 0.07% of the subsidies go to the poorest quintile as opposed to 52.6% for the richest quintile. In urban areas, lowest quintile still receives only around 8.2% of the subsidies. Thus while LPG subsidies have played an important role in expanding the access to LPG, directing the subsidies to the poorest and the most vulnerable would confer the greatest benefits of these expenditures. In fact, the Union Finance Minister in his 2015 budget speech noted that “[s]ubsidies are needed for the poor and those less well off.”

In Table 1, based on the 68th round report of the National Sample Survey on monthly per capita expenditure, we have analysed the fraction of the monthly mean household expenditure (MMHE) on LPG (monthly usage of 7.9 kg), if bought at an approximate market rate of Rs 70/kg.

### Table 1: Monthly Mean Household Expenditure on LPG

<table>
<thead>
<tr>
<th>Decile of Expenditure</th>
<th>Monthly Mean Household Expenditure (MMHE)</th>
<th>Percentage of MMHE Required for LPG</th>
<th>Requisite Subsidy (Rs/kg) to Keep Fuel Costs &lt;5% of MMHE</th>
<th>Requisite Subsidy (Rs/kg) to Keep Fuel Costs &lt;10% of MMHE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>0–10</td>
<td>2,909</td>
<td>3,702</td>
<td>19.1</td>
<td>15.0</td>
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<td></td>
<td>3,828</td>
<td>5,143</td>
<td>14.5</td>
<td>10.8</td>
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<td>20–30</td>
<td>4,432</td>
<td>6,268</td>
<td>12.5</td>
<td>8.9</td>
</tr>
<tr>
<td></td>
<td>4,987</td>
<td>7,674</td>
<td>11.1</td>
<td>7.4</td>
</tr>
<tr>
<td>40–50</td>
<td>5,566</td>
<td>8,683</td>
<td>10.0</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>6,204</td>
<td>10,030</td>
<td>8.9</td>
<td>6.6</td>
</tr>
<tr>
<td>60–70</td>
<td>6,991</td>
<td>11,721</td>
<td>7.9</td>
<td>6.7</td>
</tr>
<tr>
<td>70–80</td>
<td>8,062</td>
<td>14,089</td>
<td>6.9</td>
<td>6.3</td>
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<td>80–90</td>
<td>9,837</td>
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<td>90–100</td>
<td>17,242</td>
<td>35,953</td>
<td>3.2</td>
<td>3.5</td>
</tr>
</tbody>
</table>

NS: No Subsidy. 5 Monthly household expenditure data calculated from the monthly per capita expenditure data from the 68th round of the National Sample Survey (MoSPI 2013); average family size in urban areas: 4.6 persons; average family size in rural areas: 4.9 persons (2011 Census); monthly usage 7.9 kg bought at an approximate market rate of Rs 70/kg.

Summary implications of the table:

- For the richest 60% in rural areas and the richest 80% in urban areas, the use of LPG for household energy already would account for less than or equal to 10% of the monthly household consumption.
- For the poorest 10% in rural areas, however, the cost of unsubsidised LPG would be close to 20% of monthly household consumption.
- Alternatively, even if households are willing to commit only 5% of their total monthly expenditure on cooking fuel, the richest 40% urban households still do not need a subsidy.

Under current conditions, however, everyone receives the subsidy, no matter what their income. The table, however, highlights the need to target the subsidy to the poor rather than utilising government funds to continue subsidies to better-off households.

In order to reduce the number of well-off consumers from benefiting from the subsidy regime, the government currently provides the “Opt out of Subsidy” option. Under this scheme, a person wishing to give up the subsidy can do so either online or by making a request directly to his LPG distributor. This is a voluntary scheme and so far over 7,50,000 consumers have given up the subsidy.

### Smarter Subsidies

We suggest that the govt in addition to the Pahal scheme should also change the default nature of household LPG connection to help focus the subsidy to those who need it the most, in line with the recognition by the finance minister to rationalise subsidies.3

Currently, every household LPG connection issued to a family by omcs is a subsidised connection in which twelve 14.2 kg cylinders per annum are available to LPG consumers at subsidised price. In our suggested modification, as a default, all household LPG connections (new as well as existing ones) would be non-subsidised connections. In other words, customers would not automatically be eligible for subsidy. In order to avail of the subsidy, consumers will have to opt in for the subsidy by self-certifying that their household income is less than some specific amount, which would have to be determined and what we call here the national LPG threshold (nlt). Once the person self-certifies that he/she is eligible for the subsidy,4 he/she will then be able to enrol under Pahal scheme to receive the direct subsidy transfer in his/her bank account. This will be done without any independent verification, that is, on the honour system.

Behavioural studies have shown that choice of default options (that is, opt-in or opt-out) can have a significant impact.
on the outcome and therefore the default option becomes an important policy choice (Thaler and Sunstein 2008). For example, an opt-out model of organ donation (where the default option is agreeing to donate one’s organs, but with a choice to opt out of the donation process) results in much higher levels of participation than an opt-in model (where the person has the option to sign up to donate their organs, but if they do not do so, the default is to remain outside the organ donation programme—Johnson and Goldstein 2003). Similarly, differences in programme participation are observed between opt-in and opt-out models of pension savings, where the participation in a pension scheme is much lower if people have to actively opt in to the scheme versus a model where the default is participation but giving people the choice to opt out (Nessmith, Utikus and Young 2007).

Such a difference in outcomes obviously has significant public policy implications. If a particular option is preferable from a public policy perspective (for example, higher levels of pension-scheme participation or organ donation), then the choice of default policy can “nudge” (or “budge”) individuals into making the preferred choice (Oliver 2013). This is the rationale behind our proposal to move from an opt-out to an opt-in model for the subsidy.

**Special Case of the Poorest Households**

One income threshold that is now widely used and accepted in India is the designation of national poverty line. Few of the households below the national poverty line, however, use LPG even at the subsidised rate because it still is a big part of their low incomes (especially if living in areas where free or nearly free biomass can be gathered for cooking fuel).

These poorest households, given their particularly precarious economic conditions and high vulnerability medical expenditures due to disease, might require special consideration. What might that look like? For 2011–12, for rural areas the national poverty line using the Tendulkar methodology is estimated at Rs 816 per capita per month in urban areas. Thus, for a family of five, the all-India poverty line in terms of consumption expenditure would amount to about Rs 4,080 per month in rural areas and Rs 5,000 per month in urban areas (although the poverty lines vary from state to state because of interstate price differentials) (Planning Commission 2013). We can conclude, therefore, that families below the poverty line would be at the third decile class and below in case of rural areas and in the second decile class and below in urban areas, as shown in Table 1.

The percentage of persons below the poverty line in 2011–12 was estimated as 25.7% in rural areas, 13.7% in urban areas and 21.9% for the country as a whole. In terms of number India had 270 million persons below the national poverty line (Planning Commission 2013).

<table>
<thead>
<tr>
<th>Rural (Household Size 4.9)</th>
<th>Urban (Household Size Is 4.6)</th>
<th>Subsidy Required to Keep Fuel Expenditure Below 5% for BPL Families and 10% for Others (the BPL Comes in at the 3rd Decile for Rural and 2nd Decile for Urban)</th>
<th>Number of Households with LPG in 2027 (Assuming 70% of Rural Households and 90% of Urban Households Will Have LPG, Millions)</th>
<th>Total Annual Subsidy Burden (Crore Rupees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,909</td>
<td>3,943</td>
<td>50 50</td>
<td>13.8</td>
<td>11.6</td>
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<tr>
<td>3,888</td>
<td>5,143</td>
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<tr>
<td>4,432</td>
<td>6,268</td>
<td>25 25</td>
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<td>11.6</td>
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<td>4,987</td>
<td>7,474</td>
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<td>5,566</td>
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<td>13.8</td>
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<tr>
<td>6,204</td>
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<td>6,991</td>
<td>11,721</td>
<td>NS NS</td>
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<td>8,062</td>
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<td>9,837</td>
<td>17,906</td>
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<td>13.8</td>
<td>11.6</td>
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<tr>
<td>17,242</td>
<td>38,298</td>
<td>NS NS</td>
<td>13.8</td>
<td>11.6</td>
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<tr>
<td><strong>Total subsidy burden</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grand total</strong></td>
<td></td>
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</tbody>
</table>

**NOTES**

(1) Persons applying for new connection would have to self-certify that their household income is less than the poverty line if they wish to receive the standard subsidy designed to keep net LPG costs no more than 8% of expenditures. If he/she possesses the BPL card, he/she would submit the relevant documents also to be eligible for an additional subsidy to keep LPG costs less than 5% of expenditure.

(2) For BPL cardholders, the information would be verified from the state government which maintains BPL households list.

(3) For BPL households, the level of subsidy is Rs 50/kg.

(4) For non-BPL households below the NLT a subsidy of Rs 25/kg (half the rate under the BPL) would keep the maximum cost at 8% of income for any Indian family, and much less for most.

(5) If above the NLT, no subsidy would be available.

**Impact of Smart Subsidies**

What would the LPG subsidy in the nation look like once such a “smart subsidy” programme is in place for a few years? A detailed answer would have to consider changes in income, population, household size, urbanisation, oil price, and status of alternative fuels including electrification and piped natural gas, among other factors.

Therefore, we suggest that as a further refinement of the subsidy regime, a separate category become available for the poorest households. The subsidy provided to such households would be equal to an amount, which would make their expenditure on cooking fuel less than 5% of their total monthly expenditure. Thus, for a market price of LPG at Rs 70 per kg, this amount may be fixed at Rs 50 per kg, which is close to the requirement for the poorest decile class.5

**Our Proposed Approach**

Therefore our full proposed revised approach towards targeting subsidy would be:
For illustration, however, using Table 1 and the Indian Energy Security Scenarios of the Planning Commission, that 70% of the 197 million rural households and 90% of the 129 million urban households projected for 2027 were to use LPG, compared to 13% and 65% now, the total subsidy burden calculated is shown in Table 2 (p 83) at about Rs 46,000 crore. This is substantially less than what it would have been if the subsidy is provided to all LPG consumers as being done today, and with much more social benefit and a larger population. Put another way, the total national subsidy would drop from Rs 560 to Rs 320 per capita with much better targeting of the benefits. Of course, in reality, by that year incomes would likely have risen substantially for every group, reducing the subsidy required unless LPG prices rise even faster.

Instead of the richest half of the country receiving the subsidy as now, it would be targeted to the poorest 60% in rural areas and the poorest 40% in urban areas. No group would pay more than 8% of income on LPG in the entire country and no group in the bottom half of incomes would pay more than 5%—most less. It would create a tremendous incentive to switch to this clean fuel for hundreds of millions of the poorest and most vulnerable groups, although of course with consequent challenges to create the infrastructure for the purpose.

Having customers opt in to the subsidy scheme—requiring certain conditions to be eligible—and then taking the subsidy amount that is saved and directing it to the more needy sections of society is a smarter way of distributing subsidies and ensuring large concomitant positive health and developmental impacts to this group. And this can be done such that the total subsidy bill to the govt does not increase and, indeed, decreases over time. One can also imagine that customers have to certify their eligibility every year so that as households grow richer and go above the cut-off level (or in the case of some urban areas, move to piped natural gas or electric induction cooking), the subsidy is redirected to the poor. And as the BPL households increase their income over time, their subsidies would reduce as well. The point here is that subsidies disappear as the population’s income rises. In addition, by 2027 advances in national data collection systems may facilitate implementing smart subsidies even more.

In sum, while there has been much progress in the past decades in bringing clean cooking energy to the Indian populace facilitated by subsidies, the time has come to take the programme to the next level and use smart subsidies to ensure the maximum possible development and health benefit for a given amount of subsidy.

Indeed, if the LPG expenditure of the government can be targeted to poor people more smartly, it should be termed social investment rather than subsidy, in keeping with other public investments in health and welfare, such as primary healthcare and schools. The national health and social benefits could also be immense.

NOTES
2 We use Rs 70/kg as an estimate of the average market price circa 2015 (since the price has fluctuated over recent times between Rs 50/kg and Rs 90/kg).
4 Of course, if reliable household income data were available, self-certification would not be needed, but this is not the case in India today. However, if current trends in IT-enabled data collection continue, this might change in the near future.
5 The steps taken by the Ministry of Petroleum and Natural Gas to offer smaller cylinders (5 kg) should also make it easier for the poor to access LPG, since the immediate outlay for a small cylinder is lower. Developing even smaller cylinders—2 kg or even 1 kg—will further help. Expansion of direct household delivery of cylinders in rural areas, as already exists in urban areas, would also enhance usage.
6 The identification of eligible families may also be done on the basis of appropriate indicators through the Socio Economic and Caste Census 2011 (http://sec.gov.in), if the BPL card is phased out in any state.
7 See http://indiaenergy.gov.in/.
8 Total projected households using LPG = 254 million. Average subsidy rate for 2014-15 = Rs 30 per kg approx. Thus total subsidy burden = 25.4*7.9*12*30 = Rs 72,237 crore.

REFERENCES

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