

Pradhan Mantri Ujjwala Yojana: What we need to know

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The central government's flagship programme to provide free LPG connections has been in operation for 2 years providing more than 3.5 crore free LPG connections to poor women. This bold and much needed scheme is a major step to reduce indoor air pollution, drudgery faced by women and extend LPG access. However, little is known about the progress and impact of the scheme, especially with respect to whether the investments have translated to sustained use of clean fuels among poor households. This calls for more information in the public domain and a comprehensive evaluation of the scheme to inform mid-course correction and realise the benefits of this social investment.

1 Background

The Pradhan Mantri Ujjwala Yojana (PMUY) was launched in 2016 to distribute five crore LPG connections to poor women 'free of cost' by March 2019. As of early April 2018 more than 3.5 crore connections were provided under the scheme. Encouraged by the rapid release of connections, the central government revised the target and scope of the scheme to eight crore connections by March 2020. Under the scheme, the union government bears the connection cost of Rs. 1600 per connection, and each household pays about Rs. 1500 for the stove and the first LPG cylinder.

The announcement of PMUY and the recent increase of its target, marks a significant shift in the government's approach to providing access to clean cooking fuels. For the first time, it chose to aggressively pursue providing modern cooking fuels to all Indian households. This is an important step since household air pollution (HAP) arising from combustion of solid fuels for cooking is a major contributor to four of the top five causes of mortality and morbidity in India, and HAP is also a significant contributor to outdoor air pollution (IHME, 2017; ICMR; PHFI; IHME, 2017; IIT Bombay, HEI, IHME, 2018). Recent research suggests that providing clean cooking fuels to all can be a highly cost-effective health intervention (Smith & Sagar, 2014; Prayas, 2018). In addition, collection and use of solid fuels for cooking increases the drudgery and adversely impacts time use by women (Desai & Vanneman, 2016; Desai, Dubey, Joshi, Sen, Shariff, & Vanneman, 2010). The scheme also aims at addressing these issues. (PIB, 2016a)¹.

The LPG sector has seen a wave of schemes over the last few years targeted at various objectives such as eliminating spurious consumers, effective subsidy targeting and delivery through schemes such as PAHAL and the Give-it-up campaign². While there have been some issues such as differing claims on the actual

¹ Please see the official website of PMUY at <http://www.pmujiwalayojana.com/about.html> (accessed April 3, 2018)

² See <http://petroleum.nic.in/marketing/schemes/lpg-schemes> (accessed April 3, 2018) for a list of LPG related schemes

saving from schemes like PAHAL (CAG, 2016), it is generally accepted that these have helped reduce leakages in the LPG delivery system. These reform measures and relatively lower crude oil prices provide an opportunity for the concerted connection drive to translate to sustained adoption of LPG for many.

It has been about two years since the launch of PMUY, and it is a good time to assess the program and try to identify necessary course corrections, if any, to ensure that the program's objectives are met. This is also important because the program involves a public investment of over Rs. 12,000 crore³ and it is necessary to ensure that this investment realizes its social objectives.

2 Assessing PMUY

There are two levels at which PMUY can be assessed: the first is against the overtly stated objective of disbursing connections, while the second is against the intended objective of tackling the adverse health effects of using traditional solid fuels.

On the first parameter, Table 1 shows the status of LPG connections in the country when PMUY was launched. Given that 1.6 crore LPG connections were released to BPL households under various state government schemes till April 2016, it is evident that PMUY's target of 5 crore connections to poor households in 3 years is very ambitious and a major step to increase LPG connection coverage among poor households.

Table 1: Status of LPG connections in the country as on April 1, 2016

Parameter	Total	Urban	Rural
No. of registered LPG connections in crore	20	-	-
No. of active LPG connections in crore	17	10	7
% of households with active LPG connections	62%	118%	36%
No. of BPL households covered under schemes sponsored by state governments and OMC CSR funds in crore	1.6	-	-

Source: (Lok Sabha, 2016a; PPAC, 2016). Note: OMC stands for Oil Marketing Company and CSR stands for Corporate Social Responsibility

In this regard, PMUY has broadly been on track. Over 70% of the target of 5 crore connections have been disbursed in about two-thirds of the intended time. In fact, almost 60% of the new LPG domestic connections given across the country in 2016-17 were PMUY connections (PPAC, 2017). This encouraging start to the programme has prompted the government to increase the target to provide 3 crore additional connections over an additional year.

However, there have also been some concerns raised around identifying the beneficiaries under the scheme using the Socio-Economic Caste Census (SECC) as the basis⁴. This includes concerns around errors

³ This accounts for about 7% to 10% of the overall budget outlay for the Ministry of Petroleum and Natural Gas (SCPNG, 2018, pp. 8-10).

⁴ Beneficiaries under PMUY are identified based on whether their name appears in the SECC database of 'deprived' households. These are households who meet certain deprivation criteria as stipulated by the SECC.

in the SECC data and pressures from the oil-marketing companies (OMCs) to meet and exceed targets resulting in dilution of beneficiary identification processes (FLDI, 2016; FLDI, 2016a).

While Aadhaar based 'know-your-consumer' steps and bank account details of consumers are necessary to prevent spurious connections and LPG diversion, they can be another barrier for poor households as highlighted by studies (Parikh, Sharma, Singh, & Neelakantan, 2016). Some steps have been initiated to co-ordinate Aadhaar applications with PMUY applications (MoPNG, 2017). Nevertheless significant efforts and time would be needed to extend connections to poor households in the states of Uttar Pradesh, Bihar, Rajasthan and some north-eastern states, which have Aadhaar coverage less than 88%, LPG coverage as a primary fuel less than the national average and also relatively more socio-economically deprived households in rural areas (Unique Identification Authority of India, 2018; Ministry of Rural Development).

Notwithstanding such concerns, it is fair to conclude that the objective of providing connections to poor households is broadly being achieved. However, the real social objective of a scheme such as PMUY can only be achieved if households not only get LPG connections but use it for most, preferably all, their cooking needs on a sustained basis. Converting connections to sustained use requires overcoming a few barriers, such as affordability, reliability, accountability and viability (Dabadge, Josey, & Sreenivas, 2016).

A programme such as PMUY is also perhaps the largest ever social programme undertaken by the OMCs, which is challenging for them but also presents them an opportunity to significantly deepen their LPG market. To be able to assess these dimensions of the programme, it is necessary to have access to fairly rich data in the public domain. It is here that it becomes challenging to assess the effectiveness of PMUY.

2.1 Information gaps

PMUY connection data is provided only at a state-level and no district-wise disaggregation is available. In contrast, other government schemes such as the Deen Dayal Upadhyay Grameen Jyoti Yojana (DDUGJY)⁵ and Pradhan Mantri Awas Yojana⁶ (PMAY) provide information about the progress of the respective schemes at the district and village level. Progress is regularly tracked for the various programmes under the household electrification scheme and infrastructure development schemes such as DDUGJY, Soubhagya and IPDS using local representatives and updated on the respective portals (MoP, 2015; MoP, 2016). This makes it easier to assess the progress of these schemes and provide feedback to improve the programmes.

The most important data-point to understand whether PMUY beneficiary households are using LPG regularly is the rate of LPG consumption by such households. Such data is not reported on a regular basis for all states. The only information available for the rate of consumption for PMUY households is an

⁵ DDUGJY portal and the GARV dashboard provide information on key performance indicators up to the village level. For more information please see: <http://www.ddugjy.gov.in/mis/portal/index.jsp> and <http://garv.gov.in/dashboard> (accessed April 9, 2018)

⁶ Physical progress for PMAY is also reported till the Panchayat level. For more information, please see: <http://rhreporting.nic.in/netiay/PhysicalProgressReport/Panchayatwiseincopletesanction.aspx> (accessed April 9, 2018)

average estimate for consumption for one year from the date of release of the connection. The average estimate for the country, released by the Ministry of Petroleum and Natural Gas (MoPNG) is 4.32 14.2 kg cylinders in the first year of adoption (Lok Sabha, 2018). Estimates for states with a rate of consumption higher than the average were also provided. However, it is not clear from this estimate whether households consistently use the fuel after adoption. An estimate of number of refills from PMUY connections for every year, and not just the first year of adoption, would have been a more appropriate data point to analyse LPG use by PMUY households. The information should also be provided on a disaggregated manner (state, district, block) to help address barriers to adoption.

Indeed, even at a national level (i.e. going beyond just PMUY beneficiaries), LPG consumption data is only disaggregated to a state level, but is not available along the crucial axis of urban and rural households. Since over 85% of rural households used biomass, coal or kerosene (in comparison to about 25% of urban households) as their primary cooking fuel according to the 2011 Census, it is clear that this problem is primarily rural in nature and therefore, a rural-urban breakdown of overall LPG consumption and that of PMUY households is critical to understanding progress in uptake of modern cooking fuels.

Other relevant information such as service quality related information (average time taken for providing connections, average time for refills, proportion of consumers receiving home delivery services, instances of underweight cylinders reported by distributors and consumers, number of complaints received, complaints addressed, nature of the complaints etc.) and safety related information (inspections conducted, accidents reported, fatalities, compensation/insurance claims settled etc.) are also not publicly available. This information should be collated and made available for each distributor by the OMCs with aggregated reports at the state, district and block level for each type of distributor.

Considering that PMUY is a bold, new initiative, it is to be expected that there would be some learning along the way and need for course correction. Availability of detailed data about PMUY would enable providing useful constructive feedback to the programme to facilitate such a course correction through a richer variety of inputs. In the absence of such information, PMUY can only be assessed based on indirect indicators and scattered data available from various sources. This is attempted in the next section, though the findings can only be seen as indicative rather than firm, given the indirect methods used in the analysis.

3 Analysis of PMUY

3.1 Unrealistic connection coverage

A connection-focused approach has resulted in a few interesting anomalies. According to data submitted in Parliament, 'active'⁷ LPG connections in urban India in November 2015 (a few months before the commencement of PMUY) were already more than the number of urban households in India (Lok Sabha, 2016). While connection coverage of a little over 100% may be understandable as peri-urban LPG distributors may also be catering to some rural consumers, coverage of over 150% for urban areas in

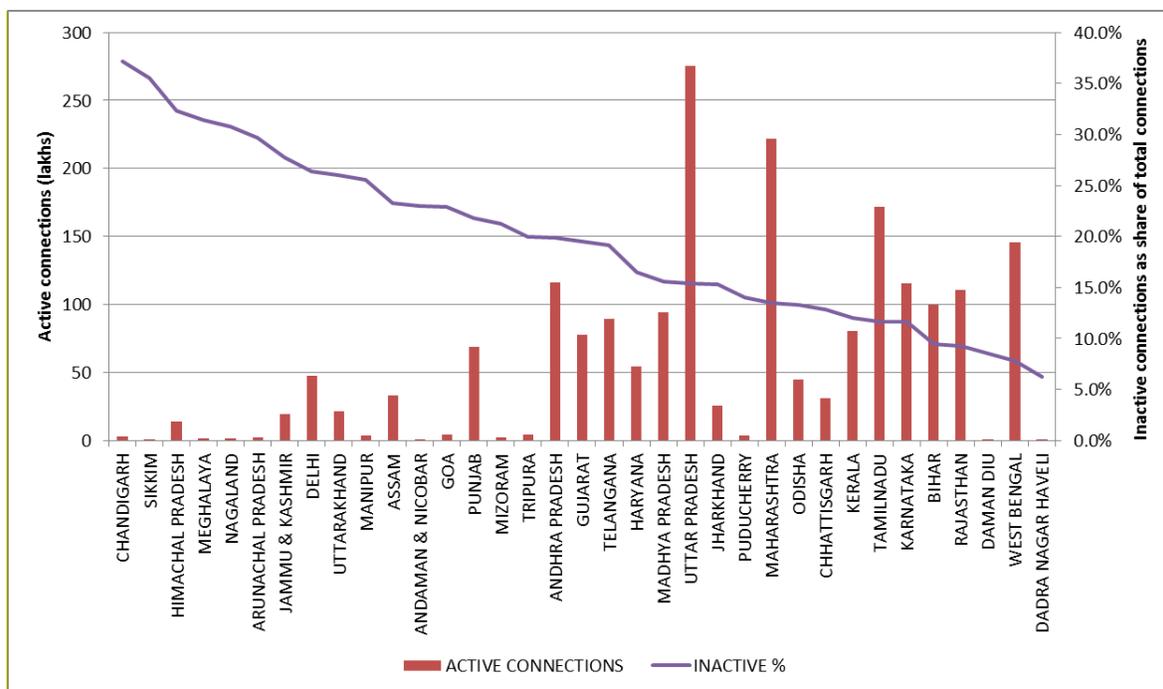
⁷ That is, connections that have had some activity in the preceding few months. We refer to connections that are not active as inactive.

states such as Himachal Pradesh, Punjab, Rajasthan and Uttar Pradesh indicates that connection levels were already very high even before PMUY⁸. Even at the state level, recent connection data indicates that it has exceeded 100% coverage in states such as Punjab, Haryana, Kerala and Telangana (PPAC, 2018). These data suggest that connections do not necessarily indicate that households are moving away from using solid fuels for cooking, but that the connections are possibly being used for other purposes.

Moreover, under PMUY, the Union Government has the ambitious target of disbursing 3 crore connections in 2018-19 itself (MoPNG, 2018). Although the net of beneficiaries has been widened to include more households, such a move might only lead to a rush in achieving connection targets. This raises questions about the effectiveness of a purely connection-focused approach.

An interesting aspect of the LPG sector is also that there are a significant number of consumers who are registered but not 'active'. As of April 2016, when PMUY was launched, there were already 3.55 crore 'inactive' connections in the country (PPAC, 2017). This had increased to 3.58 crore by April 2017 and 3.82 crore by January 2018 (PPAC, 2017; PPAC, 2018). The number of inactive connections is comparable to the total number of PMUY connections released and accounts for 15% of the total registered connections in the country. The number of inactive connections also shows wide variations across states (See Figure 1). It varies from a high of about 35% in an urban area such as Chandigarh to a low of around 6% in West Bengal. There is no obvious pattern to the number of inactive connections that is evident and this is perhaps something that needs to be understood better.

Figure 1: State-wise variations for inactive connections



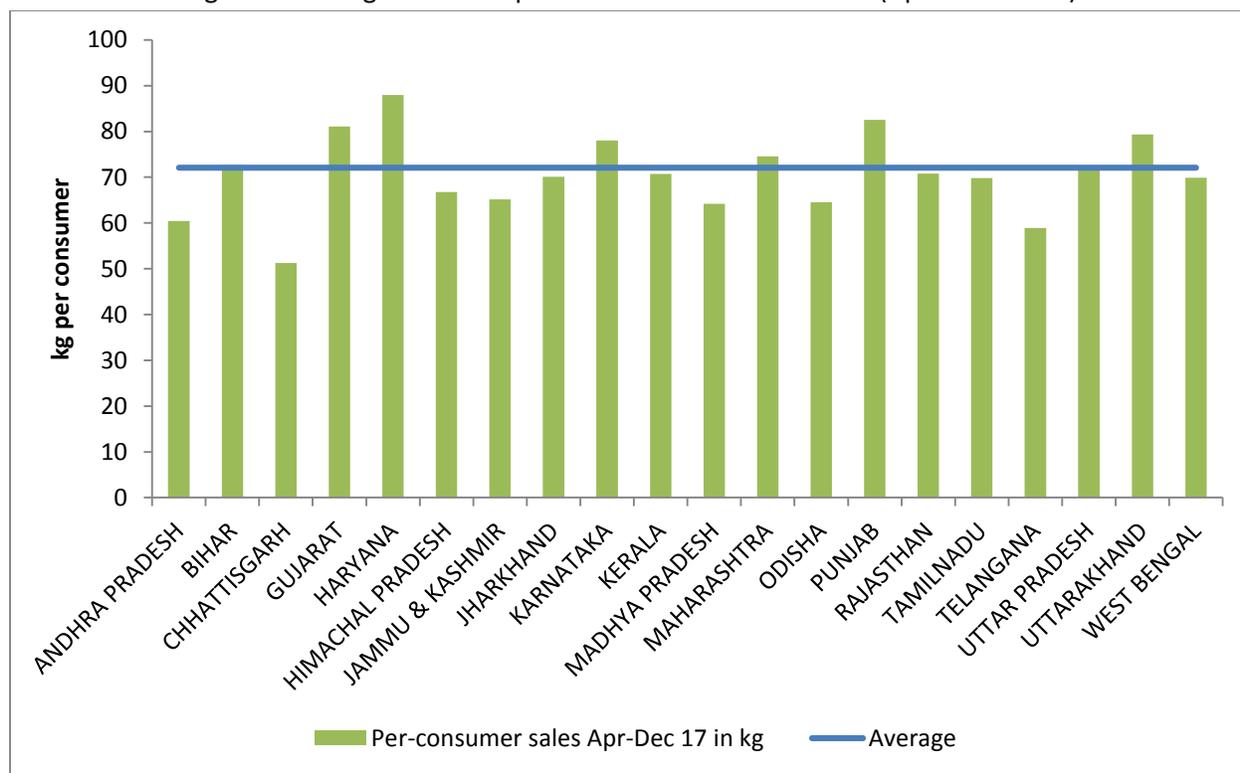
⁸ Many states did have state level subsidised connected disbursement programmes before PMUY. However, Punjab, Rajasthan and Uttar Pradesh were not among them.

3.2 Anomalous LPG consumption

The possibility of a rapid increase in connections leading to diversion is partially reinforced by an analysis of LPG consumption data per consumer across different states for April to December 2017 (see Figure 2). Some of the potentially anomalous points that emerge are that per-consumer sales in Uttar Pradesh (73 kg) is higher than the all-India average (72 kg); per-consumer sales in Bihar (73 kg) is higher than states such as Telangana (59 kg), Andhra Pradesh (60 kg) and Himachal Pradesh (67 kg) and per-consumer sales in Rajasthan is similar to Tamil Nadu (70 kg). In contrast, according to the census of 2011, Andhra Pradesh, Himachal Pradesh and Tamil Nadu are states that had a higher proportion of primary LPG users in total households while Uttar Pradesh, Bihar and Rajasthan had lower LPG users in total households (Census, 2011). Given the disparity in economic development, and hence affordability of LPG, across Indian states, the above seems to indicate diversion of LPG. These numbers are also at odds with the results of a study commissioned by the Petroleum Planning and Analysis Cell (PPAC), which showed that around 90% of households without LPG connections that were surveyed in many districts of Bihar, Uttar Pradesh and Rajasthan cited the high refill price of LPG as a barrier to using it (CRISIL, 2016).

However, it should be acknowledged the annual⁹ per-consumer consumption in Bihar (117 kg), which was higher than the national average (106 kg) a few years ago (Lok Sabha, 2016a), is now comparable to the national average, perhaps due to initiatives such as PAHAL.

Figure 2: Average LPG sales per active domestic consumer (Apr – Dec 2017)



Source: (PPAC, 2018)

⁹ As against the earlier figures which are for the nine month period from April to December.

3.3 Design of PMUY and affordability

Various surveys indicate that the share of total registered LPG consumers who use LPG as their primary cooking fuel is about 60%¹⁰ (IIPS and ICF, 2017; PPAC, 2016) – a percentage largely unchanged since 2011. This shows that many consumers who could afford to pay for an LPG connection also could not transition to being primary LPG users. High upfront costs and high refill costs are both cited as the reasons for not using LPG by roughly 85% of households surveyed in (CRISIL, 2016).

Under PMUY, beneficiaries have the option of getting the cooking stove and first LPG cylinder from the OMCs via the LPG distributor on an interest free EMI (Equated Monthly Instalment) basis (PIB, 2016). The EMIs are expected to be recovered from subsidies on future cylinder refills. This leads to a structural problem. Since stove and associated expenses cost around Rs. 1500 and the subsidy per refill is in the range of around Rs. 200 to Rs. 300, it would take five to seven refills for the loan to be repaid. During this period, beneficiaries are expected to pay the full unsubsidised price of the refill. Since PMUY beneficiaries would typically be poor households, they would find it extremely difficult to come back for refills if they have to buy LPG at unsubsidised prices five to seven times. Assuming a PMUY consumer avails 4.32 refills in the first year, this implies a payment of Rs. 2500 to Rs. 3000 for the period. A BPL consumer using 30 units to 50 units of electricity per month pays about half this amount to meet their basic electricity needs in any state in India. Perhaps, this is the reason why OMCs have recently decided not to collect EMIs for the first six refills (Bhaskar, 2018), though it seems this would, at best, only postpone the problem rather than address it.

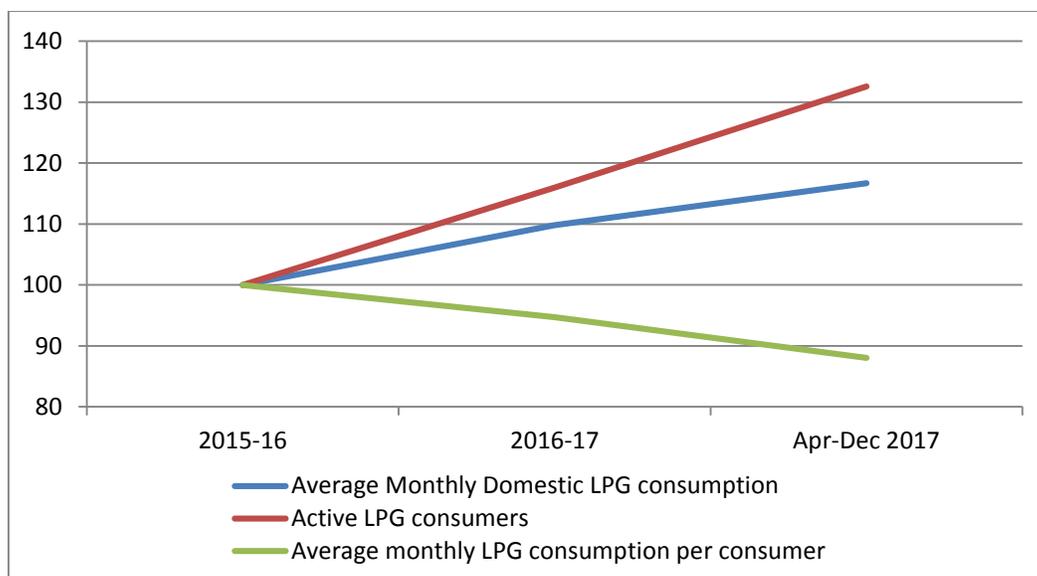
Reports indicate that about 65% - 70% of PMUY beneficiaries have availed the EMI option (Bhaskar, 2018; Sharma, 2017) but it is not clear if these consumers manage to pay the loan amount and sustain use of LPG. This is a crucial parameter to track and it would affect the sustainability of the programme.

3.4 Trends in LPG consumption

Since the launch of PMUY, overall domestic LPG consumption in the country has shown an upward trend. The average monthly domestic LPG sales has increased from 1.4 million tonnes (MT) in 2015-16, to 1.6 MT in 2016-17 and 1.7 MT in the period April-December 2017 (PPAC, 2016; PPAC, 2017; PPAC, 2018). However, the number of active LPG connections has gone up much faster during the same period due to the rapid disbursement of connections under PMUY. As a result, the per-consumer consumption of LPG has reduced over time from 9.1 kg per month in 2015-16 to 8 kg per month in 2017. This is illustrated in Figure 3.

Figure 3: Trends in LPG consumption (2015-16 = 100)

¹⁰ This is an indicative number because of possible discrepancies between survey based estimates and PPAC connection data. This number also includes PNG users, but they are negligible compared to LPG users and are mainly present in urban areas. There were only 31.6 lakh domestic PNG connections in the country at the end of 2015-16 (PPAC, 2016b). The number of households is as reported in the LPG profiles published by PPAC.



Source: (PPAC, 2016; PPAC, 2017; PPAC, 2018)

This suggests that LPG consumption of newer consumers – who are primarily PMUY beneficiaries – is lower than what it was earlier, and that newer PMUY connections may not be translating to consistent use, even to the extent of earlier connections. This may be aggravated by a steady increase in the price of even subsidised LPG, which grew by 12% between April and December 2017 (MoPNG, 2017a; PPAC, 2017a).

The national average LPG consumption per consumer was about 7.3 cylinders per year in 2015-16, as against a normative expectation of about 12 cylinders if it were used for all cooking¹¹, indicating that LPG was meeting only about 60% to 80% of the normative cooking needs even before PMUY. Official estimates indicate that PMUY beneficiaries consume only 35% to 50% of even the normative estimate. This is another indicator that PMUY consumers are perhaps consuming much less LPG than other Indian LPG consumers, pointing to issues of affordability and reliability of service.

In addition to these indirect indicators of PMUY consumers not shifting to sustained use of LPG, there have been various field visit based media reports that indicate that refill adoption is low among PMUY beneficiaries (Pandey, Jitendra, Sahu, & Thakur, 2017; Malhotra, 2017; Kishore, 2017; Jha, 2017). Thus, in spite of the official figure of about 80% of PMUY beneficiaries opting for at least one refill (Lok Sabha, 2018), it appears that the number of refills are far from sufficient to meet the cooking needs of the household.

3.5 LPG distribution

The LPG distributor is the customer’s link to the LPG supply chain. Thus, unless the distributor is able to function effectively and is held accountable for its services, the ambitious program to reach LPG to a large number of unserved or underserved households is unlikely to fructify. Lessons from the electricity sector

¹¹ Assumptions for the estimation: Per-capita useful cooking energy required: 947 MJ / year; LPG stove efficiency: 55%; average family size: 4.5

can be valuable in ensuring mid-course correction. Concerted drives to increase access to electricity across the globe relied on financially viable and healthy utilities (Barnes, 2007) .

The PPAC-commissioned study had identified that the distance to the LPG distributor and long waiting time to get a refill are barriers to adoption of LPG (CRISIL, 2016), further underscoring the importance of the location and accountability of the distributor. The LPG distribution guidelines, introduced after the survey, now mandate all distributors, except the 'Durgam Kshetra' distributors, to home deliver LPG cylinders (MoPNG, 2016). It would be useful to conduct a survey now to see how well this is implemented in rural and remote areas.

LPG distributors are currently classified as Shehri (urban), Rurban (rural-urban), Gramin (rural) or Durgam Kshetra, with the criteria for opening a distributorship gradually weakening from Shehri to Rurban to Gramin to Durgam Kshetra. In addition, there are some distributors classified under the erstwhile Rajiv Gandhi Gramin LPG Vitaran Yojana (RGGLVY). While some rurban distributors, who are located in urban areas may also supply rural consumers, it is expected that most rural consumers would be serviced by one of the other kinds of distributors. While there are about 8 distributors per lakh households in urban areas, it seems there are only 6.5 distributors per lakh households in rural areas (SCPNG, 2018) – in spite of the fact that the LPG distributorship guidelines require fewer consumers per distributor for Rurban, Gramin and Durgam Kshetra distributors (MoPNG, 2016).

The number of distributors has not kept pace with the increasing number of active LPG consumers as connections are disbursed under PMUY. Between April 2016 and January 2018, the total number of distributors in the country went up by 9%, while the total number of active LPG consumers shot up by 31% (PPAC, 2016; PPAC, 2018). The discrepancy between increase in the number of distributors and consumers is much worse in some states. For example, in Bihar and Chattisgarh, the total number of distributors went up by only 5% and 18% respectively while the number of consumers increased by 84% and 91% respectively¹². It is unlikely that distributors would be able to service consumers effectively in this situation, and points to a need to increase the number of LPG distributors rapidly in rural areas.

While it is necessary to increase the number of distributors, a couple of other points also need to be kept in mind. Firstly, the distribution business needs to be viable to ensure that distributors are interested in serving their clients and are not tempted to use other means such as diversion to remain viable. Given the lower density of consumers in rural areas and resultant increased costs in delivering services to them, and potentially lower consumption of such consumers, it is not clear whether the distribution business remains viable in rural areas. An independent study in this matter is desirable to explore strategies to ensure that rural distribution is a viable proposition.

3.6 Supply and Service Quality, Safety and complaint handling

Given the increase in connections especially to BPL households, safety has been a major concern. The likelihood of accidents has increased not only because of the lack of amenities in beneficiary households but also because of lack of awareness. MoPNG has taken cognizance of this fact and has recently launched

¹² Thus, the consumers per distributor increased from 6,500 to almost 11,500 in Bihar, while the same increased from less than 5,500 to more than 8,500 in Chhattisgarh.

the LPG Panchayat programme to increase awareness about safety related issues (PTI, 2017). However, a lot more needs to be done in order to avoid accidents including regular inspections and adherence to safety procedures. Compliance to such procedures should be monitored by the OMCs and also reported for every distributor. Data related to accidents, loss of life and property and the action taken should also be reported publicly.

In addition to safety, monitoring supply and service quality is also paramount. Though the LPG Marketing Discipline Guidelines stipulate actions and penalties to ensure compliance to procedures and practices specified by the OMCs, there are no published reports of compliance to this. Anecdotal evidence suggests that current mechanisms may not be sufficient to ensure accountability of distributors and OMCs to consumers (Pandey, Jitendra, Sahu, & Thakur, 2017). Some performance indicators can be regularly collected and reported on a disaggregated basis to ensure accountability such as the average time taken to get connections, average time to obtain refill and other key parameters.

There is also a need for a well-defined and fair multi-tiered consumer grievance redressal mechanism, consumer awareness programmes about the existence of such a mechanism and publicly available information about consumer grievances raised and addressed by type (e.g. overcharging, issues with home delivery services etc.) on a disaggregated basis. These are some ingredients that can help increase accountability of distributors and OMCs.

4 Conclusions

PMUY is a bold new initiative that aspires to fundamentally address one of the pressing energy-access, health and gender challenges in the country. The broad picture that emerges is that while the programme has been successful in introducing a sense of urgency into the transition to modern cooking fuels and disbursing connections, it has been less successful in introducing a sustained change. Indicative evidence suggests that this is because of issues around affordability and reliability of LPG supply. A major concern is the absence of publicly available data about the programme, its progress and impact. Lack of availability of such information results in reliance upon anecdotal reports to assess the programme. In light of this analysis, we suggest the following changes to the PMUY programme in particular and the LPG sector in general.

1. **Publishing more information:** MoPNG should publish more information about the PMUY programme and the LPG sector at regular and frequent (say quarterly) intervals disaggregated along various dimensions such as by state/district/block, by distributor type, by PMUY / non-PMUY consumers, rural-urban and by subsidised / non-subsidised consumer type. Examples of the kind of data that should get published include consumption of LPG by households, details of expenditure on the programme, the number of PMUY consumers who availed of the EMI facility and the status of repayment of those loans, statistics on key performance indicators, especially for distributors and OMCs, aggregate information about LPG consumer complaints and their status / resolution, and data about accidents involving LPG categorised by their severity. The data along with analysis reports using the data should be published online, with the PMUY portal being the obvious choice. In addition, apps can be provided to easily access this information as in the case of other

government programs. The data should also be available as a time-series to enable analysis of trends over time.

2. **Periodic studies:** It would be good to conduct an independent study periodically (say, every three years) to understand ground realities regarding adoption of LPG (and, more broadly, modern cooking fuels) as a primary cooking option. Such a study can be commissioned by the PPAC. This would help recalibrate the programme by understanding consumer preferences, problems, barriers, affordability issues, service issues etc. The study can also try to estimate the changes in air pollution levels in homes and resultant health benefits. Regular monitoring of PMUY and publishing of information has also been recommended by the corresponding Parliamentary Standing Committee (SCPNG, 2018).
3. **Fuel pricing:** Studies as recommended above can help inform policy decisions, particularly around the pricing of fuel, as that is likely to be a critical barrier to sustained modern fuel adoption in the near to medium term. Various options may be considered such as telescopic pricing, cross-subsidies, smaller gas cylinders, pre-paid coupons, targeted subsidies etc. which may ease cash flow and / or make LPG more affordable. This is also an urgent need as more than 50% of the MoPNG budget is allocated for DBTL. For PMUY consumers on EMI, loan repayments can also be rationalised so that some benefits of subsidy per refill can be realised. Insights can also be gained from state specific initiatives to alleviate the financial burden on poor consumers, such as the ones initiated by Chhattisgarh and Jharkhand (Sharma, 2017).
4. **LPG distribution and its performance:** The success of the programme also hinges on the distributors as they are tasked with implementing all modalities of the scheme – right from identification of beneficiaries to organizing camps for LPG use and safety. However, they form the weakest link in the LPG supply chain. Currently, this segment of the supply chain is totally controlled by, and accountable to, only the OMCs. Instead, distributors and OMCs should be made accountable to the government and citizens at large. The possibility of an independent regulator, whose responsibilities include consumer service, pricing, planning etc. can also be considered. Simultaneously, challenges faced by distributors – including the current business model and its viability – need to be understood and addressed. A first step towards such a reform could be to commission a detailed, independent study of the LPG distribution eco-system and accountability and publish it, with a view to initiating discussions on addressing this critical issue. More immediately, there is a need to rapidly increase the number of rural distributorships to enhance the reach of LPG to rural consumers.
5. **Safety, supply and service quality:** There is a need to bring greater consumer accountability of the distribution segment by instituting appropriate standards of performance for services and multi-tier grievance handling systems and processes to increase accountability, and publishing annual reports on grievances addressed in a disaggregated manner. One such process could be to have annual public hearings for supply and service quality at the block or district level. In addition incentives and penalties linked to performance and service quality indicators can be provided to distributors to improve quality of service.

A connection focussed approach without adequate provisions to ensure affordability, availability and accountability will not result in a corresponding increase in consistent use of LPG among poor households. We believe that incorporating suggestions as given above would help social investment

programmes such as PMUY to achieve the desired objective of not only disbursing connections but making the LPG sector a real contributor to overcoming this deep-rooted challenge affecting energy access, health and gender disparity.

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6 References

- Barnes, D. (2007). *The challenge of rural electrification : strategies for developing countries*. (D. F. Barnes, Ed.) Washington D.C: Routledge.
- Bhaskar, U. (2018, March 25). Ujjawala scheme: Indian Oil, others defer loan recovery up to 6 LPG refills. *Mint*.
- CAG. (2016). *Implementation of PAHAL (DBTL) scheme*.
- Census. (2011). *Household Level Indicators*. New Delhi: Census of India.
- CRISIL. (2016). *Assessment report: Primary survey on household cooking fuel usage and willingness to convert to LPG*.
- Dabadge, A., Josey, A., & Sreenivas, A. (2016, April). From LPG connections to use: Realising smokeless kitchens for all. *Economic and Political Weekly*, LI(16), 47-50.
- Desai, S., & Vanneman, R. (2016). *India Human Development Survey -II (IHDS-II) 2011-12*. Ann Arbor MI: ICPSR36151-v5.
- Desai, S., Dubey, A., Joshi, B., Sen, M., Shariff, A., & Vanneman, R. (2010). *Human Development in India: Challenges for a Society in Transition*. Oxford University Press.
- FLDI. (2016, May 18). Letter from the Federation of LPG Distributors of India to Joint Secretary (M), MoPNG .
- FLDI. (2016a, July 4). Letter from Federation of LPG Distributors of India to Joint Secretary (M), MoPNG.
- ICMR; PHFI; IHME. (2017). *India: Health of the Nation's States - the India state-level disease burden initiative*.
- IHME. (2017). *Global Burden of Disease Results Tool*. Retrieved January 23, 2018, from <http://ghdx.healthdata.org/gbd-results-tool>
- IIPS and ICF. (2017). *National Family Health Survey (NFHS-4) 2015-16: India*. Mumbai: IIPS: International Institute for Population Sciences and ICF.

- IIT Bombay, HEI, IHME. (2018). *Burden of Disease Attributable to Major Air Pollution Sources in India*.
- Jha, D. (2017, June 11). *Modi's pet Ujjawala scheme wobbles as many beneficiaries drop out after their first LPG cylinder*. Retrieved April 4, 2018, from Scroll: <https://scroll.in/article/839961/modis-pet-ujjawala-scheme-wobbles-as-many-beneficiaries-drop-out-after-their-first-lpg-cylinder>
- Kishore, R. (2017, June 28). *India's poor are not using LPG cylinders they got under Ujjwala scheme*. Retrieved April 4, 2018, from Mint: <https://www.livemint.com/Politics/oqLQDFKNUmDbmLEVL88krN/Indias-poor-are-not-using-LPG-cylinders-they-got-under-Ujjw.html>
- Lok Sabha. (2016, March 14). *Unstarred question no. 2706: LPG connections to consumers*. Retrieved April 4, 2018, from <http://164.100.47.190/loksabhaquestions/annex/7/AU2706.pdf>
- Lok Sabha. (2016a, April 25). *Starred question no. 1: LPG in rural areas*. Retrieved April 4, 2018, from <http://164.100.47.190/loksabhaquestions/annex/8/AS1.pdf>
- Lok Sabha. (2018, March 12). *Unstarred question no. 2657: Target of PMUY*. Retrieved April 6, 2018, from Lok Sabha Secretariat: <http://164.100.47.190/loksabhaquestions/annex/14/AU2657.pdf>
- Malhotra, S. (2017, December 14). *Prime Minister Modi's LPG scheme for poor running out of gas*. Retrieved April 4, 2018, from Hindustan Times: <https://www.hindustantimes.com/india-news/lpg-scheme-for-poor-running-out-of-gas/story-t4SSXDV9tkDWCYoyKURtKP.html>
- Ministry of Rural Development. (n.d.). *Socio Economic and Caste Census 2011*. Retrieved April 6, 2018, from Socio Economic and Caste Census 2011: <http://secc.gov.in/categorywiseDeprivationReport?reportType=All%20Category#>
- MoP. (2015, October 9). *Handbook for Gram Vidyut Abhiyanta*. Retrieved April 06, 2018, from Ministry of Power: <http://www.ddugjy.gov.in/mis/portal/RE-APP/pdf/GVABookOctober-2015.pdf>
- MoP. (2016). *Role of Urban Vidyut Abhiyantas under IPDS*. Retrieved April 6, 2018, from Ministry of Power: http://www.ipds.gov.in/Whats_New_Files/Role_of_Urban_Vidyut_Abhiyantas.pdf
- MoPNG. (2016). *Unified guidelines for selection of LPG distributorships*.
- MoPNG. (2017, March 6). *Ministry of Petroleum and Natural Gas Notification*. Retrieved April 3, 2018, from MoPNG: http://petroleum.nic.in/sites/default/files/Policies-LPG_Aadhaar_6_3_2017.pdf
- MoPNG. (2017a). *Indian Petroleum & Natural Gas Statistics 2016-17*.
- MoPNG. (2018, March 12). *Pradhan Mantri Ujjwala Yojana-Revised Scheme Guidelines*. Retrieved April 5, 2018, from MoPNG: <http://petroleum.nic.in/sites/default/files/revujscheme.pdf>
- Pandey, K., Jitendra, Sahu, P., & Thakur, P. (2017, August 31). *Ujjwala scheme: Are cleaner cooking fuels affordable and accessible?* Retrieved April 4, 2018, from Down To Earth: <http://www.downtoearth.org.in/coverage/india-steps-on-the-gas-58502>

- Parikh, J. K., Sharma, A., Singh, C., & Neelakantan, S. (2016). *Providing Clean Cooking Fuel in India: Challenges and Solutions*. International Institute for Sustainable Development and Integrated Research and Action for Development.
- PIB. (2016, July 4). *State Launch of Pradhan Mantri Ujjwala Yojana (PMUY) at Shahdol, M.P.* Retrieved April 7, 2018, from PIB: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=146767>
- PIB. (2016a, March 10). *Cabinet approves Pradhan Mantri Ujjwala Yojana - Scheme for Providing Free LPG connections to Women from BPL Households*. Retrieved March 28, 2016, from Press Information Bureau: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=137647>
- PPAC. (2016). *LPG profile as on 1.4.2016*. Retrieved April 10, 2018, from <http://ppac.org.in/WriteReadData/Reports/201606300235093395237DataonLPGMarketing.pdf>
- PPAC. (2016b). *Pipeline and City Gas Distribution Structure*. Retrieved 2016, from PPAC: [http://ppac.org.in/WriteReadData/userfiles/file/NG_CGD\(2\).xls](http://ppac.org.in/WriteReadData/userfiles/file/NG_CGD(2).xls)
- PPAC. (2017). *LPG profile as on 1.4.2017*. Retrieved April 10, 2018, from <http://ppac.org.in/WriteReadData/Reports/201706201136261740776DataonLPGMarketingApr17LPGProfile.pdf>
- PPAC. (2017a, December). *Price Build-up of Domestic LPG (Subsidized) at Delhi*. Retrieved December 17, 2017, from PPAC: http://ppac.org.in/WriteReadData/userfiles/file/PP_8_C_PriceBuildupSensitive_Products%2016_2_2018.pdf
- PPAC. (2018). *LPG profile as on 1.1.2018*. Retrieved April 10, 2018, from <http://ppac.org.in/WriteReadData/Reports/201802221141024777342LPG01Jan2018.pdf>
- Prayas. (2018). *Fuelling the transition: Costs and benefits of modern cooking fuels as a health intervention in India*.
- PTI. (2017, September 23). *Govt launches 'Pradhan Mantri LPG Panchayat' to boost PMUY*. Retrieved April 8, 2018, from Business Standard: http://www.business-standard.com/article/economy-policy/govt-launches-pradhan-mantri-lpg-panchayat-to-boost-pmuy-117092300702_1.html
- SCPNG. (2018, March 13). *Ministry of Petroleum and Natural Gas: Demand for Grants, 2018-19*. Retrieved April 06, 2018, from Standing Committee on Petroleum and Natural Gas, Sixteenth Lok Sabha: http://164.100.47.193/lsscommittee/Petroleum%20&%20Natural%20Gas/16_Petroleum_And_Natural_Gas_23.pdf
- Sharma, S. K. (2017, February 7). *Ujjwala Plus : Contributions towards Clean Kitchen*. Retrieved April 5, 2018, from WLPGA 2017 Asia Summit: <https://www.wlpga.org/wp-content/uploads/2016/10/Ujjwal-Plus-updated.pdf>

Smith, K. R., & Sagar, A. D. (2014). Making the clean available: Escaping India's Chulha Trap. *Energy Policy*, 410-414.

Unique Identification Authority of India. (2018). *State/UT wise Aadhaar Saturation 31st March, 2018*.

Retrieved April 4, 2018, from Unique Identification Authority of India:

https://uidai.gov.in/images/StateWiseAge_AadhaarSat_24082017.pdf