

Subsidised, Not Sustained

Rural Cooking-fuel Usage Trends in Six Indian States

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Executive summary

The launch of the *Pradhan Mantri Ujjwala Yojana* (PMUY) scheme has fundamentally reshaped India's efforts towards achieving universal access to clean cooking fuels. Between May 2016 and July 2026, over 105 million women from low-income households received deposit-free liquefied petroleum gas (LPG) connections under the scheme (based on PMUY website as on 31 July 2026).

Despite this significant progress in expanding access to clean cooking energy, large sections of rural India still rely on solid fuels, such as firewood, coal, and cow dung cakes. According to NFHS-5 (2019–21), 41 per cent of Indian households use solid fuels for cooking,

primarily firewood and dung cakes (IIPS 2021). This reliance is far more pronounced in rural areas, where 56 per cent of households use solid fuels, compared with only 10 per cent in urban areas.¹ Latest data from HCES 2023–24² further show that 47 per cent of rural households use firewood as their primary cooking fuel (MoSPI 2025).

This gap between connections (i.e., LPG access) and consumption (i.e., sustained use) is primarily driven by costs, along with other factors such as poor accessibility in remote areas, and behavioural factors—leading to low refill rates for LPG in India (Kar et al. 2024). PMUY beneficiaries use only 4.8 cylinders

per year (PPAC 2026), whereas a typical household needs seven to eight 14.2 kg LPG cylinders per year to achieve exclusive use (Mani et al. 2021). Data from the India Residential Energy Survey (IRES), indicate that **78 per cent of non-exclusive LPG users cite the high cost of LPG as a major barrier** to sustained usage (Mani et al. 2021). Because refills are a recurring cash outlay that competes with food, rent and other essentials, while biomass typically carries no cash price, sustained clean fuel use is a question of affordability at the margin. Assessing the status of usage, and willingness to pay (WTP) is therefore crucial to understand this margin: it identifies the price point at which refill behaviour changes, and so bridges physical access and functional adoption.

That margin has become more precarious. Globally, there were indicators that the COVID-19 pandemic had reversed the gains in clean cooking access, and usage of clean cooking fuels³ in several developing countries (World Bank ESMAP 2022; Pachauri et al. 2021). This has impacted the WTP for clean fuels. Accordingly, this issue brief examines fuel choices for cooking and WTP for cleaner fuels, among economically vulnerable population groups. The findings presented here are part of a larger survey of more than 4,000 respondents across urban informal settlements (n = 1,116), migrant

workers (n = 1,061) and rural households (n = 2,222). We selected these three respondent groups given they are more likely to rebound to solid fuels as a result of the pandemic. This issue brief presents findings from **2,222 rural households across six states**—Assam, Jharkhand, Maharashtra, Telangana, Uttar Pradesh, and Uttarakhand. The key respondents to the survey were the primary cook of households. The survey was conducted between November 2024 and January 2025.

Findings

1. Poor sustained usage of clean fuels persists in rural households.

The study finds that both LPG and firewood have prominent positions in the cooking fuel mix for rural households. Around 73 per cent of respondents reported using LPG during the three months preceding the survey. However, the majority of households continue to practise fuel stacking, combining LPG usage with solid fuels. Only 23 per cent reported exclusive use of LPG in the total sample. Around 48 per cent of households use LPG as their primary cooking fuel,⁴ while 50 per cent primarily use firewood.



LPG consumers await refilling at a distribution point. Heavy reliance on a single imported fuel leaves low-income households exposed to price volatility and supply disruption.

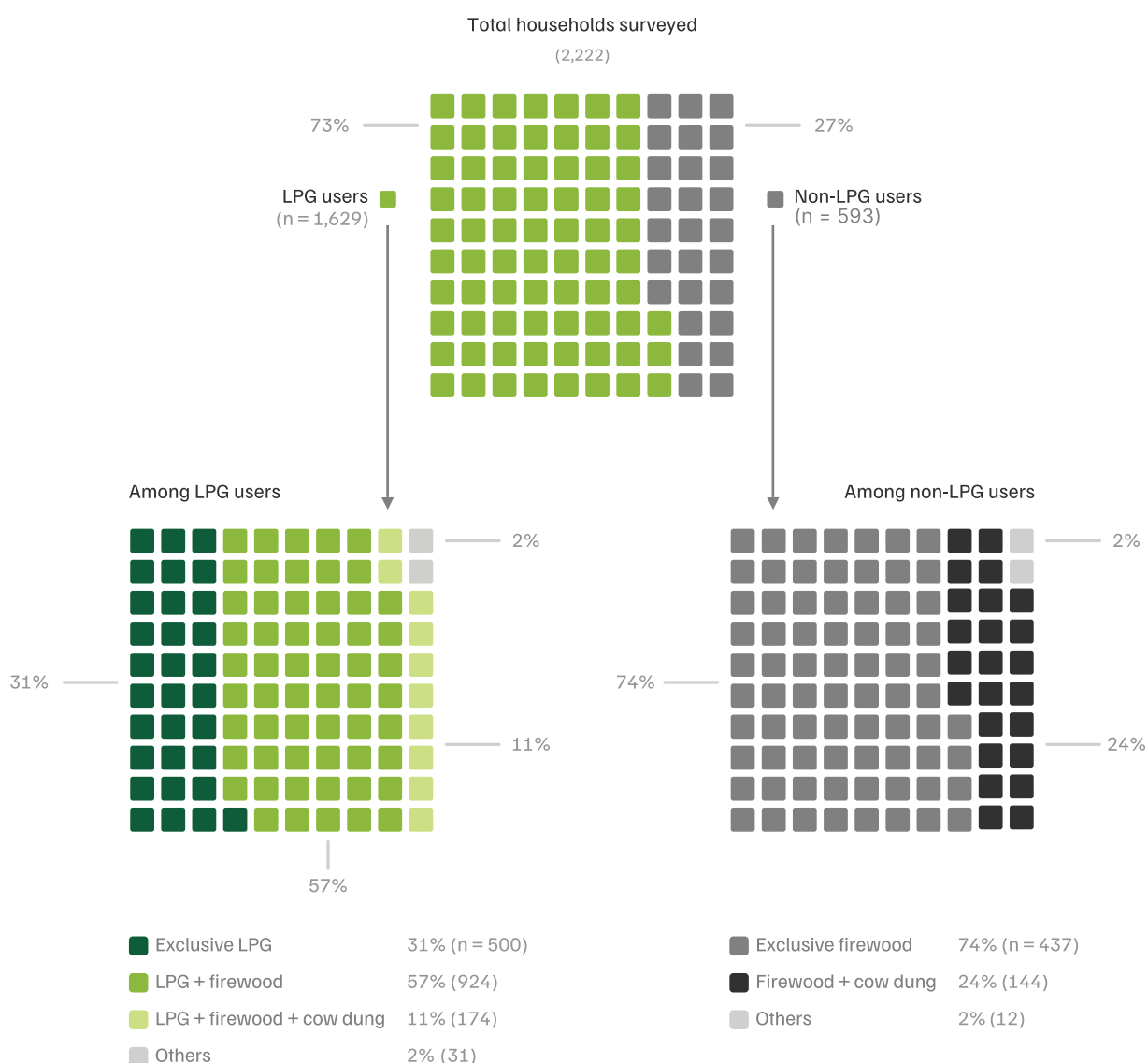
¹ The total sample for NFHS-5 was 6,36,699 - rural sample of 75 per cent and urban sample of 25 per cent.

² The total sample for HCES 2023-24 was 2,61,953 - rural sample of 59 per cent and urban sample of 41 per cent.

³ 'Clean' fuel for cooking here for the purpose of this brief is LPG and electric though literature has a wider group of BLEENS - Biogas, Liquefied Petroleum Gas, Electricity, Ethanol, Natural Gas, and Solar

⁴ In this analysis, primary usage of LPG is defined as a 1:1 ratio between household size and annual cylinder consumption (of 14.2 kg), while exclusive usage is defined as a 1:2 ratio (two cylinders per person per year). This is based on a baseline cooking energy requirement of 3,500 MJ/year for a five-person household (Kar et al. 2019), which scales to approximately 700 MJ/year for a single-member household. Given that a standard LPG cylinder delivers ~385 MJ of useful energy, a single person requires roughly two cylinders per year ($700 \div 385 = 1.82$; rounded up to 2) for cooking exclusively.

Figure ES1. Out of the total households surveyed, only 23 per cent reported exclusive use of LPG.



Source: Authors' analysis.

Note: (a) n = 2,222, (b) Data from 6 states: Assam, Jharkhand, Maharashtra, Telangana, Uttar Pradesh, and Uttarakhand, (c) one square = 1 per cent of the group shown, (d) group values may not add up to 100 due to rounding off.

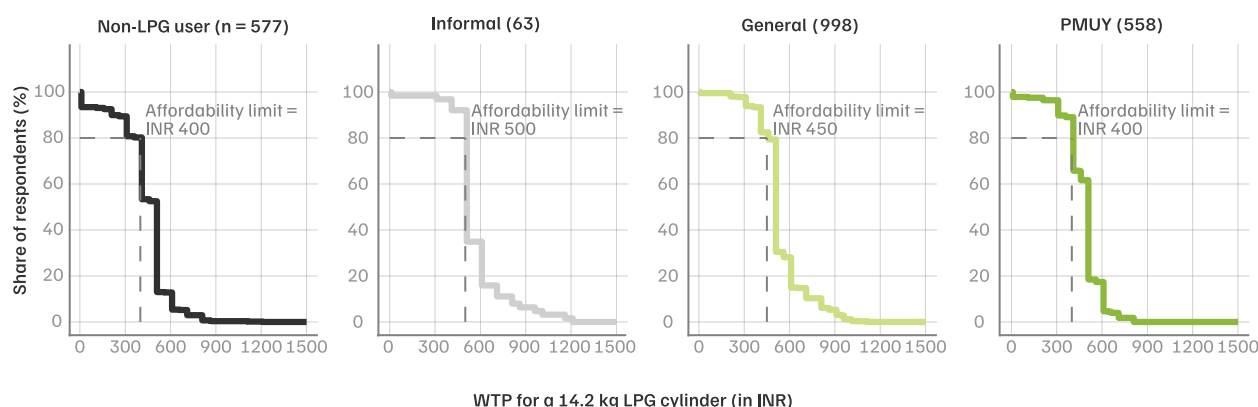
2. Affordability is the key barrier to the transition and sustained usage of LPG.

High LPG refill costs are a major deterrent to the transition and sustained usage of cleaner fuels. Among respondents who do not use LPG ($n = 593$), 70 per cent cited high refill costs as a significant barrier to transitioning, followed by factors such as the inconsistent availability of LPG, easy availability of firewood and a cultural preference for meals cooked on a *chulha* (traditional cookstove).

The WTP analysed in this study indicates stated preferences for LPG refill prices. To analyse WTP,

households were asked the price they would be willing to pay for a 14.2 kg LPG cylinder to transition to exclusive LPG use. The study defines the 'affordability limit' as the maximum price point at which 80 per cent of households self-report that they would switch to exclusive use of LPG. The relevant policy question is therefore not what the average household can afford, but the price point that leaves the fewest households behind. We analysed the WTP across different LPG connection types (Figure ES2). Our survey results for the overall sample show that, at a stated WTP of INR 400, at least 80 per cent of respondents would transition to exclusive LPG use for cooking.

Figure ES2. 80% of respondents from our total sample self-report that at a price of INR 400 per cylinder, they would switch to exclusive use of LPG



Source: Authors' analysis.

Note: (a) $n = 2,196$; 26 values were winsorised. (b) The 80 per cent affordability limit is the 20th percentile of the WTP responses. (c) Households that did not use LPG (non-LPG users) during the survey were asked about their WTP to adopt LPG as their exclusive cooking fuel in the future. (d) During the survey, the retail price of a 14.2 kg LPG cylinder was ~INR 803 (based on the retail price in Delhi). With a PMUY subsidy of INR 300, the effective subsidised price was INR 503. The average retail price in Delhi has since increased to INR 942 following three price revisions: INR 50 in April 2025, INR 60 in March 2026, and INR 29 in June 2026. Consequently, the subsidised price for PMUY beneficiaries is now ~INR 642. Most respondents are willing to pay up to INR 500 (median value) for a 14.2 kg LPG refill. (e) Here, the WTP has been analysed across the various LPG connections. A general connection is a standard LPG connection provided by an OMC. Here, the consumer pays the full upfront security deposit for the cylinder, the regulator, and the cookstove out of pocket. Connections under the PMUY scheme are targeted to provide clean cooking fuel to women from low-income, BPL households. The government covers the upfront connection costs, giving the beneficiary a deposit-free cylinder, regulator, and their first refill for free. An informal connection means the household uses LPG but does not have a legally registered connection under their own name with an authorised distributor.

This stated or self-reported WTP may not accurately reflect actual purchasing behaviour if LPG prices change in the future, because stated WTP often overestimates actual behaviour change. Households may continue to rely on locally collected firewood and other solid fuels

as secondary fuels alongside LPG for their cooking needs. Such discrepancies between stated responses and revealed preferences are well documented (Mobarak et al. 2012). Thus, stated WTP may not accurately reflect real-world choices.

3. Home delivery rates remain low for rural households.

Only 47 per cent of LPG-using households (n = 1,629) reported receiving doorstep delivery. The remaining respondents travelled to LPG distributors, *kirana* (grocery shop) stores, or roadside collection points to obtain refills, incurring additional time, costs, and effort in the refill process. CEEW has previously documented this delivery gap — in a 2024 survey, only 52 per cent of rural distributors self-reported delivering LPG to more than 90 per cent of their consumers (Kar et al. 2024). This delivery gap underscores the need to rethink last-mile distribution models, particularly in remote rural areas.

Recommendations

This issue brief proposes 4 key measures to improve the transition to cleaner cooking fuels:

1. Address the affordability challenge.

As of July 2026, the subsidised price for one 14.2 kg cylinder is INR 642 (consider retail price in Delhi). The government must consider expanding the PMUY subsidy by an additional INR 200, bringing the price closer to INR 400, where 80 per cent of households self-report a willingness to use LPG exclusively. While the subsidised price of one 14.2 kg cylinder has fluctuated between INR 553 and INR 642 in the last 1 year, we assume INR 600 as a reference point for the recommendation and suggest an additional subsidy of INR 200. This however does not imply that increasing subsidy would definitely lead to increased usage - stated WTP may not accurately reflect real-world choices (Mobarak et al. 2012). It would also be important to innovate measures that support rural households to overcome the 'lumpiness' of payments for LPG refills. The government could, thus, explore mechanisms to enable mobile-phone-based micro-savings and micro-distributors.

2. Address barriers beyond affordability through behaviour change interventions.

It would be important to address barriers beyond affordability and costs—such as awareness gaps, and socio-cultural preferences. These should be targeted through focused behaviour change interventions through multi-channel campaigns using radio, street theatre, and door-to-door

outreach by local female community workers. These campaigns should explicitly encourage sustained post-adoption usage rather than initial access alone, along with covering aspects of health and environmental impact. Similar campaigns, supported by the Clean Cooking Alliance, have also demonstrated success in several other countries such as Bangladesh, Kenya, and Nigeria (Johnson et al. 2020; Evans et al. 2017).

3. Enhance last-mile delivery and logistics.

Out of the non-LPG users from our sample (n = 593), around 30 per cent of households do not use it due to issues with refilling, such as inconsistent availability or long wait times. CEEW recommends a differentiated commission model for LPG distributors based on their level of systemic disadvantage (Kar et al. 2024). CEEW had previously proposed replacing the current flat commission of INR 73.08 per cylinder, with a differentiated model that categorises distributors based on their level of structural disadvantage. Under the proposed model, distributors classified as severely disadvantaged would receive a targeted top-up commission to offset higher delivery costs, such as those associated with long-distance trips that often result in failed deliveries (Kar et al. 2024). This would help ensure that rural households are not pushed back towards using biomass fuels due to unreliable LPG supply.

4. Promote other fuel pathways in the medium-to-long run to move beyond LPG.

Heavy dependence on a single fuel exposes vulnerable populations to price volatility and supply shocks (Ali 2025; Shukla 2026), as seen during the recent West Asia crisis. India's clean cooking mix must diversify in the medium-to-long term. In rural regions, the government should promote electric cooking, as well as biogas-based cooking as supplementary fuels with LPG (Kar and Auddy 2026; Auddy and Das 2026; Kar and Gill 2026). Induction cookstoves could be provided at discounted rates through LPG distributors, given their extensive on-ground presence across India. For biogas, India's dairy belt, especially states such as Gujarat, Punjab, Rajasthan, Maharashtra, Tamil Nadu, and Uttar Pradesh, should explore biogas-based cooking. CEEW estimates that if just 25 per cent of India's approximately 40 million cattle-rearing households (i.e., 10 million households) shifted to biogas, this could save up to INR 2,000 crore annually in LPG import costs (Kar and Gill 2026; Jain et al. 2026).

1. Introduction

The transition to clean cooking fuels in India is critical to addressing three interconnected socio-economic priorities: public health, gender equality, and environmental protection. Multiple large-scale surveys consistently highlight the persistent and widespread reliance of India's rural population on polluting fuels. The *National Family Health Survey* (NFHS-5) indicates that 56 per cent of rural households rely on solid fuels for cooking (IIPS 2021), while the HCES 2023–24 indicates that 47 per cent of rural households rely on firewood. In stark contrast, 89 per cent of urban households use liquefied petroleum gas (LPG) and piped natural gas (PNG) as their primary cooking fuels (IIPS 2021), underscoring a significant rural–urban disparity in access to clean energy.

The *Pradhan Mantri Ujjwala Yojana* (PMUY), launched in May 2016, marked a significant shift in India's clean cooking policy by providing deposit-free LPG connections to women from below poverty line (BPL) households, prioritising them as beneficiaries given their disproportionate exposure to household air pollution (HAP) (MoPNG 2021). By July 2026, more than 105 million women from low-income households had been provided with LPG connections (PMUY n.d.). Access, however, has not translated into sustained usage. PMUY beneficiaries use only 4.8 cylinders per year (PPAC 2026). There exists a gap between this use and exclusive consumption - a typical household needs seven to eight 14.2 kg LPG cylinders per year to achieve exclusive LPG use (Mani et al. 2021). Nearly two-fifths (38 per cent) of Indian households continue to stack LPG with solid fuels (Mani et al. 2021), and the consequences for such households are tangible: continued exposure to household air pollution, with disproportionate health burdens borne by women and children who spend the most time near cookstoves (Kar et al. 2024).

The principal constraint to sustained use is costs. The *Access to Clean Cooking Energy and Electricity: Survey of States* (ACCESS) (Jain et al. 2015) found that close to 95 per cent of households cited the high upfront cost of securing an LPG connection as a major issue. The PMUY substantially alleviated this concern. What remains binding is the recurring cost of refills: the IRES survey in 2020–21 found that 78 per cent of non-exclusive LPG users still mention high costs as a major barrier to exclusive usage (Mani et al. 2021). Even among primary LPG users, high recurring monthly fuel expenditure can be prohibitive after initial adoption (Narlanka and Patil 2025). This refill cost is a lumpy, recurring cash outlay that competes directly with food, rent and other essentials, whereas biomass

typically carries no cash price. Whether a household sustains clean fuel use is consequently a question of affordability at the margin.

Two recent shocks have made the situation more precarious. Globally, there were indicators that the COVID-19 pandemic had stalled or reversed the gains made in clean cooking access over the preceding decade, with several developing countries recording stagnation in the growing use of clean cooking fuels (World Bank ESMAP 2022; Pachauri et al. 2021). This has direct implications for WTP for cleaner fuels, which is not a fixed household attribute; it responds to income expectations, price volatility and the perceived reliability of supply. Recent supply shocks have compounded this from the price side. India imports two-thirds of the LPG it consumes, and nearly 90 per cent of those imports originate in West Asia - the conflict in early 2026 triggered rationing, extended booking cycles, and panic buying at the distributor level (Kar and Auddy 2026; Auddy and Das 2026). For households already at the affordability margin, income insecurity and price volatility act on the same decision - whether to book the next refill.

Despite these constraints, LPG remains the most scalable clean fuel option available today: electric cooking lacks a national strategy and depends on a reliable 24/7 electricity supply, which remains a challenge in rural areas (Rastogi et al. 2023), and fewer than 1 per cent of Indian households use electricity as their primary cooking fuel (Mani et al. 2024). Biogas serves only 0.32 per cent of households for cooking (IIPS 2021), with uptake constrained largely by the high upfront costs of setting up biogas plants (Patnaik and Tripathi 2017) and poor awareness. Diversifying India's clean cooking pathways is a necessary medium-term objective, but it does not resolve the affordability question facing households today.

1.1 Objectives of the study

Existing studies have established that fuel stacking is widespread and that cost is its principal driver. What has not been established is the price point at which clean fuels become affordable enough to displace solid fuels for economically vulnerable households. Understanding WTP is essential here, because it bridges the gap between physical access and functional adoption: it captures what a household will actually sustain, rather than what it nominally possesses. Accordingly, this issue brief has two key objectives; (a) cooking fuel choices and stacking patterns across the sampled group, and (b) WTP for

LPG for rural households and how it varies across household characteristics.

The findings presented in this issue brief are for rural households, and are part of a larger survey of more than 4,000 respondents across urban informal settlements ($n = 1,116$), migrants ($n = 1,061$) and rural households ($n = 2,222$). These three groups were selected because each faces a distinct combination of income insecurity and constrained fuel access that raises the likelihood of a rebound to solid fuels following an economic shock.

2. Methodology and limitations

This section outlines the sampling methodology adopted for the study, details regarding the questionnaire design and data collection process, and the limitations that should be considered while interpreting the findings from the study.

2.1 Sampling method for the study

The survey was conducted across six Indian states: Assam, Jharkhand, Maharashtra, Telangana, Uttar Pradesh, and Uttarakhand. The sampling methodology used to identify these states was adapted from a recent CEEW study on energy transitions (Kar et al. 2024). The six states were selected to represent varying stages of transition to exclusive LPG use. The study constructed

a composite index to evaluate all states across four key variables: alternative fuel availability (share of area with above-ground biomass), affordability (per capita net state domestic product), awareness (share of households using clean fuels), and the ‘bandwagon effect’ (average LPG consumption per person). Based on their composite scores, the states were stratified into six distinct groups, and one state was purposively sampled from each group to ensure a representative mix of geographic and traditional fuel diversity (Kar et al. 2024).

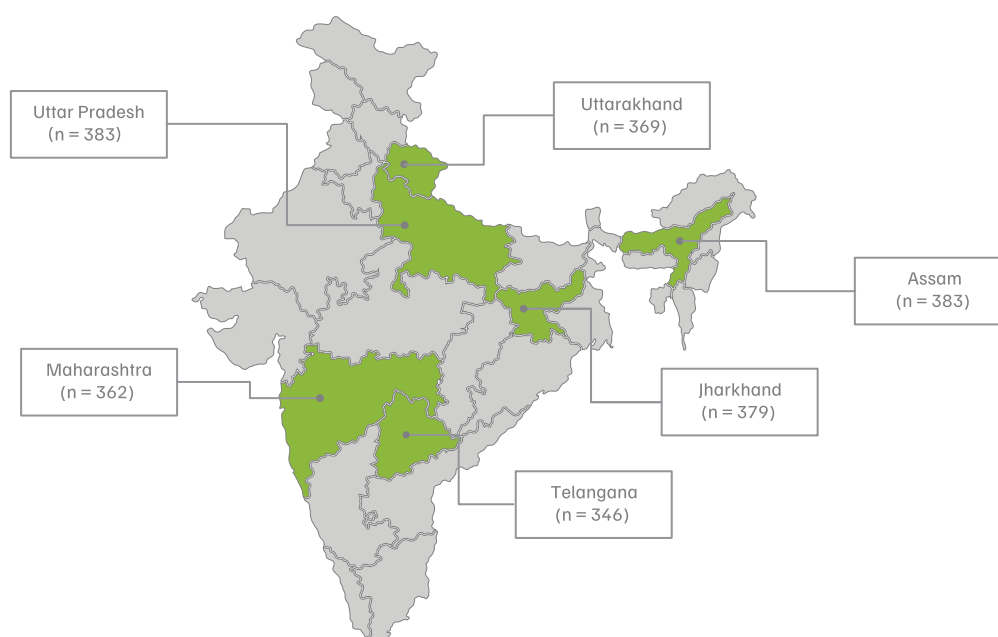
Within each state, the district with the highest proportion of Scheduled Caste, Scheduled Tribe, and Other Backward Classes (SC/ST/OBC) populations was selected, along with one additional district chosen at random. This was done to determine whether fuel use patterns varied between SC/ST/OBC and other population groups. In each district, 4 blocks were selected to represent the north, south, east, and west directions from the district headquarters, based on official district maps. Within each block, 2 villages were randomly selected from the *Census 2011* towns/villages directory. Thus, from each state, 2 districts, 8 blocks, 16 villages, and 336 households were selected.

The target was to survey 21 households in each of the 96 villages, resulting in 42 households per block, 168 households per district, 336 households per state, and 2,016 overall. A further 206 households were surveyed using the same selection procedure to buffer against non-response, giving a final sample of 2,222 households.



CEEW researchers on a pre-survey scoping visit in a village in Jharkhand to understand household fuel use patterns.

Figure 1. State-wise sample distribution



Source: Authors' analysis.

2.2 Questionnaire design and data collection

The questionnaire comprised three key sections: household demographics, including information on the household head and primary cook; an assessment of household assets and income sources; and an extensive evaluation of cooking fuel practices. The survey examined usage patterns, costs, and preferences for various fuels, including LPG, electricity, firewood, coal, and cow dung cakes, as well as logistical aspects such as cylinder refill history and awareness of government subsidies.

After the questionnaire was developed, data collection was undertaken by the survey agency Sigma Research and Consulting Pvt Ltd. Institutional Review Board (IRB)⁵ approval was obtained from Sigma Research and Consulting to ensure ethical compliance (IRB number: 10021/IRB/24-25). A

Computer-Assisted Personal Interviewing (CAPI) system incorporating the survey logic and final survey tool was deployed through SurveyCTO. In-person interviews were conducted by a team of more than 60 trained enumerators in four languages: Hindi (in Uttar Pradesh, Uttarakhand, and Jharkhand), Telugu (in Telangana), Assamese (in Assam), and Marathi (in Maharashtra). **The survey was conducted between November 2024 and January 2025.**

We used median values for most of the critical variables in the study, as they are less affected by extreme values and provide a better measure of central tendency. To analyse the WTP data, we also used winsorisation⁶ at INR 800 for PMUY users and INR 1,200 for informal, general, and non-LPG users. Historically, retail and PMUY prices for LPG have not exceeded INR 1,200 and INR 800, respectively. A total of 26 extreme values (approximately 1 per cent) were winsorised.

⁵ The Institutional Review Board (IRB) is responsible for protecting the rights and welfare of research participants, ensuring ethical standards, and maintaining the integrity of research studies involving human subjects.

⁶ Winsorisation is important when dealing with datasets that contain extreme values that could skew the results of statistical analyses. It is particularly useful in scenarios where the dataset is skewed, such as in finance, economic data, or survey research. Here, winsorisation maintains the original number of observations, and limits WTP values up to 800 and 1,200 respectively across user groups.

2.3 Limitations to the study

Several biases, including recall bias, and social desirability bias, may arise during data collection (Kar et al. 2020). For instance, respondents may understate their WTP relative to their actual budget in anticipation of a possible ‘true’ reduction in prices. As a result, stated WTP (as mentioned in section 3.3) may overstate actual behaviour change. This has been discussed in detail in section 4.2. The presence of male or senior family members may lead to respondents (in this case, the primary cook) filtering certain responses to align with the expectations of other household members or maintain a specific household image. Questions such as ‘the number of cylinders purchased in the last year’ may also be subject to significant recall bias, as they rely on long-term memory.

Given the purposive selection of states, districts, and blocks, and the deliberate oversampling of districts with high SC/ST/OBC populations, the sample is not statistically representative at the state or national level. The findings are indicative of fuel-use patterns among rural households in the surveyed districts and should be interpreted accordingly.

3. Key findings

This section presents the survey findings, starting with a demographic profile of the respondents before moving to overall cooking fuel consumption patterns. As we had relevant insights pertaining to LPG, a detailed section on examining LPG use, delivery status, affordability limits and WTP has been added.

3.1 Descriptive statistics on the respondents of the survey

The following tables provide a demographic overview of the total sample based on household dynamics, gender, social class distribution, and occupation of the respondents. We also asked respondents about their cooking spaces. **Indoor cooking is the standard for the vast majority, with 80 per cent of respondents cooking inside their household.**

Only the primary cook from each household was interviewed in the survey. Ninety-six per cent were women, the household members most exposed to household air pollution.

Table 1. 96% of all respondents in the survey were female

Total respondents = 2,222 [Only the primary cook from each household was interviewed in the survey]	Respondents who were also household heads	684	Male	64
			Female	618
			Others	2
	Respondents who were not household heads	1,538	Male	22
			Female	1,516
	General	SC	ST	OBC
By social category	23%	18%	31%	27%

Source: Authors' analysis.

Note: Nine respondents did not respond to the question on their social class.

Table 2. More than one-third of the households rely on agriculture as their primary income source

Category bucket	Specific occupations included	Count (n)	Percentage (%)
Agricultural sector	Agriculture (self-employed), agricultural labour, cattle rearing	774	35
Non-agricultural labour	Non-agricultural labour (wage/salary)	582	26
Unemployed/Homemaker	Unemployed/Homemaker	322	15
Other private income	Pension, self-employed, business, food vendor, rental, small business/ shop, remittances	294	13
Private/Contractual work	Private jobs, contractual labour	182	8
Government job	Government job	37	2
Other	Other	31	1

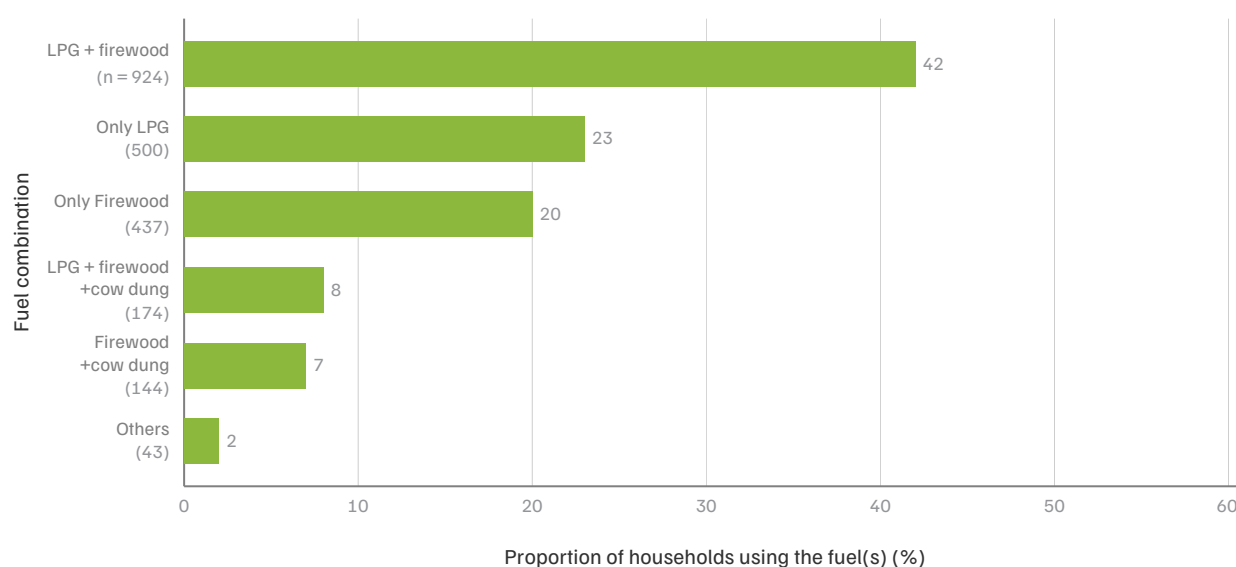
Source: Authors' analysis.

3.2 Overall fuel consumption pattern

The data reveal that 73 per cent of respondents used LPG in the 90 days preceding the survey, but only around 48 per cent of households use it regularly as their primary cooking fuel. Similarly, while 77 per cent

of households used firewood in the 90 days preceding the survey, approximately 50 per cent use it as their primary fuel. LPG and firewood are therefore tied in importance for rural households.

Figure 2. LPG is the most preferred clean cooking fuel among the surveyed households, though firewood and LPG both have prominent positions in the cooking fuel mix.



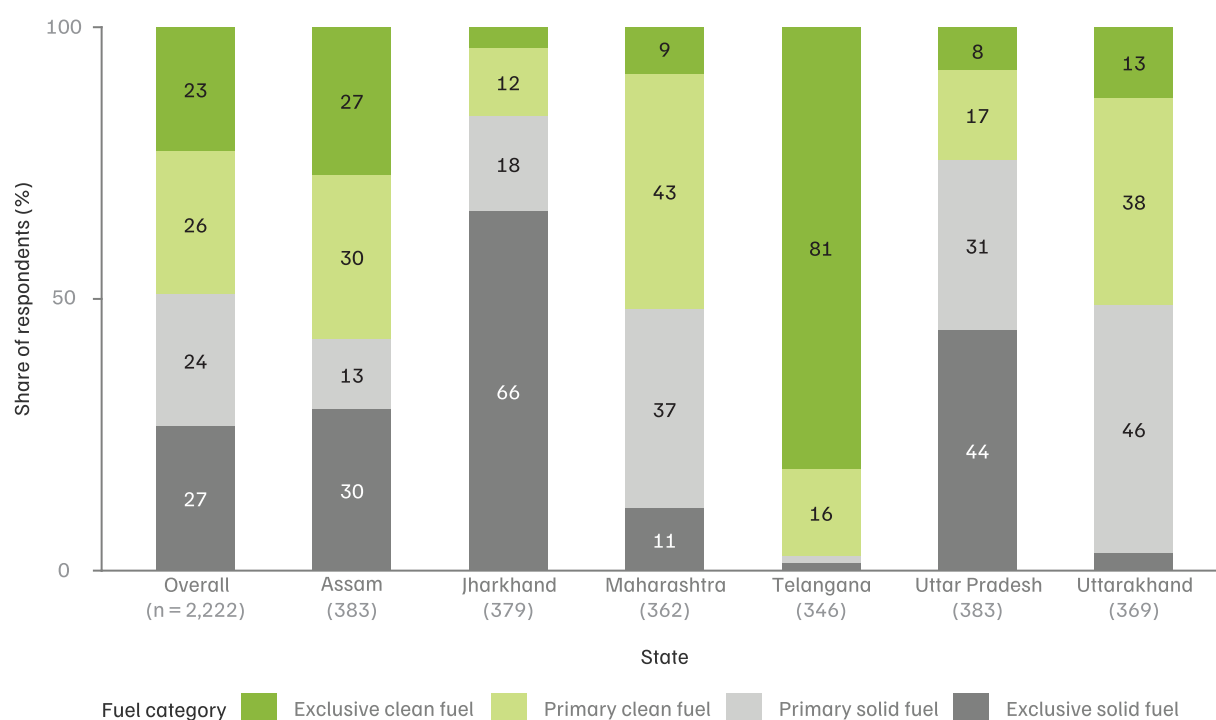
Source: Authors' analysis.

Note: (a) n = 2,222; (b) Fuel combinations here highlight the various cooking fuel stacks used by rural households and do not indicate the primary use of any fuel.

In terms of exclusive use, only 23 per cent of households use clean fuels for cooking, with electric cooking reported by just 28 households. Exclusive reliance on solid fuels (firewood, coal/charcoal, cow dung cakes, and kerosene) is observed among 27 per

cent of households. Thus, fuel stacking is significant among rural households: at least 50 per cent of households use both clean and solid fuels for cooking, indicating that the clean cooking transition remains incomplete for most households.

Figure 3. Telangana shows higher adoption of clean fuels than the other surveyed states



Source: Authors' analysis.

Note: (a) Clean fuels include LPG and electric cooking, while solid fuels include firewood, cow dung, coal/charcoal, and kerosene; (b) Labels less than 5 per cent have been suppressed for visual clarity.

Clear regional disparities emerge across states. Jharkhand and Uttar Pradesh show a strong reliance on solid fuels, while Telangana shows greater adoption of clean fuels. These differences may partly stem from certain socio-economic factors. Telangana's markedly higher per capita income (INR 1.87 lakh in 2025-26) (PPAC 2026) may support greater LPG affordability. This is discussed further in section 4.1. Jharkhand's relatively high forest cover (30 per cent) makes firewood more readily accessible (FSI 2023).

In Uttar Pradesh, the common use of cow-dung-based fuel combinations may reflect the state's large cattle population, the second largest in India according to the 20th Livestock Census (DAHD 2019).

At the district level, Simdega in Jharkhand records the highest share of exclusive solid-fuel users, at 78 per cent, while close to 88 per cent of households in Warangal, Telangana, use clean fuels exclusively.

3.3 An in-depth analysis of LPG as the most preferred clean cooking fuel among the surveyed households

LPG has played a central role in India's efforts to transition households away from polluting solid fuels towards cleaner cooking solutions. The PMUY scheme has substantially widened access to LPG nationwide, a trend reflected in the preceding analysis, where LPG emerges as the dominant clean fuel. Yet many households, despite owning an LPG connection,⁷ continue to use traditional fuels such as firewood alongside LPG (fuel stacking). This section examines LPG consumption patterns among rural households in greater depth.

Price and quantity of LPG consumed

We analysed LPG usage patterns over the preceding year. Households with a general or informal connection report the same median consumption of five cylinders annually. In contrast, PMUY beneficiaries consume a lower median of four cylinders per year.

All consumers, whether informal, general, or PMUY users, pay the upfront retail price of LPG when purchasing refills. Any subsidy, such as the PMUY subsidy for scheme beneficiaries, or discount on state taxes or rebate on delivery costs for general consumers, is subsequently credited to the consumer's bank account through the Direct Benefit Transfer for LPG (DBTL)⁸ scheme.

The analysis reveals a clear price hierarchy across connection types. Households with an informal connection face the steepest financial barrier, paying a median price of INR 1,000 per cylinder, INR 200 above the retail price of approximately INR 803. This reflects the markup associated with informal and undocumented delivery channels, where the absence of regulatory oversight allows intermediaries to charge substantially more than the official retail price. Even PMUY beneficiaries, who pay the lowest median price of INR 900, pay approximately INR 100 above the retail price. General connection holders pay a median of INR 120 above the retail price.

Table 3. Consumers across all connection types pay a premium for LPG cylinders over the prevailing retail prices

Connection type	Median cylinders (14.2 kg) purchased in the last year	Median retail price paid during the last cylinder refill
General connection (n = 1,008)	5	INR 920 (~INR 120 more over the retail price)
PMUY connection (558)	4	INR 900 (~INR 100 more over retail price)
No formal LPG connection (63)	5	INR 1,000 (~INR 200 more over the retail price)

Source: Authors' analysis.

Note: n = 1,629; During the survey, the retail price of an LPG cylinder (14.2 kg) was ~INR 803 (based on the retail price in Delhi). If we consider a PMUY subsidy of INR 300, the effective subsidised price of LPG was INR 503. Presently, the average retail price in Delhi has increased to INR 942, following three price increments: an INR 50 price hike in April 2025, an INR 60 price hike in March 2026, and an INR 29 price hike in June 2026. As a result, the subsidised price for PMUY users is ~INR 642.

⁷ LPG connections referred to in this study are broadly divided into three categories. A general connection is a standard LPG connection provided by an OMC (such as Indane, HP Gas, or Bharat Gas). Here, the consumer pays the full upfront security deposit for the cylinder, the regulator, and the cookstove out of pocket. Connections under the PMUY scheme are targeted to provide clean cooking fuel to women from low-income, BPL households. The government covers the upfront connection costs, giving the beneficiary a deposit-free cylinder, regulator, and their first refill for free. An informal connection means the household uses LPG but does not have a legally registered connection under their own name with an authorised distributor, and thereby may pay higher prices than the official retail price. This informality is, however, not incidental; it reflects the practical reality that households without locally valid identity documents, fixed addresses, or bank linkages are excluded from formal connections and resort to informal channels as a convenient option.

⁸ Any LPG subsidy is received through the *Direct Benefit Transfer for LPG* (DBTL) mechanism. Under the DBTL scheme, consumers purchase LPG cylinders at the regular market price, and the government subsequently credits the subsidy amount directly to their linked bank accounts.

Home delivery of LPG

According to MoPNG, there are four categories of LPG distributors based on geographic location: *shehri vitrak* (urban distributors who primarily serve urban LPG consumers); *rurban vitrak* (distributors who serve a mix of urban and rural consumers); *gramin vitrak* (rural LPG distributors who primarily serve rural consumers); and *durgam kshetriya vitrak* (distributors who serve rural LPG consumers in remote regions, such as forested areas) (MoPNG 2016). According to the 2016 *Unified Guidelines* issued by oil marketing companies (OMCs), all distributors except *durgam kshetriya vitraks* are mandated to provide home delivery.

Poor access to delivery services compounds the LPG affordability challenge. The number of LPG distributors serving the rural population increased by more than

160 per cent between 2014 and 2026, from 6,724 to 17,683 (PMUY 2026). However, despite this growth, home delivery for rural consumers has remained almost stagnant. On the demand side, only 54 per cent of rural households reported receiving home delivery of LPG cylinders in a CEEW survey in 2020 (Mani et al. 2021). Even in 2024, only 52 per cent of rural distributors reported providing home delivery to more than 90 per cent of their consumers (Kar et al. 2024). We have limited data from other large scale surveys to comment on delivery rates of LPG for rural households.

In this study, we find that less than half of the rural LPG-using households ($n = 1,629$) surveyed receive doorstep delivery from a distributor. The majority therefore collect their cylinders themselves, incurring additional time, costs, and effort in the refill process. Overall, more than 50 per cent of households travel to obtain their LPG refills.

Table 4. Home delivery status for households using LPG

Home delivery status for LPG users	Percentage (%)
Doorstep delivery by a distributor ($n = 767$)	47
Pickup from a point on the road (414)	25
Pickup from a distributor agency (414)	25
Pickup from a <i>kirana</i> store (30)	2

Source: Authors' analysis.

Note: (a) $n = 1,625$; 4 non-responses to this question have been removed from analysis. (b) Group values may not add up to 100 due to rounding off.



An LPG delivery worker moves refill cylinders on foot. Sustained LPG use depends not only on affordability but also on reliable last-mile delivery.

Analysis of affordability limits and willingness-to-pay for LPG

Before the introduction of PMUY in 2016, several studies analysed WTP for cooking fuels. WTP in this study is reported on a per-cylinder basis, whereas previous research has estimated it on a per-month basis; the two are therefore not directly comparable without assumptions about refill frequency.

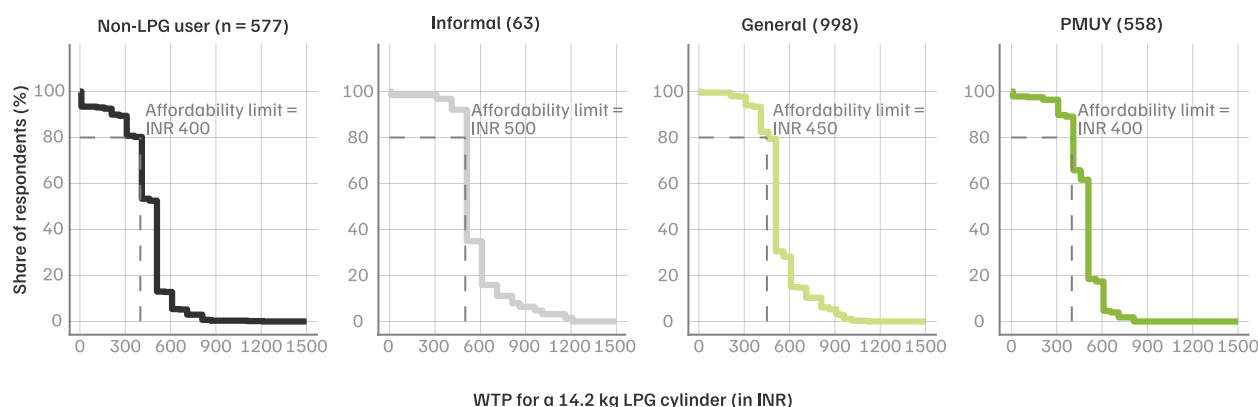
In 2014, a CEEW study found that a typical household needed to allocate a significant portion of its monthly budget to cooking expenses, approximately 6 per cent of total household expenditure (Jain et al. 2014). In 2016, the Petroleum Planning and Analysis Cell (PPAC) and Credit Rating Information Services of India Limited (CRISIL) conducted a primary survey of over one lakh households and found that the average WTP for LPG was **INR 313 per month for rural households** (CRISIL 2016). Following the launch of PMUY, a 2021 study of PMUY households found a WTP of INR 372 per month for exclusive LPG cooking (Chindarkar et al. 2021). Recent analysis suggests that, for lower-income households, the cooking fuel cost burden

ranges from around 7 to 10 per cent of total monthly expenditure (Haider 2022). According to the *Household Consumption Expenditure Survey* (MoSPI 2022–23) data, household expenditure on cooking fuel accounts for 7 per cent of total monthly expenditure (MoSPI 2024).⁹

In this study, households were asked the price they would be willing to pay for each 14.2 kg LPG cylinder to transition to exclusive LPG use. This question was anchored to the number of cylinders they would require annually based on household size. The responses were then analysed across LPG connection types (Figure 4), caste categories, and states (Figure 5).

We define the ‘affordability limit’ as the maximum price point at which 80 per cent of households would be willing to transition to exclusive LPG use. This corresponds to the 20th percentile of the WTP distribution. The relevant policy question is therefore not what the average household can afford, but the price point that leaves the fewest households behind.¹⁰ At INR 400, 80 per cent of households self-report that they would be willing to transition to exclusive LPG use.

Figure 4. For different user types for LPG, affordability limit ranges between INR 400 and 500



Source: Authors' analysis.

Note: (a) 26 values were winsorised. (b) The 80 per cent affordability limit is the 20th percentile of the WTP responses. (c) Households that did not use LPG during the survey were asked about their WTP to start using LPG in the future as an exclusive fuel for cooking.

⁹ For HCES 2022 to 23, the total sample size is 261,746, with 60% rural and 40% urban households. Median total expenditure for households is INR 17,712, while median value for total expenditure on cooking fuel is INR 1,213, i.e., ~6.84 or ~7%.

¹⁰ It is a somewhat arbitrary trade-off between inclusion and financial constraints. If we must make LPG affordable for 100% of households, the financial cost would be a non-starter. Given the stickiness of fuel subsidies, this is something policymakers avoid. Our understanding, based on engagement with relevant policymakers in recent years, is that a proposal that can work for a significant majority of the population, balancing fiscal considerations, has a higher likelihood of success. Hence, while we acknowledge that it is somewhat arbitrary, we have settled for 80% as the inclusion criteria.

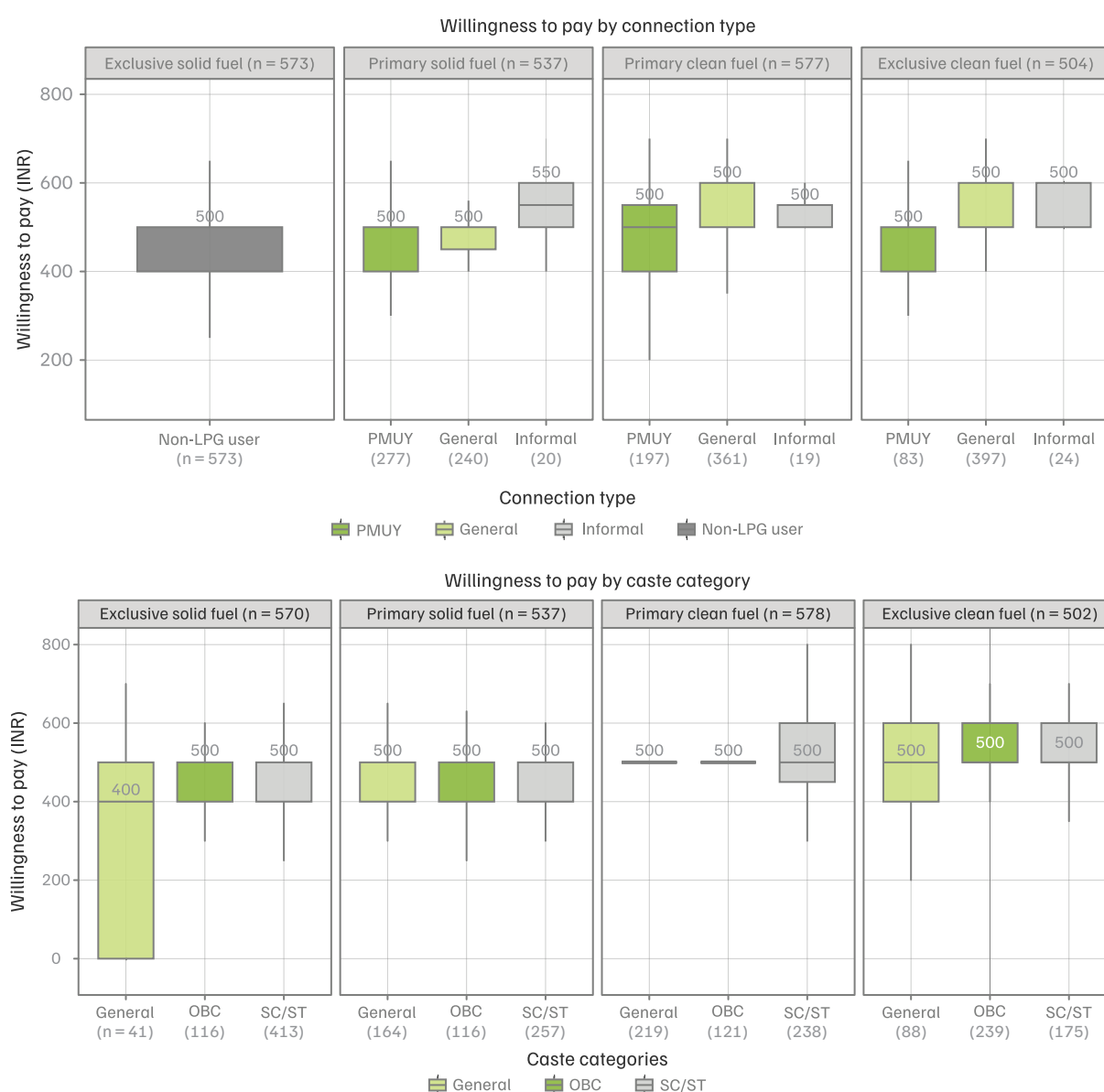
There is limited variation in stated WTP between general connection and PMUY users. This may be because survey responses on WTP for an LPG cylinder are unlikely to be formed independently of the prices households have paid in the past. Households that have historically used LPG may have anchored their stated WTP closer to the subsidised price they were aware of at the time of their last refill. Informal users indicate a higher WTP, potentially reflecting the higher prices paid when purchasing LPG through informal channels (Table 3). For non-LPG users, the reference point may be more diffused, based on second-hand knowledge of what neighbours or relatives pay.

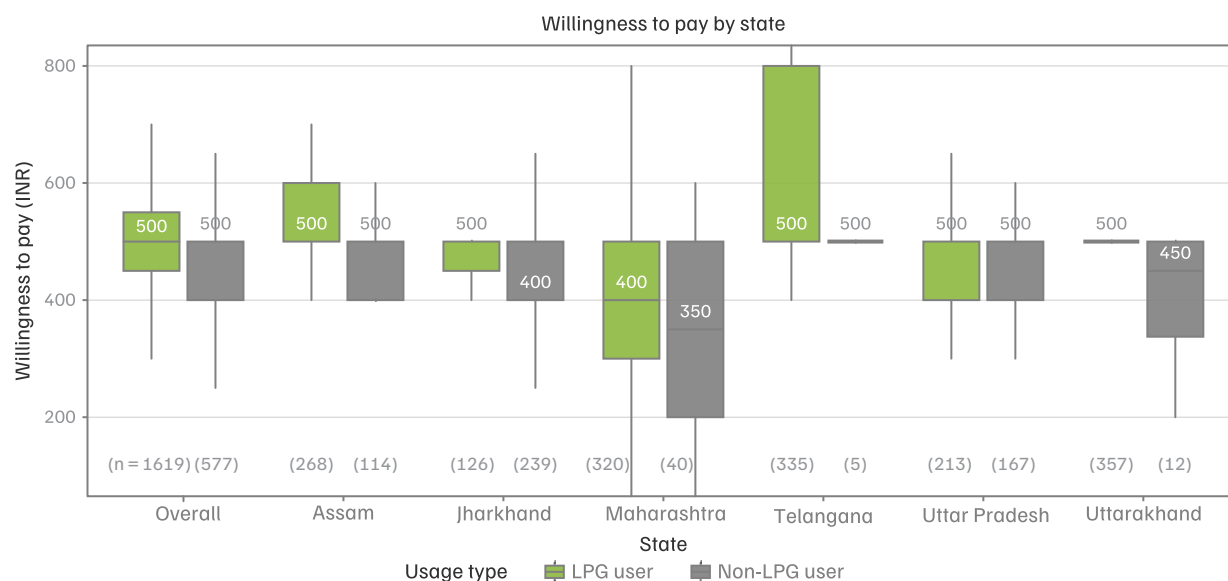
Around one-fourth of our surveyed households still do not use LPG ($n = 593$), or any other clean fuel for cooking. The primary reason is economic: 70 per cent of these non-LPG users cite the high cost of LPG.

Beyond affordability, logistical challenges pose the second major hurdle: 30 per cent of these non-LPG users indicate issues with refilling, such as inconsistent availability or long wait times. Additionally, 22 per cent of non-LPG users cite habituation to traditional biomass. For these households, the familiarity and low cost of biomass often outweigh the expense and effort of obtaining an LPG connection. The values here sum to more than 100 per cent because non-LPG respondents ($n = 593$), could select multiple reasons for not using LPG.

Figure 5 presents a multidimensional analysis of WTP for LPG among rural households, segmented by connection type, caste, and state. Across most segments, the median WTP is approximately INR 500, with some variation by current fuel use and social category. State-wise data highlight regional disparities.

Figure 5. WTP for LPG is at a median value of INR 500 across connection types, caste categories, and states

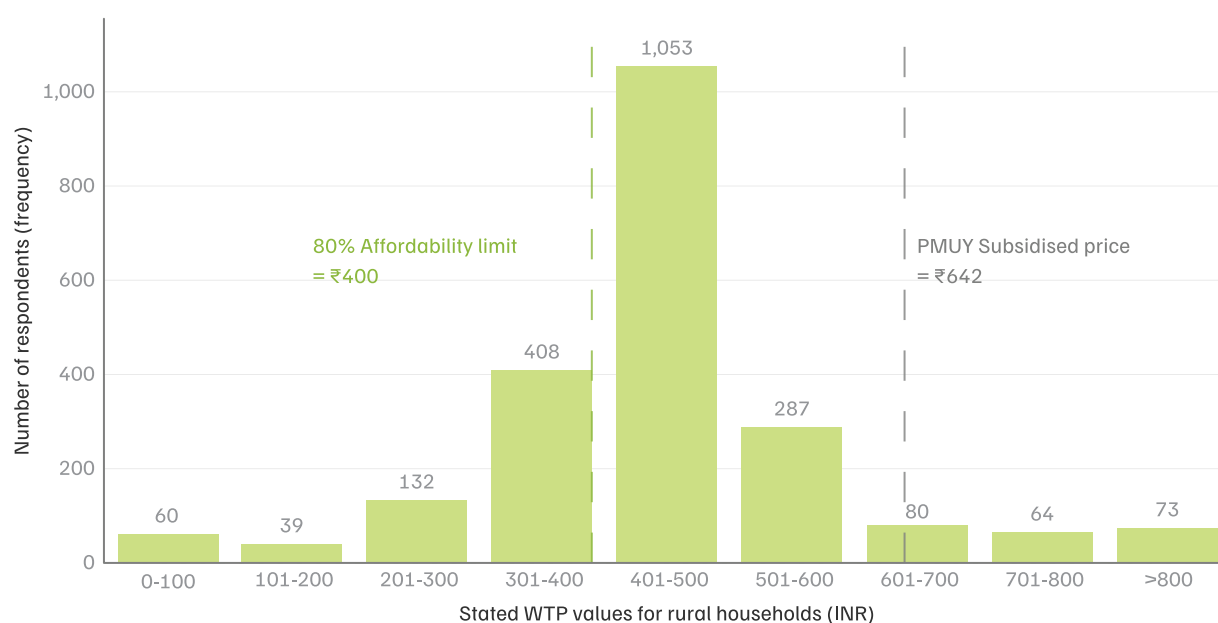




Source: Authors' analysis.

Note: (a) As questions on caste and WTP were voluntary, all non-responses have been removed from the analysis. (b) 31 non-responses were removed from Panel A, 35 non-responses were removed from Panel B, and 26 non-responses were removed from Panel C. (c) Abbreviations: OBC: Other Backward Classes; SC/ST: Scheduled Caste/Scheduled Tribe

Figure 6. At a stated WTP of INR 400, 80% of households self-report that they would move to exclusively using LPG for their cooking needs



Source: Authors' analysis.

Note: (a) $n = 2,196$; (b) The 80 per cent can be calculated by considering all WTP responses $\geq$ INR 400

The frequency plot in Figure 6 illustrates WTP for exclusive use of 14.2 kg LPG cylinders across the overall sample and different price categories. Two key insights emerge from this analysis: (a) an affordability threshold persists: at a stated WTP of INR 400, 80 per

cent of respondents indicate that they would be willing to transition to exclusive LPG use; and (b) a substantial price barrier remains: given the subsidised PMUY cylinder price of approximately INR 642, a further subsidy or price reduction is needed to increase LPG consumption.

Perceptions of schemes for promoting higher LPG use

In this study, we also explored how households might respond to different government initiatives related to LPG prices and subsidies. Respondents were presented with three distinct financial schemes designed to make LPG more accessible and asked to predict how each scheme would affect their LPG use.

The three proposed schemes were:

Reduction in upfront cost

A price mechanism in which the subsidy is applied directly at the point of sale, reducing the immediate cash payment required. For example, instead of paying INR 800 and receiving an INR 300 subsidy later, the customer would pay INR 500 upfront.

‘Save and Get’ Scheme (pre-paid)

A savings-based model in which households make small, regular deposits (e.g. INR 100 per week) into an account. Once the accumulated savings are sufficient to cover the cost of a cylinder, they can make the purchase.

‘Buy Now, Pay Later’ Scheme (post-paid)

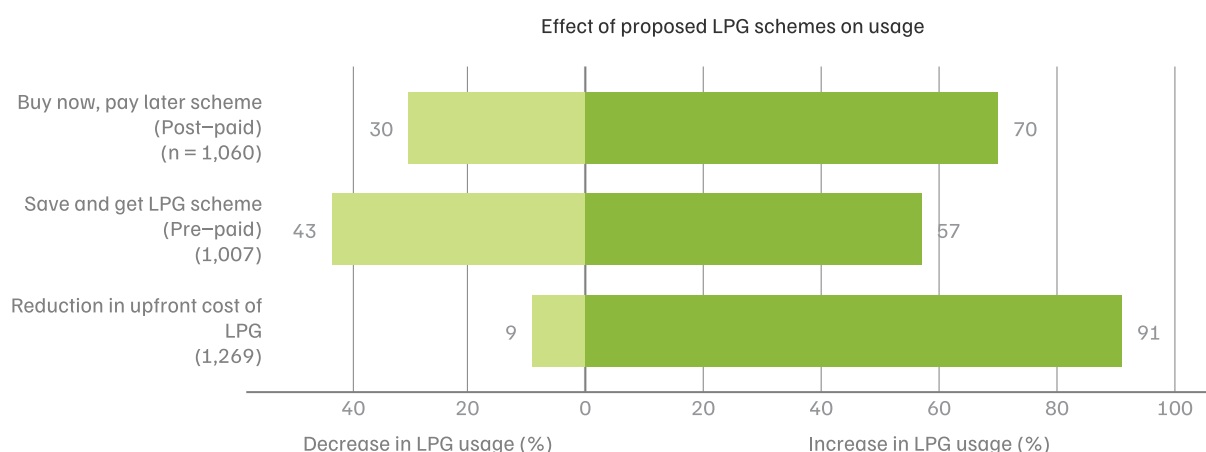
A credit-based model that allows households to purchase an LPG cylinder with a small initial payment and pay the remaining balance in instalments.

Among respondents who responded to the question on potential schemes, **more than 90 per cent indicated that a reduction in upfront costs would increase their LPG use.** If we consider the total sample, this translates to around **52 per cent indicating that direct cost reduction may lead to an increase in LPG usage.** This finding suggests that the high initial cash outlay is an important barrier for many households and that directly addressing it could encourage greater LPG use.

Around 57 per cent of respondents also supported the micro-savings (pre-paid) scheme. However, a significant share (more than 40 per cent) indicated that it would lead to a decrease in their LPG use. This may reflect the high opportunity cost of locked capital. More than 60 per cent of surveyed rural households are engaged in agricultural or non-agricultural labour (Table 2) and may not receive a steady income; data analysis indicates that only 22 per cent of households are paid monthly. During liquidity constraints or emergencies, this locked money may feel more like a financial burden rather than a benefit.

Rural households report that the refill cost of an LPG cylinder is a key barrier to sustained usage, suggesting that additional subsidy support or upfront price reduction could increase consumption.

Figure 7. A direct reduction in upfront LPG cost is the most powerful motivator for increasing LPG consumption



Source: Authors' analysis.

Note: Responses to this question were voluntary, therefore, the number of responses was lower than the total sample of n = 2,222; the sample size for each scheme has been added in the plot.

4. Discussion

This section examines two key observations from the study: why Telangana records markedly higher LPG use than the other surveyed states, and why stated WTP is likely to overstate actual purchase behaviour. Both point to the gap between access and sustained use in practice.

4.1 Why does Telangana have significantly higher use of LPG?

There is a distinct geographical disparity in LPG access and use across Indian states. Along with a clear north–south divide, states in the eastern part of the country remain the most energy-deprived. Our analysis reflects this disparity: while Jharkhand and Uttar Pradesh show a strong reliance on solid fuels, Telangana shows greater adoption of clean fuels. Historical data indicate that the Andhra Pradesh–Telangana region has consistently led in adoption, rising from 36 per cent in 2011 to 92 per cent by 2020, while states such as Bihar reached only 49 per cent during the same period (Mani et al. 2021).

Following the LPG shortage in the late 1990s, several southern state governments launched dedicated programmes that distributed subsidised or free LPG connections to BPL households, substantially increasing access to clean cooking fuels (Sati et al. 2022). Andhra Pradesh's *Deepam Scheme* (1999), for instance, covered the LPG connection fee for BPL women belonging to self-help groups (SHGs) identified through white ration cards, making clean cooking fuel directly accessible to the poorest households (Rajakutty et al. 2002).

This state-level model was successful enough to be adopted nationally, first as the *Rajiv Gandhi Gramin LPG Vitran Scheme* in 2009 and later as the PMUY in 2016 (Sati et al. 2022). Similarly, Telangana's *Maha Lakshmi Scheme*, which offers LPG cylinders at INR 500 (equivalent to the median WTP identified in this study), alongside financial assistance for women, presents a case for promoting women's agency as well as sustained fuel usage (Government of Telangana 2023). Southern states have historically performed better due to early state-level schemes launched in the late 1990s to subsidise connections for BPL households (Sati et al. 2022).

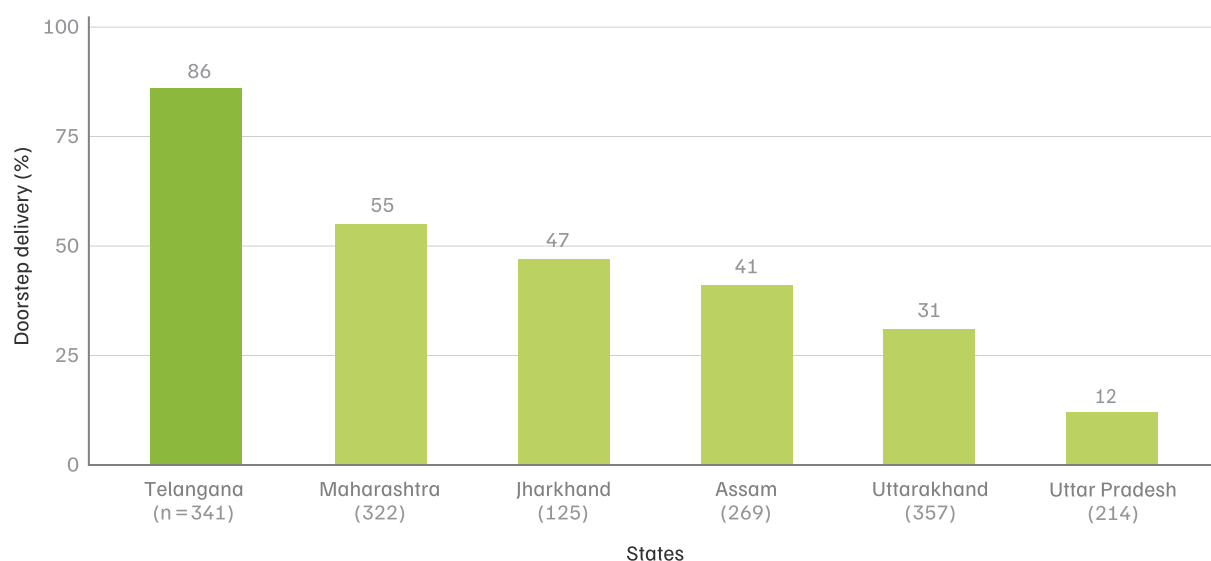
Table 5. Telangana has much higher LPG access rates as compared to national averages

Parameter	All India	Telangana	Key insight
LPG access	102%	120%	Significantly exceeds national saturation levels
PMUY connection ratio	31.2%	9.2%	Only 1 in 10 customers in Telangana are PMUY beneficiaries
Distributor density	1 per 12,924 customers	1 per 15,782 customers	Higher doorstep delivery despite lower distributor density

Source: Authors' compilation from PPAC 2025.

Note: The LPG access value exceeding 100 per cent results from PPAC's estimation approach, which calculates LPG penetration as the ratio of total active domestic connections to the total number of households. However, the number of domestic connections should not be used as a proxy for households using LPG. Despite past deduplication efforts, the data do not account for a substantial share of households with more than one LPG connection, potentially due to service delivery concerns (Mani et al. 2021; CAG 2019).

Figure 8. Telangana has the highest doorstep delivery rate in our survey data



Source: Authors' analysis.

Note: (a) n = 1,628 is the total number of responses received for this question; (b) One NA response from Jharkhand was removed from the analysis.

Unlike PMUY, which focuses on providing new connections to low-income households, the *Maha Lakshmi* subsidy applies to existing connections (above poverty line [APL]/BPL) provided the annual family income is below INR 2 lakh. Telangana currently records a per capita income (for Financial Year (FY) 2025–26), of INR 1.87 lakh - more than the national average of INR 1.21 lakh (PPAC 2026). Higher disposable income may directly translate to a higher WTP for cleaner fuels.

4.2 Stated WTP tends to overstate actual purchase behaviour

The WTP results (section 3.3) indicate that, at a price of INR 400, 80 per cent of respondents self-report that they would be willing to transition to exclusive LPG use for their cooking needs. However, this stated or self-reported price preference may not accurately reflect actual behaviour if LPG prices change in the future, as stated WTP may overestimate actual behaviour change. Households may continue to rely on firewood and other solid fuels as secondary fuels along with LPG for their cooking needs.

Such discrepancies between stated responses and revealed preferences are well documented. A 2012 study on the adoption of non-traditional cookstoves in rural Bangladesh found that hypothetical survey demand was significantly higher than actual purchases at market prices, with only 2–5 per cent of households purchasing non-traditional cookstoves, depending on the type (Mobarak et al. 2012). Hence, stated WTP may poorly reflect real-world choices. Findings from this study suggest that other factors, such as financial circumstances, habits, and low perceived health risks, may continue to drive solid fuel dependence even among respondents who indicate a willingness to switch. This may also reflect social desirability bias in the WTP results.

An important aspect of this study is understanding willingness to pay for cooking fuels; however, stated WTP may poorly reflect real-world choices.

5. Recommendations

Historically, LPG access has predominantly been defined by the number of connections delivered rather than sustained use. Initiatives to improve access and ensure sustained use can be categorised into four broad areas:

1. **Provide additional LPG subsidy to bridge the affordability gap.**

Subsidies are a critical social investment, as the costs of inaction, including health impacts, may far outweigh the fiscal burden. The survey results indicate that additional government subsidies of INR 200 could help bring the subsidised price of LPG at around INR 400, the price point at which 80 per cent of respondents stated that they would be willing to transition to exclusive LPG use. While the subsidised price of one 14.2 kg cylinder has fluctuated between INR 553 and INR 642 in the last 1 year, we assume INR 600 as a reference point for the recommendation and suggest additional subsidy of INR 200. However, this finding is based on self-reported data and may not reflect revealed preferences, as discussed in section 4.2.

Given that there is a strong linkage between household and ambient air pollution, the feasibility of providing additional geography- and season-specific subsidies could also be explored. This broader policy could, thus, be applicable during high-pollution periods (e.g. during the winter months) in geographically disadvantaged locations such as the Indo-Gangetic Plain (IGP) to reduce the overall burden of PM_{2.5} on ambient air quality.

Innovative financing methods could also be piloted before large-scale deployment. To overcome the high upfront costs of stoves and connections, especially for households ineligible for PMUY, financing innovations such as carbon-linked subsidies or micro-loans could be used (Calyx Global 2023). CEEW research indicates that the valuation of carbon credits could further subsidise the cost of a 14.2 kg LPG cylinder by almost INR 147 for end users (Kar et al. 2023).

2. **Moving beyond price interventions to ensure sustained use through a multidimensional approach**

Previous studies have established that price reductions alone may not ensure sustained or increased use of a particular fuel or technology

(Mobarak et al. 2012). Similarly, research has documented a significant gap between self-reported and actual clean fuel consumption, highlighting the risk of overestimating behaviour change when relying on stated preferences or WTP as proxies (Kar et al. 2020). These findings indicate that the barriers to sustained LPG use are complex and must be systematically addressed.

The barriers to exclusive LPG use are multiple, overlapping, and often context specific. They include gaps between LPG refill cycles, high or unpredictable delivery costs, lump-sum payment constraints, ingrained preferences for the flavour imparted by solid-fuel cooking, and limited awareness of the long-term health consequences of smoke exposure. The relative importance of each barrier varies significantly across geographies, socio-economic groups, and household compositions. A policy that effectively addresses the dominant barrier in one setting may not have a significant impact in another. This highlights the need for locally contextualised policy interventions that identify which barriers matter most, for whom, and under what conditions.

a. **Overcoming the ‘lumpiness’ of payments**

Despite LPG being subsidised under PMUY, upfront costs remain a significant barrier, especially for low-income households. From our survey, data indicates that around 57 per cent of respondents supported the micro-savings (pre-paid) scheme (section 3.3). The Ministry of Petroleum and Natural Gas (MoPNG) and OMCs could explore micro-savings mechanisms that allow households to stagger payments according to their income cycles. Mobile-phone-based micro-savings and micro-payment platforms could allow households to set aside small amounts daily or weekly towards their next refill, effectively spreading the cost over six or seven weeks to better match their cash flows. For example, paying INR 160 per week over six weeks (i.e., $\text{INR } 160 \times 6 = \text{INR } 960$) may be more manageable than paying a lump sum of INR 942 (the LPG price as of July 2026). Survey data indicate that around 47 per cent of households receive payments daily or weekly. Given India’s high digital penetration and access to mobile phones, such a model could be operationally feasible and tested through pilots using *Jan Dhan*-linked accounts or fintech intermediaries.

b. Addressing socio-cultural preferences through focused behaviour change interventions:

Evidence from multiple countries shows that well-designed behaviour change communication—information, education, and communication (BCC–IEC) campaigns can accelerate the clean cooking transition when mass media is combined with interpersonal communication (IPC) to address context-specific barriers. Between 2016 and 2019, the Clean Cooking Alliance (CCA) supported campaigns across Bangladesh, Kenya, and Nigeria that collectively reached over 13 million people, resulting in measurable improvements in awareness, purchase intention, and behaviour towards clean fuels, with a statistically significant dose–response relationship observed between BCC exposure and outcomes (Johnson et al. 2020; Evans et al. 2017). Indonesia’s experience further illustrates that communication campaigns work best when embedded within a broader enabling environment of subsidies, infrastructure, and social trust (Astuti et al. 2019).

Within India, a 2019 multi-channel campaign across Gujarat and Uttar Pradesh reached over 1.1 million people through radio, street theatre, and door-to-door outreach led by local female community workers, explicitly targeting sustained post-adoption use rather than initial access alone (Clean Cooking Alliance 2021). Together, these findings point to the need for a structured BCC–IEC strategy in rural India that goes beyond connection distribution to address cooking norms, safety perceptions, and the health costs of fuel stacking.

3. Enhancing last-mile delivery and logistics

To improve access, it is critical to ensure last-mile delivery, especially in rural, and remote areas. In 2024, CEEW proposed replacing the current flat commission of INR 73.08 per cylinder, paid equally to all distributors regardless of operating conditions, with a differentiated model that categorises distributors based on their level of structural disadvantage (Kar et al. 2024). A rural distributor serving 8,000 consumers spread across remote villages, nearly half of whom are low-income PMUY beneficiaries purchasing as few as 3 cylinders a year, faces fundamentally different costs from an urban distributor serving 15,000 consumers in densely populated areas. Under the proposed model, distributors classified as severely disadvantaged would receive a targeted top-up

commission to cover higher delivery costs, such as those associated with long-distance trips that often result in failed deliveries. This could help ensure that rural households are not pushed back towards biomass fuels due to an unreliable LPG supply (Kar et al. 2024; Pai et al. 2020).

Further, models such as Bharat Petroleum Corporation Limited’s (BPCL) *Urja Devi* could be scaled and replicated across OMCs. The government could leverage SHGs, village-level entrepreneurs (VLEs), and common service centres (CSCs) as micro-distributors (Kar et al. 2024). These entities could stock small quantities of cylinders (<100 kg for fire safety purposes, as per existing law; Petroleum and Explosives Safety Organisation 2016) to provide on-demand refills, reducing the need for rural consumers to travel long distances (Kar et al. 2024).

4. Transitioning ‘beyond LPG’ by promoting other fuel pathways such as biogas and electric cooking

While LPG remains the single most scalable interim model (Kar et al. 2023), heavy dependence on a single fuel exposes vulnerable populations to price volatility and supply shocks, as seen during the recent West Asia crisis (Ali 2025; Shukla 2026). India’s clean cooking mix must, therefore, diversify. Several consumers have already shifted to electric cooking amid the LPG shortage, while the government has fast-tracked PNG installations, providing connections to 580,000 new households in March 2026 alone (Economic Times 2026).

The government should therefore encourage greater adoption of electric cooking options such as induction cookstoves and rice cookers (Kar and Auddy 2026; Auddy and Das 2026). At a broader policy level, electric cooking devices could also be considered to be provided to rural users at a discounted rate through LPG distributors, given their extensive on-ground presence across India. Further, India’s dairy belt, particularly states such as Gujarat, Punjab, Rajasthan, Maharashtra, Tamil Nadu, and Uttar Pradesh, should explore biogas-based cooking. CEEW estimates that if just 25 per cent of India’s approximately 40 million cattle-rearing households (i.e. 10 million households) shifted to biogas, this could save up to INR 2,000 crore annually in import costs (Kar and Gill 2026; Jain et al. 2026).

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India imports a large share of the LPG it consumes from West Asia. Geopolitical conflicts such as those in early 2026 may disrupt supply and impact vulnerable rural consumers.





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