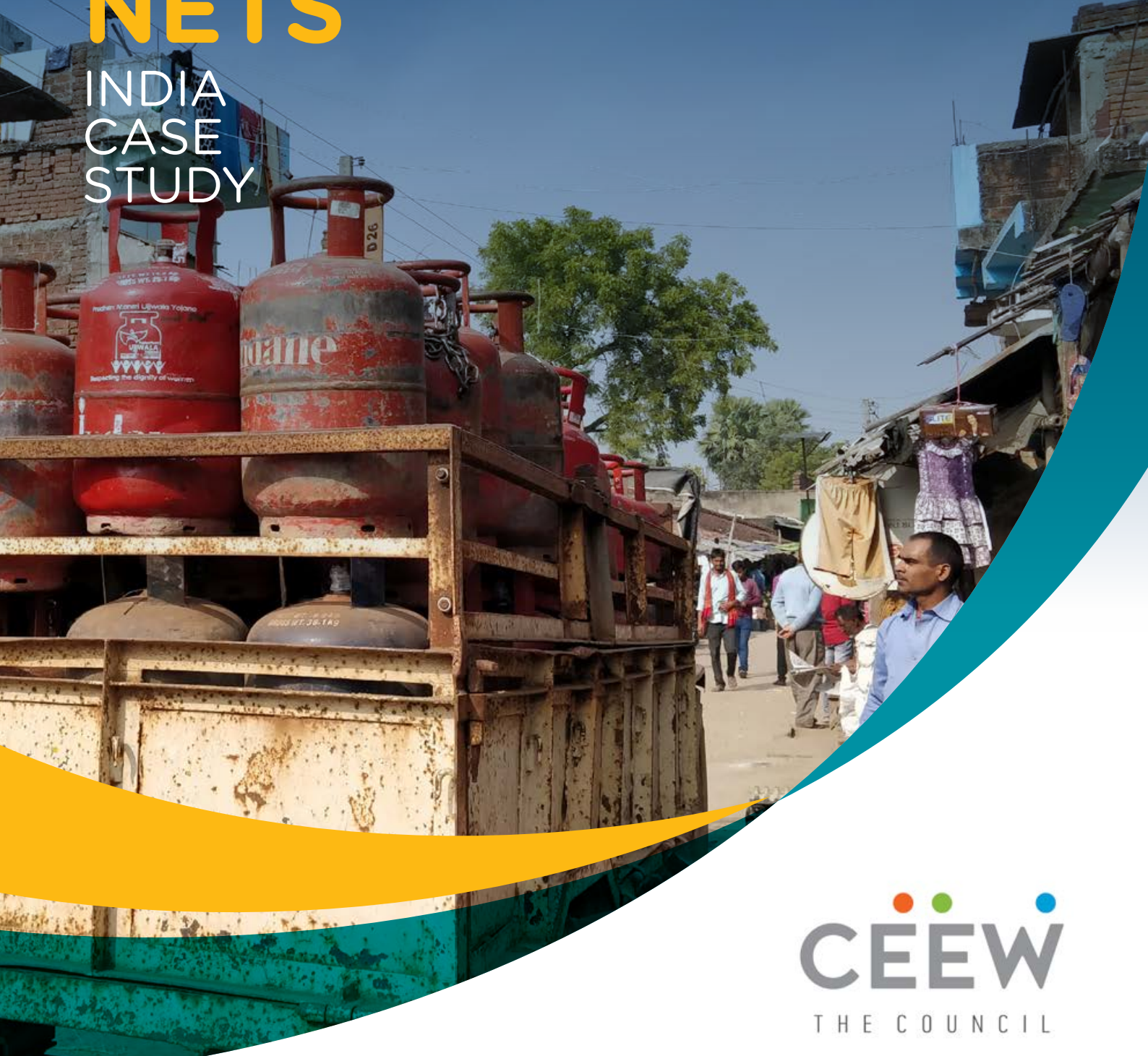


ENERGY SAFETY NETS

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ACKNOWLEDGEMENTS

The Energy Safety Nets: India Country Study was researched and written by partners the Council on Energy, Environment and Water (www.ceeew.in) in New Delhi. The lead researcher was Sasmita Patnaik (sasmita.patnaik@ceeew.in), supported by a team that included Shaily Jha, Karishma Pradhan and Abhishek Jain.

The authors of the report would like to thank SEforALL and Sarah Wykes of CAFOD for their technical inputs, and Sam Pickard and Andrew Scott at Overseas Development Institute for their valuable contribution in shaping the report.

The authors are extremely thankful to the external reviewers of the study – Madhumita Hebbar, Oxford Policy Management; Rohit Azad, Jawaharlal Nehru University; and Nidhi Tewari, Ministry of Petroleum and Natural Gas, for providing valuable insights to the research. Finally, the authors would like to thank all the stakeholders who participated in the workshops and interviews conducted during the study.

The research team acknowledges the contributions to this work of the following workshop attendees and key interviewees: Center for Study of Science, Technology and Policy (Riya Rachel, Poornima Kumar), Centre for Global Development (Alan Gleb), Clean Cooking Alliance (Akanksha Rai), Indian Council for Research on

International Economic Relations (Sandeep Paul, Samridhi Jain), Indian Oil Corporation Limited (Avantika Garg, Bijay Kumar, Rumana Qidwai), Indian Oil Corporation Limited and Hindustan Petroleum Corporation Limited (LPG Distributors from states of Haryana, Jharkhand, Madhya Pradesh, Punjab, Rajasthan, Uttar Pradesh and West Bengal), Indian Society of Health Professionals (Puneet Dutt), Indian Statistical Institute, Delhi (E. Somanathan, Aiswharya Singh), Integrated Research and Action for Development (Chandrashekhar Singh), International Institute of Sustainable Development (Shruti Sharma), Jawaharlal Nehru University (Rohit Azad, Himanshu), Landesa (Govind Kelkar), LPG Distributor, Uttar Pradesh, Indian Oil Corporation Limited (Rachna Yadav), Michigan State University (Prabhat Barnwal), MicroSave Consulting (Anurodh Giri), Ministry of Petroleum and Natural Gas (Nidhi Tewari), MS Swaminathan Research Foundation (Dev Nathan), National University of Singapore (Namrata Chindarkar), NRDC (Madhura Joshi), Oxford Policy Management (Madhumita Hebbar), Prayas Energy Group (Ashok Sreenivas), RICE University (Ashish Gupta, Nazar Khalid), The Energy and Resources Institute (Mini Govindan), University of California, Berkeley (Kirk Smith).

We acknowledge with gratitude the financial support provided by the Wallace Global Fund.



This report is based on research jointly implemented by CEEW, the Overseas Development Institute (ODI) and Catholic Agency for Overseas Development (CAFOD). The research in India is part of a broader program of energy safety nets research also carried out in Brazil, Ghana, Kenya, Indonesia and Mexico funded by Sustainable Energy for All (SEforALL) as part of its People-Centered Accelerator work program.

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ABBREVIATIONS

AAY	<i>Antyodaya Anna Yojana</i>
ASHA	Accredited Social Health Activist
BPL	Below poverty line
CSC	Common Service Centers
CTC	Cash-Transfer Compliant
CNG	Compressed Natural Gas
DBT	Direct Benefit Transfer
DBTL	Direct Benefit Transfer for LPG
DNSA	Different Name Same Address
ESN	Energy Safety Net
GDP	Gross Domestic Product
HAP	Household Air Pollution
ICDS	Integrated Child Development Scheme
ICMR	India Council of Medical Research
INR	Indian National Rupee
IOCL	Indian Oil Corporation Limited
IT	Information Technology
JSY	<i>Janani Suraksha Yojana</i>
KYC	Know Your Customer
LPG	Liquefied Petroleum Gas
MeitY	Ministry of Electronics and Information Technology
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MoPNG	Ministry of Petroleum and Natural Gas
MoHFW	Ministry of Health and Family Welfare
NeGP	National E-Governance Plan
NFHS	National Family Health Survey
NRLM	National Rural Livelihood Mission

NSS	National Sample Survey
NGO	Non-governmental Organization
OMC	Oil Marketing Companies
PaHaL	<i>Pratyash Hastantrit Labh</i>
PDS	Public Distribution System
PMAY-G	<i>Pradhan Mantri Awas Yojana – Gramin</i>
PMJDY	<i>Pradhan Mantri Jan Dhan Yojana</i>
PMMVY	<i>Pradhan Mantri Matru Vandana Yojana</i>
PMUY	<i>Pradhan Mantri Ujjwala Yojana</i>
PNG	Piped Natural Gas
PPAC	Petroleum Planning and Analysis Cell
PPP	Purchasing Parity Power
RGGLVY	Rajiv Gandhi Gramin LPG Vitrak Yojana
RRB	Regional Rural Banks
SC	Scheduled Caste
SDG	Sustainable Development Goal
SECC	Socio Economic and Caste Census
SHG	Self-Help Group
SNSA	Same Name Same Address
SSN	Social Safety Net
ST	Scheduled Tribe
UIDAI	Unique Identification Authority of India
USD	United States Dollar
VLE	Village-Level Entrepreneurs

A note on currency

India uses the Indian rupee (INR). For currency conversions, the exchange rate used is an average of the relevant year(s) detailed in the text. Where no year is provided, the report assumes an exchange rate of USD 1 = INR 70.

EXECUTIVE SUMMARY

Sustainable Development Goal 7 (SDG7) aims to ensure access to affordable, reliable, sustainable and modern energy for all. The idea of 'leave no one behind' is inherent to all the SDGs. Social protection programs are a major mechanism for ensuring access to social goods such as nutrition, healthcare, education and employment for deprived populations. In a similar context, Energy Safety Nets (ESNs) refer to social assistance mechanisms that enable poor and vulnerable people to access and use modern energy services. ESNs are a broad set of measures ranging from general energy price subsidies at one end to highly targeted social assistance at the other. The aim of this research is to identify measures that have been implemented to enable poor people to access modern energy services, analyzing their impacts and experiences, and explore the reasons for their success or lack thereof. India has experience subsidizing both access to electricity and liquefied petroleum gas (LPG) for cooking; this case study focuses on the latter. In particular, it focuses on the policies and schemes introduced since 2013 to improve access to and targeting of LPG subsidies.

The Government of India primarily provides LPG subsidies to address the ill effects of combustion of biomass on maternal and child health. Since 2013, LPG subsidies have undergone many modifications to improve subsidy delivery and targeting, access to connections, and the availability of LPG. This research focuses on four major schemes within the ambit of the LPG program in India: *Pratyash Hanstantrit Labh* (PaHaL) or the Direct Benefit Transfer for LPG Subsidy (DBTL),

the Give it Up Campaign, *Pradhan Mantri Ujjwala Yojana* (PMUY), and Unified Guidelines for Selection of LPG distributorship.

The subsidy reforms (DBTL and Give it Up) aimed to improve the targeting of the LPG subsidy to households that need support, reduce subsidy leakage to non-domestic uses, and remove spurious connections. PMUY and Unified Guidelines for the Selection of LPG distributorship addressed the high upfront cost of an LPG connection for poor households and its unavailability in rural areas, respectively.

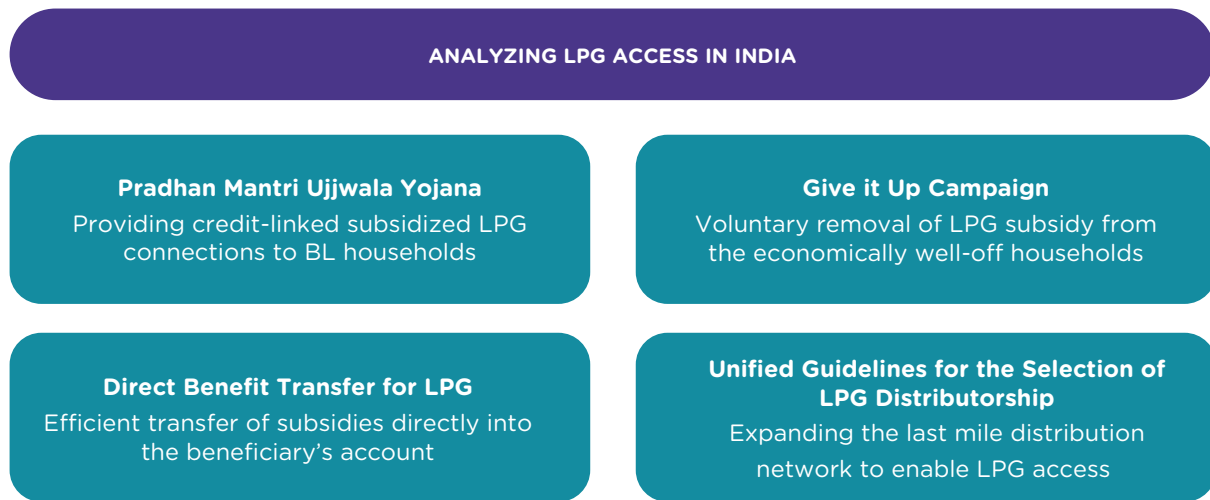
IMPACTS AND EXPERIENCES

The schemes have achieved much of their intended impact, especially with respect to coverage of poor and marginalized households, most of which have been brought into the LPG program. As of September 2019, 80 million families had received a subsidized connection under the PMUY. Targeting of subsidized LPG was further enhanced by checks instituted under the Know Your Customer (KYC) and DBTL schemes, which had blocked 42.3 million duplicate, fake/non-existent, and inactive LPG connections from receiving the subsidy by March 2019.

Access to an LPG connection has not necessarily translated into sustained use, despite LPG refills being subsidized. For PMUY consumers, the subsidy provided on the first few cylinders was used to pay back the loan taken out to cover the unsubsidized portion of the connection. This means that PMUY consumers, who are among the poor-

Figure ES1

Scope of the policies analyzed in the study



Source: Authors' compilation

est in India, had to pay the market price for the first few cylinders. Affordability challenges around the recurring cost of LPG for such households contributed to an average PMUY household consuming 3.4 cylinders per year against an all-India average of 6.77 in 2018. Budgeting for the relatively large initial cost is also a major concern among households with irregular or uncertain primary income from occupations such as casual labor. Additionally, there are challenges of awareness at the beneficiaries' end regarding the receipt of subsidy.

This case study suggests that the different consumers along the spectrum of poverty may require a different amount of subsidy to make LPG use affordable. Improved targeting and rationalization of use-based subsidies could help to concentrate the subsidy on the poorest households. The Give it Up Campaign attempted to voluntarily remove the LPG subsidy from economically well-to-do households, but 90 per cent of India's non-poor population continue to receive it. At the other end of the income scale, the Socio Economic and Caste Census (SECC) provided a leap forward in the comprehensiveness of defining deprivation. However, using this for targeting means drawing on data obtained in 2011, overlooking changes to

households' circumstances since then, with some escaping poverty and others falling into it.

Many households' regular use of LPG is constrained by insufficient availability of LPG and limited awareness of its benefits. To increase availability, the government instituted a tiered distribution structure that aimed to deliver LPG directly to homes or nearby collection points across India. Yet the rate of expansion in the distribution of LPG has not kept pace with the rate of connections, particularly over the last four years, which have seen a rapid increase in connections provided under PMUY. To improve awareness, during implementation of PMUY, the government started conducting *LPG Panchayats*, community-level platforms to facilitate interaction among new and old users of LPG (all women), educating them on the benefits of using LPG, and addressing any queries new users had with the fuel or the subsidy process. A sex-disaggregated examination of the cooking energy transition revealed that social norms mean most women lack the required means to exercise the autonomy that the PMUY scheme is trying to provide. Including the decision-makers of household expenses in awareness-raising programs is important if consumption patterns are to change.

DELIVERING ENERGY ACCESS THROUGH SOCIAL ASSISTANCE PROGRAMS

With the dynamic nature of poverty, households are more likely to revert to the use of solid fuels for cooking if existing social assistance programs are ineffectual in providing support for regular use of clean fuel. There exists the potential to integrate and link key aspects (identification, targeting and delivery mechanisms) of different social assistance programs with the promotion of sustained use of LPG.

The Government of India implements various social assistance programs that provide targeted support for health, nutrition and education through measures that range from conditional cash transfers to subsidies. Targeting under some of the LPG programs is similar to that used in other social safety nets, i.e., they focus on the population living below the poverty line, based on SECC data. Support for the regular use of LPG could be enhanced in two ways: 1) by integrating targeting, beneficiary enrollment and delivery mechanisms across social assistance programs for the poorest population, thus reducing the administrative burden for households and the government in aggregate; and 2) by linking the identification and targeting methods across existing social assistance programs to provide a differential subsidy, i.e., enhanced support for the poorest households.

To account for the overall health impact of household air pollution in India, the government could link the existing healthcare schemes on maternal and child health with earmarked transfers for using clean cooking fuels. A precedent for this exists: other schemes such as those focusing on ensuring decent housing and sanitation have integrated beneficiaries across various social assistance programs.

POLICY RECOMMENDATIONS

The government needs to continue to improve its support for transitioning poor households away from cooking with biomass. To support a reorientation of the approach, this case study discusses potential steps to address challenges around affordability, availability, and awareness of LPG.

Recognising the poverty of the PMUY beneficiaries, the Ministry of Petroleum and Natural Gas (MoPNG) could waive the loan or at least reduce the repayments to avoid these households having to pay the full market rate for LPG. A smaller amount (e.g. USD 0.71 or INR 50) paid over more refills would be easier for the households to afford than the current arrangement of using the entire subsidy amount to pay off the loan as quickly as possible.

Increasing the subsidy amount to cover a minimum energy threshold for all poor households would be a plausible first step to ensure sustained use of LPG. Considering the need for improved targeting, the government should adopt an approach for layered assessment. PMUY beneficiaries are an obvious first choice for an increased subsidy given their documented poverty level. To further sharpen targeting, a combination of socioeconomic factors – such as location (urban and peri-urban), social standing, education level of the primary earner of the household, age of connection, and number of refills per annum for existing connections – should be used to better identify households that should receive a reduced amount of LPG subsidy or no subsidy at all.

To deal with the high upfront cost of LPG refills paid by beneficiaries, the subsidy delivery mechanism could be changed. Instead of paying the full market price to the distributor, beneficiaries could pay the subsidized rate to the distributor with a direct debit of subsidized cylinder value transferred automatically from their bank accounts, perhaps via digital (or e-) vouchers.

Consistent and sustained awareness-raising campaigns are required to facilitate the behavioral shift to cooking with LPG and to reduce uncertainty around the LPG program. These should focus on communicating the process of subsidy calculation and disbursement for households, alongside maintaining messaging about the adverse health impacts of burning biomass. Such messages should focus on a household's decision-maker, in addition to the primary cook.

In some areas, the government should investigate schemes that remove the option of using traditional biomass as a cooking fuel, to avoid the stacking of LPG with traditional biomass or falling back to biomass use entirely. This could involve creating opportunities for the commercial use of biomass such as bio-CNG or biomass gasification. As well as removing the potential for biomass use, such programs could also provide households with the additional income and the motivation to use LPG for cooking.

To improve distribution of LPG in rural areas, adding a component for transportation or an incentive to reward distributors who provide home delivery in hard-to-reach areas could be an effective way to improve the availability of LPG. Also, providing households in underserved areas with a back-up cylinder to account for the waiting time between running out of LPG and receiving the

next cylinder would prevent them from reverting to the use of biomass temporarily.

The intra-household dynamics of decision-making may pose a barrier to use LPG for women whose labor has no perceptible economic value. Other social assistance programs focused on livelihood opportunities for women that provide them the agency to gain financial independence could be leveraged to enhance their ability to pay for LPG. Delivery of differential subsidy for LPG use could also be linked with the existing social assistance programs for maternal and child health, nutrition, and livelihoods.

Finally, several government programs now rely on the SECC database to identify and target beneficiaries. While the SECC database is effective in the identification of below poverty line (BPL) households, the administrative challenges around it should be dealt with in the next round of the national sample survey (NSS). There is a need to set clear protocols on inter-ministerial coordination, sharing of data across departments and well-defined roles for data collection, periodic updating and data management. While conceptually we have evolved in our understanding of poverty, social assistance information systems need to account for dynamic changes. This would require an independent administrative infrastructure that is focused on strengthening such a database to be used across ministries.

INTRODUCTION



SDG7 aims to ensure access to affordable, reliable, sustainable and modern energy for all. The idea of 'leave no one behind' is inherent to all the SDGs. For SDG7, this implies that even the poorest and most marginalized should have access to modern energy sources. In order to achieve this, all barriers to energy access need to be addressed effectively. Affordability is a key barrier for poor and vulnerable populations; households beyond a certain income threshold have been shown to change their cooking energy preferences in line with what they are able to afford (Ranjan and Singh 2017). This reflects one side of the two-way relationship between lack of access to energy and income poverty, but while energy poverty is strongly correlated with income poverty, access to energy could also help alleviate income poverty by increasing incomes and improving living conditions (Mary Robinson Foundation 2016).

Social protection programs are a major mechanism for ensuring access to social goods such as nutrition, healthcare, education and employment. SDG Target 1.3 (Implement social protection, including floors) explicitly recognizes the potential of social protection systems for eradicating poverty (Gassmann and Handayani 2018). Social Assistance/Social Safety Nets (SSNs) are an important part of social protection systems. The World Bank defines SSNs as "non-contributory" transfers designed to provide regular and predictable support to poor and vulnerable peo-

ple". Support can be targeted based on categories of vulnerability, or made broadly available to low-income groups (Barrientos 2010) and may occur as conditional or unconditional transfers of cash, near-cash, or in-kind materials. Public works programs provide cash, food, or other support in exchange for work (World Bank 2018). The overarching goals of SSNs are to improve the resilience of, equity among, and the opportunity for people through integrated social protection and labor systems (World Bank 2012).

In a similar context, ESNs refer to social assistance mechanisms that enable poor and vulnerable people to access and use modern energy services (Scott and Pickard 2018). ESNs are a broad set of measures ranging from general energy price subsidies at one end to highly targeted social assistance at the other. General price subsidies like those supporting the consumption of LPG in India often begin with legitimate socio-economic intentions. These can include keeping energy prices low for economic development, helping the poor meet basic energy needs, or providing input subsidies in the form of cheap energy to certain industries, for which alternative instruments are not seriously considered, preferred, or available (Inchauste et al. 2018). Subsidies have a redistributive and substitutive effect on the income of the groups they are provided to and, according to the World Trade Organization, are efficient when they correct a market failure and align social and private costs and ben-

Energy Safety Net (ESN) is an umbrella term for government-led approaches to support very poor and vulnerable people to access essential modern energy services, defined as electricity and clean fuels and technologies for cooking, by closing the affordability gap between market prices and what poor customers can afford to pay.

ESNs can make physical access (i.e. connections) to electricity or clean fuels affordable for poor and vulnerable people, or they can make the unit price of electricity or fuel affordable to consume. ESNs include some form of targeting or eligibility criteria to direct benefits to those who need them.

efits. However, in practice, fuel subsidies confer private benefits on particular groups and, once introduced, tend to be persistent (Commander 2012). These issues should motivate democratic institutions to assign the maximum value of such support towards the most deserving parts of the population and adapt as circumstances change.

In recent years, the global political debate has often pitted fossil fuel subsidies against the subsidies needed for a transition to clean energy. However, low- and middle-income countries like India are in the process of doing both – providing energy access to millions through subsidies on conventional fuels but also investing in renewable sources of energy such as solar and wind (Soman et al. 2018; Singh 2019). While the cost of renewable energy has fallen dramatically, the need to integrate renewables with existing energy systems and deliver energy to the ‘last mile’ remains. In such a context, fossil fuels have been the primary means of providing some facets of energy access to the populace in many developed and developing countries.

The aim of this case study is to identify measures that have been implemented to enable poor people to access modern energy services, analyze their impact, and explore the reasons for their success or lack thereof. While India’s experience with subsidizing access to electricity is not new (Box 1), this study focuses on the subsidization of clean cooking energy in India, in particular on the policies and schemes introduced since 2014 to improve access to and targeting of LPG subsidies. Following the Multi-Tier Framework to measure energy access introduced by the Global Tracking Framework report, and work that has adapted it for use in India (Jain et al. 2015), the case study looks beyond connections and assesses the progress of the LPG program in India in its entirety.

The research is inspired by a multivariate framework,ⁱⁱ which allows for a two-pronged assessment, focused on the effects of the policy being studied

and on the issues surrounding its implementation. A literature review, primary interviews with stakeholders in energy and social welfare sectors, and consultation workshops were used to gather insights and feedback. Relevant policies are analyzed on the basis of their design, implementation mechanism and impact. The following chapters highlight the noteworthy steps taken by the government and evaluate their effectiveness in terms of enabling the sustained use of LPG for all cooking needs by poor and marginalized households.

The discourse surrounding fuel subsidies continues to evolve, strengthening the relationship between energy access and poverty elimination, and investigating women’s empowerment through increased access to LPG via contemporary politics on gender (Manjula and Gopi, 2017; Kelkar et al. 2016; Kitson et al. 2016). This lens is particularly important because cooking in India is gendered, meaning women tend to bear the large majority of cooking responsibilities. Increasing access to clean cooking energy has strong links to SDGs 3 and 5, focusing on improved health of women and gender equality, respectively. These issues are also analyzed through the overarching research questions below.

This country case study – like the other five, covering Brazil, Ghana, Indonesia, Kenya and Mexico – seeks to answer four research questions:

- What policy measures have been used in India to enable very poor and marginalized people to access and use LPG as a cooking fuel?
- How effective have these measures been in enabling the poorest social groups to access and use LPG?
- What links have there been/are there between these measures and wider/other social assistance programs?
- What changes could be made to enhance the effectiveness of existing policy measures in enabling very poor people to access modern cooking energy services?

Box 1: Electricity access in India

Electricity has always received attention in the national discourse for its role as an enabler for industrialization, mechanization of agriculture, and human development. Therefore, various groups of beneficiaries – farmers, households, and industries – have received subsidies such as free electricity connections, free supplies of power, and reduced tariffs to enable different types of consumers to use electricity. Moreover, given that electricity is a concurrent subject in the Indian Constitution, most states provide certain specific benefits to consumers below the poverty line (Mayer, Banerjee and

Trimble 2015). Recently, the conversation on electricity access in India has evolved from the Nehruvian idea of access rooted in industrial and economic development, to its role as an enabler for all including the poorest sections of society. Subsidies for electricity access in India have witnessed an increasing focus on the rural population, on industries that gathered political momentum such as the sugarcane industry in Maharashtra, and on social groups (farmers, weavers, cooperatives, etc.) whose livelihoods have been at the core of the Indian polity (Dixit 2017; Balls 2017).



CONTEXTUAL OVERVIEW



Post liberalization in the 1990s, the socioeconomic context of India was influenced by strong economic growth and rapid urbanization. The percentage of the population living in urban areas increased from 28 percent in 2001 to 31 percent in 2011 as per the census. By 2018, World Bank estimates show that the share of urban population had increased to 34 percent. Between 2004 and 2011, the proportion of the population living below the poverty lineⁱⁱⁱ in urban India declined from 26 percent to 14 percent in urban areas, and from 42 percent to 26 percent in rural India (World Bank 2018). Simultaneously, India witnessed an increase in income inequality with a GINI index of 35.7 in 2011 (compared to 34.4 in 2004). The Global Multidimensional Poverty Index (2018) states that India has 364 million people living under multidimensional poverty based on health, nutrition, education and living standards (Oxford Poverty and Human Development Initiative 2018).

As indicated in Table 1, other indicators of human development such as literacy levels and access to bank accounts have also witnessed improvement. Access to energy – both electricity and clean cooking fuel – has also evolved significantly over the years, and the country is on track to achieve the target of SDG7. 1—universal access to modern energy services. Nonetheless, disparities remain between genders, between rural and urban locations, and between states. For example, over 75 percent of households still cook with biomass in the low socio-demographic index^{iv} states of Bihar, Jharkhand, and Odisha (India State-Level Disease Burden Initiative Air Pollution Collaborators 2018) and nationally only 24 percent of rural households used clean fuel^v for cooking while the figure is 81 per cent for urban households (Ministry of Health and Family Welfare and International Institute for Population Studies 2016).

Table 1
Evolution of key indicators of human development in India

INDICATOR	2005-06	2015-16
Households with electricity	67.9%	88.2%
Households with clean cooking fuel	25.5%	43.8%
Sex ratio of total population	1000	991
Women who are literate	55.1%	68.4%
Men who are literate	78.1%	85.7%
Currently married women who usually participate in household decisions	76.5%	84%
Women having a bank or savings account that they themselves use	15.1%	53%
Women having a mobile phone that they themselves use	N.A.%	45.9%

Source: India Fact Sheet 4, Ministry of Health and Family Welfare, Government of India 2015-16 (Ministry of Health and Family Welfare and International Institute for Population Studies 2016)

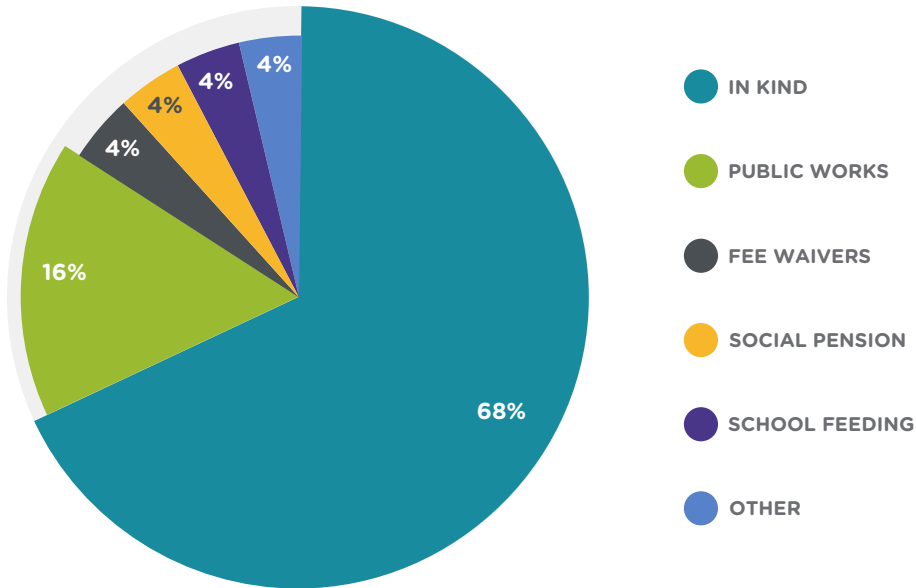
India’s spending on non-energy social safety nets (SSNs) comprises 1.5 percent of its GDP (World Bank 2018), which is similar to that of most developing countries and higher than the average for South Asia (0.9 per cent of GDP). The amount of benefit conferred per household (in Purchasing Parity Power USD) is four times greater in upper-middle-income countries than in low-income countries (\$_{PPP}106 versus \$_{PPP}27, respectively) while in India the value is about \$_{PPP}77 (World Bank 2018). The highest share of India’s SSN budget supports public works such as via the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), but there are also conditional cash transfers for encouraging the institutionalization of childbirth such as *Janani Suraksha Yojana* (JSY), and in-kind food support for the poor through the public distribution system (PDS). The Direct Benefit Transfer (DBT) system provides cash transfers for 452 social safety programs across 56 ministries (Government of India 2019). Some of these programs have been enacted into laws (Acts), thereby making it a legal right that every recognized beneficiary should receive the SSN, yet despite some of

the programs being available to many millions of beneficiaries (e.g. MGNREGS covers 27 percent of the population (World Bank 2018)), SSNs in India continue to struggle with inclusion and exclusion errors (Dreze and Khera 2017).

The Government of India has implemented clean cooking initiatives aimed at replacing traditional cooking fuels, including promoting biomass cookstoves (National Biomass Cookstoves Program in 1985 and *Unnat Chulha Abhiyan* in 2013) and biogas (National Project on Biogas Development in 1981-82, National Biogas and Manure Management Program in 2002-03, and New National Biogas and Organic Manure Program in 2018), although these have had limited reach and impact (Jain et al. 2018). Alongside these, the government has subsidized the price of LPG since the 1970s, with much of the growth in the consumption of LPG being supported through subsidies (Jain, Agrawal and Ganesan 2016). In rural areas in particular affordability has historically been a barrier to uptake. In 2013 the Indian Government began introducing reforms to

Figure 1

Over two-thirds of India’s SSNs deliver in-kind benefits such as the PDS



Source: World Bank 2018

its LPG subsidization program to address these issues. These reforms are the focus of this case study.

SCOPE OF THE RESEARCH

This case study assesses four key schemes within the reform to the Indian LPG subsidization program that have been implemented to increase the efficiency and effectiveness of providing LPG subsidies to poor and vulnerable households. These schemes cover various aspects, including the targeting and delivery of the subsidy, and providing access to and improving the availability of the fuel.

- **Pratyaksh Hastantarit Labh (PaHaL) or Direct Benefit Transfer for LPG (DBTL).** The DBTL scheme was launched in 2013-14 to avoid diversion of subsidies by changing the way that support was received by beneficiaries. The scheme transfers subsidies directly into beneficiaries' bank accounts rather than to the distributor.
- The **Give it Up** Campaign, launched in 2015, was designed to reduce the inclusion error associated with the LPG subsidy by nudging

wealthy households to voluntarily forego the subsidy (Mittal, Mukherjee and Gelb 2017).

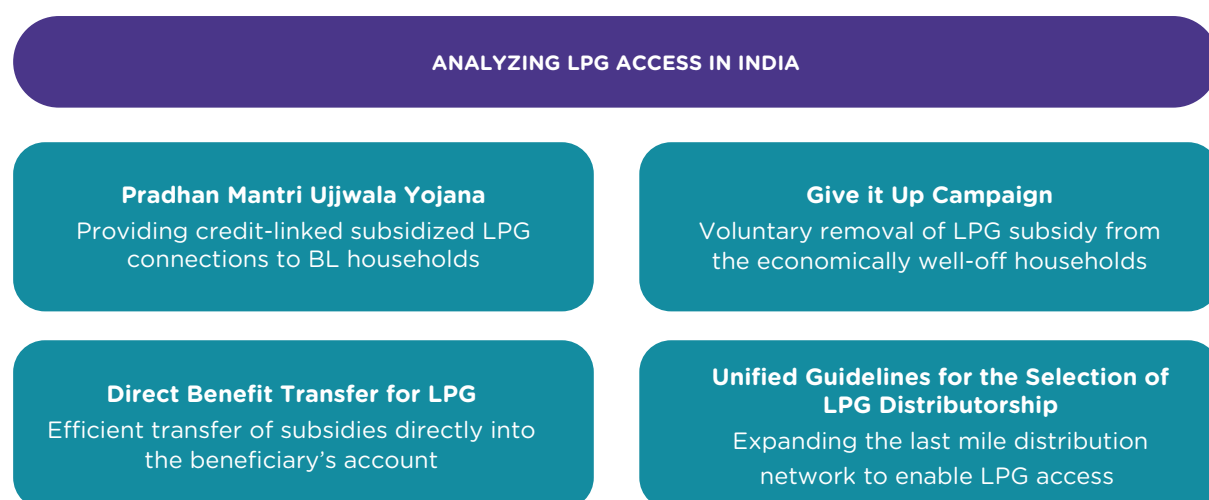
- **Pradhan Mantri Ujjwala Yojana (PMUY).** The PMUY scheme was launched in 2016 and aimed to overcome the barrier associated with the upfront cost of an LPG connection. The scheme reduced the overall cost of an LPG connection, subsidizing half its cost and providing an interest-free loan for the other half (USD 23 (INR 1600)^{vi}) to BPL households.
- The **Unified Guidelines for Selection of LPG distributorship**, launched in 2016, focused on improving LPG availability, especially in remote and rural areas. It also aimed to create employment opportunities by improving the efficiency and increasing the coverage of the LPG-supply chain.

MOTIVATION FOR ESN POLICY

Subsidies promoting LPG use were adopted in India to address the ill effects of combustion of biomass on maternal and child health, and to safeguard households from the shocks in international oil prices (MoPNG 2016a). Chronic obstructive pulmonary disease caused primarily by household air pollution (HAP) is the second highest cause of

Figure 2

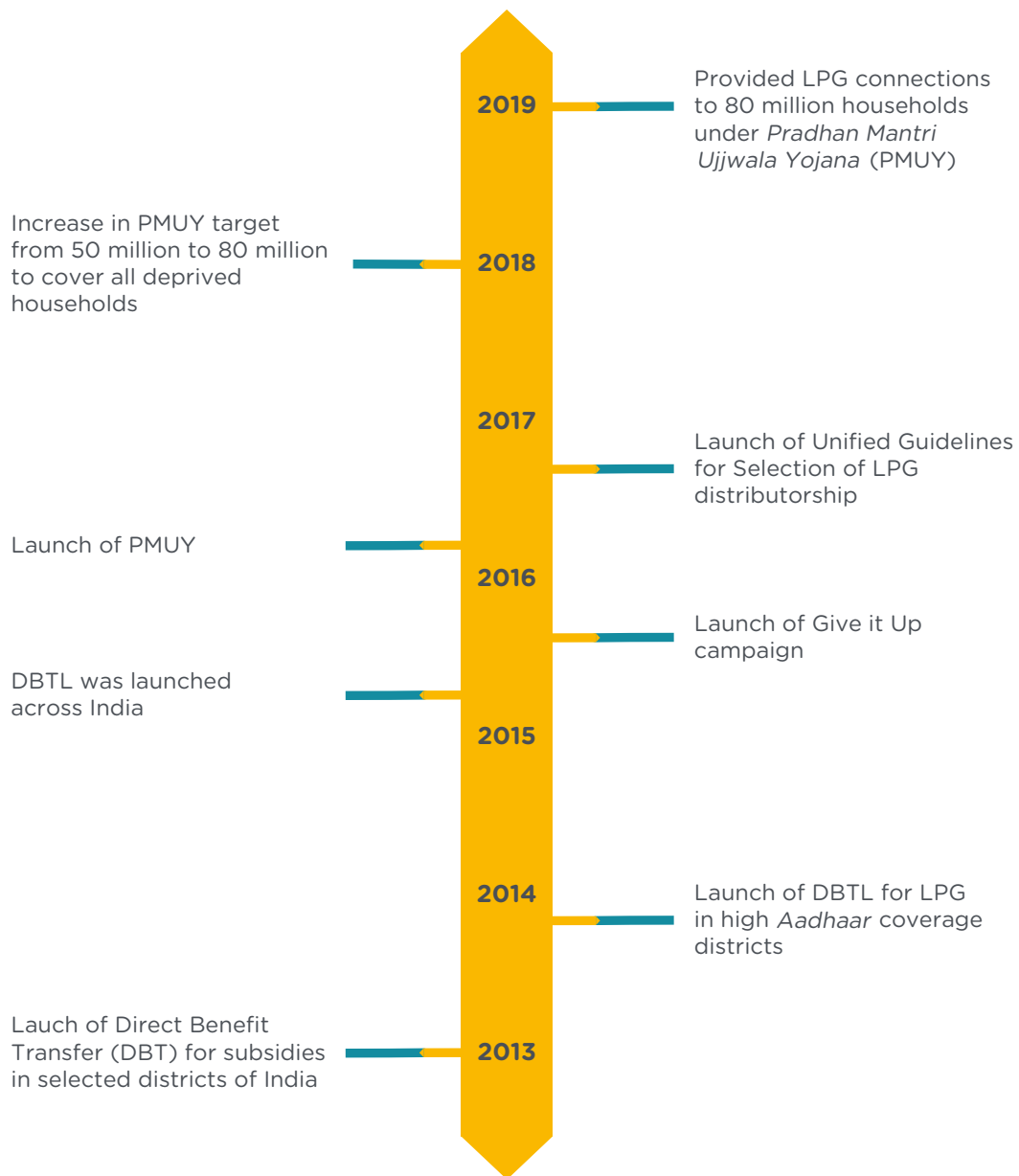
Scope of the policies analyzed in the study and their objectives



Source: Authors' compilation

Figure 3

Timeline of key events for improving LPG access in India



Source: Authors' compilation

death after heart attack in India (Health Effects Institute 2018). Combustion of biomass for cooking is a major contributor to four of the top five causes of mortality and morbidity and is also a significant contributor to outdoor air pollution (Chowdhury et al. 2019; Institute for Health Metrics and Evaluation 2018). About 13 percent of premature deaths in India (1.24 million) are attributable to air pollution, including 0.67 million from ambient particulate

matter pollution and 0.48 million from HAP (India State-Level Disease Burden Initiative Air Pollution Collaborators 2018).

Moreover, cooking is a gendered activity in India and is not just limited to cooking but the general process of collection and preparation of biomass, which also has an adverse impact on the health and productive time of women. Improved energy

access could free up time for income-generating activities, possibly increasing the decision-making and bargaining power of women within the household (Gill et al. 2010). The transition to cleaner energy may be improved as income-generating women are more likely to adopt more convenient cooking solutions such as LPG. A gendered analysis of use of LPG in selected states reported that 58 percent of women who were independent income earners used LPG as a primary cooking fuel, compared to 29 percent of women who were unpaid family workers (Kelkar et al. 2016).

The Government of India has provided LPG subsidies since the 1970s. Historically, households were entitled to an unlimited number of subsidized 14.2 kg cylinders that were provided after they placed a refill request with their oil marketing company (OMC)-licensed LPG distributor. In 2011, the government established a task force to suggest options to tackle increasing under-recoveries to OMCs and the diversion of domestic subsidized cylinders to the commercial sector. The task force report made three suggestions (Comptroller and Auditor General of India 2016):

- i) cap the number of subsidized cylinders
- ii) directly transfer the subsidy into consumers' *Aadhaar*^{vii}-enabled bank accounts
- iii) target segmented customers to ensure the subsidy reaches only the intended beneficiaries.

In 2012 the government introduced an annual cap on the number of cylinders,^{viii} which stands at twelve 14.2 kg LPG cylinders, as of 2019. The following year, modifications were introduced to the LPG subsidies to improve the effectiveness and efficiency with which the cash benefit was delivered to deserving households. To limit leakage, the reforms eliminated the price difference between commercial and domestic cylinders and removed multiple and spurious connections. Following the task force's recommendations, the DBTL scheme was launched in 2013 with a cap of nine cylinders, which were bought at the market price with beneficiaries receiving the subsidy directly into their bank accounts.

Initially the LPG subsidy was available to all households. As the consumers' purchasing power increased, particularly in urban India, increasing amounts of subsidies were transferred to increas-

Box 2: Direct Benefit Transfer

Direct Benefit Transfer (DBT) began on 1 January 2013 with the aim of reforming the delivery mechanism of existing government welfare schemes and increasing public confidence in government bureaucracy. DBT was designed to directly transfer subsidy funds to beneficiaries' accounts and bring efficiency, effectiveness, transparency and accountability to the government system. To test the efficacy of the process, in 2013, the government re-engineered the existing process used

for welfare schemes to allow a simpler and faster flow of information/funds, to ensure accurate targeting of the beneficiaries, and to facilitate de-duplication and reduction of fraud. Roll-out was tested in selected districts, and then gradually expanded to other administrative areas and schemes, including those supporting energy access. DBT has now been implemented for 452 social safety schemes across 56 ministries (Government of India 2019).

Box 3: Smokeless Village Project

Prior to PMUY, the Indian Oil Corporation (IOCL) implemented the 'smokeless village' initiative in multiple states across India, providing BPL families with subsidized LPG connections (IOCL 2015). IOCL staff went door-to-door trying to persuade families in the target village to shift to LPG. The

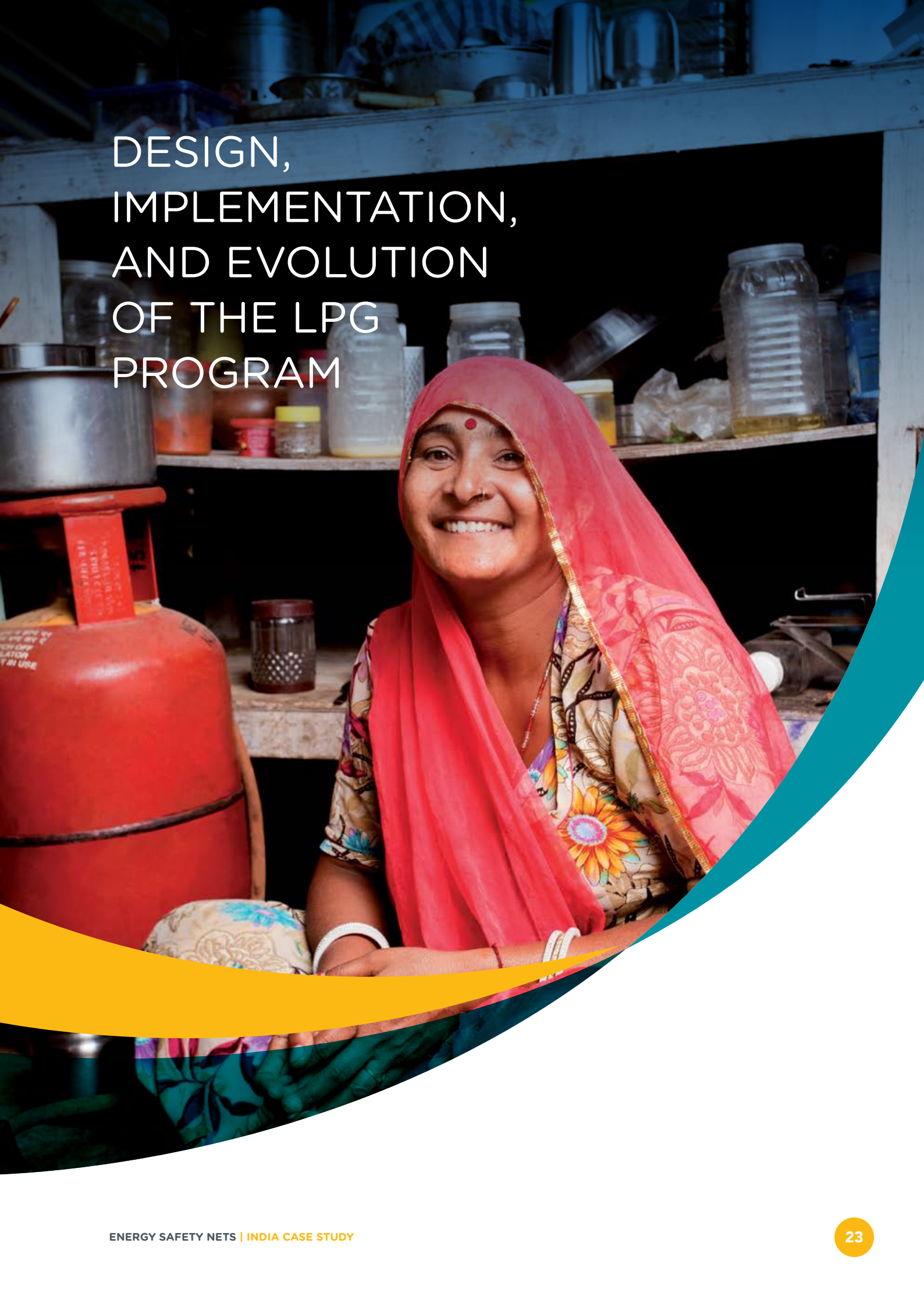
main objective of this exercise was to sensitize people to shift towards the use of a cooking energy that is not detrimental to their health. When PMUY was announced, about 4,000 villages across India had 100 percent LPG connections as a result of this initiative.

ingly wealthy households. In 2014-15, the richer half of households accounted for 75 percent of domestic LPG use (Kitson et al. 2016). This imbalance motivated targeting the subsidy away from better-off households and towards those more in need of support. Therefore, soon after DBTL was rolled out, the government launched the Give it Up Campaign. The campaign was led by the Prime Minister who appealed to richer sections of society to forego their subsidies to enable support directed at the poorest households.

As well as affordability challenges related to the cost of LPG, poor availability of LPG in rural areas was also cited as one of the major hurdles in making the transition to using clean cooking energy (CRISIL 2016a; Jain et al. 2015). To promote the

distribution of LPG in rural areas by increasing the penetration of LPG distribution agencies in rural and remote areas, the government built on an earlier initiative—*Rajiv Gandhi Gramin LPG Vitrak Yojana* (RGGLVY)—and announced the Unified Guidelines for Selection of LPG Distributorships in 2016.

Despite these reforms, the upfront cost of an LPG connection remained a big barrier for adoption of LPG by rural households in particular (CRISIL 2016a; Jain et al. 2015). Building on experience acquired during the Smokeless Village Project (Box 3), in 2016, the government launched the PMUY to subsidize the upfront cost of connection and increase the number of LPG connections among BPL households.

A photograph of a woman in a red headscarf and floral sari, smiling warmly. She is sitting in a kitchen area with a red LPG cylinder on the left and shelves with various kitchen items in the background. The image is overlaid with a yellow and teal curved graphic at the bottom.

DESIGN, IMPLEMENTATION, AND EVOLUTION OF THE LPG PROGRAM

In this section, the case study discusses the key aspects of the design and implementation of the LPG program, by highlighting the characteristics and objectives of each of the underlying scheme or policy. Some schemes under the program have focused on inclusion and equity, while others have focused on efficiency. In its entirety, the schemes aim to enable access to LPG for all households, including the poorest and the most marginalized.

DBTL – REDUCING LEAKAGE AND IMPROVING DELIVERY

DBTL has attempted to reduce the leakage of the LPG subsidy in two ways. The first of these is by removing duplicate and ghost connections with the aim of limiting transfers to genuine domestic LPG users. The second is by transferring the subsidy amount to beneficiaries' bank accounts instead of providing them with subsidized cylinders. Under DBTL, the customer pays the market price of the cylinder to the LPG distributor and receives the subsidy in their bank account. The subsidy amount differs according to the market price of LPG, meaning that the beneficiary should, in net terms, pay a fixed amount for each refill.

To enrol in the scheme, new beneficiaries were required to link their *Aadhaar* number and bank account with their LPG consumer ID. Existing DBTL beneficiaries were given a six-month grace period to become 'Cash-Transfer Compliant' (CTC) by either linking their *Aadhaar* number with the bank account and LPG consumer number or presenting their bank account information to the LPG distributor if they did not have an *Aadhaar* number. If they had not signed up after this period, the subsidy lapsed and they would not receive any further subsidy until they became CTC (MoPNG n.d.). The ability to do this relied on a financial inclusion drive that promoted the opening of bank accounts under another government scheme – the *Pradhan Mantri Jan Dhan Yojana*^{ix} (PMJDY).

Inactive connections are blocked from receiving the subsidy and automatically de-activated by the OMC. Initially this applied to households that had not purchased a refill within the previous three months, but this was extended to six months and then to a year.

The government recognized that paying the market price for the first cylinder and then claiming the subsidy back may present a barrier to take-up. To mitigate this, a one-time advance^x for the first cylinder is provided to the customer during registration, thereby ensuring that the beneficiaries always have the subsidy amount in advance for subsequent refills (Barua 2018; MoPNG, n.d.). The subsidy for the next refill is paid into a beneficiary's bank account within five working days of them paying for the refill. Information, feedback and grievances are all handled via toll-free telephone numbers for the OMCs or by consumers filling out complaints/suggestions forms at their local LPG distributorship (*ibid.*)

GIVE IT UP – REDUCING INCLUSION ERRORS

The Give it Up Campaign was launched in 2016 and urged non-poor households to voluntarily forfeit their subsidy with the value being used to provide a connection to a poor household. OMCs were encouraged to target their appeals throughout the public and private sectors (including banks and educational and medical institutions) asking companies to motivate their employees to join the scheme. This was accompanied by a social media and advertising campaign to reach households. Every consumer that forfeited the LPG subsidy was recognized on a 'scroll of honour' where their name was linked with that of a corresponding BPL family that received a subsidized LPG connection. A strong nation-building message was seen as key to 'nudge' households to voluntarily surrender their subsidy. Special camps were organized by OMCs at various locations to facilitate the giving up of subsidy by consumers (MoPNG 2015).

PMUY – EXTENDING COVERAGE TO POOR AND MARGINALIZED HOUSEHOLDS

The PMUY program addressed a significant hurdle in access to LPG connections for poor households by providing them with credit-linked subsidized connections. The scheme initially targeted BPL households with at least one indicator of deprivation as per the 2011 SECC (Box 4). Inclusion was also prioritized for households from Scheduled Caste (SC) and Scheduled Tribes (ST), and in states with lower rates of LPG coverage. In 2018, the scheme expanded its ambit to include all households from SC, ST and disadvantaged sections of the society, including forest and island dwellers, members of Other Backward Classes (OBCs), and households that enrolled in the *Antyodaya Anna Yojana* (AAY)¹ or *Pradhan Mantri Awas Yojana – Gramin* (PMAY-G) schemes, which include marginalized groups such as landless agricultural laborers, Tea & Ex-Tea Garden Tribes, households headed by widows, and people who were terminally ill, disabled or HIV positive (CCEA 2017). Eligible households were invited to apply for a connection at their local distributor with their address, bank account number, and *Aadhaar* number. The initial target to provide 50 million LPG connections to SECC BPL families by 2019–2020 was revised to 80 million households within the timeline.

The scheme involves the government subsidizing 50 percent of the cost of an LPG connection – including an LPG stove, hose, valve and the first full LPG cylinder (USD 23 (INR 1600)). The remainder of the cost can be paid by the household upfront, or covered by a loan from the OMCs (MoPNG 2016a) who worked with manufacturers to reduce the connection cost to a total of USD 46 (INR 3200). Initially the idea was that beneficiaries would repay the loan using the subsidy provided

¹ A scheme that provides subsidized food to millions of the poorest families

via DBTL, i.e. pay the full market price until the loan was paid off. The scheme also allows state governments and voluntary organizations to contribute to connection costs on behalf of the beneficiaries as long as the contributions occur under the umbrella of PMUY, unless otherwise agreed by the MoPNG.

PMUY – WOMEN AS THE PRIMARY BENEFICIARIES

Connections under the PMUY are provided in the name of an adult woman of the household, irrespective of her marital status, and the subsidy is transferred to her bank account. Given that the beneficiary requires a bank account and an *Aadhaar* number, this was expected to further improve the financial inclusion of rural women. In addition, it was hoped that because women hold almost all responsibility for cooking in India, managing regular withdrawals to procure LPG could increase their decision-making authority within households. It was further hoped that the focus on women from SC/ST households would address marginalization along caste and gender lines.

UNIFIED GUIDELINES FOR SELECTION OF LPG DISTRIBUTORSHIP – A TIERED DISTRIBUTION SYSTEM TO INCREASE THE PENETRATION OF LPG

LPG is distributed to retail customers through a network of three public sector OMCs, namely the Indian Oil Corporation Limited, Bharat Petroleum Corporation Limited and Hindustan Petroleum Corporation Limited. The symbiotic relation between the three OMCs, the MoPNG and the implementing agencies is key to the proper operation of the schemes. The logistics of bottling and distribution of LPG, internet service platform for easy transaction and record keeping, etc. is handled by the OMCs, and the banks provide infrastructure for the flow of subsidies.

Box 4: Socio Economic and Caste Census (SECC)

Identifying and targeting the 'poor' requires complex methodologies (as well as higher administrative capacity and resources) than universal schemes (TRANSFORM 2017). Literature suggests there is no one perfect targeting mechanism, therefore a combination of various methods across these stages needs to be employed for effective subsidy disbursements, in ways that enable and accelerate human development for the poorest populations (Rentschler 2016; Devereux et al. 2015; Coady, Grosh and Hoddinott 2004). The SECC was launched by the Ministry of Rural Development Government of India in June 2011 in order to assess the socioeconomic status of the population of the country. Since 2015 the government has been using the SECC database to target all social welfare schemes, essentially sharing the cost of conducting the exercise

(estimated at USD 700 million (INR 4,894 crores) (CCEA 2017)) across them.

SECC collects households' social and economic indicators and evaluates them using inclusion and exclusion criteria and seven deprivation indicators in an acknowledgment that poverty is not uni-dimensional (i.e. cannot be defined by income or consumption). The database ranks households on a scale of zero to seven on the basis of the seven deprivation criteria to identify the deprived households for various social welfare schemes. Households that are found to be deprived according to the SECC framework are considered BPL. Each social protection program identifies beneficiaries using the deprivation criteria most appropriate to the nature of the benefit and the objectives of the program (Srinivas 2019).



Table 2

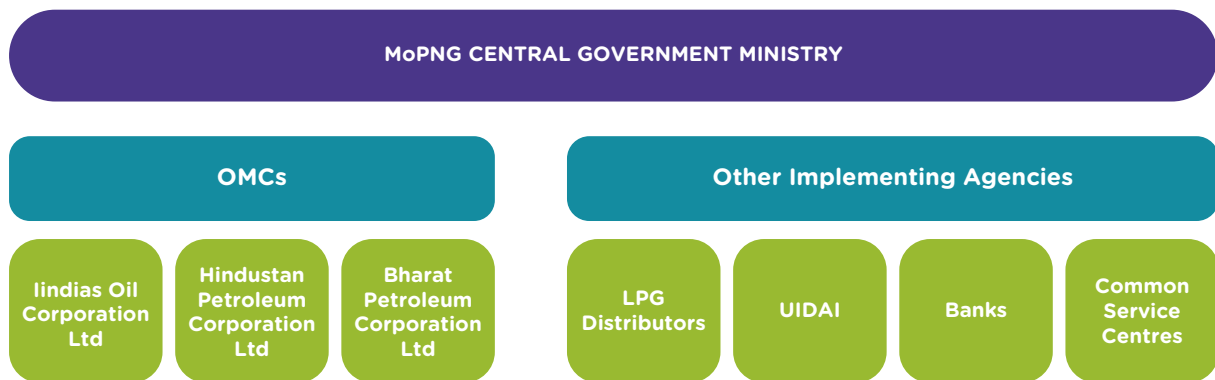
SECC 2011 inclusion, exclusion and deprivation criteria

14-Point Automatic Exclusion Criteria (based on fulfilling any of the 14 parameters of exclusion)	• Owns a motorized 2/3/4 wheeler/fishing boat
	• Owns mechanized 3-4-wheeler agricultural equipment
	• Has a Kisan credit card with credit limit of over USD 715 (INR 50,000)
	• Household member government employee
	• Households with non-agricultural enterprises registered with government
	• Any member of household earning more than USD 143 (INR 10,000) per month
	• Pays income tax
	• Pays professional tax
	• 3 or more rooms with pucca walls and roof
	• Owns a refrigerator
	• Owns a landline phone
	• Owns more than 10,117 square meters (2.5 acres) of irrigated land with 1 piece of irrigation equipment
	• 20,234 square meters (5 acres) or more of irrigated land for 2 or more crop seasons
	• Owns at least 30,351 square metres (7.5 acres) of land or more with at least 1 piece of irrigation equipment
Automatic Inclusion Criteria (based on fulfilling any of the 5 parameters of inclusion)	• Households without shelter
	• Destitute, living on alms
	• Manual scavenger families
	• Primitive tribal groups
	• Legally released bonded labor
Deprivation Indicators (based on fulfilling any of these seven deprivation criteria)	• Households with 1 or fewer rooms, kuccha walls and kuccha roof
	• No adult member in household between 18 and 59
	• Female-headed household with no adult male member between 16 and 59
	• Households with differently-able member with no other able-bodied adult member
	• SC/ST Households
	• Households with no literate adult above 25
	• Landless households deriving a major part of their income from manual labor

Source: Ministry of Rural Development 2011

Figure 4

Implementation architecture of LPG subsidies in India



Source: Authors' compilation

A network of distributors managed by the OMCs serves LPG distribution in India and forms a key link between consumers and producers. The distributors provide the LPG connections, and enrol the beneficiaries by matching applications to the SECC 2011 database, verifying the residences of applicants physically in order to ensure non-duplication and safety, and then entering the details (name, address, etc.) into a dedicated OMC web portal as part of the Know Your Customer (KYC) scheme (Barua 2018). Once enrolled, the distributorships take customer orders for LPG refills and supply the cylinders either to their households or the nearest point of access. To ensure an equitable spread of distributors that permits access

to LPG cylinders for all areas of the country, the OMCs appoint four types of distributors: *Shehri Vitrak* (urban distributor), *Rurban Vitrak* (urban and rural distributor), *Gramin Vitrak* (rural distributor), and *Durgam Kshetriya Vitrak* (difficult and special areas distributor).

In 2009 the RGGLVY scheme expanded the distribution system to open up LPG distribution in underserved rural areas (IOCL 2011) but rural distributors under this scheme were exempt from making home delivery of cylinders. This meant that consumers had to pick up cylinders from a storage facility or common retail points. To address this, the Unified Guidelines for Selection of LPG distributorship reclassified these distrib-

Box 5: Know Your Customer (KYC)

Know your customer (also alternatively known as know your client) is a process of verification undertaken by businesses to identify their clients. It is primarily used to establish the identity and address of customers to ensure that bank services are not misused in any way. It is normally undertaken during the opening of a bank

account. Electronic KYC or e-KYC is a service available to people who have *Aadhaar* numbers. While using the e-KYC service, the consumer has to authorize the Unique Identification Authority of India (UIDAI) to release their identity/address through biometric authentication to the bank branches.

utors into *Gramin Vitrak* and *Durgam Kshetriya Vitrak*, making home delivery of LPG mandatory for the former. The scheme also specified eligibility criteria that vary depending on the category of distributorship, the area's socioeconomic profile and the estimated number of refill sales. Criteria typically include infrastructure requirements for LPG storage facilities and showrooms and ensure home deliveries. The OMCs advertise the need for distributors in a particular geography and draw lots to select successful applicants from a pool of those who meet all the prescribed eligibility criteria. Reserved distributorships for women and people from disadvantaged groups ensure the inclusion of otherwise marginalized groups (MoPNG 2016c).

There is a strong network in the system between the three OMCs and the MoPNG to monitor the LPG program. At the district level, a District Nodal Officer directly engages with the district supply officers, UIDAI,^{xi} banks, and district and local administrators (Unique Identification Authority of India 2019). They collectively ensure that the program is smoothly implemented and that awareness is spread through advertisements and promotional campaigns to educate customers on the allocation of subsidies and delivery of cylinders (Barua 2018). To ensure a minimum level

of service, distributors are rated on the basis of their service. A consistent below average service (i.e. if 85 percent of the delivery is not completed in two days) can also lead to termination of distributorship.

Expanding distribution to the last mile

To further expand the LPG distribution network, the MoPNG is now using the services of the common service centers (CSCs). One CSC was established for every six census villages under the National e-Governance Plan (NeGP) to provide e-governance services to the local population (PIB 2018). CSCs serve as the access points for a range of public services and social welfare schemes in rural and remote areas. As of November 2018, 0.3 million (3.15 lakh) CSCs were functional, of which 0.2 million (2.10 lakhs) were at the *Gram Panchayat* level across 36 States and Union Territories. Of this number, 60,000 CSCs are run by women. In a pilot scheme the MoPNG has involved over 100,000 CSCs to help people sort out issues related to every step of the enrolment process or receiving the subsidy for LPG (*Ibid.*). These CSCs can store LPG cylinders (up to 100 kg) and function as an additional support system to local LPG distributors who, in return, share their margin with the CSCs as per the schedule in Table 3.

Table 3
Operating margins of Common Service Centers for LPG distribution

SERVICE	TYPE	CHARGES
Booking of new gas connection (under Ujjwala & General categories)	Per transaction (with clear KYC under PMUY)	USD 0.3 (INR 20) per connection
Refilling booking by LPG consumers	Per transaction	USD 0.03 (INR 2) for each refill booking by village level entrepreneurs (VLEs)
LPG distribution through CSCs if the distributor delivers the cylinder to POS / VLE premises	Per cylinder	USD 0.14 (INR 10)
LPG distribution through CSCs if POS / VLE transports cylinders from the distributor's storage facility	Per cylinder	USD 0.28 (INR 19.50)

Source: MoPNG 2018

IMPACT AND EXPERIENCES OF LPG PROGRAM IN INDIA



The schemes within the LPG program launched at different points in time have been individually revised depending on individual challenges and focused on addressing separate gaps in the provision of access to LPG. As more households gained an LPG connection, the focus evolved towards addressing challenges related to distribution, affordability and consumer awareness.

Subsidies supporting consumption of LPG and LPG connections (DBTL and PMUY, respectively) constitute approximately 77 percent of the MoPNG's total budget (Khullar 2018). The one-off investment required to provide 80 million connections under PMUY was estimated to be USD 1.8 billion (INR 12,800 crores) as of October 2018 with about 80 per cent of all LPG connections in 2018-19 provided by PMUY (PPAC 2019c). The recurring expenditure supporting use under DBTL has steadily increased from USD 1.9 billion (INR 13,000 crore) in 2016-17 to an earmarked value of USD 4.2 billion (INR 29,500

crore) for 2019-2020 as more households have enrolled in the scheme (Mishra 2019).

EFFECTIVENESS OF DBTL

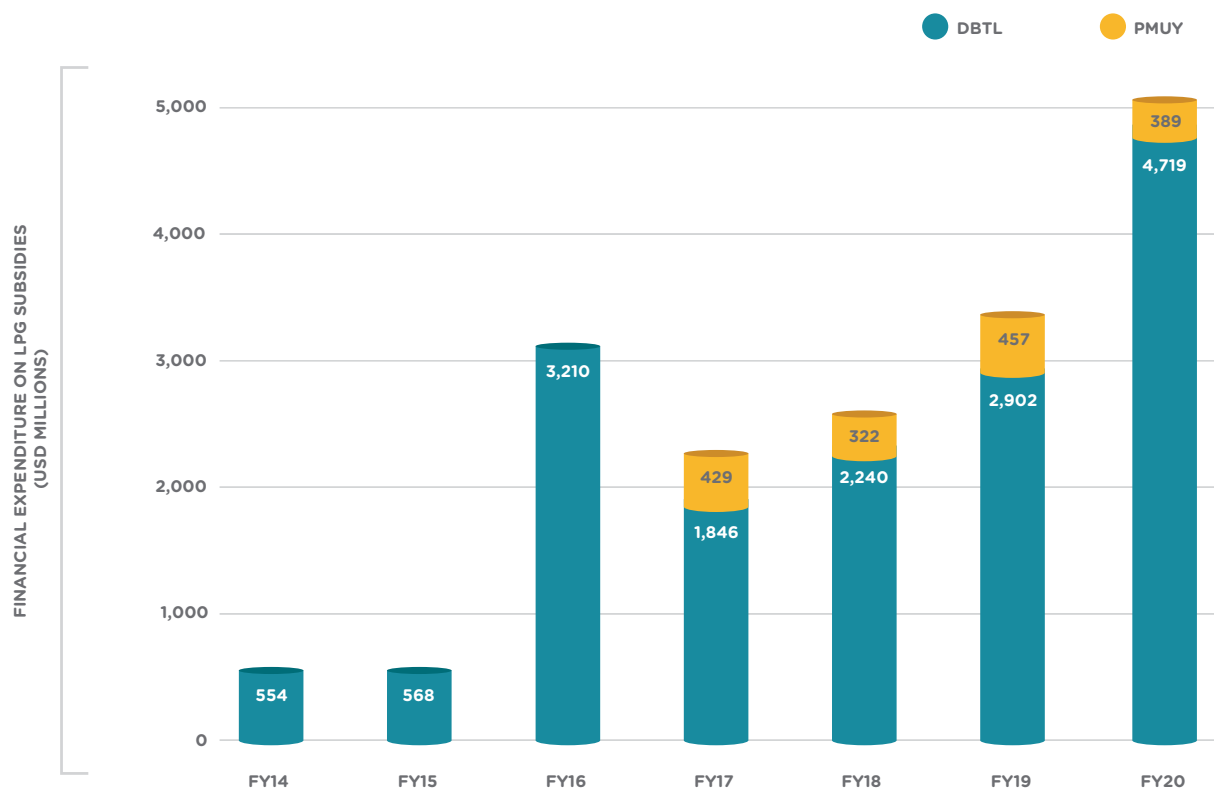
Reducing leakage via inactive and ghost connections

A large KYC and de-duplication exercise started in 2013 within the respective databases of OMCs. This continued with DBTL and was further strengthened through the addition of the IFSC^{xii} code and bank account number to beneficiary records. As of March 2019, 42.3 million (4.23 crore) duplicate, fake, non-existent or inactive LPG connections had been blocked from receiving the subsidy (Government of India 2019).

However, leakages remain a challenge for DBTL. A 2015 compliance audit was carried out for 34 percent of all distributors (who served 119 mil-

Figure 5

Government spending on LPG subsidies has been increased



Source: PPAC 2019c, Khullar 2018

Table 4

Estimated LPG coverage in states where 50% or more households report at least one deprivation as per SECC 2011

STATE	PERCENTAGE OF HHS WITH AT LEAST ONE SECC DEPRIVATION	PERCENTAGE OF HHS WITH LPG CONNECTION
Chhattisgarh	70	72
Meghalaya	67	45
Odisha	66	74
Nagaland	64	62
West Bengal	64	94
Bihar	61	72
Madhya Pradesh	60	81
Mizoram	60	108
Tripura	58	74
Dadra and Nagar Haveli	56	83
Jharkhand	53	71
Manipur	53	86
Andhra Pradesh	52	98
Rajasthan	51	105
Assam	50	88

Note: The coverage of LPG is estimated based on the potential population growth since 2011 and the number of active LPG connections. Therefore in some cases the number may be greater than 100%.

Source: PPAC 2019b, Ministry of Rural Development 2011

lion (11.9 crore) domestic LPG consumers, about 62 per cent of all registered LPG consumers). This indicated instances of multiple LPG connections with the same *Aadhaar* number and bank account number in the different OMCs' databases that were 'active', 'transferred' or 'in transit' (Comptroller and Auditor General of India 2016).

A lack of awareness may be hindering subsidy delivery

The reduction in delivery costs of DBTL via the removal of non-qualifying connections and diversion of subsidy should be discussed alongside the costs that it has added to house-

holds. The increase in the upfront expense for LPG and the requirement to manage the subsidy via a bank account may pose a barrier to households that would otherwise have bought a directly subsidized LPG refill previously. Two recent studies have found that 25 to 35 percent of LPG-using households reported not receiving the subsidy at all (Gupta et al. 2019; Mani et al. 2019) and that 39 percent of households were not aware of the amount of subsidy that they received in their bank account against the last refill (Jain et al. 2018). Interviews for this case study with distributors with distributors also revealed that beneficiaries are often not aware that only one bank account can be linked with their DBTL, which creates confusion as payments are automatically transferred to the bank account of the beneficiary that has been linked to DBT most recently. Although such challenges can usually be resolved via OMC grievance-redressal portals, local distributors and bank branches, limited access to these media for new users poses a barrier to the effectiveness of the DBTL scheme.

The problem of inactive connections

An inactive connection^{xiii} does not necessarily mean a ghost or a second connection (Jain, Agrawal, and Ganesan 2016). Especially before the automatic disconnection due to lack of use was extended to one year, this policy could have affected households who are forced to spend long periods outside their village (e.g. owing to migratory or transitory employment) or those who are unable to afford the costs associated with refilling the LPG cylinder. Once disconnected, households have to begin the enrolment process again (undergoing KYC and submitting all relevant documents), which may pose a barrier to the continuity of LPG use. A simpler process of re-activation of the connection would help consumers, especially those in rural and/or remote areas.

Physical diversion of cylinders despite DBTL

Our interviews with sector experts suggested a small number of PMUY customers may be on-selling subsidized LPG but that the diversion of LPG cylinders is less common in rural areas than in urban ones owing to the limited number of industries and restaurants that usually benefit from diversion. Compliance checks to ensure that domestic LPG is not diverted for commercial purposes are carried out by the Department of Food, Civil Supplies, and Consumer Affairs at the district level (MoPNG 2000). However, the administrative capacity to monitor the diversion of DBTL is limited and current structures are unlikely to be sufficient to curb such leakages.

Separately, field visits to local markets revealed that small quantities (1 – 2 kg) of LPG are readily sold from diverted 14.2 kg cylinders to cash-constrained, LPG-using households that are unable to afford the cost of a full refill. This phenomenon appears to be more common in urban and peri-urban areas but is still present in some rural areas.

PMUY – FROM EQUITABLE ACCESS TO CONNECTIONS TO THE EQUITABLE USE OF LPG

The LPG program covered 94 percent of Indian households as of mid-2019, with around one quarter of these being connected under PMUY (PPAC 2019a). As well as reaching BPL households, the PMUY increased coverage and reduced exclusion errors by expanding its ambit to include beneficiaries of other welfare schemes (Giri and Aadil 2018). One outcome has been that the PMUY has connected a higher proportion of SC and ST households, helping to address unequal LPG connection rates among different social categories (Figure 6) (Jain et al. 2018).

Box 6: De-duplication of LPG connections

A streamlined database of LPG consumers was created from the three separate databases held by the OMCs. Two categories of potential ghost connections were identified using an algorithm that matched name and address fields across the different OMC databases: 'Same Name Same Address (SNSA)' and 'Different Name Same Address (DNSA)' (Mittal, Mukherjee and Gelb 2017). Once the suspected ghost connections were identified in an area, various media channels (newspapers, portals, call center distributors) were utilized to

communicate that subsidy recipients needed to complete the KYC process before a cut-off date, after which the subsidized connections were blocked. Although it is difficult to evaluate the efficacy of DBTL in the de-duplication exercise because of a lack of relevant data, it seems likely that this algorithm-based sifting significantly accelerated the de-duplication process. The PMUY enrolment procedure has an in-built methodology based on *Aadhaar* to avoid duplicate connections in the same household.

PMUY's inclusive approach has also acted as a gateway to enabling more households to avail themselves of the subsidized use of LPG. Prior to PMUY, in 2015 most poor households did not have an LPG connection and 97 percent of LPG consumption was accounted for by the richest 30 percent of households (Ministry of Finance 2016). Six Indian states with very low levels of energy access reported that 6-7 percent of SC and ST households used LPG as their primary cooking fuel in 2015, but by 2018 this had increased to 32 (SC) and 21 (ST) percent (Mani et al. 2019).

The provision of an LPG connection does not necessarily translate to sustained adoption of LPG as the main cooking fuel. In fact, while the number of LPG connections increased by 60 percent between 2016 and 2019, LPG sales only increased by 26 percent (PPAC 2016; 2019a). No, or lower-than-average, use among poorer sectors of the population explains this disparity. Fourteen percent of PMUY beneficiaries did not purchase an LPG refill during the first year after receiving the connection (PIB 2019a). Uptake varied starkly between states, with less than half of PMUY households in low-income states such as Chhattisgarh, Jharkhand, Assam, Mizoram, Nagaland and Odisha opting for a second refill while in richer states such as Haryana, Maharash-

tra and Gujarat over 80 percent of the beneficiaries availed themselves of a second refill (Kumar 2018). For households that purchased LPG refills, LPG use was still relatively low: the average PMUY household consumed 3.4 cylinders per year against an all-India average of 6.77 cylinders (MoPNG 2019). Even this national figure is unlikely to represent LPG being the sole cooking fuel. Prior to the introduction of PMUY, the national average for LPG consumption by (relatively wealthy) households in 2011-12 was nine cylinders per year. These national averages also mask differences between social groups. In parts of India in 2018, despite having LPG connections, the proportion of ST and 'General' households that used LPG as their main cooking fuel were 56 and 70 percent respectively (Jain et al. 2018).

Interviews for this case study also highlighted that the restriction on co-branding with PMUY could create political disincentives that could have impacted the take-up of LPG among PMUY households. For example, state governments or other entities that are not politically aligned with the central government may be discouraged from providing additional support to cover the cost of LPG connections if they are unable to secure some of the credit associated with any positive outcomes from the scheme.

Box 7: Channels for diversion of LPG

There are two LPG markets in India. LPG for domestic purposes is subsidized (via DBTL) and sold in signature red cylinders (14.2 kg and recently 5 kg). Unsubsidized LPG for commercial uses is sold in 19 kg cylinders that are painted Oxford Blue. The commercial cylinders are also subject to extra taxation. The relative prices as of July 2019 in New Delhi were:

	Price (unsubsidized) including taxes			
	Per cylinder		Per kg LPG	
	\$	INR	\$	INR
Domestic (14.2 kg)	7.07 (9.11)	494 (637)	0.50 (0.64)	34.8 (44.9)
Domestic (5 kg)	3.34 (4.69)	234 (328)	0.67 (0.94)	46.8 (65.6)
Commercial (19 kg)	(16.14)	(1130)	(0.85)	(59.5)

The stark difference in prices creates the potential for diversion of domestic cylinders for unintended users/uses. While DBTL has addressed the price difference between subsidized and unsubsidized domestic LPG cylinders by making consumers pay the market price for the domestic LPG cylinders, the difference in taxation between domestic and commercial LPG cylinders means the temptation to divert LPG continues with most leakage occurring via the 14.2 kg domestic cylinders being used by restaurants and hotels. Anecdotal evidence suggests three separate beneficiaries of diversion: distributors gain additional revenues by selling domestic cylinders to commercial consumers at non-subsidized prices; domestic consumers receive the subsidy payment without using the LPG; and the commercial entity avoids paying the tax levied on commercial LPG.

Source: Petrol Diesel Price 2019

Some of the challenges that remain in transitioning households to cleaner cooking fuels are elaborated on below.^{xiv}

Recovery of the PMUY loan hinders initial refills

Nearly three-quarters (74 percent) of PMUY beneficiaries opted to take out a loan from the OMCs to cover half the LPG connection costs (Pandey 2019). Paying back the loan equates to the subsidy component of six to eight refills, depending on the LPG market price. As most PMUY households are economically marginalized, paying the market price for LPG for these first refills poses a barrier to changing cooking behaviors toward regular and

sustained use of LPG. In an attempt to counter low first-refill rates, the OMCs deferred this repayment for the first six refills or one year, whichever is earlier (PIB 2019b). However, this only delays the payment burden, it does not eliminate it.

DBTL is insufficient to make sustained LPG use affordable for many PMUY households

In six states with some of the lowest energy access rates, almost 30 percent of LPG-using households who procured connections on their own (non-PMUY connections) do not use LPG exclusively for all cooking needs, with 90 percent citing 'expensive to use' as the reason for not being able to do so (Jain et

al. 2018). This implies that the subsidized cost of regularly using LPG is prohibitive even for households who could afford to pay for the connection. In those states, worries around recurring costs are listed by 87 percent of households who do not use LPG as a reason for not doing so (Jain et al. 2018).

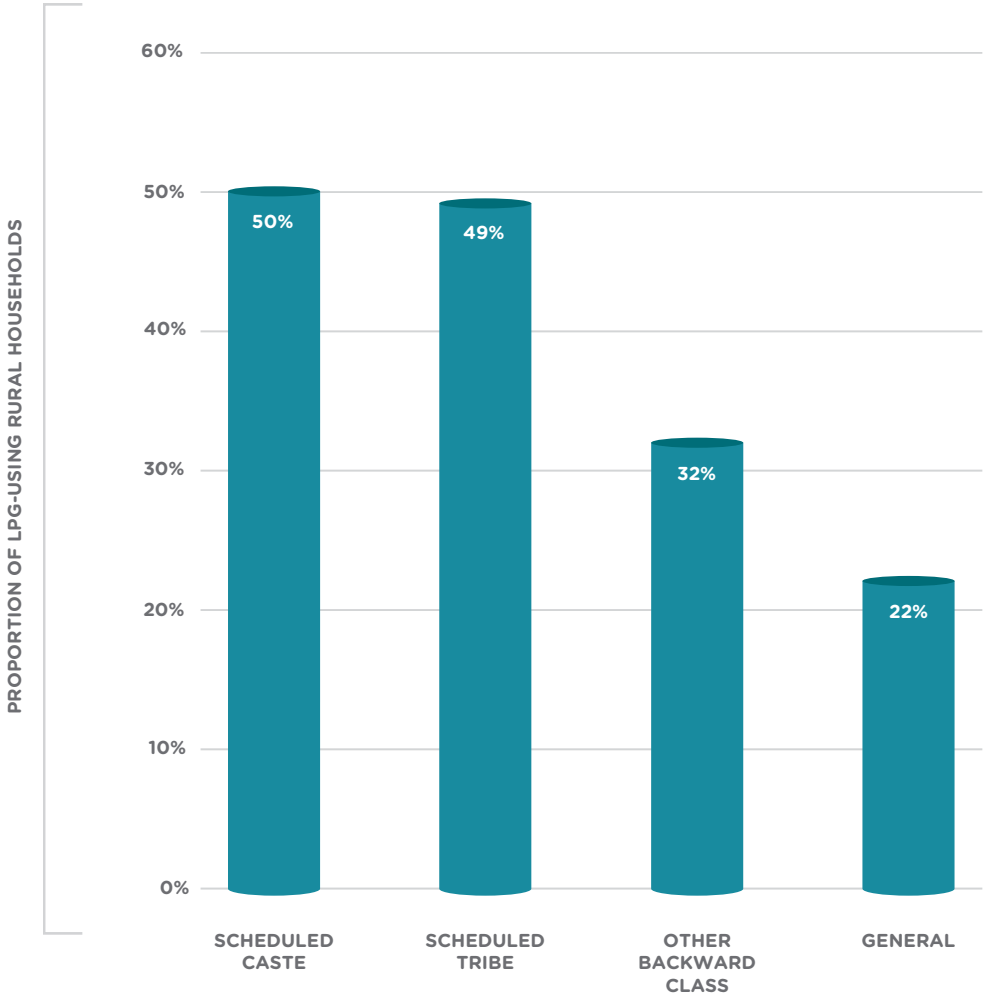
Regular use of LPG is likely to be even more challenging for households connected under PMUY given their lower median monthly expenditure of USD 72 (INR 5000) compared to USD 86 (INR 6000) for non-PMUY households (Jain et al. 2018). This disparity also varies between states. More than 60 percent of PMUY beneficiaries in Del-

hi, Goa, Haryana, Uttarakhand and Puducherry availed themselves of at least four LPG refills, while the figure was less than 30 percent for Chhattisgarh, Tripura, Jharkhand and Assam (Abdi 2019).

The affordability threshold for cooking energy is estimated at 6 percent of total household expenditure (Jain et al. 2018). A recent household survey found that the willingness to pay for LPG is USD 4.5 (INR 313) per month in rural areas and USD 4.8 (INR 333) in urban areas, equating to 4.5 per cent of the total monthly consumption for a household in the lowest income group (CRISIL 2016b). Using estimates from the NSS 2011-12 for use of LPG as the primary cook-

Figure 6

A greater proportion of the Scheduled Caste and Scheduled Tribes received LPG connections under PMUY as a result of using SECC data for targeting



Source: Jain et al. 2018

ing fuel (Jain, Agrawal and Ganesan 2014), the cost of consuming 9 LPG cylinders per year amounts to 7.5 percent of the household's expenditure.^{xv} This is unlikely to change going forward: the estimated financial outlay for DBTL in 2019-20 suggests each household would receive an annual LPG subsidy of USD 17 (INR 1188), which is equivalent to subsidizing five refills.^{xvi} Further, these are median values; they imply that subsidized LPG is unaffordable for the majority of PMUY beneficiaries. Findings like this have led to some commentators recommending the universal provision for a free quota of energy that equates to the minimum threshold of energy access. Any consumption above that level would then be charged at a higher level to cross subsidize the scheme (Azad and Chakraborty 2019).

Initial efforts failed to consider broader affordability issues, but the OMCs are responding

The upfront cost of refilling a cylinder and its variance with international oil prices may have posed affordability challenges for poor households. Their ability to arrange payment may be especially affected if they are unaware of why the price changes or by how much. This is particularly the case for households where income depends on manual labor (casual agricultural or daily wage), a high proportion of those which are also in debt (51 per cent and 38 per cent respectively) (Mani et al. 2019). Understanding such differences in cash flows and incomes is imperative to better identify where support is needed, noting that this may extend beyond the current targeting regime.

The OMCs have recently begun addressing these challenges by encouraging low-income households to use a 5 kg cylinder. The subsidized cost-per-kg of LPG for these cylinders is marginally higher than for the standard 14.2 kg option (by USD 0.034 (INR 2.5) per kg), but the total outlay for the refill is lower. In Jharkhand in May 2019 the market price to fill a 14.2 kg cylinder was USD 11 (INR 768) (the subsidy value was USD 3.8 (INR 262)) while that for a 5 kg cylinder was USD 4 (INR 284) with a subsidy of USD 1.35 (INR

94) (Petrol Fuel Price India 2019). While switching to the 5 kg cylinder could help overcome affordability issues, interviews with OMC officials revealed that some households have resisted moving to the smaller cylinder owing to the social value attached to the 14.2 kg version.^{xvii} The OMCs implemented a further change to allow households to switch between small and large cylinders depending on their ability to purchase at the time of ordering the refill.

EFFECTIVENESS AND EQUITY IN SUBSIDY TARGETING AND DISBURSEMENT

Reducing inclusion errors via Give it Up

By February 2019, the Give it Up Campaign had encouraged more than 10.4 million (1.04 crore) well-to-do households to voluntarily forfeit their LPG subsidy (Government of India 2019). However, even when added to the number of households that did not apply for the subsidy when taking out a connection, this still means that subsidies are being transferred to 93 percent of households using LPG (PPAC 2019a; Government of India 2019). The degree to which the poverty line should be used for government policy is contested (Himanshu 2012). However, for illustration, assuming that the BPL population is similar to the 363 million (29.5 per cent of the total population) figure in 2011-2012, as per the estimates of the Rangarajan Committee (Planning Commission 2014), this suggests that approximately 90 percent of India's non-poor population receive the subsidy. In 2016, the ministry began to further reduce inclusion errors by means testing the upper threshold, removing the subsidy for households with an annual income of over USD 14,493 (INR 1 million).

Targeting using the SECC may not reflect current household situations and could exclude some groups

Each targeting mechanism has its benefits and challenges, associated with both errors of inclusion and exclusion. Often, targeting schemes attempt to inte-

grate vulnerabilities. Hence, it is common for social assistance programs to use a combination of two or more targeting methods or mechanisms. These can be used sequentially to reduce the number of beneficiaries (e.g. individuals must satisfy both a age and income criteria to qualify for a means-tested social pension) or in parallel to increase it (e.g. beneficiaries are eligible if they satisfy any of the criteria) (Devereux et al. 2015).

The SECC database provided a leap forward in the comprehensiveness of defining deprivation, yet experience to date suggests that more could be done to reduce exclusion errors related to the dynamic nature of poverty and poor and vulnerable groups that are not captured by the SECC.

Targeting currently draws on data obtained in 2011 and does not account for changes to households' circumstances since then, with some escaping poverty and others falling into it. For instance, a recent survey in Chhattisgarh and Jharkhand revealed that only 48 percent of the PMUY beneficiaries were among the poorest 40 percent of households (Global Subsidies Initiative-IISD et al. 2019).

Use of the SECC alone also excluded groups that may require support to transition to using LPG. These include the disabled poor who received motorized mobility aids from the government and landless fishermen who were forced to motorize their boats to compete with big trawlers (Business Line 2011). Interviews with distributors also suggested that households with two kitchens (common in many parts of rural India where smaller units of families share the same house) and members who move out of a house that had a connection and try to claim a new one (as is typical when women get married) can find it difficult to receive a new connection. The SECC does not account for household debt, which was reported by 41 percent of rural households in 2018 (Mani et al. 2019). With the median debt value increasing to USD 787 (INR 55,000) between 2015 and 2018 for the same households, it seems likely that household

debt could dramatically reduce household income available for LPG consumption (Mani et al. 2019).

These exclusion errors have been partially mitigated as the MoPNG has expanded the beneficiary population to include beneficiaries of other schemes but other groups, such as the transient and urban poor, may still be overlooked. Population growth and urbanization have deepened urban poverty in India. Studies focused on the urban poor in Maharashtra and Bengaluru found that every fifth household spends more than 20 percent of their income on energy (Vincent et al. 2015). Although most urban poor households use LPG, they stack it with unclean fuels such as kerosene or firewood to heat water or make *chapatti* (bread).

Some state-level social assistance schemes have adopted a decentralized mechanism for continuously updating their beneficiary database at the village or block level – *Samagra* – but this has not yet been deployed for LPG (Drèze et al 2019).

ROLE OF NON-SUBSIDY COMPONENTS

There are other operational aspects of the LPG program that are not necessarily directly linked with the receipt of subsidy but enable households to use LPG and receive the subsidy. These include the efficiency of the LPG distribution network, accessibility of banking services, consumer awareness of the subsidy-delivery mechanism, and the sustained agency of women to procure LPG.

Pervasiveness of fuel stacking even for wealthier households

Although LPG use by households increases with income, this neither eradicates the use of biomass nor eliminates the dangers of exposure to indoor air pollution as households tend to simultaneously use ('stack') clean and unclean fuels (Cheng and Urpelainen 2014). Even among households that use LPG as their pri-

mary cooking fuel, 48 percent also cook with traditional biomass with increases in income having only a modest impact on decreasing its use (Jain et al. 2018). Household income and the affordability of LPG are only two factors that contribute to fuel stacking (Gupta et al. 2019); others include LPG's availability and how these characteristics compare to those of alternative fuels. These factors can lead to significant subnational variation in the impact of programs. For instance, stacking among LPG-using households with a median monthly expenditure of USD 72 (INR 5000) or more was 75 percent in Uttar Pradesh, and only 37 percent in West Bengal.

Persistent awareness-raising campaigns educating households about the adverse health impacts of burning biomass or schemes that remove the option of using traditional biomass may be required to complete households' transition to sole use of LPG.

Importance of an expanded, capable and equitable distribution network

The increase in the number of LPG distributors in India in 2016-2019 (32 percent) has been considerably slower than that of LPG connections (60 percent), with the discrepancy considerably larger in some states (PPAC 2019a). Most new distributors serve many PMUY beneficiaries, placing additional responsibilities on them to generate awareness of LPG's benefits and stimulate its use, handle queries from new consumers, and monitor the regularity of refills to avoid inactive connections.

However, progress has been made in recent years with the number of new distributors increasing from 870 in 2016-17 to 3,591 in 2018-19 with 6,400 new locations advertised by the OMCs, many of these in rural areas (PPAC 2019a; 2018; 2017). CSCs have also supported the expansion of distribution networks but the skill levels of the local village-level entrepreneurs (VLEs) that operate the CSCs are varied.

A study commissioned by the Petroleum Planning and Analysis Cell (PPAC) identified the distance to the LPG distributor and long waiting time to get a refill as key barriers to the adoption of LPG (CRISIL 2016a). These may disproportionately impact poorer households for whom time is more strongly associated with income. Reducing the distance required to procure a cylinder could motivate a household to use more LPG (Parikh 2016) as 95 percent of households in well-connected villages use LPG as their primary fuel; in remote villages the figure is 29 percent (Kelkar et al. 2016). Home delivery of LPG also makes it more likely that a household will use LPG as its primary or exclusive cooking fuel (Mani et al. 2019), underscoring the importance of a drive towards an equitable reach of the distribution network.

Although all distributors except *Durgam Kshetriya Vitra*ks are under instruction to make home delivery of LPG cylinders in their authorized area of operation, studies show that the rate of home delivery varies between states from 79 percent of rural LPG-using households receiving the LPG cylinder at their doorstep in West Bengal to only 22 percent of such households in Jharkhand (Jain et al. 2018). Other studies report that delivery vehicles stop on a village's main road once per month and that local shops often serve as storage and pick-up points (Gupta et al. 2019). Nevertheless, households in Madhya Pradesh report the median one-way distance to procure LPG can be as much as 7 km (Jain et al. 2018).

Access to banking services

Access to banking services, in terms of the distance travelled, frequency of visits, and convenience of available services, is key to the smooth operation of DBTL. The density of bank branches is much higher in urban areas (18.7 bank branches per 100,000 adults) than in rural and semi-urban areas (7.8 branches per 100,000 adults) (Jain 2016). In 2016-17 there were approximately 51,000 rural bank branches and about 547,000 branchless banking outlets^{xviii} in rural India (MoSPI 2018). The median daily transactions per rural agent tripled from 14 in 2015 to 41 in

2017 despite agents facing additional challenges compared to their urban counterparts, such as high operational costs, greater fraud risks, lower profitability, frequent service downtime and poor internet connectivity (Mehrotra et al. 2018).

Awareness creation among LPG users

The PMUY program was accompanied by several print and digital advertisements and the launch by MoPNG of *LPG Panchayats* across towns and villages to generate awareness about the program, and inform new LPG users of safety aspects, the subsidy delivery process and how to order LPG refills.

Interviews for this case study with the relevant stakeholders highlighted gaps in knowledge about accessing the scheme and use of LPG among households.

Interviews with ministry representatives and NGOs that help organize *LPG Panchayats* yielded several examples of confusion among beneficiaries that the *LPG Panchayats* helped to resolve. These include:

- Initially some consumers thought that they would get the LPG connection completely free-of-cost
- Other consumers were unsure as to how connections would be assigned for households with more than one adult woman or more than one kitchen, which led to some households unsuccessfully applying for multiple connections
- In some cases, distributors reported that multiple gas agencies enrolled the same beneficiaries, creating delays in providing connections
- There was confusion over when and to whom the subsidy would be delivered via DBTL.

On the strength of how effective the *LPG Panchayats* have been, the MoPNG plans to appoint an *Ujjwala didi* for every five villages whose prime responsibility would be to support and give ser-

vice to PMUY beneficiaries (MoPNG 2018). It remains to be seen whether this approach will be able to reach household decision-makers (i.e. also include spouses) and consistently deliver the messaging, which has been vital to the success of other behavioral-change initiatives, such as the awareness campaigns run by the Ministry of Health and Family Welfare (MoHFW) that encourage institutional births and immunization.

Role of women and intra-household dynamics

The PMUY has placed women at the center of its intended impact by providing LPG connections in the name of the adult woman of the household. In this way, schemes such as PMUY and PM-JDY have resulted in many more women having active bank accounts – 45 percent of women in India had an active^{xix} account in 2017 (the figure for men is 55 per cent) (InterMedia and Bill and Melinda Gates Foundation 2018). However, the sociocultural context around gender influences the way the benefit of PMUY and DBTL is accrued by households and it is unclear whether greater financial inclusion has translated into more financial independence. For example, in 2016, more than half of employed married women reported that their spouses decide how their incomes are spent (InterMedia and Bill and Melinda Gates Foundation 2017) with more than two-thirds of LPG-using households in low-income states reporting that a male member of the household decides when to order a refill (Jain et al. 2018). That males control a household's LPG usage is further suggested by the fact that only 37 per cent of women in rural India owned a personal mobile phone in 2015-16 (Ministry of Health and Family Welfare and International Institute for Population Studies 2016) and the fact that only a quarter of rural women were paid for their work in cash (Ministry of Health and Family Welfare and International Institute for Population Studies 2016). Noting that almost one-third of women who are or have been married report having

Box 8: LPG Panchayats

An LPG *Panchayat* is a community-level platform set up to facilitate interaction among multiple stakeholders, exchange experiences of using LPG, and explain the difference in cost of using LPG vis-a-vis other fuels (MoPNG 2018). The target of the sessions is women of the household and in addition to themes related to the workings of PMUY and DBTL, themes covered in the *Panchayats* include:

- the impact of smoke from chulhas on the health of the women
- the opportunity cost of women's time and labor in the gathering and preparation of biomass for cooking

- safe and responsible use of LPG
- the impact of soot and smoke produced by biomass cooking
- economic empowerment of women through time saved on cooking and collecting biomass.

The platform also aims to resolve issues and modify traditional beliefs among people through officials of OMCs, representatives of non-governmental organizations (NGOs), and Accredited Social Health Activist (ASHA) workers. The LPG distributors in their respective areas moderate these *Panchayats* and use various innovative methods to increase households' attendance.

faced spousal violence (Ministry of Health and Family Welfare and International Institute for Population Studies 2016), in many cases women may not possess the means to exercise the autonomy that the scheme is trying to provide. This may further be compounded by reliance on the men of a household to transport the cylinder, and

could delay LPG refills, pushing households back to using traditional biomass (Giri and Aadil 2018). This web of interactions had led some to suggest that a gender-segregated approach is required to examine the impact of LPG subsidies as part of a clean cooking energy transition (Kitson et al. 2016).

DELIVERING ENERGY ACCESS THROUGH SOCIAL ASSISTANCE PROGRAMS IN INDIA



As India transitions into the next phase of development, the focus on the rationalization of benefits and avoiding exclusion of the poorest should be the primary objectives of its social welfare agenda. This section discusses the potential of integrating and linking aspects of different social assistance programs in India, including the identification, targeting and delivery of subsidies, to promote sustained use of clean cooking fuel.

OVERVIEW OF SOCIAL SAFETY NETS (SSNs) IN INDIA

The Government of India has a large social protection program that is largely aimed at addressing instances of capability deprivation (inadequate nutrition, lack of employment, low educational attainment) and providing access to services that are beyond the reach of the beneficiary households (Mary Robinson Foundation 2016; Sharma 2017). Typically, the beneficiaries include chronically poor and socially and economically vulnerable households, many of whom also lack access to modern energy services.

The Integrated Child Development Services (ICDS); MGNREGS; Public Distribution System (PDS); Midday Meal Scheme and social security pensions for specific groups account for the bulk of social protection public expenditure (Drèze and Khera 2017). Public works schemes, and those providing food/nutrition and maternity benefits are the backbone to India's approach to achieving SDG1.3. For example, one of the largest programs is the MGNREGS that provides 100 days of casual manual labor at government notified wage rates to applicants seeking work (about 85 percent of those who apply qualify) (NITI AAYog 2018). Other schemes like *Janani Suraksha Yojana* (JSY) and *Pradhan Mantri Matru Vandana Yojana* (PMMVY) provide conditional cash transfers to pregnant and lactating women. The Food Security Act brought about the ICDS, PDS and Midday Meal Scheme, which focus on improving access to food and nutrition for all poor households.

India has historically provided general (price) subsidies on certain products. Perhaps as a result, most ESNs in India are broadly inclusive and – unlike DBTL – do not require a financial contribution from the beneficiary (Drèze and Khera 2017). This has begun to change in recent years to reduce fiscal outlay and ensure benefits are targeted towards those who are most in need as this has a much greater social return than supporting wealthier households (Coady, Grosh and Hoddinott 2004). Unlike the DBTL, most schemes transfer the benefit without expecting a **financial** contribution from the beneficiary (pension, PDS, MGNREGS).

EXPERIENCE WITH OTHER SSNS WITH LESSONS FOR THE LPG PROGRAM

As shown in Table 5, the focus on inclusivity of schemes like PMMVY, PMAY-G and PMUY has led to coverage of millions of India's poorest people. However, under the DBTL, the universal nature of this recurring subsidy ends up covering three times more than the estimated number of BPL households (as estimated based on the poverty line determined by the Rangarajan Committee). This has an indirect impact on support for the poorer households because of the pressure exerted on finite government budgets. While in other recurring health-related schemes like JSY the beneficiaries are age-specific, DBTL is not conditional on the age of the beneficiaries.

However, across schemes, implementation failures due to weak state capacity or corruption have often been cited as reasons for coverage rates being lower than anticipated (Gupta 2018). Exclusion errors may also arise owing to enrolment barriers. Long application processes potentially lead to the exclusion of some of the most vulnerable individuals from the social assistance programs. Research suggests that non-income vulnerabilities of the poor play an important role in determining who is able to successfully engage

Table 5

Major social assistance schemes in India and the scale of their beneficiaries

SCHEME (YEAR INSTATED)	IMPLEMENTING MINISTRY	TARGET POPULATION	TYPE OF TRANSFER	INCIDENCE OF BENEFIT	BENEFICIARY COVERAGE	ANNUAL BUDGET
Mahatma Gandhi National Rural Employment Guarantee Scheme (2005)	Ministry of Rural Development	Unemployed poorest of the poor and marginalized population through self-targeting mechanism	Cash for work	Recurring	122 million [^]	USD 8.6 billion INR 60,000 crores (2019-20)
Integrated Child Development Services (1975)	Ministry of Women and Child Development	Children under 6, pregnant and lactating women	In-kind transfer (food and nutrition)	Recurring	139 million [*]	USD 3.9 billion INR 27,584 crore (2019-20)
Janani Suraksha Yojana (2005)	Ministry for Health and Family Welfare	All BPL, SC and ST pregnant women	Conditional cash transfer on institutional birth	Recurring	10.4 million ^{**}	USD 287 million INR 2013 crore (2017-18)
Direct Benefit Transfer for LPG (2013)	MoPNG	Beneficiaries with an income below USD 14,000 (INR 10 lakh)	Earmarked cash transfer provided for each refill purchased by the household	Recurring	1235 million [^]	USD 4.2 billion INR 29,500 crore (2019-20)
Pradhan Mantri Matru Vandana Yojana (2017)	Ministry of Women and Child Development	Pregnant and lactating women over 19 who do not receive paid maternity leave	Conditional cash transfer for compensation for wage loss during pregnancy	One time	3.7 million ^{***}	USD 358 million INR 2500 crore (2019-20)
Pradhan Mantri Awas Yojana - Gramin (2016)	Ministry of Rural Development	BPL households with housing deprivation parameters as per SECC 2011	Cash transfer for construction of a pucca house	One time	76.5 million [^]	USD 18.6 billion (2018-19) USD 3 billion INR 21,000 crore
Pradhan Mantri Sahaj Bijli Har Ghar Yojana (2017)	Ministry of Power	BPL, SC, ST and other 'deprived' (as per SECC) households	In-kind transfer (Connection cost of electricity)	One time	132 million [^]	USD 2.3 billion# INR 16,320 crore
Pradhan Mantri Ujjwala Yojana (2016)	MoPNG	BPL, SC, ST and other 'deprived' (as per SECC) households and AAY beneficiaries	In-kind transfer (Connection cost of LPG)	One time	365 million [^]	USD 1.8 billion# INR 12,800 crore

[^] Data for 2018-19 * Data for 2014-15 ** Data for 2014-15 *** Data for 2017-18 # Total budget for the scheme

Note: To make the beneficiary number comparable across schemes, for schemes that provide benefit to households, the size of the beneficiary number has been arrived at by multiplying with the average household size of 5.

Sources: Government of India 2019; Women and Child Development 2018; Women and Child Development 2015; Ministry of Health and Family Welfare 2015a; Ministry of Power 2019; Khullar 2018; Narayan 2019; Rawat 2019; Ministry of Finance 2019.

with the political and bureaucratic machinery that implements the welfare programs (Gupta 2018).

Most schemes are designed by the central government, but state governments are responsible for essential components of implementing social assistance programs, as well as often co-funding them (Mangla 2016). For example, the housing scheme (PMAY-G) involves village-level administration in the identification of targeted households and provides beneficiaries with state-level technical support for different housing designs that are suitable for local

geo-climatic conditions. Instances of local corruption notwithstanding, this insight has resulted in increased assistance for beneficiaries in hilly states to overcome the higher cost of raw construction materials they face. Similarly, involving local administrations in the implementation of social pensions has led to states like Delhi and Haryana relaxing eligibility criteria and increasing the pension amount to account for the higher-than-average cost of living (Bhattacharya, Mehta, Murgai 2015). This approach contrasts with the targeting and identification of beneficiaries under the LPG program, who are

often defined centrally using the SECC database without further considering state-level variation in poverty indicators.

DEGREE OF INTEGRATION OF LPG PROGRAM WITH OTHER SSNS TO DATE

The LPG program is not explicitly linked to other ESNs in India and is almost entirely orchestrated by MoPNG. However, the LPG program does have similarities to schemes delivered by other ministries. For example, similar to the food, education or health-focused SSNs, the LPG program bases its targeting approach on the SECC data. In some cases, targeting within the LPG program has been extended to include beneficiaries of other schemes (e.g. AAY), and DBTL is delivered in

the same way as hundreds of other benefits through the direct benefit transfer system. Sharing these architectures (SECC and DBT) among many schemes can help to share and avoid duplication of their administrative costs and provide a more holistic approach to poverty alleviation.

However, there are several areas in which the LPG program is not well integrated with other social assistance schemes. For example, schemes that focus on health have not focused on the impacts of household air pollution on the health of women and children, who tend to spend more time in the kitchen and are exposed to the smoke from the *chulha*. Similarly, while it is known that pregnant women who are exposed to higher pollutant levels are at a higher risk of delivering low-birth-weight

Box 9: Existing social protection schemes in India have adopted convergence in programming

Linkage of benefits across different social protection schemes is already being implemented in the rural housing scheme in India. PMAY-G beneficiaries are entitled to 90 days of unskilled labor under MGNREGS and assistance for toilet construction under the *Swachh Bharat* Mission. The government is also attempting to bring together the provision of free electricity connections under *Saubhagya* and credit-linked LPG connections under PMUY with this housing scheme. PMAY-G has included a provision for a dedicated area of hygienic cooking by increasing the housing unit size from 20 square meters to up to 25 square meters. However, a crucial aspect of a mandatory kitchen

slab, which would facilitate safe usage of LPG cylinders, is missing in the design. The government could incentivize the construction of elevated kitchen slabs and chimneys through PMAY-G. Such incentives play a major role in inducing behavioral changes amongst households.

Similarly, the *Swachh Bharat Mission – Gramin*, a scheme that provides financial incentives for the construction of toilets, integrates beneficiaries by giving a preference under the scheme to pregnant and lactating mothers covered by maternal health programs, and to girls covered by any other scheme.

babies (Shriyan et al. 2018), the potential for a lack of modern energy services to negate the efforts of maternal and child health schemes could hinder India's achievement of other SDGs.

A final consideration is that the health impacts of household air pollution are related to the levels of ambient air pollution (i.e. that outside of the household). Any progress on limiting indoor air pollution through the LPG program in one given household may be offset if neighbouring households continue to use biomass for cooking or if other sources of ambient air pollution are not also addressed.

POTENTIAL FOR INTEGRATING AND LINKING THE LPG PROGRAM AND OTHER SSNs TO AMPLIFY THEIR IMPACT

There are two main opportunities for using experience with other SSNs to enhance support for the regular use of LPG by poor or vulnerable households. First, the integration of the LPG program with other SSNs (such as those supporting health-care, education, housing and nutrition) to reduce the administrative barriers that households face in accessing multiple benefits. Second, the experience gained from the various programs could, in theory, be used to better target support and provide a differential subsidy that is based on a household's level of deprivation, amplifying the positive impact of individual safety nets and their aggregate impact on living standards.

Integrating programs to improve targeting and reduce administrative burdens

Integrating the targeting approaches used by different social assistance programs could help to ensure that the various dimensions of poverty like health, nutrition, and access to water, energy and safe housing are included in the targeting mechanism. Such an approach could help to bring a local aspect to LPG targeting, as is already the

case with some of the other schemes. For example, by considering factors that are shown to vary between rural and urban locations and between states, like the local availability of fuelwood and biomass or the local climatic conditions. It would also be important to account for any variation in administrative capacity between states.

Further integration using a unified database could also help to ensure shared resources are directed to maintaining the quality, accuracy and relevance of the database, strengthening the social information system. This approach also echoes the suggestions made by the Committee Expert Group formed during SECC 2011. The group specifically called for the SECC database to be used in all centrally-sponsored and state-government schemes to reduce inclusion and exclusion errors and emphasized the need for regular updating and verification of the database (Ministry of Rural Development 2016). There should be an option to update the social status and allow for inclusion of transient poor between two rounds of the census, through periodic outreach. There is a need for clear protocols on inter-ministerial coordination, sharing of data across departments, and well-defined roles for data collection, updating and management. An independent agency akin to the Ministry of Social Protection that exists in many countries could play an important role here. The inclusion of local governments and state governments is particularly important to ensure effectiveness of periodic outreach. Leveraging the SECC database would provide additional subsidy support to the deprived households through DBTL.

In addition to targeting, integrating social assistance programs could link the beneficiary enrolment procedure and delivery mechanisms. This could result in integrated support being provided to the poorest households instead of them enrolling for benefits across individual schemes. It could also reduce duplication in the outreach and enrolment process for the beneficiaries. This would minimize the aggregate effort currently required to enroll poor households in

multiple processes, for both the government and the beneficiaries. Although integration could streamline the process overall, it would require significant coordination across government ministries and may be less transparent to applicants.

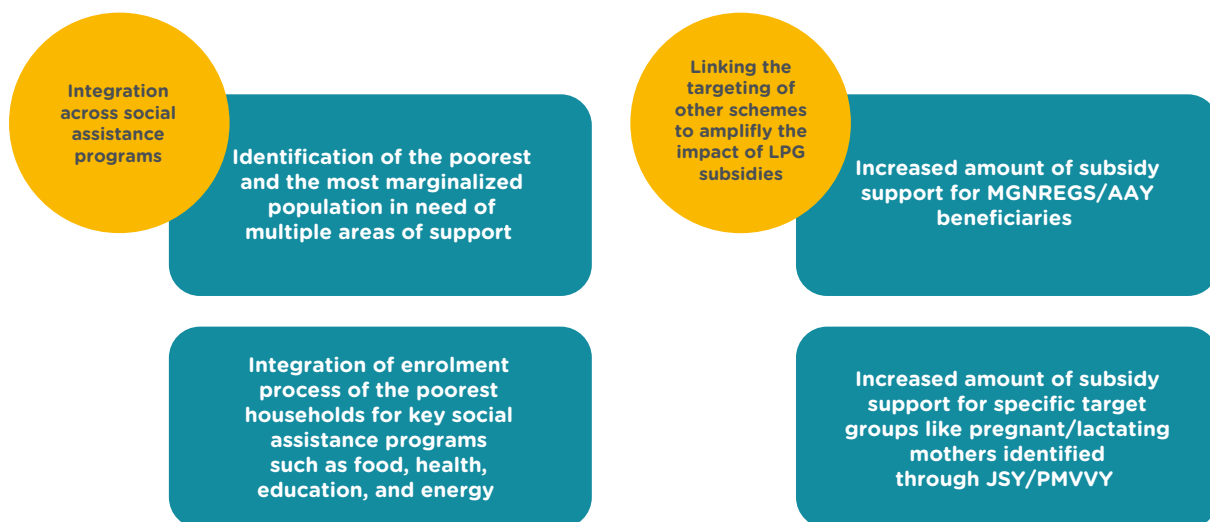
Linking targeting across other schemes to amplify impact of LPG program

As noted in earlier sections, two conflicting issues currently hamper the impact of the LPG program. First, the amount transferred through DBTL is insufficient to ensure regular use for some of the poorest households. Second, many households that are subsidized through DBTL are non-poor. One way of improving the impact of the LPG program could be to use targeting of other programs to identify which groups should be a high priority to receive an increased LPG

subsidy. For example, the beneficiaries of both the MGNREGS (120 million) and PMAY-G (9.4 million households) schemes are amongst the poorest and most deprived sections of the country and increasing the LPG subsidy provided to these households could help to make LPG more affordable for them while limiting further leakage to the non-poor. Complementary programs that supplement the earmarked transfers for LPG refills with livelihood security, better housing, and healthcare and nutrition schemes would similarly ensure that the existing beneficiaries of the LPG programs are more likely to transition to sustained use of cleaner cooking fuels. Similarly, recent work has suggested that providing existing beneficiaries of maternity benefit schemes like JSY or PMMVY with an additional LPG subsidy could promote the sustained use of LPG during the health-critical pre- and post-natal period (Pillarsetti et al. 2019).

Figure 7

Integration and linking across existing social assistance schemes to improve access to LPG



Source: Authors' analysis

CONCLUSION



Energy Safety Nets (ESNs) refer to social assistance mechanisms that enable poor and vulnerable people to access and use modern energy services. ESNs are a broad set of measures ranging from general energy price subsidies at one end to highly targeted social assistance at the other. The aim of this research is to identify measures that have been implemented to enable poor people to access modern energy services, analysing their impacts and experiences, and explore the reasons for their success or lack thereof. This case study focuses on subsidization of clean cooking energy in India, in particular on the policies and schemes introduced since 2014 to improve access to and targeting of LPG subsidies.

The primary motivations behind the provision of LPG subsidies in India include addressing the ill effects of the combustion of biomass on maternal and child health. LPG policies and schemes have focused on aspects of subsidy delivery and targeting, access (to connections), and availability. Simultaneously, they have focused on inclusion and equity, along with improved efficiency. DBTL has attempted to reduce the leakage of the LPG subsidies to non-poor recipients through removal of duplicate and ghost connections and direct debit of the subsidy amount to beneficiaries' bank accounts. PMUY has effectively tar-

geted the most marginalized sections through SECC deprivation indicators and leveraging the targeting approaches of other schemes. The subsidized connection under PMUY has enabled 80 million households to receive an LPG connection without any upfront expenditure. Considering the gendered nature of cooking and fuelwood collection in India, PMUY has provided LPG connections in the name of the adult woman of the household and the DBTL subsidy is transferred to her bank account.

However, experience shows that access to an LPG connection does not necessarily translate into sustained use. Despite the fact that LPG subsidies constitute the largest component of MoPNG's expenditure, the average annual LPG consumption of PMUY households is less than four cylinders, less than half of consumption by non-poor households.

Different consumers along the spectrum of poverty may require a different amount of subsidy to afford the use of LPG, and differential subsidy mechanisms along with improved targeting of subsidies could provide greater support to the poorest households. The Give it Up Campaign took the first step in sharpening the target by reducing the share of subsidies going to econom-

Box 10: LPG schemes in India

Pratyaksh Hastantarit Labh (PaHaL) or Direct Benefit Transfer for LPG (DBTL): Under this scheme, the subsidy amount for domestic cylinders is directly transferred to the bank account of the beneficiary, against the purchase of cylinder, for up to 12 cylinders a year.

Give it up Campaign: With the aim of improved targeting, the scheme encouraged willing households who did not need the subsidy amount to forfeit it.

Pradhan Mantri Ujjwala Yojana (PMUY): Provision of credit-linked LPG connection subsidy to reduce the barrier of the high upfront cost.

Unified Guidelines for Selection of LPG Distributorships: For improved availability of LPG in remote and rural areas.

ically well-to-do households, yet, 90 percent of the non-poor continue to avail themselves of the LPG subsidy. An effective subsidy mechanism would adopt a targeted approach, which allocates and distributes a higher amount of subsidy to the poorest households.

In addition to affordability, the lack of availability of LPG and awareness of its benefits currently limit many households from using it regularly. The government needs to address these gaps to ensure all households use clean fuel for cooking in due course. Considering that a household's tendency to stack fuels may depend on factors like affordability of a clean fuel like LPG, ease of access to LPG, availability of free-of-cost biomass, etc., it is important to account for these while designing subsidy and incentive mechanisms. Creating an economic opportunity for other uses of biomass would be helpful in transitioning away from the use of biomass for cooking. Generating continued awareness regarding the benefits of clean cooking fuel via *LPG Panchayats* has the potential to increase the use of LPG. Additionally, despite the government's focus on women in the implementation of the schemes, intra-household decision-making with respect to purchasing LPG refills remains dominated by their spouses and other members of the household. Therefore, including the decision-makers of household expenses in awareness-raising programs is important to change consumption patterns. Ongoing campaigns educating households about the adverse health impacts of burning biomass or schemes that remove the option of using traditional biomass are required to complete a household's transition to sole use of LPG.

Considering the dynamic nature of poverty, households are more likely to revert to the use of biomass for cooking unless existing social assistance programs are effectual in providing support

for regular clean fuel use. Existing large-scale social assistance programs in India offer opportunities to integrate and leverage the aspects of identification, targeting and delivery mechanisms used in other programs for the sustained use for LPG. Similar to food, education or health-focused social safety nets, the targeting approach for some policies under the LPG program has focused on the BPL population based on the SECC.

Support for use of LPG could be enhanced in two ways. Firstly, by integrating support for healthcare, education, food, energy and other essentials for the poorest parts of the population, to improve targeting and reduce the administrative burden of enrollment and delivery, both for households and for government. Secondly, by linking the identification and targeting methods across existing social assistance programs to provide differentiated subsidy to the poorest households based on their level of deprivation. For instance, integration of benefits across multiple schemes on food, health, education and energy, would reduce the burden on the households as well as the administrative burden for the ministries. While accounting for the overall health impact of household air pollution in India, the government could link existing schemes supporting maternal and child health with earmarked transfers for using clean cooking fuels. A precedent for this exists: some housing and sanitation schemes directly include and prioritize beneficiaries targeted by other social assistance schemes.

While conceptually our understanding of poverty has evolved, the social assistance information systems must also be updated to remain relevant to the realities faced by poor households. This requires an independent administrative infrastructure that is focused on strengthening a database to be used across ministries.

A close-up profile of a woman with dark hair and a gold earring speaking into a silver and black microphone. The microphone has 'EM-58' printed on it. In the background, several women wearing colorful saris and headscarves are listening attentively. The scene is set against a warm, orange-toned background. A large teal and yellow curved graphic element is at the bottom of the image.

POLICY RECOMMENDATIONS

The discussion on subsidies and Energy Safety Nets (ESNs) spans beyond the reach of energy access. Therefore, the recommendations, while centered on energy access, consider the broader ambit of identification, targeting, implementation and monitoring of social safety nets. In the light of recent achievements and the evolving challenges of the LPG program in India, this section focuses on some key policy recommendations to improve the sustained use of LPG among the poorest and most marginalized.

Given its social benefits, the burden of disuse of biomass should not entirely be on the poorest households. The campaign to shift households to exclusive use of LPG should reorient its strategy to more strongly support the poorest households in providing both financial incentives for the use of LPG and improving households' understanding of the adverse health impacts of using biomass through consistent messaging.

Differential subsidy for PMUY households

An important aspect to consider is whether the amount of subsidy is sufficient to allow all households to use LPG. Our evidence demonstrates that it is not. Despite the subsidy, the cost of using LPG as the primary cooking fuel remains unaffordable for very poor households. A differentiated subsidy mechanism should be adopted whereby PMUY beneficiaries are provided a higher amount of subsidy for six to ten cylinders per annum, depending on the size of the family. Such an approach could be materially significant in transitioning households away from energy poverty.

Further, the safety net should also account for the nuances in the affordability of LPG. The capacity of households to pay for LPG across months could vary, depending on local agricultural incomes and employment opportunities. Similarly, seasonal consumption of LPG could vary.

Relax conditions for loan-repayment by PMUY beneficiaries

Given the deprivation of PMUY beneficiaries, the MoPNG could consider waiving loans or reducing the instalments for repayment. The poorest consumers cannot pay the market price of LPG for the first few refills, as they learn to use LPG. A smaller amount (e.g. USD 0.71 or INR 50) against more refills would be easier for the households to afford.

Improved targeting of existing subsidies

There is an opportunity to redirect LPG subsidies away from higher income groups in order to provide greater support to poorer households. This would ensure that all LPG consumers are able to use LPG as their primary fuel, without increasing the financial burden on the government. Using income tax returns as the only indicator to exclude households from receiving the LPG subsidy may not be adequate when only about 4.5 percent of the population pays income tax.

The government could attempt to screen households based on the intersection of factors to reduce or eliminate the subsidy for non-poor households. Some of these indicators (as mentioned in Box 11) could relate to location (urban and peri-urban), social category, education level of the primary earner of the household, age of the connection, and number of refills per annum in the case of older connections.

Acquiring such information can be expensive and time consuming. Therefore, there is a need to evaluate the cost and benefit of such an exercise. With significant urban areas gaining access to piped natural gas (PNG) in the next few years, many households may not require LPG subsidies. Nonetheless, this depends on how soon the transition from LPG to PNG happens in urban India, and the inclusion of urban poor in the planning process.

Box 11: Recommended indicators for better targeting of poor households for LPG subsidy: Adopting layered assessment for better targeting

- Number of years of LPG connection
- Number of refills per annum
- Education of the primary earner of the household
- Geographical location
- Social category
- PMUY beneficiary
- Simultaneous ownership of refrigerator and air conditioner

Source: Authors' analysis, Primary interviews, Jain, Agrawal and Ganesan 2016

In the meantime, simpler strategies to improve targeting could include consumers opting in for the subsidy by self-certifying that their household income is less than an amount set by the government, instead of the opt-out approach followed currently. This approach could be undertaken for urban areas where access to LPG distributors and banks is relatively easier. Careful testing will be required to ensure that deserving households are able to enrol themselves easily for the benefit.

Dealing with the upfront expenditure of LPG refills

Although the subsidy for every cylinder is credited in the beneficiary's account, at the time of purchase of refills households have to pay the market price, which could be steep for very poor households. For such consumers, direct debit of a subsidized cylinder value from the bank account or digital vouchers (in the form of mobile one time passwords) could be used to reduce the upfront expense.

Staggered payments to deal with cash flows

Cash flow is another barrier for many households in using LPG. The government is now encouraging households to use 5 kg cylinders whenever

they do not have enough cash to pay for a larger cylinder. Additionally, MoPNG could collaborate with bank, microfinance institutions and self-help groups (SHGs) to provide monthly loans to households to pay on the spot for the LPG refill and then repay that loan in weekly instalments. Many existing microfinance organizations would need to top up this loan over the pre-existing loans of the customers. Banks could also provide such loans in areas that are frequently visited by their banking correspondents.

Boosting awareness of the subsidy process and the health impacts of burning biomass

Many new users of LPG are also new to the process of DBT. Awareness-raising campaigns should be recurring and emphasize communicating the process of subsidy calculation and disbursement for households. This would help increase the trust between the customer, the OMC value chain and the government. Although helplines exist to enable customers to reach out when in doubt, the information about such helplines and ease of connecting with them should also be highlighted in awareness-raising programs. Such campaigns should include a focus on a household's decision-makers, in addition to the primary cook.

Specifically related to the health benefits of LPG over biomass, the MoHFW could integrate messaging on air pollution with existing awareness generation conducted through ASHA and Anganwadi workers.

Incentives for better distribution of LPG

For small distributors, particularly those serving rural (and PMUY) customers, additional incentives per refill delivered should be provided to account for the higher transportation cost, lower customer density and lower refill rates. Other schemes such as JSY have adopted a similar approach where ASHA workers from rural and urban areas and expecting mothers are both provided with cash incentives to encourage institutional births (MoHFW 2015b). Also, introducing new stakeholders for the distribution of LPG such as SHGs or local institutions that could become the last mile distributors with adequate training and certification could help.

Provide rural households with back-up cylinders to sustain LPG use

A substantial proportion of LPG connections in the country have single bottle connections. Such households end up relying on traditional biomass between the time the LPG cylinder runs out and the time it takes for them to procure a refill. Until a quicker turnaround for distribution of LPG across all regions is possible, providing all rural households with a back-up 5 kg cylinder to use while waiting for the refill could be useful.

Promote non-cooking uses of biomass

Biomass in the rural context has a value owing to the fact that it is freely available. The unpaid labor of women (often because of the lack of alternative livelihood opportunities) in biomass collection and preparation makes it seem cheaper in comparison to LPG where activities across the value chain entail a monetary cost. Access to

free-of-cost biomass (particularly in states with highly forested areas) is a disincentive for households to pay for LPG.

Creating alternative opportunities for the commercial use of biomass such as bio-CNG or biomass pelletization and gasification could provide households with additional income and dissuade them from using biomass for cooking. A similar model has been adopted in the dairy industry where milk is collected daily from households providing them with a regular income. Bio-CNG plants could collect dung cakes from households and ensure a regular monthly income. An understanding of local politics would be important to detail such a collection mechanism to ensure that biomass access is not restricted for households owing to the opportunity of income from it.

Livelihood opportunities for women, cash transfers and linkages with other social assistance schemes

Other social assistance schemes focused on livelihood opportunities for women that provide them the agency to gain financial independence could be leveraged to enhance their ability to pay for a cleaner and more convenient cooking fuel, predominantly LPG in India. Stakeholder discussions for this case study pointed to the potential of women-led SHGs under the National Rural Livelihood Mission (NRLM) to stock LPG cylinders and deal directly with households in order to reduce the distance travelled by households to procure cylinders. Moreover, the prevalent social network and trust between households and SHG members could be leveraged to allow for payments for LPG refills in instalments.

Delivery of subsidy for LPG use could also be linked with the existing social assistance schemes for maternal and child health (JSY), nutrition (ICDS), and livelihoods (MGNREGS). For older women who are not able to engage in economic activities, pension schemes should include the support required to

use LPG on a regular basis. This could mean increasing the amount of pension or providing LPG cylinders for regular use to such households without any upfront expenditure.

Strengthening social information systems

Many government schemes now rely on the SECC database to identify and target beneficiaries. While the SECC database is effective in the identification of BPL households, the administrative challenges around it should be dealt with in the next round of the NSS. There should be an option to update the social status and allow for inclusion of transient poor between rounds of the census, through periodic outreach. There is a need for clear protocols on inter-ministerial coor-

dination, sharing of data across departments and well-defined roles for data collection, updating and management. An independent agency akin to the Ministry of Social Protection that exists in many countries could play an important role here.

The inclusion of local governments and state governments will be important to ensure effective periodic outreach. Such periodic updating could also address the challenges of implementation in the SECC database. For instance, a change in a physical address in the time between census rounds should also be accounted for. Households that migrate from their original residence should not be prevented from receiving support. CSCs could be utilized to allow for regular online updating of population details.

REFERENCES

- Abdi, Bilal (2019). "Ujjwala Uptake Strongest in Delhi, Goa and Haryana; Telangana, Chhattisgarh with Lowest Refill Count." *Economic Times*. 2019.
- Azad, Rohit, and Shouvik Chakraborty (2019). "The 'Right to Energy' and Carbon Tax: A Game Changer in India." *Ideas for India*, April 2019. Accessed 16 June 2019. <https://www.ideasforindia.in/topics/environment/the-right-to-energy-and-carbon-tax-a-game-changer-in-india.html>.
- Balls, Jonathan (2017). "Stalled Reform in a Politically Competitive State: Uttar Pradesh's Electricity Distribution Sector."
- Barrientos, Armando (2010). "Poverty Reduction and Policy Regimes: Social Protection and Poverty."
- Barua, Samir Kumar (2018). "Lighting up Lives through Cooking Gas and Transforming Society."
- Bhattacharya, Shrayana, Soumya Kapoor Mehta, Rinku Murgai, (2015). "Beyond Leaky Pipes: Fixing Enrolment Systems of Welfare Schemes." *Ideas for India*. 2015.
- Business Line (2011). "'Deprivation Criteria' in Census Will Exclude Vast Sections of Poor from Entitlements." *The Hindu Business Line*, November 29, 2011. Accessed 16 June 2019. <https://www.thehindubusinessline.com/economy/policy/deprivation-criteria-in-census-will-exclude-vast-sections-of-poor-from-entitlements/article23068091.ece>.
- Cabinet Committee on Economic Affairs (CCEA) (2017). "Cabinet Approves Revision of Cost of Socio Economic and Caste Census 2011." Accessed 16 June 2019. <http://pib.nic.in/newsite/PrintRelease.aspx?relid=169111>.
- Cheng, C., and Urpelainen J. (2014). "Fuel Stacking in India: Changes in the Cooking and Lighting Mix, 1987-2010". *Energy, Elsevier*, Vol 76 (c), 306-317.
- Chowdhury, Sourangsu, Sagnik Dey, Sarath Guttikunda, Ajay Pillarisetti, Kirk R. Smith, and Larry Di Girolamo. 2019. "Indian Annual Ambient Air Quality Standard Is Achievable by Completely Mitigating Emissions from Household Sources." *Proceedings of the National Academy of Sciences*, 201900888. Accessed 16 June 2019. <https://doi.org/10.1073/pnas.1900888116>.
- Coady, David, Margaret Grosh, and John Hoddinott. 2005. *Targeting of Transfers in Developing Countries*. Accessed 16 June 2019. <https://doi.org/10.1596/0-8213-5769-7>.
- Commander, S. (2012). "A Guide to the Political Economy of Reforming Energy Subsidies." *IZA Policy Paper No. 52*.
- Comptroller and Auditor General of India (2016). "Report of the Comptroller and Auditor General of India on Implementation of PAHAL (DBTL) Scheme."

Comptroller and Auditor General of India (2019). "Report No.14 of 2019 – Performance Audit of Pradhan Mantri Ujjwala Yojana, Ministry of Petroleum and Natural Gas". <https://cag.gov.in/content/report-no14-2019-performance-audit-pradhan-mantri-ujjwala-yojana-ministry-petroleum-and>

CRISIL 2016a. "Assessment Report: Primary Survey on Household Cooking Fuel Usage and Willingness to Convert to LPG." June 2016.

CRISIL 2016b. "Household Survey on India's Citizen Environment & Consumer Economy (ICE 360 Survey)."

Devereux, Stephen, Edoardo Masset, Rachel Sabates-Wheeler, Michael Samson, Althea-Maria Rivas, and Dolf Lintelo (2015). Evaluating the Targeting Effectiveness of Social Transfers: A Literature Review. *IDS Working Paper 460, CSP Working Paper 012. Brighton: Institute of Development Studies and Centre for Social Protection*. Vol. 2015.

Dixit, Kalpana (2017). "Political Economy of Electricity Distribution in Maharashtra." Accessed 16 June 2019. http://www.cprindia.org/system/tdf/working_papers/rap-india-mappingpower-maharashtra-2017-july.pdf?file=1&type=node&id=6389.

Drèze, Jean, and Reetika Khera (2017). "Recent Social Security Initiatives in India." *World Development* 98: 555–72. Accessed 16 June 2019. <https://doi.org/10.1016/j.worlddev.2017.05.035>.

Drèze, Jean, Prankur Gupta, Isabel Pimenta, and Reetika Khera (2019). "Casting the Net: India's Public Distribution System after the Food Security Act" *Economic and Political Weekly* LIV:6, 36-47.

Garg, Vibhuti, Ivetta Gerasimchuk, Christopher Beaton, Kaushik Ranjan Bandyopadhyay, Shelagh Whitley, Leah Worrall, Andrew Scott, et al. (2017). "India's Energy Transition: Fossil Fuels and Clean Energy in India."

Gassmann, Franziska; Sri Wening Handayani (2018). "Fiscal Challenges to Financing Social Protection to Achieve the Sustainable Development Goals: A Case of Three Countries" *Asian Development Bank* (47): 1–8.

Gill, K, Brooks K., McDougall J., Patel P., and Kes A. (2010). "Bridging the Gender Divide: How Technology Can Advance Women Economically." *Centre for Research on Women*, 8.

Giri, Anurodh, and Arshi Aadil (2018). "Pradhan Mantri Ujjwala Yojana: A Demand-Side Diagnostic Study of LPG Refills," no. August.

Global Subsidies Initiative-IISD, BIDS, IRADe, and Spaces for Change (2019). "Gender and Fossil Fuel Subsidy Reform: Findings from and Recommendations for Bangladesh, India and Nigeria." *ENERGIA*.

Government of India (2019). "Direct Benefit Transfer." Accessed 16 May 2019. <https://dbt Bharat.gov.in/>.

Gupta, Aashish, Sangita Vyas, Payal Hathi, Nazar Khalid, Nikhil Srivastav, and Dean Spears. (2019). "Persistence of Biomass Use despite Increases in LPG Ownership: New Survey Evidence from Rural North India." Accessed 16 June 2019. <https://riceinstitute.org/research/persistence-of-solid-fuel-use-despite-increases-in-lpg-ownership-new-survey-evidence-from-rural-north-india/>.

Gupta, Sarika (2018). "Who Does Not Get Caught by Social Safety Nets?" *Ideas for India*. 2018.

Himanshu (2012). "Walking the Poverty Line." *Ideas for India*, July 2012. Accessed 16 June 2019. <https://www.ideasforindia.in/topics/poverty-inequality/walking-the-poverty-line.html>.

Health Effects Institute (2018). "Burden of Disease Attributable to Major Air Pollution Sources in India." *Special Report 21*. Boston, MA:Health Effects Institute. Accessed 16 June 2019. <https://doi.org/10.1186/cc7871>.

Inchauste, Comboni, Maria Gabriela, David G Victor, and Eva Schiffer (2018). "Assessing the Political Economy of Energy Subsidies to Support Policy Reform Operations."

India State-Level Disease Burden Initiative Air Pollution Collaborators (2018). "The Impact of Air Pollution on Death, Disease Burden, and Life Expectancy across the States of India: The Global Burden of Disease Study 2017." *Lancet Planet Earth* 3: 26–39.

Institute for Health Metrics and Evaluation (IHME) (2018). "Findings from the Global Burden of Disease Study 2017." http://www.healthdata.org/sites/default/files/files/policy_report/2019/GBD_2017_Booklet.pdf.

InterMedia, and Bill and Melinda Gates Foundation (2017). "WAVE 4 REPORT FII TRACKER SURVEY."

InterMedia, and Bill and Melinda Gates Foundation (2018). "WAVE 5 REPORT FII TRACKER SURVEY."

IOCL (2015). "IndianOil Declares 60 Villages as 'Smokeless Village' in Karnataka." 2015.

IOCL (2011). Brochure on Selection of Rajiv Gandhi Gramin LPG Vitruk (RGGLV).

Jain, Abhishek, Shalu Agrawal, and Karthik Ganesan (2014). "Rationalising Subsidies, Reaching the Underserved," no. November.

Jain, Abhishek, Shalu Agrawal, and Karthik Ganesan (2016). "DBTL Performance Evaluation: Insights from the World's Largest Subsidy Benefit Transfer Scheme." *International Institute for Sustainable Development*, no. April: 36.

Jain, Abhishek, Sudatta Ray, Karthik Ganesan, Michaël Aklin, Chao-yo Cheng, and Johannes Urpelainen (2015). "Access to Clean Cooking Energy and Electricity – Survey of States," 1–98.

Jain, Abhishek, Saurabh Tripathi, Sunil Mani, Sasmita Patnaik, Tauseef Shahidi, and Karthik Ganesan (2018). "Access to Clean Cooking Energy and Electricity: Survey of States 2018," no. November.

Jain, Mahima A. (2016). "Infographic: Little Known Facts about India's Banking Network." *BusinessLine*, November 2016.

Kelkar, Govind, DevNathan, Rengalakshmi, Manjula M, Gaikwad Shantanu, Shakya Indira, Shrestha Purushottam, and Pakhrin Tamang Ashma (2016). "The Gender Factor in Political Economy of Energy Sector Dynamics – Scoping Study."

Khullar, Vatsal (2018). "Demand for Grants 2018-19 Analysis: Petroleum and Natural Gas."

Kitson, Lucy, Laura Merrill, Christopher Beaton, Shruti Sharma, Andrew McCarthy, Chandrashekhar Singh, Ashutosh Sharma, Jyoti Parikh, Victoria Ihuoma Ohaeri, and Tahreen Tahrima Chowdhury (2016). "Gender and Fossil Fuel Subsidy Reform: Current Status of Research". Accessed 16 June 2019. Retrieved from <https://www.lisd.org/sites/default/files>.

Kumar, Vikram (2018). "Pradhan Mantri Ujjwala Yojana: Costly Refill Forces Poor to Come out of Free LPG Connections." *The Indian Express*, December 10, 2018. Accessed 16 June 2019. <http://www.newindianexpress.com/nation/2018/dec/10/smoke-signals-1909360.html>.

Mangla, A. (2016). "Bureaucratic Norms and State Capacity in India: Implementing Primary Education in the Himalayan Region." *Asian Survey* 55 (5): 882–908. Accessed 16 June 2019. <https://doi.org/10.1525/as.2015.55.5.882>.

Mani, Sunil, Tauseef Shahidi, Sasmita Patnaik, Abhishek Jain, Saurabh Tripathi, Karthik Ganesan, Michaël Aklin, Johannes Urpelainen, and Namrata Chindarkar (2019). "Access to Clean Cooking Energy and Electricity: Survey of States 2018."

Manjula, M., and Girigan Gopi (2017). "Universal Access to Clean Cooking Energy and the Need for an Inclusive Policy: Evidence from Analysis of Cooking Fuel Use in Odisha and Tamil Nadu." *Decision* 44 (3): 193–207. Accessed 16 June 2019. <https://doi.org/10.1007/s40622-017-0159-3>.

Mary Robinson Foundation (2016). "The Role of Social Protection in Ending Energy Poverty: Making Zero Carbon, Zero Poverty the Climate Justice Way a Reality."

Mayer, Kristy, Sudeshna Ghosh Banerjee, and Chris Trimble (2015). "Elite Capture: Residential Tariff Subsidies in India." Washington, DC: World Bank.

Mehrotra, Aakash, Akhand Tiwari, M. P. Karthick, Mimansa Khanna, and Vivek Khanna (2018). "State of the Agent Network, India 2017."

Ministry of Finance (2016). "Economic Survey 2015-16."

Ministry of Finance (2019). "Budget Outlay 2019" February 2019: 1–13.

Ministry of Health and Family Welfare 2015a. "Beneficiaries under *Janani Suraksha Yojana*." Government of India. 2015. Accessed 16 June 2019. <http://pib.nic.in/newsite/PrintRelease.aspx?relid=133709>.

Ministry of Health and Family Welfare 2015b. "*Janani Suraksha Yojana*." 2015. Accessed 16 June 2019. <http://pib.gov.in/newsite/printrelease.aspx?relid=123992>.

Ministry of Health and Family Welfare and International Institute for Population Studies (2016). "India Fact Sheet: National Family Health Survey (NFHS-4) 2015–16".

Ministry of Electronics and Information Technology (2016). "Unique Identification Authority of India." 2016.

Ministry of Power (2019). "*Saubhagya* Dashboard." 2019.

Ministry of Women and Child Development (2015). "Status Report of *ICDS* – 2015."

Ministry of Women and Child Development (2018). "*Pradhan Mantri Matru Vandana Yojana (PMMVY)* Progress Report September 2017 – August 2018,"

MoPNG. n.d. "PAHAL-Direct Benefits Transfer for LPG (DBTL) Consumers Scheme." Accessed 16 May 2019. <http://petroleum.nic.in/dbt/whatisDBTL.html>.

MoPNG (2000). "Liquefied Petroleum Gas (Regulation of Supply and Distribution) Order, 2000."

MoPNG (2015). Policy of Give It Up and Release of LPG Connections to BPL Families under CSR to Regular Distributors in Addition to RGGLVs.

MoPNG 2016a. "PMUY KYC Form." Accessed 16 May 2019. <https://www.pmujiwalayojana.com/download.html>.

MoPNG 2016b. "Pradhan Mantri Ujjwala Yojana." 2016. Accessed 16 May 2019. <http://www.pmujiwalayojana.com/>.

MoPNG 2016c. "Unified Guidelines for Selection of LPG Distributorships." New Delhi. Accessed 16 May 2019. http://petroleum.nic.in/sites/default/files/P_20019_2_2016_Unified_Guidelines.pdf.

MoPNG 2018. MoU Signed between OMCs and CSC SPV for Collaboration in LPG Services. Accessed 16 June 2019. <https://pib.gov.in/newsite/PrintRelease.aspx?relid=184587>.

MoPNG 2019. "Surrender of LPG Subsidy." Lok Sabha, India. UNSTARRED QUESTION NO. 1289. Accessed 28 May 2019.

Mishra, Twesh (2019). "LPG Subsidy Zooms 63% to 32,989 Cr for 2019-20." *Business Line*, February 1, 2019. Accessed 16 June 2019. <https://www.thehindubusinessline.com/economy/budget/lpg-subsidy-zooms-63-to-32989-cr-for-2019-20/article26154067.ece>.

Mittal, Neeraj, Anit Mukherjee, and Alan Gelb (2017). "Fuel Subsidy Reform in Developing Countries: Direct Benefit Transfer of LPG Cooking Gas Subsidy in India." *Center for Global Development (CGD) Policy Paper*. Washington, DC., no. December: 38.

Morestin, Florence (2012). "A Framework for Analyzing Public Policies: Practical Guide." *National Collaborating Centre for Healthy Policy* 1536 (September): 13.

Narayan, Sudha. (2019). "Social Protection in the Union Budget 2019." *Ideas for India*. 2019. Accessed 16 June 2019. <https://www.ideasforindia.in/topics/human-development/social-protection-in-the-union-budget-2019.html>.

NITI AAYog (2018). "SDG India Index: 2018 Baseline Report."

Petrol Diesel Price (2019). "Delhi LPG Gas Cylinder Price." Accessed 16 May 2019. Available at: <https://www.petroldieselprice.com/lp17/lpg-gas-cylinder-price-in-delhi-delhi>.

Oxford Poverty and Human Development Initiative (2018). *Global Multidimensional Poverty Index 2018: The Most Detailed Picture to Date of the World's Poorest People*. University of Oxford, UK.

Pandey, K. (2019). "1.5 Crore People Didn't Avail Ujjwala Loan Benefit, 1.2 Crore Didn't Go for Refill." *Down To Earth*, January 3, 2019. Accessed 16 May 2019. <https://www.downtoearth.org.in/news/energy/1-5-crore-people-didn-t-avail-ujjwala-loan-benefit-1-2-crore-didn-t-go-for-refill-62660>.

Parikh, Jyoti K. (2016). "Providing Clean Cooking Fuel in India: Challenges and Solutions," no. April.

PIB (2019a). "86% of PMUY Beneficiaries Who Are At least One Year Old Returned for the Second Refill." Accessed 16 May 2019. <http://pib.nic.in/newsite/PrintRelease.aspx?relid=191003>.

PIB (2019b). "Deposit Free LPG Connections to Poor Women under PMUY." 2019. Accessed 16 May 2019. <http://pib.nic.in/PressReleaselframePage.aspx?PRID=1562821>.

Pillariseti, A., Makarand G., Sathish M., Arun D., Sudipto R., Kalpana B., Sambandam S, et al. (2019). "Promoting LPG Usage during Pregnancy: A Pilot Study in Rural Maharashtra, India." *Environment International* 127 (January): 540–49. Accessed 16 May 2019. <https://doi.org/10.1016/j.envint.2019.04.017>.

PPAC (2016). "LPG Profile (Data on LPG Marketing) as on 1.4.2016."

PPAC (2017). "LPG Profile (Data on LPG Marketing) as on 1.4.2017."

- PPAC (2018). "LPG Profile (Data on LPG Marketing)." 2018. Accessed 16 May 2019. <http://ppac.org.in/WriteReadData/Reports/201706201135402990732DataonLPGMarketingApr17LPGProfile.pdf>.
- PPAC (2019a). "LPG Profile (Data on LPG Marketing) as on 1.4.2019."
- PPAC (2019b). "LPG Profile (Data on LPG Marketing) as on 1.7.2019."
- PPAC (2019c). "Ready Reckoner: Snapshot of India's Oil & Gas Data."
- Planning Commission (2014). Rangarajan Report on Poverty. Accessed 16 May 2019. <http://pib.gov.in/newsite/printrelease.aspx?relid=108291>.
- Ranjan, R., Sudershan S. (2017). "Energy Deprivation of Indian Households: Evidence from NSSO Data Energy Deprivation of Indian Households: Evidence from NSSO Data." *Munich Personal RePEc Archive*, no. 83566. Accessed 16 May 2019. https://mpa.ub.uni-muenchen.de/83566/1/MPRA_paper_83566.pdf.
- Rao, Narasimha D. (2012). "Kerosene Subsidies in India: When Energy Policy Fails as Social Policy." *Energy for Sustainable Development* 16 (1): 35–43. Accessed 16 May 2019. <https://doi.org/10.1016/j.esd.2011.12.007>.
- Rawat, M. (2019). "Budget 2019 Explained in 5 Charts | All Sectors, Ministries & Major Schemes at One Place." *India Today*. 2019. Accessed 16 June 2019. <https://www.indiatoday.in/budget-2019/story/union-budget-2019-explained-in-simple-interactive-charts-major-schemes-all-sectors-ministries-1562786-2019-07-05>.
- Rentschler, Jun. 2016. "Incidence and Impact: The Regional Variation of Poverty Effects Due to Fossil Fuel Subsidy Reform." *Energy Policy* 96: 491–503. Accessed 15 June 2019. <https://doi.org/10.1016/j.enpol.2016.06.025>.
- Scott, A., and Pickard. S. (2018). "Energy Safety Nets A Literature Review," no. September: 1–38.
- Ministry of Rural Development (MoRD) (2011). SECC (Socio Economic and Caste Census). Accessed 15 June 2019. <https://secc.gov.in/reportlistContent>.
- Sharma, Amiya (2017). "Social Protection in India: The Present and Future." 2017.
- Shriyan, Prafulla, Giridhara R Babu, Deepa Ravi, Yamuna Ana, Onno CP van Schayck, Prashanth Thankachan, and GVS Murthy. 2018. "Ambient and Indoor Air Pollution in Pregnancy and the Risk of Low Birth Weight and Ensuing Effects in Infants (APPLE): A Cohort Study in Bangalore, South India." *Wellcome Open Research* 3: 133. Accessed 15 June 2019. <https://doi.org/10.12688/wellcomeopenres.14830.1>.
- Singh, Sudheer (2019). "India Looking at \$500 Bn Investment in Renewable Energy Generation by 2028." *ET Energyworld*, April 25, 2019. Accessed 15 June 2019. <https://energy.economictimes.indiatimes.com/news/renewable/india-looking-at-500-bn-investment-in-renewable-energy-generation-by-2028/69040344>.
- Soman, Abhinav, Ivetta Gerasimchuk, Christopher Beaton, Harsimran Kaur, Vibhuti Garg, and Karthik Ganesan (2018). "India's Energy Transition: Subsidies for Fossil Fuels and Renewable Energy 2018 Update."
- Srinivas, Arjun (2019). "The Targeting Challenge in India's Welfare Programs." *Livemint*, May 8, 2019.

TRANSFORM (2017). "Administration of Non-Contributory Social Protection: Delivery Systems – Manual for a Leadership and Transformation Curriculum On Building and Managing Social Protection Floors in Africa."

Unique Identification Authority of India (2019). "UIDAI." 2019. Accessed 10 June 2019. <https://uidai.gov.in/about-uidai/unique-identification-authority-of-india/about.html>.

Vaishnav, Anurag (2019). "Demand for Grants 2019-20 Analysis Petroleum and Natural Gas," no. 011.

Vincent, Möller, Monali Waghmare, Maria Lobo, and Sheela Patel (2015). "Energy Justice for the Urban Poor." Mumbai. Accessed 10 June 2019. http://sparcindia.org/pdf/studies/EnergyJusticefortheUrbanPoorgraphicalReport_webversion.pdf.

World Bank (2012). "Resilience, Equity and Opportunity: The World Bank's Social Protection and Labor Strategy 2012–2022."

World Bank (2018). "The State of Social Safety Nets 2018." Washington DC.

World Bank (2018). "Rural Population (Percentage of Total Population)." 2018. Accessed 10 September 2019.

<https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=IN>.

World Bank and ESMAP (2011). "Improving Energy Access to the Urban Poor in Developing Countries." (November): 115.

Endnotes

- i The recipient of the transfer is not required to pay for it through premiums or specific taxes.
- ii The framework for analysis has been adopted from the National Collaborating Centre for Healthy Public Policy's guide for analysis of public policies. This framework follows an evidence-informed approach to evaluation where the emphasis is on examining the effectiveness of the policies in question. It has been modified to fit the requirements of this study (Morestin 2012).
- iii The poverty line is estimated at a per capita of USD 0.46 (INR 32) per day for rural India and USD 0.67 (INR 47) per day for urban India (Planning Commission 2014).
- iv A summary measure based on average income per person, educational attainment, and total fertility rate.
- v LPG, Natural Gas, Electricity, Biogas.
- vi 1 USD = 70 INR (as on 13 June 2019).
- vii *Aadhaar* is a 12-digit unique identification number assigned to the residents of India that captures the resident's biometric and other demographic details. It is issued by the Unique Identification Authority of India (UIDAI), a statutory body under the Ministry of Electronics and Information Technology.
- viii This has been modified a number of times. The Government of India introduced a cap of six cylinders in 2012 and in 2013 revised it to nine cylinders to achieve efficient subsidy administration. This cap was revised to 11 in February 2014 and to 12 in 2014-15 (Comptroller and Auditor General of India 2016).

- ix *Pradhan Mantri Jan Dhan Yojana* (2014) is one of the biggest financial inclusion initiatives in the world. It aims to provide banking facilities that include basic savings bank accounts, access to need-based credit, remittance facilities, insurance, and pensions to all households in the country.
- x An advance equivalent of the market price of the LPG cylinder is paid into the bank accounts of consumers as soon as they make the first booking for a cylinder after joining the scheme, prior to its delivery. This advance ensures that LPG consumers have extra cash to pay for the first LPG cylinder at market price. It will remain with the consumer until the connection is terminated, at which time there will be a final adjustment to its price. This amount is revised from time to time.
- xi Statutory authority under Ministry of Electronics and Information Technology to empower residents with unique identification number or an *Aadhaar* card (UIDAI 2016).
- xii Indian Financial System Code.
- xiii A connection is deemed inactive if a household has not taken a refill in the last year.
- xiv Subsequent to the writing of the report, the Comptroller and Auditor General of India released the latest review of the PMUY program, noting key lessons of the initiative. Additional findings can be found in CAG Report No. 14 Performance Audit of Pradhan Mantri Ujjwala Yojana (2019).
- xv Estimated for nine cylinders per year at USD 7 (INR 500) per cylinder.
- xvi Average subsidy amount per cylinder is INR 219 as of 2018-19 (PPAC 2019c).
- xvii LPG was an aspirational commodity for many rural households in India, owing to its limited penetration in rural India historically. Many households associate the acquisition of large (14.2 kg) LPG cylinders with upward social mobility and assertion of a higher social hierarchy. Even though the upfront cost for the large cylinder is prohibitive, households would prefer to order a bigger cylinder rather than ordering multiple less expensive 5 kg cylinders.
- xviii These are operated by agents who represent the bank and provide banking services in the customers' area of residence.
- xix Defined as having made a transaction in the past 90 days.

GLOSSARY

Aadhaar	A 12-digit unique identification number issued by the Indian government to every individual resident of India in the form of a card.
Accredited Social Health Activist (ASHA)	ASHA is a trained female community health worker instituted as part of the National Rural Health Mission. Selected from the community and accountable to it, the ASHA is trained to work as an interface between the community and the public health system.
Anganwadi	A type of rural child care center. <i>Anganwadis</i> were instituted as a part of the Integrated Child Health Development System.
Antyodaya Anna Yojana (AAY)	Under the scheme, 1 crore of the poorest among BPL families covered under the targeted public distribution system are identified and provided with 25 kilos of food grains at a highly subsidized rate of INR 2 per kg for wheat and INR 3 per kg for rice.
Chulha	A small earthen or brick stove, usually seen in rural areas and slums.
Common Service Centers (CSC)	The CSCs have been set up in villages and remote locations to provide e-governance services to the population. They are the access points for delivery of essential public utility services, social welfare schemes, and healthcare, financial, education and agriculture services, in addition to many other services to citizens in rural and remote areas of the country.
Durgam Kshetriya Vitrak	Distributors delivering LPG cylinders in difficult and remote areas.
Fuel stacking	The parallel use of several fuels.
Gram Panchayat	A grass-roots level formalized local self-governance system in India that operates at the village level.
IFSC Code	Acronym for Indian Financial System Code. It is a unique 11 digit number that is a combination of letters and numerals used to transfer funds online for NEFT, IMPS and RTGS transactions.

Inactive Connections	Connections that do not refill an LPG cylinder at least once a year.
Integrated Child Development Scheme (ICDS)	Under the central government, the ICDS provides food, pre-school education, primary healthcare, immunization, health check-up and referral services to children under six years of age and their mothers.
Janani Suraksha Yojana (JSY)	A conditional cash transfer scheme introduced by the central government to promote institutional delivery. It integrates cash assistance with delivery and post-delivery care.
Kisan Credit card	A credit delivery mechanism initiated to ensure farmers have access to credit at an affordable rate. It provides short term formal credits to farmers.
LPG Panchayat	A community-level platform set up to facilitate interaction among multiple stakeholders to exchange experiences and challenges in using LPG.
Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)	Aimed at providing livelihood security to rural households, this act provides at least 100 days of guaranteed wage employment in every financial year to every household whose adult members volunteer to do unskilled manual work.
Midday Meal Scheme	Under this scheme, every child in every government and government supported primary school is served a cooked midday meal with a minimum content of 300 calories of energy and 8-12 grams protein per day for a minimum of 200 days.
National Family Health Survey (NFHS)	A large-scale, multi-round survey conducted in a representative sample of households throughout India.
National Rural Livelihood Mission (NRLM)	Instituted with the aim of creating efficient and effective institutional platforms for the rural poor, enabling them to increase household income through sustainable livelihood enhancements and improved access to financial services.
National Sample Survey (NSS)	A permanent survey organization to collect data on various facets of the economy. In order to assist in socioeconomic planning and policy making, NSS conducts continuing nationwide sample surveys . These are carried out in the form of successive 'rounds', each round usually of a year's duration covering several topics of current interest. The surveys are conducted through household interviews, using a random sample of households and covering almost the entire geographical area of the country.

Other Backward Class (OBC)	A category used by the government to denote citizens other than those in the Scheduled Castes and the Scheduled Tribes for whom jobs should be reserved. This is an attempt to correct the fact that OBC, ST and SC groups are inadequately represented in some government and local authority services.
Pradhan Mantri Awas Yojana – Gramin (PMAY-G)	With the aim to provide housing for all, PMAY-G provides financial assistance to the homeless and those residing in <i>kuccha</i> houses in rural areas to assist them in the construction of <i>pucca</i> houses.
Pradhan Mantri Jan Dhan Yojana (PMJDY)	This scheme provides a platform for universal access to banking facilities with at least one basic banking account for every household offering financial literacy, and access to credit, insurance and pension services.
Pradhan Mantri Matru Vandana Yojana (PMMVY)	A cash incentive of USD 70 (INR 5000) is provided directly to the bank accounts of pregnant women and lactating mothers (PW&LM) for the first living child of the family subject to families fulfilling specific conditions relating to maternal and child health.
Public Distribution System (PDS)	The Public Distribution system in the country facilitates the supply of food grains and distribution of essential commodities to a large number of poor people through a network of Fair Price Shops at a subsidized price and on a recurring basis.
Rajiv Gandhi Gramin LPG Vitrak Yojana (RGGVY)	Under this scheme, distributors are identified broadly based on a potential of average monthly sale of 600 LPG cylinders of 14.2 kg and 1,800 customers
Rangarajan Committee poverty line	The Expert Group (<i>Rangarajan</i>) calculated the average requirements of calories, proteins and fats based on India Council of Medical Research (ICMR) norms differentiated by age, gender, and activity for all-India rural and urban regions to derive the normative levels of nourishment. The committee stated that the poverty line should be based on certain normative levels of adequate nourishment, clothing, rent, transportation and education, and a behaviorally-determined level of other non-food expenses. Based on these considerations, the poverty line is estimated as Monthly Per Capita Expenditure of INR 1407 in urban areas and INR 972 in rural areas.
Rurban Vitrak	Distributors delivering LPG cylinders in both urban and rural areas.
Saubhagya Scheme	A scheme under which the government provides free electricity connections to all households.

Scheduled Caste (SC)	The official name given in India to the lowest caste, considered 'untouchable' in orthodox Hindu scriptures and practice, officially regarded as socially disadvantaged.
Scheduled Tribe (ST)	Tribes or indigenous communities suffering from extreme social, educational and economic backwardness on account of primitive agricultural practices, lack of infrastructure facilities and geographical isolation, who need special consideration for safeguarding their interests and for their accelerated socioeconomic development.
Self-Help Group (SHG)	A financial intermediary committee usually composed of 10–20 local women or men. These are informal associations of people who promote small savings among their members.
Shehri Vitrak	Distributors delivering LPG cylinders in urban areas.
Socio Economic and Caste Census (SECC)	Identification method established to assess the socioeconomic status of the population of the country. It is meant to generate information on a large number of social and economic indicators relating to households across the country. SECC was launched by the Ministry of Rural Development Government in June 2011.
Swachh Bharat Mission – Gramin (SBM-G)	The government's effort to achieve universal sanitation coverage in India. The sub-mission SBM-G pertains to rural areas and focuses on improving the levels of cleanliness through solid and liquid waste management activities and making villages open defecation free (ODF), clean and sanitized.
Unique Identity Authority of India (UIDAI)	A statutory authority established under the provisions of the <i>Aadhaar Act, 2016</i> . It is responsible for <i>Aadhaar</i> enrolment and authentication, including operation and management of all stages of the <i>Aadhaar</i> life cycle, developing the policy, procedure and system for issuing <i>Aadhaar</i> numbers to individuals and performing authentication. The authority is also required to ensure the security of identity information and authentication records of individuals.

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Vienna Headquarters

Andromeda Tower, 15th Floor
Donau City Strasse 6
1220, Vienna, Austria
Telephone: +43 676 846 727 200

Washington, DC Satellite Office

1750 Pennsylvania Ave. NW
Washington, DC 10006 USA
Telephone: +1 202 390 0078

Website: www.SEforALL.org

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