Fuel Subsidy Reform in Developing Countries: Direct Benefit Transfer of LPG Cooking Gas Subsidy in India

Neeraj Mittal, Anit Mukherjee, and Alan Gelb*

Abstract

As shown by international experience, efforts to reform energy subsidies have a mixed record of success. This paper provides a detailed picture of the India's reform of household subsidies for the purchase of LPG cooking gas—the largest cash transfer program in the world. From all available evidence the reform has been a success, both in reducing leakage and diversion of LPG to the commercial market and in improving the quality of service for legitimate beneficiaries. The paper documents the process of implementation, especially de-duplication of beneficiary lists, elimination of price subsidies by direct transfers to bank accounts, and the use of Aadhaar, India's biometric ID program, to improve access to poor and rural beneficiaries, especially women. Lessons for other countries include: (i) clearly articulating reform objectives helps to build strong political support; (ii) capping consumption of subsidized cylinders together with removal of market price distortion reduces black marketing and improves quality of service delivery; (iii) information campaigns and social media can encourage self-targeting and "nudge" the wealthy to opt out of the subsidy; and (iv) using information technology and digital ID, or Aadhaar, eliminates duplicates and provides fiscal space to target subsidies and expand access to clean cooking fuel for poor rural households, especially women.

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Table of Contents

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Glossary

AEPS	Aadhaar Enabled Payment System
APB	Aadhaar Payment Bridge
CTC	Cash Transfer Compliant
DBT	Direct Benefit Transfer
DBTL	Direct Benefit Transfer of LPG
KYC	Know Your Customer
LPG	Liquified Petroleum Gas
MoPNG	Ministry of Petroleum and Natural Gas
NCPI	National Payments Corporation of India
OMC	Oil Marketing Company
PaHaL	Pratyaksh Hastantarit Laabh (Direct Benefit Transfer of LPG)
PDS	Public Distribution System
PMUY	Pradhan Mantri Ujjwala Program
UIDAI	Unique ID Authority of India

1. Introduction and Overview

India's cooking gas subsidy is the largest direct benefit transfer program in the world. Also known by its acronym PaHaL,[1] it enables transfers of cash subsidy on LPG cylinders directly to the bank accounts of 177 million subscribers enrolled with the three state-owned petroleum product marketing companies in India.[2] The direct benefit transfer for LPG (DBTL) scheme was initiated in 2013, but the current form of scheme called PaHaL was rolled out on 15 November 2014 and progressively rolled out to cover the entire country by early 2015. Within four years, the program has transferred a total of nearly $10 billion in public subsidy to LPG consumers and currently involves approximately 40 million subsidy transfer transactions every day.[3]

India's LPG reform is a rare case of success in achieving reform in the difficult area of energy subsidy reform. PaHaL has increased efficiency and reduced leakages compared to the previous in-kind subsidy regime, resulting in significant fiscal savings for the government at fraction of the cost of the program. By providing additional fiscal space, it has also facilitated a rapid expansion of clean cooking fuel especially to poor rural households who were previously left out of the LPG network. In the process, it is reducing exposure to household air pollution with positive long term health benefits, in particular for rural women and girls.

Energy subsidies are particularly difficult to reform. Over the past two decades, several countries have tried to rationalize fuel subsidies to maintain fiscal stability and improve market efficiency (IMF, 2013). In almost all cases, the policy has been to increase administered prices, leaving the underlying iniquitous distribution of benefits unchanged. India has moved to market price for LPG and targeted the subsidy towards lower income groups. Few countries have tried to impose consumption caps through vouchers that are particularly hard to administer and are quickly undermined by black marketing and corruption. India's experiment with subsidized LPG consumption cap is therefore an interesting case, especially since it seems to have coincided with improved service delivery (Gelb et.al., 2017). With the exception of Iran, none of these reform cases have used cash transfers as a compensatory mechanism while this is one of the most important innovations in India. Finally, there are few cases where the reform process has leveraged technology in the way India's program has to manage change and deliver benefits. This has important implications for future design of energy subsidy reforms in other countries with comparable architecture, including digital ID, access to financial services and mobile enabled information and communication.

All reform efforts face political opposition and popular backlash. Resistance stems from several factors, including misinformation about the impact of the reform, lack of trust in leadership, poor perceptions of government effectiveness and inadequate compensation for

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[1] **Pra**tyaksh (Direct) **Ha**stantarit (Transfer) **L**abh(Benefit) in Hindi

[2] http://mylpg.in/

[3] https://dbtbharat.gov.in/scheme/schemedetail?id=MQ==

poor households that are most severely impacted by price increases (Atansah et.al., 2017). India's LPG reforms provide lessons on how to mitigate these political economy risks that could derail energy subsidy reform programs.

The success or failure of energy subsidy reforms depend on the ability of governments to institute permanent and stable reform that gain public support and mitigate opposition by coalition of vested interests. The design, sequencing, coordination and implementation of various components of the reform agenda is crucial to its success. India's LPG reform program provides an opportunity to understand how these have been brought together to achieve the objectives of public policy, providing lessons for other countries facing similar challenges in restructuring their own energy subsidies.

The reform program in India adopted a two-pronged approach. On the one hand, it has cleaned up and pruned the subsidy beneficiary lists. This involved the one-time removal of duplicate and ghost connections through a Know Your Customer (KYC), which reduced diversion of subsidized LPG cylinders from domestic to commercial use using these ghost connections. The KYC process also prevents duplicate enrollments in the 10-12 million new customers who apply for LPG connections each year. The program also allowed the move to target subsidies that were previously universal. Over 10.5 million people have been motivated to voluntarily give up their subsidy through the GiveItUp initiative, a rare example of a reform that has successfully incorporated self-targeting of a subsidy regime by nudging those who did not need it to opt out. By putting in place a system of standardized, de-duplicated list of consumers, the program will improve the targeting and distribution of public resources on fuel subsidies for the foreseeable future.

On the other hand, the reform has removed market distortions and the incentive to divert LPG due to a dual pricing mechanism. LPG cylinders are now sold at the market price through the supply chain right up to the consumer, and the subsidy is only transferred after delivery, directly to consumers' bank accounts. The number of subsidized cylinders is capped at 12 per connection per year. While the new subsidy mechanism has shielded the beneficiaries from the volatility of international fuel prices it has simultaneously enabled the central government to manage its expenditure on fuel subsidies by cutting down on leakages.

India's cooking gas subsidy has demonstrated that it is possible to implement a complex reform that leverages technology—including digital ID, electronic banking in conjunction with sound policy measures, in a harmonized way in spite of political sensitivity. It has also supported a broader social goal—expanding access to clean cooking fuel for all, including the poor thereby increasing buy-in of those consumers who are adversely impacted by the reform. This makes it particularly interesting as a model for programs to reform other in-kind subsidies in India, such as food and fertilizer, and for other countries striving to improve the efficiency and equity of their own subsidy mechanisms.

2. The Previous System and Motivation for the Reform

2.1. How the Previous System Worked

Before the reforms, all registered domestic users received *unlimited* domestic LPG cooking gas delivered to their place of residence in 14.2 kg cylinders in response to bookings made by them with their LPG distributor for one of the Oil Marketing Companies (OMCs) at *subsidized prices* fixed by the Government. The subsidized price of the domestic LPG cylinders was set by the Ministry of Petroleum and Natural Gas (MoPNG) based on federal Cabinet decisions, and the consumers paid that price irrespective of the international market price of LPG. The subsidy could be as high as 100 percent of the payments in certain months or even more when LPG prices were high in global markets.

The difference between actual market price and subsidized retail price—the LPG subsidy—was absorbed on the balance sheets (called "under-recoveries") of the oil marketing companies and partly covered by the federal government's budget. Consumers were unaware of the subsidy burden, paying only the subsidized price set by the federal government.

The difference in price between subsidized domestic LPG and commercial LPG (that was sold at market price and faced higher taxes) created an incentive for intermediaries to divert the subsidized LPG for commercial purposes (Barnwal, 2016). The supply chain of LPG was opaque and in the absence of access to the booking/ supply details, the end consumer was not even aware of the diversion. While this was universally recognized and widely reported in the media, there was little systematic data on the quantum of produce diverted but anecdotal evidence pointed to a black-market cylinder price that was double that of the subsidized price.

To tackle the issue, governments have tried various initiatives—including color coding LPG cylinders (red for domestic, blue for commercial use), raids on warehouses by criminal investigating agencies and radio frequency (RFID) tagging with smartcards that could track consumers. However, none of these efforts addressed the core problems effectively—duplicate/ghost LPG connections, the inability of consumers to track delivery of domestic LPG cylinders and the dual pricing in the supply chain leading to wide gap between prices of domestic and commercial LPG rates. These initiatives could also not address the problem of unreliable supply arising exacerbated by diversion to the commercial sector and the lack of accountability of domestic deliveries.

2.2. The Need for Better Fiscal Management of Fuel Subsidies

Budgetary subsidies in India have been the subject of intense policy debate since the early 1990s. In 1991, India started a process of economic liberalization under an IMF structural adjustment program. Government's control over the economy, known as the "license-permit raj" was progressively dismantled to encourage private investment in manufacturing and services. Tariffs on imports were significantly reduced, exposing domestic producers to external competition. Reforms included rationalizing the existing subsidy regime to reduce fiscal and revenue deficits, with energy subsidies being at the center of the debate.

Nevertheless, the subsidy reform effort over the last quarter of a century has been erratic at best and ineffective at worst. During the structural adjustment period from 1992 to 1996, subsidies as a percentage of GDP declined from 4.92 percent to 3.61 percent. The fiscal deficit fell from 7.6 percent of GDP before the reforms to 5.6 percent in 1995-96, demonstrating the government's commitment to better fiscal management (Kumar et.al., 2004).

However, popular backlash against hardline structural adjustment policies resulted in a period of political instability in the second half of the 1990s. Successive changes of government led to a reversal of fiscal performance especially in food, fertilizer, and fuel subsidies. At the aggregate level, subsidies rose to 4.59 percent of GDP by early 2000, with both food and fertilizer subsidies increasing by nearly 20 percent between 1995-2000. By 2003-04, the subsidy bill contributed nearly 80 percent of the fiscal deficit, putting macroeconomic stability of the economy in jeopardy (Kumar et.al., 2004).

Management of fuel subsidies has been particularly problematic. Compared to food and fertilizer, fuel subsidies are more sensitive to fluctuation in the international energy prices as India's import dependency is over 80 percent (Rangarajan, 2006). The basket of commodities is diverse. It includes motor spirits (petrol and high speed diesel) distributed through a retail network controlled by state oil marketing companies. Kerosene for cooking and lighting is sold exclusively through the public distribution system (PDS). Cooking LPG bottled in cylinders is sold by a network of distributors selected by, and on contract with, the oil marketing companies. In addition to these final products, crude oil derivatives are also used in the manufacture of fertilizer with its own elaborate system of producer subsidies. The logistics of crude production, distribution and end use in various sectors involves millions of intermediaries and at least three different ministries of the government of India.

Until 2002, the central government fixed the final price of petroleum products below its full cost to shield consumers from the adverse impact of volatility in international prices. In 2002, the government took the first step towards decontrol of the administered price regime by allowing the oil marketing companies to fix petrol and diesel prices based on the fortnightly average of the prevailing international price of crude. While fiscally responsible, it was understandably a deeply unpopular measure, and was discontinued under the next government that came into power after the elections in 2004. The rollback was ill-timed—estimated fuel subsidies increased from 0.6 percent of GDP in 2004-05 to 1.9 percent in 2007-08, due to the sharp increase in crude oil prices from $40 per barrel to $140 in the international market during that period. (Anand et.al. 2013)

In 2005, the Parliament enacted the Fiscal Responsibility and Budget Management (FRBM) Act that capped the fiscal deficit at 3 percent of GDP, reducing the headroom for absorbing significantly higher subsidies on imports and consumption of petroleum products. The burgeoning fiscal cost due to the increase in international crude oil prices necessitated a radical rethink of the administered price regime and a holistic look at the structure of the prevailing fuel subsidies in India.

In June 2010, the government announced full decontrol of petrol prices giving the oil marketing companies the task of setting pump prices of petrol aligned to the global price of crude oil. It also announced a phased decontrol of diesel prices but kept kerosene and LPG out of the ambit. While there is still considerable ambiguity about the fate of kerosene subsidies, major reforms have been carried out in LPG supply chain and subsidy management. These started in mid-2013 with Project Lakshya and continued by the PaHaL program that was rolled out nationwide from January 2015 onwards (Mittal 2014). These reforms also set the stage for the Ujjwala program, that provides subsidized LPG to poor rural households.

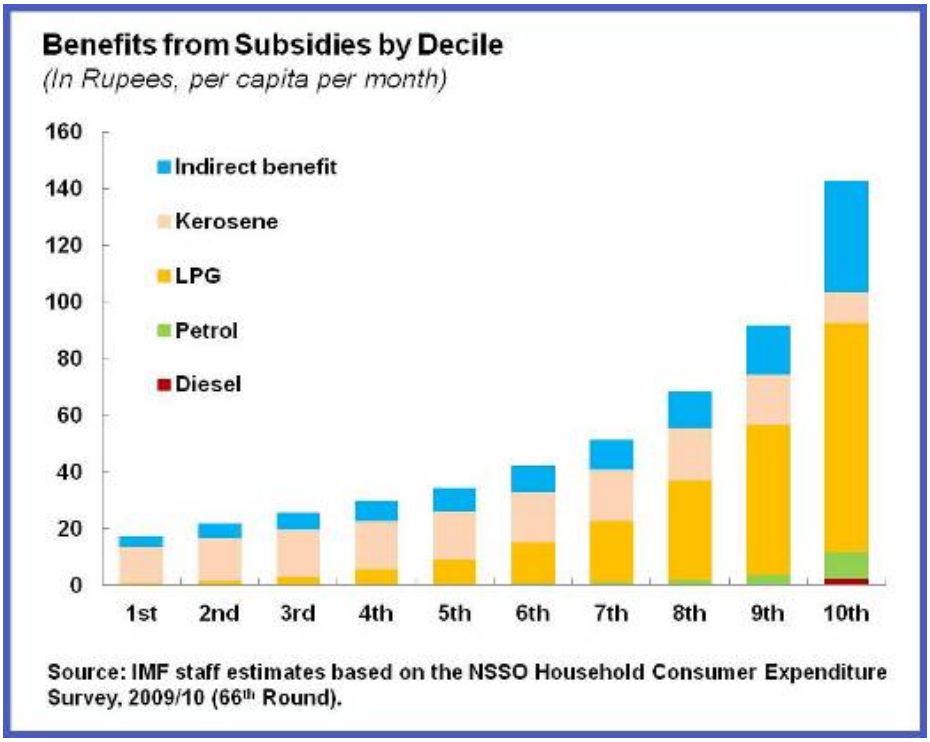
2.3. The Need for Better Effective Targeting of Fuel Subsidies

Apart from the fiscal management imperative, inequities in the distribution of public subsidies was also evident. Relatively richer and administratively more efficient states were able to garner a larger share of consumer subsidies, especially on food and fuel (Chakraborty, Mukherjee and Amarnath 2010). While most of the poor resided in rural areas, mis-targeting and diversion resulted in an urban bias in the incidence of food and fuel subsidies (Howes and Jha 1992; Anand et. al. 2013). Finally, using data from the National Sample Survey, various studies documented the wide disparity in the distribution of subsidy across income deciles. In 2004-05, ten years after the so-called "targeted" PDS (TPDS) was launched to give higher food grain entitlement to below poverty line families, the offtake of poorer households was actually 10 percent less than that of richer households both in rural and urban areas. Reducing targeting errors, along with the elimination of diversion was estimated to improve the incidence of subsidy on poorer households by nearly 25 percent (Jha and Ramaswami 2010).

Except for kerosene which is distributed through the PDS system, fuel subsidies in India were universal in nature and included in the subsidized price of the product, with adverse distributional impact. This is not very different from the experiences of most other countries, where fuel subsidies are often captured by the relatively richer segments of the population (IMF 2013). Per IMF estimates, the top 20 percent of households in India captured six times more in benefits from fuel subsidies than the poorest 20 percent of the population (Anand et.al., 2013).

The product mix in fuel consumption varies considerably across income classes (Figure 1). While almost all the subsidy to the bottom 20 percent was from use of PDS kerosene, more than half of the total fuel subsidy going to the top 20 percent was from the use of LPG. (Anand et.al. 2013). This reflects the differences in composition of cooking fuel between urban and rural areas—65 percent of urban households reported LPG as their primary cooking fuel in 2011, compared to 11.4 percent of rural households who depended overwhelmingly on firewood and other biomass (Registrar General of India, 2011). It is also an indication of the difficulty faced by poor households to pay for initial setup costs and recurring expenses for LPG. Weak LPG distribution network in rural areas was an additional barrier. The LPG subsidy was thus inequitable and did not much benefit the poor, providing the rationale for a radical overhaul of the system (Lahoti et.al., 2012).

Figure 1: Distribution of Subsidies—By income group and type of product, 2009-10



3. Implementation of LPG Subsidy Reform

3.1. Preparatory Stages

The LPG reforms were the culmination of nearly a decade of policy recommendations by various committees set up by the government of India to provide guidance on fuel subsidy reform. While the detailed terms of reference of the committees varied, they had a similar mandate: to recommend strategies for the government to rationalize fuel subsidies including LPG and improve its targeting. Recommendations relevant to the case study are summarized in Box 1.

Box 1: Policy Recommendations on LPG by Government Committees/Task Forces

Rangarajan Committee Report, 2006: Recommended that subsidized kerosene should be restricted to BPL families and the retail price of LPG should be raised with any remaining subsidies financed directly from the federal budget.

Parikh Committee Report, 2010: Recommended that subsidized LPG should be quantity rationed or replaced by direct cash transfers to BPL households with prices fully liberalized.

Nilekani Task Force Interim Report, 2011: Laid out a roadmap for linking LPG database with Aadhaar, the unique ID number, to undertake de-duplication of beneficiaries. It also suggested using the Aadhaar Enabled Payments System (AEPS) to transfer the subsidy directly to bank accounts of customers already linked to the Aadhaar number. For LPG, it specifically recommended a phased approach as follows:

Phase I: Cap consumption of subsidized cylinders for all customers;

Phase II: Direct transfer of subsidy to consumers;

Phase III: Identify and target different consumer segments

Kelkar Committee Report, 2012: Recommended the elimination of LPG subsidies over a period of three years as part of its roadmap for fiscal consolidation, noting the adverse impact of fuel price subsidies on macro-fiscal management.

Taken together, these recommendations provided the rationale to achieve two primary goals—better targeting of beneficiaries and elimination of price distortions to reduce the subsidy burden. The Nilekani Task Force Interim Report provided a detailed roadmap and the solutions architecture for rolling out the direct benefit transfer system. It noted that "*a move towards direct transfer of subsidies will require re-engineering the subsidy administration process…in doing so, it has to address existing challenges with targeting, address leakages and diversion through transparency and use of technology, empower beneficiaries with the choice in accessing subsidies, provide a quick and convenient method to report grievances, provide a robust electronic process for identification of beneficiaries, and electronic transfer of funds into their bank accounts.*" (Nilekani 2011).

The main stages of the reform process, listed in Box 2 (and not strictly sequential), addressed these challenges directly. Of course, an essential requirement was the political will needed to push through and implement the reforms. The rest of the elements in the reform architecture then fell into place—an effective deduplication process for existing and new connections, transformation of supply chain management, capping the number of subsidized LPG cylinders per year (with no limit on unsubsidized LPG domestic cylinders beyond the cap), changeover from in-kind subsidy transfer to direct payment system, the progressive use of Aadhaar (India's unique biometric ID system) to transfer subsidy, enhanced supply chain transparency through web-enabled services including a responsive grievance redressal system, using various targeting mechanisms to generate fiscal savings, and finally, expanding the LPG consumer base to cover hitherto unserved populations, especially rural women.

Box 2: Stages of LPG reform

1. Bridging the information gap—setting up of www.mylpg.in brought transparency and enabled electronic monitoring of LPG supply performance indicators
2. Data Mining—Customer data, although inaccurate and incomplete was in digital form which allowed computer processing of large data possible
3. KYC and De-duplication—Matching customer name and address across oil companies databases by setting up a mandatory KYC process
4. Imposing caps on subsidized household supply—a blunt instrument of achieving some fiscal savings and controlling diversion
5. Move towards direct benefit transfer (DBT)—set up systems for subsidy delivery into bank accounts enabling single price across LPG supply chain
6. Use of Aadhaar as the key identifier—this enabled uniqueness of accounts and thus ensured effectiveness of capping
7. Begin targeting—via voluntary "Give It Up"—a successful example of "nudge" towards self-selection for subsidy
8. Extend targeting by eliminating the rich based on self-declared income
9. Lock in unique identification via Aadhaar as KYC—as penetration becomes almost universal for receiving subisidy
10. Using Aadhaar, further rationalize energy subsidies by dis-incentivizing use of kerosene as enrollment for subsidized LPG is rolled out
11. Rollout subsidies to all poor households enabled by use of fiscal space created by curtailing leakage of subsidy
12. Expand the use of the subsidy plumbing system—bank accounts linked to unique ID lays the groundwork for delivering other subsidies and payments such as Universal Basic Income.
13. Dynamic targeting possible—Depending on fiscal resources and the world price of LPG, use the system to further calibrate the subsidy using the two instruments: change the level of the cap (reduce from 12 to 6, for example) and tweak the subsidy transferred to the consumers.

With the benefit of hindsight, the LPG supply chain reform, starting with project Lakshya, culminating in PaHaL and followed up by the Ujjwala program that provides LPG connections to poor rural women is a textbook case of a successful reform cycle.

3.2. Harmonizing and De-duplicating Beneficiary Lists: Project Lakshya and Beyond

PaHal built on a number of critical reforms that included public access to LPG delivery and information available in databases of oil marketing companies, the deduplication and harmonization of lists of LPG consumers across suppliers, establishing a KYC framework

for new connections,[4] creation of a unique17 digit consumer ID for each LPG connection (that was hitherto not unique across the three oil marketing companies), establishing portability of connections across distributors, and a unified web portal enabling transparency of the demand, supply and distribution network.

This reform of the LPG supply chain started with Project Lakshya (meaning "target") in early 2012. The main aim of the project was to put in place a system based on a Know Your Customer (KYC) protocol and unique identifier for LPG consumers (in absence of Aadhaar as an ID). This facilitated the removal of duplicate, ghost and inactive connections and the onboarding of genuine new LPG users by creating a clean database of consumers across the three oil marketing companies. It also laid the foundations for a transparent supply chain visible on the web that empowered the consumers, allowing them to track their bookings and deliveries and provide feedback through rating distributor service, thereby instilling a degree of competition across distributors. By creating an integrated LPG consumer database and online de-duplication across the three OMCs, it enabled online applications for new connections. These were fundamental to the reform of the market structure of LPG in India and laid the foundations for the subsequent direct transfer of subsidies to cooking gas consumers.

One of the main reasons for the existence of duplicate and ghost beneficiaries in the prevailing system was the lack of harmonization of customer data across the three oil marketing companies. As of April 2012, the OMCs supplied LPG cylinders to nearly 140 million households through a network of over 12 thousand distributors spread across the country. As an immediate step following the Nilekani Task Force Report, the OMCs were mandated to set up a transparency portal that was publicly accessible, listing details of purchases and deliveries of subsidized LPG cylinder to consumers across the country. Project Lakshya leveraged on the electronic end-of-day transactions data that each OMC obtained from their 15,000-odd distributors. The individual OMC transparency portal was created with individual LPG consumer bookings and delivery information updated as and when LPG cylinders were booked by, and delivered to, the end consumer. The OMC portals were aggregated to a single web platform (www.myLPG.in).

This opened the LPG supply chain to public audit and scrutiny and enabled consumers to access information relevant to them. The portal not only provided transparency to the consumers, it also brought a degree of competition to the monopolistic market structure through 5-star rating of distributors based on service provided and allowing for portability across distributors.

A transparency portal is only as effective as the quality of the underlying database on which it is built. Deduplication of the consumer list is a necessary condition for an effective regime of cylinder caps suggested by the Nilekani Task Force and the move towards direct benefit transfer of subsidy. A critical requirement was to design a mechanism to identify duplicate

[4] http://petroleum.nic.in/sites/default/files/LPG%20Control%20Order%20GSR%20791%20dated%2025.10.2012.pdf

connections and segregate them from genuine consumers to make the transition as trouble-free as possible for the latter. Information technology (IT) was leveraged to carry out the deduplication by using software matching of name/address fields. An algorithm was designed to detect such connections across the different OMC databases. The list of suspected duplicates was created by the matching of the name and the address for each LPG connections in two categories—Same Name Same Address (SNSA) and Different Name Same Address (DNSA). These connections were potentially duplicate and if so they went against the legal mandate that that there could be only one connection for each household and at each address.

The potentially duplicate consumer connection holders were then informed through various channels (newspapers, distributors, call-centers, portal) and were advised to complete the KYC process to confirm their genuineness as per the legal mandate. After a defined deadline, connections that did not complete the required KYC were blocked and quarantined pending reactivation.

The algorithm-based sifting of potential duplicates enabled completion of the process in a much shorter period than would otherwise have been possible. It saved government resources and avoided harassment of genuine LPG consumers. Full physical verification of all LPG customers would have taken several years to complete, would have led to long queues and could also be manipulated.

OMCs had been previously deactivating connections that did not consume LPG cylinders for a period for 6 months (currently 1 year) as they could be travelling or for some other reason. The rationale to deactivate them was that these could potentially be used to divert subsidized LPG to the black market. This was a blunt instrument to limit diversion. The name and address-matching algorithm expanded the number of connections that could lead to diversion i.e, duplicate connections at the same address. Using the new method allowed the tracking and blockage of 1.3 million connections that were detected through SNSA. It also identified 25.3 million connections through DNSA who were then sent notices to update their records. By November 2012, a total of 13.3 million LPG connections had been blocked using the algorithm, nearly 10 percent of the overall consumer base. This was reflected in a significant slowdown in LPG consumption growth; it declined from 7.5 percent in 2011-12 to 2.4 percent in 2012-13, a reduction of over two-thirds in the year of operation of Project Lakshya (Mittal, 2014; CAG, 2016).

De-duplication continued at a steady pace. By March 2017, the government had cumulatively blocked 35.85 million duplicate/ghost LPG connections as shown in Table 1. The exact number of de-duplicated connections before and after the PaHaL scheme is hard to determine due to inadequate publicly available time series data. However, it is fair to say that a very large number of additional LPG connections would still be receiving subsides in the absence of the deduplication and harmonization of the LPG consumer database carried out under Project Lakshya and under PaHaL.

As part of the reforms, an annual cap was also imposed on subsidized cylinders (see below) and households were not permitted to have more than one connection per household.[5] This set up incentives for families to try to obtain multiple connections from different oil companies. However, especially after Aadhaar was made compulsory to identify users across OMCs, attempts to obtain new duplicate connections have been easy to recognize, and denied. Government also allowed households to obtain non-subsidized household LPG connections, without any limit, to encourage richer households to access LPG at market price.

Table 1: Domestic LPG Connections in India, 2012-17 (in millions)

Year	Total Connections (As on April 1)	Domestic Connections	Commercial Connections	New Connections (April–March)	Active * Domestic	Inactive Domestic **	% Active
Apr-12	139.12			13.16			
Apr-13	152.28	150.39	1.89	15.91			
Apr-14	168.26	166.26	2.01	16.34			
Apr-15	184.01	181.90	2.11	20.45	148.56	33.34	81.67
Apr-16	204.11	201.79	2.33	33.17	166.25	35.54	82.39
Apr-17	237.14	234.61	2.53		198.76	35.85	84.72

Source: Petroleum Planning and Analysis Cell, Ministry of Petroleum and Natural Gas (http://ppac.org.in/WriteReadData/Reports/201708240541401252278DataonLPGProfileAsonJuly2017.pdf)

Note: * - Active connections include those whose KYC has been verified and are receiving supplies. It included customers that failed to join the PaHal scheme and those who availed market priced domestic connections; ** Inactive connections include those that are either blocked temporarily due to inactivity or were blocked due to non-establishment of KYC during SNSA/DNSA process

3.3. Capping LPG Consumption

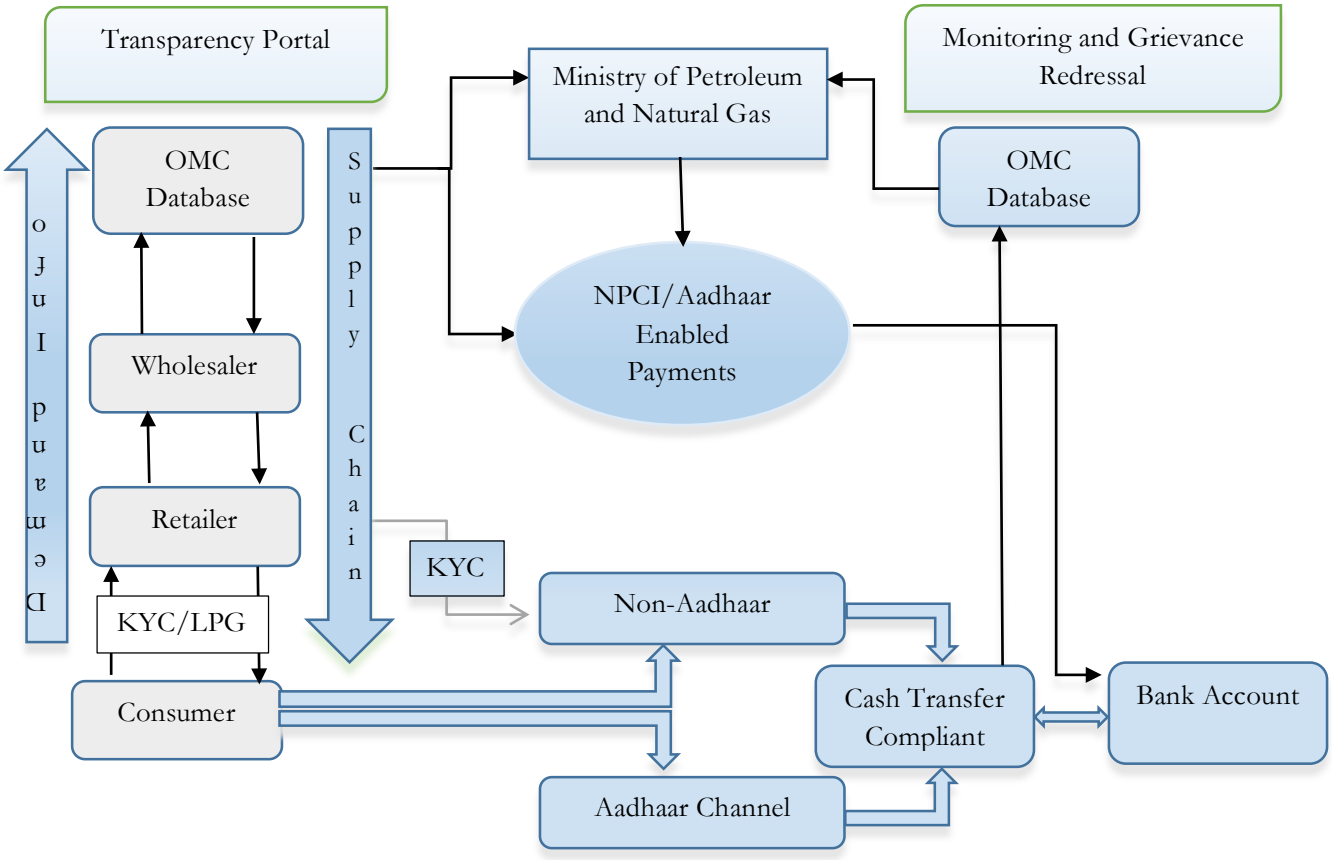
The current PAHAL ecosystem and delivery mechanism is depicted in Figure 2. On the left-hand side, it captures two processes—demand management from the consumer to the OMC and the supply chain management for the LPG cylinders from the OMCs to consumers. The transparency portal enables transparency of bidirectional information streams (top down and bottom up) with the 17 digit LPG ID as a common identifier.

On the right-hand side is the direct benefit transfer architecture that uniquely identifies *bona fide* customers by ensuring linkage of their bank accounts to their LPG connection. These are used to deposit the subsidy and are available to the OMCs through two channels, one using the Aadhaar and the other the non-Aadhaar channel where the customer's bank account information is directly linked to the LPG consumer number. The NPCI module ensures

[5] https://www.hindustanpetroleum.com/documents/pdf/lpg.pdf

subsidy delivery into the correct bank account. All LPG consumers pay the market price and most transfers now go through the Aadhaar channel.

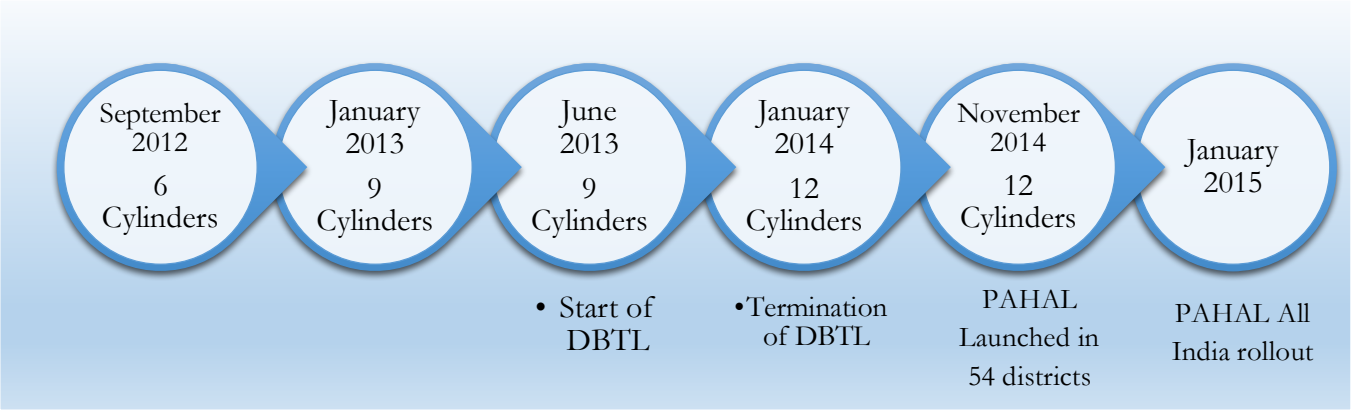
Figure 2: PAHAL Direct Benefit Transfer Architecture



With the success of Project Lakshya, and following the recommendations of the Kelkar Committee Report to eliminate LPG subsidies within three years, the government decided to impose an annual cap on subsidized LPG cylinders used by households. This was probably the most contentious and politically challenging part of the reform, undergoing several policy adjustments between 2012 and 2015.

The first cap of 6 cylinders per year was announced in September 2012. As expected, it was an unpopular measure and politically sensitive. In January 2013, the cap was increased from 6 to 9 cylinders per household. In October 2013, the government announced the direct benefit transfer scheme, moving to a uniform market price with a cap of 9 cylinders per year per household. In January 2014, the cash transfer scheme was cancelled and the cap was increased to 12 cylinders. After a hiatus of nearly one year, a redesigned DBTL scheme called PAHAL scheme was launched in November 2014 with the cap continuing at 12 cylinders. PAHAL was rolled out across all districts in January 2015, with a new Government in office, exactly one year since the reform had been suspended. The timeline and milestones of the LPG cap are summarized in Figure 3.

Figure 3: Policy Changes for LPG Cap, September 2012—January 2015



What was the appropriate level for the cap? Data from the Nilekani Task Force suggested that average consumption was 6.5 cylinders per household per annum and that a cap of 6 cylinders would cover 40 percent of the LPG consumer base (Nilekani, 2011). An additional 40 percent would be covered if the cap was raised to 9 cylinders per year and 93 percent of total subscribers would be covered if the cap was 12 per household per year. The Task Force report also cautioned against any uncertainty in policy measures vis-à-vis the cap, noting that "there may be a spurt in new connections and old, inactive connections may become active…. becoming a hurdle for the next stage of reform."

Evidence from the ground suggests that this was indeed the case. Barnwal (2016) undertook a survey of LPG retailers and compared black market demand for LPG during the period of the cap and after the program was terminated in January 2014. The study found an increase in the supply of subsidized LPG to the black market when the cap on the number of

cylinders was increased from 6 to 12 between January 2013 and 2014; the higher cap provided more opportunity for dealers and customers to divert cylinders.

In response to consumer grievances the government found it expedient to pause the program in January 2014 and in February it appointed a committee to review the functioning of the LPG subsidy reform scheme. As we have seen in other country contexts, government's resolve to reform fuel subsidies, either to limit subsidized consumption or to increase prices, is frequently tested by popular unrest and a backlash from vested interests (CGD, 2017 forthcoming). In India's case, the change in government in May 2014 gave a boost to the reform process. Following the recommendations of the Dhande Committee Report in May, the new government launched the modified direct benefit transfer program in November 2014—called PaHaL—with the previous cap of 12 cylinders per household per year which has remained unchanged.

3.4. DBTL: Shifting from In-Kind to Cash Subsidy Payment

The direct benefit transfer for LPG (DBTL) is at the core of India's ongoing subsidy reform program and a harbinger of similar programs that are either planned or currently being implemented in food, fertilizer, kerosene, and electricity. As noted above, the current version of DBTL known as PaHaL was launched in November 2014 after the original program was terminated in January 2014.

Following the cap on consumption imposed in September 2012. DBTL was implemented in various stages. Its basic architecture (Figure 2 above) involved linking the LPG consumer database to consumers' Aadhaar numbers which in turn were linked to the consumers' bank accounts. This "Aadhaar channel" allowed a subsidy payment to be transferred directly into a bank account via the Aadhaar Payment Bridge (APB). Subsequently, a "non-Aadhaar channel" was also allowed in PaHaL wherein LPG consumers without an Aadhaar number could directly furnish their bank account numbers to the OMCs for cash transfer of subsidy. This was a critical change that allowed rapid rollout of PaHaL.

The Aadhaar channel process required three actions on the part of the beneficiary: (i) obtain an Aadhaar number from UIDAI; (ii) register Aadhaar with LPG retailer; and (iii) link Aadhaar number with bank account at the bank. The rollout therefore depended on having high Aadhaar penetration in the district, having authentication infrastructure at the retail point and the onboarding of the beneficiary in the Aadhaar-enabled banking ecosystem. The scheme involved multiple stakeholders (LPG retailers, Aadhaar enrolment centers and banks) each with their own independent chain of command, necessitating close coordination between all stakeholders for the success of the scheme.

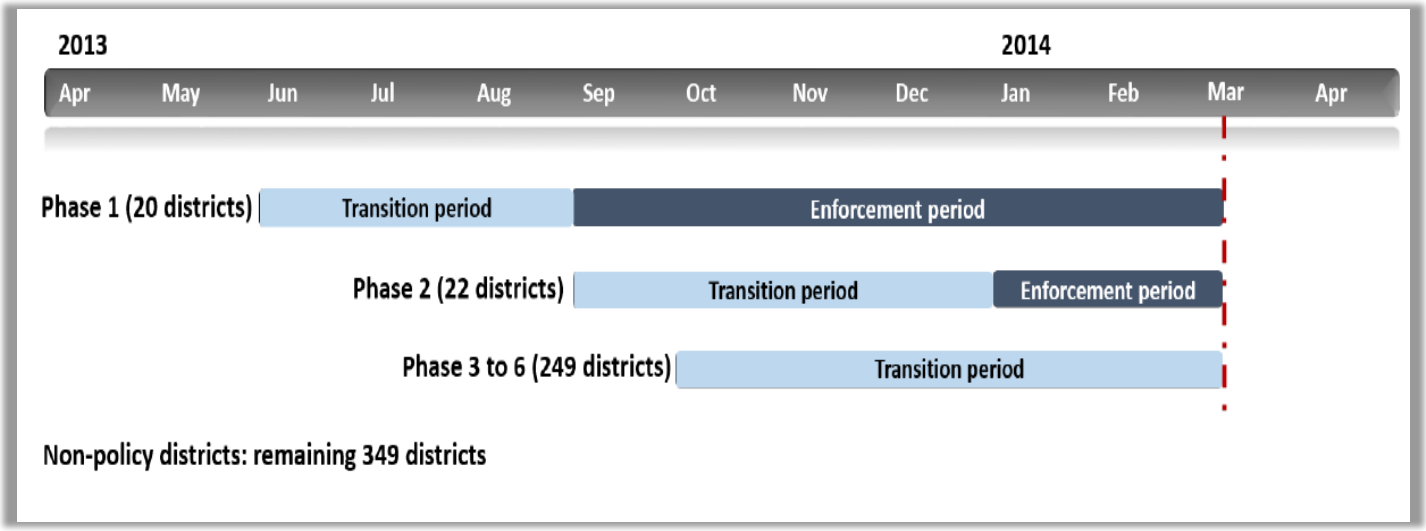
Per the recommendations of the Nilekani Task Force, the preparation for the DBTL rollout started with pilot projects in Mysore in Karnataka and Mandi in Himachal Pradesh in July and August respectively, in 2012. The districts were chosen due to their substantial Aadhaar penetration at the time and the challenge of managing the program in difficult geographical terrain, as in the case of Mandi. When the Mysore pilot ended on December 31, 2012, OMCs had completed nearly 34 thousand biometrically authenticated deliveries and

transferred the subsidy directly to bank accounts as per the program. The pilot also revealed that many consumers were unwilling to share their bank account numbers with dealers because of trust issues with LPG distributors but were willing to link their Aadhaar numbers to their bank accounts (Dhande Committee Report 2014).

Based on the results of the pilots, the government decided to extend DBTL with the aim of covering 291 districts by January 2014, rapidly scaling up the program to cover nearly 90 million consumers within a span of six months. The DBTL scheme envisaged the following components:

- All LPG consumers would have to obtain an Aadhaar number and link it to their bank accounts
- Sale of all LPG cylinders would be at market price in the districts covered under DBTL
- Provision of an advance roughly equal to the subsidy to finance the first cylinder at market price
- Actual applicable subsidy would be transferred into consumer's bank account linked to Aadhaar
- A transition period of 3 months was stipulated for consumers to fulfill the DBTL requirements and be ready for cash transfer (compliant households receive the transfer while others continue receive subsidized cylinders)
- After the expiry of this grace period, all consumers would be required to purchase cylinders at the market price and only those who joined the scheme would get the subsidy in their bank account

Figure 4: Phased rollout of DBTL, 2013-14



Source: Barnwal (2016)

The timeline for the rollout of DBTL is summarized in Figure 4. By early January 2014, the policy had been introduced in 291 districts out of which 42 had fully enforced it. However, as noted above, on January 31, the Cabinet Committee on Political Affairs (CCPA) unexpectedly terminated DBTL citing implementation issues and at the same time raised the annual cap on LPG cylinders from 9 to 12 per household. As mentioned earlier, the scheme was terminated and the cap was removed in January 2014, and by then about 17 million households were already availing benefits through the DBTL cash transfer program (Barnwal 2016).

Analysis of the rollout indicates that Aadhaar-based direct subsidy transfer reduced fuel purchases in the domestic sector by more than 11 percent, mainly through a reduction in diversion through ghost beneficiary accounts. The termination of the program again increased supply in the black market, leading to a fall in black market price of between 13 and 19 percent. An explanation posited for the increase in black market supply is that there was less stringent enforcement on the part of the OMCs as a result of the policy uncertainty on the part of the government (Barnwal, 2016). This hypothesis is not supported by any ground level evidence. However, the results confirm that the administrative objective of DBTL—to reduce diversion—was being met, and underscores the likely nature of the pausing of the reform as more driven by political considerations than by lack of effectiveness.

While holding DBTL in abeyance, the government appointed an independent committee chaired by a respected academic, S.G.Dhande in February 2014 to assess the scheme and provide recommendations to make it more effective. While this was a move to assuage public pressure, it gave a much needed hiatus to review implementation experience and look for improvements. The incumbent government was defeated in the elections and a new government was formed under Prime Minister Narendra Modi. The new government came out unequivocally in support of Aadhaar and launched the scheme called PaHaL. LPG subsidy reform was back on top of the administrative agenda, with strong political support from the highest levels of the government.

From a political economy standpoint, the Dhande Committee provided an opportunity to independently assess the efficacy of the reform, its initial implementation and areas for improvement going forward. It provided a strong value proposition to continue with the program, facilitated a mid-course correction and provided the space to rollout innovative ideas such as the successful GiveItUp campaign. Such a "pause and review" mechanism should have been part of the initial design, which is a lesson both for India and other countries embarking on a complex and politically sensitive reform fuel subsidy reform program.

The report was submitted following extensive consultations with consumers, retailers, and OMC and bank officials. It concluded that "the DBTL scheme had been successful in achieving its objectives, viz. "reducing diversion, eliminating ghost/duplicate connections, and improving LPG availability…and [that it] promotes financial inclusion." The Committee therefore "strongly recommended that the DBTL scheme be reinstated" (Dhande, S.G., 2014, Pg.25). In its detailed recommendations, it outlined the following measures to make

the scheme more effective and reduce inconvenience for the beneficiaries which was cited as the major source of resistance to DBTL:

- Implementation of a centralized grievance redressal mechanism by three entities—OMCs and their distributors, National Payments Corporation of India and the Unique ID Authority of India (UIDAI), to have joint responsibility for complaint tracking and appeal (Recommendation 1)
- A 3-month preparatory period with (i) an extensive information, education, and communication (IEC) campaign, (ii) enrollment and Aadhaar seeding in LPG and bank databases, and (iii) preparation by all stakeholders to fully ramp up the scheme across the country (Recommendation 5)
- Completion of Aadhaar seeding and authentication in bank and LPG databases within 48 hours of receipt of request from the consumer (Recommendation 13)

These recommendations addressed some problems that had impeded the rollout of the earlier scheme and eroded popular support for the reform. These included the lack of a unified and effective grievance redressal mechanism, lack of information and coordination among stakeholders, and delays in onboarding complying customers. These were accepted by the government and led to the launch of PaHaL - in November 2014.

A key change that the Government introduced in PaHaL architecture was to allow consumers not having Aadhaar numbers to also join the scheme and receive a subsidy in their bank accounts.[6] This change was partly driven by the Supreme Court ruling that benefits could not be denied on account of absence of Aadhaar—as the latter was voluntary. This change also eliminated one of the challenges of customer onboarding in the earlier program, namely, the low penetration of Aadhaar in some parts of India. Although a bank account was not as unique as was Aadhaar, the level of KYC in the banking system was considered robust enough to prevent ghost connections. In this new process, if the LPG consumer did not have an Aadhaar number, s/he could either (i) present bank account details to the LPG distributor for capture in the LPG database, or (ii) present his/her 17 digit LPG consumer ID to his bank. As depicted in Figure 2, the KYC process is then completed by the distributor or the bank by checking with the OMC database, which uniquely identifies the consumer. Once the consumer is marked as Cash Transfer Compliant (CTC), the subsidy transfer is made directly to the bank account through the usual electronic banking payment settlement as an alternative to the Aadhaar Payment Bridge (APB). The government also made the PaHaL scheme requirements applicable to the new enrollments of LPG consumers so that the expansion of the LPG customer base would be fully cash transfer compliant.

In summary, the implementation of the direct subsidy transfer was an eventful process. In less than 18 months, the program went from a pilot study in two districts in July 2013 to full

[6] Termed as the "non-Aadhaar subsidy transfer channel" allowing the beneficiary to become "cash-transfer-compliant" (CTC).

rollout in 291 districts covering nearly 100 million LPG consumers, followed by termination, redesign, and relaunch across the country, to cover nearly 190 million eligible households by January 2015. What is remarkable is not only that the reform survived popular discontent and varying political commitment, but also how it leveraged other digital governance initiatives especially Aadhaar and financial inclusion. In that sense, PaHaL offers an example of a subsidy reform program that brings together initiatives on digital governance, financial inclusion and digital payments, as well as a showcase of the government's overall vision of inclusive development.[7]

The government also achieved a significant reduction in the subsidy burden that enabled it to expand LPG coverage to the poor and underserved sections especially in rural areas. While the exact quantum of savings is a continuing matter of debate (see below), it is undeniable that PAHAL provided a subsidy delivery platform that can be used by other sectors, especially food and fertilizer that constitute the major share of the government's subsidy expenditure, not only in India but in almost all developing countries.

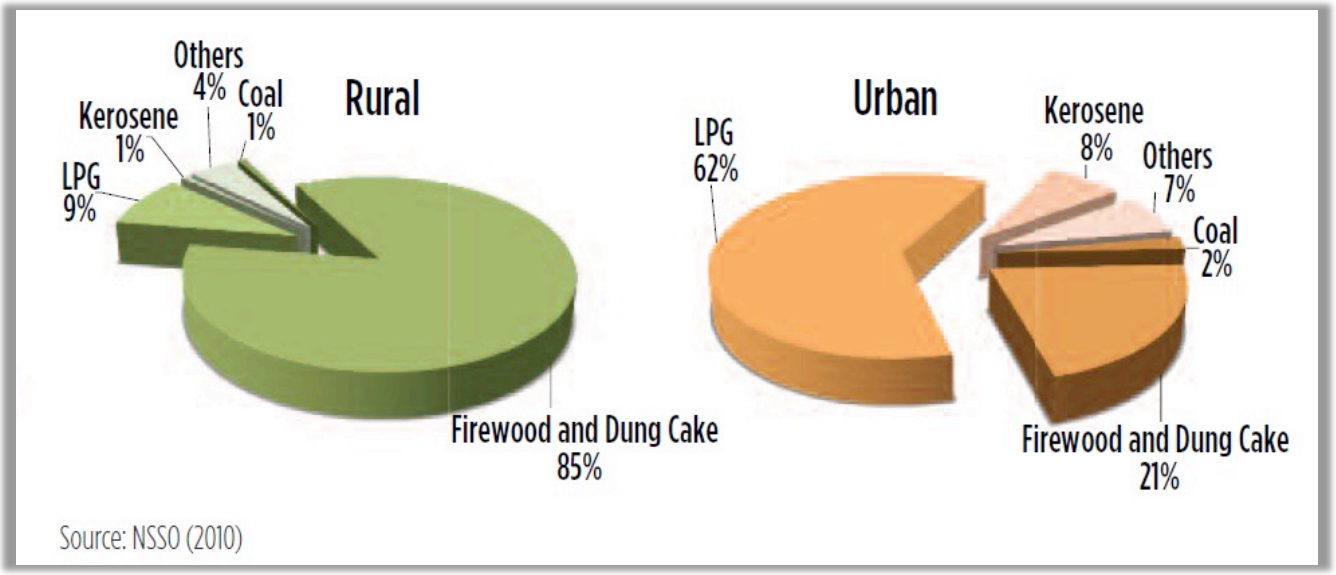
3.5. Targeting Subsidies: From Self-selection to Exclusion Criteria

Like many "universal" subsidies, the LPG subsidy regime in India was inequitable in the incidence of its benefit across income groups (Figure 1). Solving the problem of duplicate, fake and ghost beneficiaries is a necessary but insufficient condition for improving targeting and ensuring equity. In 2010, 62 percent of urban households reported LPG as their primary source of cooking fuel, compared to only 9 percent in rural areas as depicted in Figure 5 (NSSO, 2010). Not surprisingly, the top two deciles garnered over 50 percent of the total subsidy, making it one of the least equitable subsidies of any kind (Parikh 2010).

In general, policies to reform fuel subsidies try to address targeting and equity with a combination of exclusion of the rich and differential pricing to favor the poor. Experiences around the world show that neither of these approaches may be particularly effective when promoted as the primary objectives of the reform (IMF 2013). Governments may be overwhelmed by the complexity of the administrative exercise and the popular unrest following the reform (CGD, forthcoming). As we have seen earlier, even a modest cap on LPG cylinders along with a soft exclusion principle (enrollment in Aadhaar) led to backlash. Moreover, the constraints on expanding access cannot be addressed without substantial fiscal savings from the reform.

[7] The aspect of the scheme that has not been discussed here is the legal challenges it faced in the Supreme Court of India where Aadhar was challenged on grounds of privacy and suffered temporary setbacks.

Figure 5: Distribution of cooking fuel use in rural and urban India, 2010



The subsidy reform strategy therefore needed to demonstrate success in achieving its objectives, minimizing beneficiary grievances, and creating winners at scale to prevent vested interests from influencing implementation. PaHaL addressed all these challenges. Targeting different consumer segments to improve equity in the distribution of subsidies is now integral to the program and is evolving rapidly. In the remaining part of the section, we outline the subsidy reduction strategies followed along with roll-out of PaHaL and assess their effectiveness, with the caveat that actual data on implementation is still too limited for a full-scale evaluation of the impact of the program.

(i) Applying the Principle of Inclusion

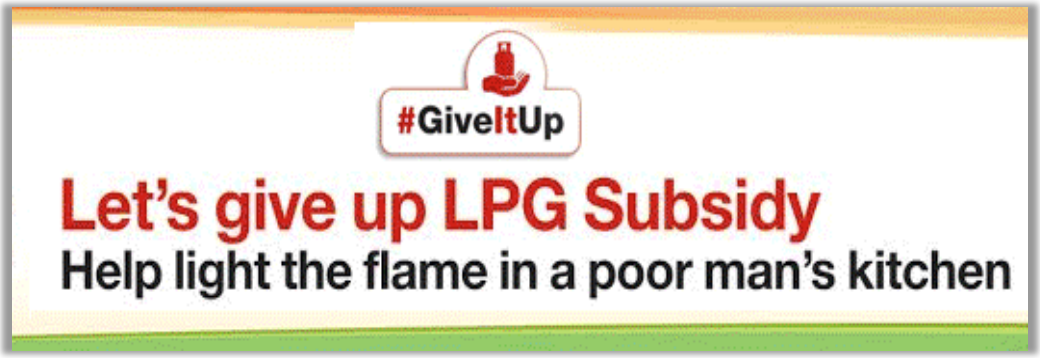
in contrast to other subsidy reform examples that prioritize exclusion based on a set of criteria as the core element of the reform PaHaL first developed an inclusive architecture to onboard all existing genuine beneficiaries. As explained in section 3.1, the objective of Project Lakshya, the precursor of PaHaL, was only to remove duplicate, fake and ghost beneficiaries through an algorithm that minimized the compliance cost to genuine beneficiaries. It was not a targeting mechanism. The earlier version of DBTL had required that every consumer must possess an Aadhaar number, which required a separate process with its own implementation and delivery problems. This requirement, which could have led to exclusion, was relaxed in PaHaL to create a non-Aadhaar channel for beneficiaries. Onboarding PAHAL beneficiaries through Aadhaar and using the Aadhaar Enabled Payments System (AEPS) for transferring subsidy was sought to be achieved while providing options rather than coercion. The government made Aadhaar mandatory for LPG only from December 2016 onwards. By this time Aadhaar coverage was almost complete—nearly 1.1 billion residents out of an estimated 1.23 billion already had an Aadhaar number (UIDAI

portal).[8] The principle of inclusion was therefore preserved even while imposing the Aadhaar mandate.

(ii) Self-Selection and Nudge—the "Give It Up" Campaign

The "Give It Up" campaign was launched in March 2015, three months after PaHaL's all-India rollout. It is one of the few examples of a "nudge," a new kind of public policy tool that has its origins in the field of psychology and behavioral economics (Smith and Sagar, 2016).[9] To increase its effectiveness, the scheme was backed by an intensive Information, Education and Communication (IEC) campaign, including from the Prime Minister himself. By all accounts, the scheme has been a success—as of June 2016, over 10 million LPG subscribers had given up subsidy by joining the scheme, saving the exchequer over Rs.21.6 billion (US$ 332 million) per year at the then-current rate of LPG subsidy.

Figure 6: "Give It Up" Campaign Communication Poster



Source: www.bharat-gas.in

"Give It Up" encouraged well-to-do households to voluntarily give up their LPG subsidy. In return, the government promised to publish their names in a scroll of honor on the Ministry of Petroleum website together with information about a rural household who had received a new connection due to his/her participation in the scheme. The rich and poor households are listed under "Champions and Beneficiaries" on the Ministry website. Communications focused on the theme of "nation building" to appeal to the affluent and middle class who felt connected to a greater social objective.[10] In addition to the direct effect—the number of people who gave up the subsidy—the "Give It Up" campaign brought the issue of unfair distribution of subsidies to the forefront, and paved the way for implementing an explicit exclusion principle using the same rationale.[11]

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[8] https://portal.uidai.gov.in/uidwebportal/dashboard.do (accessed June 27, 2017)

[9] http://blogs.economictimes.indiatimes.com/et-commentary/lpg-subsidy-analysing-the-give-it-up-scheme/

[10] http://www.straitstimes.com/asia/south-asia/modi-getting-middle-class-to-give-it-up

[11] http://www.business-standard.com/article/beyond-business/what-makes-the-give-it-up-campaign-click-115072500902_1.html

(iii) Targeting Beneficiaries—Exclusion of Higher Income Groups

Following the success of "Give it Up," in December 2015 the government announced that taxpayers with an annual income of more than 1 million rupees (approx. 16 thousand dollars) would not be eligible for subsidized LPG cylinders effective from January 1, 2016. The measure was introduced initially on a "self-declaration basis," where the customer would have to submit a legally enforceable affidavit to the OMC to receive a subsidy. Moreover, since LPG is a household subsidy, the government stipulated that the threshold would apply to both the beneficiary and his/her spouse, closing a loophole that is common in several other incentive schemes where the lower of the two individual's income is reported. The statement also noted that "while many consumers have given up subsidy voluntarily, it is felt that consumers in the higher income bracket should get LPG cylinders at the market price" (MoPNG, 2016).

This measure potentially affected 2.03 million individual taxpayers who had reported taxable income of more than the ceiling for LPG subsidy in 2014-15.[12] However, over 5 million LPG consumers—more than twice the previous number—had already joined the "Give It Up" campaign by December 2015. The imposition of the income limit therefore excluded only thosewho had not yet given up their subsidy voluntarily and therefore, did not meet with much resistance from those affected.

3.6. Expanding Access to LPG—the Prime Minister's Ujjwala Program (PMUY)

Prime Minister's Ujjwala Program (PMUY) is an ongoing initiative that was enabled by the fiscal space created by the success of PaHaL and the "Give It Up" campaign, with the social objective of expanding access to clean cooking fuel to rural areas. The scheme was launched in May 2016 in eastern Uttar Pradesh, one of the poorest parts of the country. The budgeted expenditure on LPG subsidy decreased by nearly $660 million from 2016-17 to 2017-18, almost 90 percent of the expenditure on Ujjwala in the two fiscal years.[13] Addressing a long-standing issue of gender inequality that exposes women to unclean cooking fuel each day, it provides a new LPG connection in the name of the woman of the household since she is traditionally responsible for working in the kitchen. In one year of its operation, PMUY has issued 21.7 million new LPG connections—all of which has gone to rural women who are identified to be below poverty line (BPL).

The positive impact of the program on women's health should be significant. Studies show that exposure to biomass fuels (firewood, dung cake, coal) is associated with higher rates of asthma, chronic obstructive pulmonary disease (COPD), lung cancer and partial blindness in women compared to men living in the same household (Kankaria et.al. 2014). The PMUY

[12] http://www.incometaxindia.gov.in/Documents/Direct%20Tax%20Data/Income-Tax-Statistics-IT-Return-AY-2014-15-V1.pdf

[13] http://www.indiabudget.nic.in/ub2017-18/eb/sbe72.pdf

strategy is therefore a win-win in terms of both equity and efficiency, with significant spillovers for gender empowerment and women's health.

Figure 7: Connecting Give It Up to Ujjwala

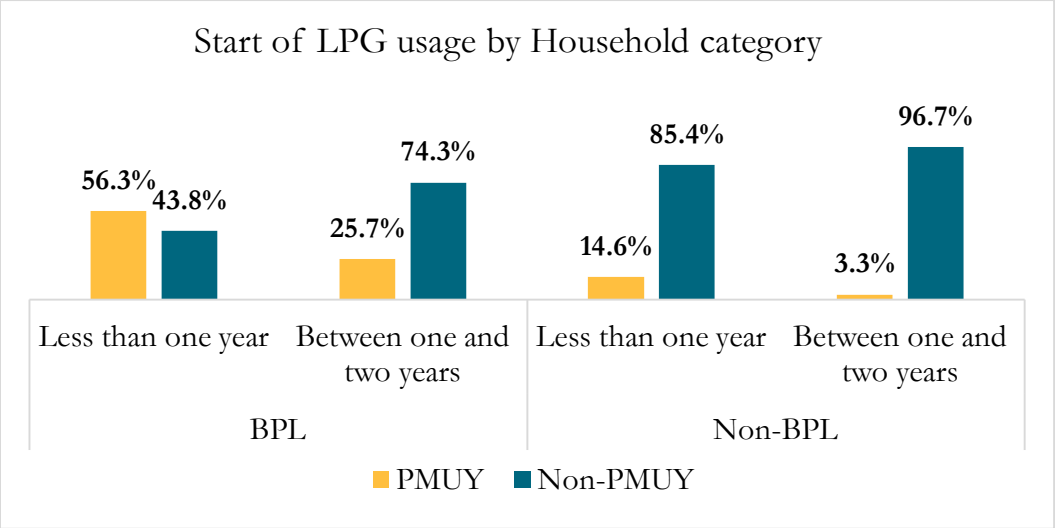
Source: www.pradhanmantriyojana.in

Full evaluation of PMUY is beyond the scope of this case study. However, initial independent rapid assessments indicate that the scheme has been successful in targeting poor, rural women who had hitherto used biomass fuels. Cooking on gas stoves has helped to save up to two hours of cooking time and reduced time and effort spent to collect firewood as well as time spent in a polluted kitchen environment.[14] While the long-term health effects are yet to be determined, it seems clear that the program has had a positive impact on the lives of women.

Preliminary results from a field survey covering 633 households in seven districts of Rajasthan indicate that PMUY has indeed been successful at increasing LPG coverage following its launch in May 2016. New beneficiaries have been identified using the Socio-Economic and Caste Census (SECC) rather than the BPL list due to its perceived benefits in classifying households based on more objective criteria (Figure 8). Results show that most BPL households that started using cooking gas in the last year were those who received it through the PMUY program, thereby fulfilling one of its key objectives. The survey results also indicate that nearly a quarter of Ujjwala beneficiaries have completely stopped using kerosene or firewood. This by itself reduces the demand for subsidized kerosene and should have positive spillovers on women's health and the environment.

[14] http://www.thehindubusinessline.com/economy/policy/modi-govts-ujjwala-scheme-leaves-women-healthier-happier/article9685035.ece

Figure 8: Rollout and Coverage of Pradhan Mantri Ujjwala Program (PMUY)



Source: CGD and MicroSave, 2017 (http://www.microsave.net/files/pdf/171212_Household_Perception_Impact_of_Bhamashah_Digital_Governance_Reforms_in_Rajasthan.pdf)

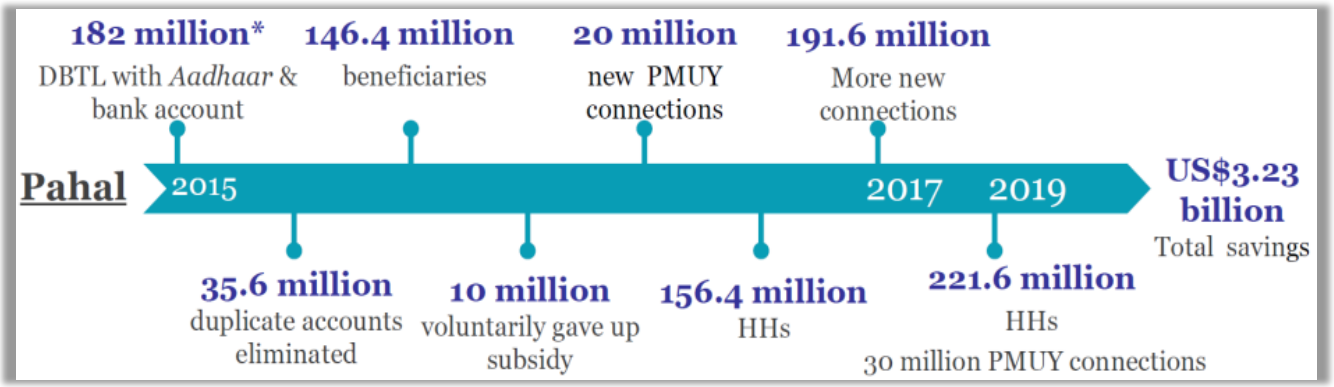
4. Savings from Reform and Effects on Consumers

Have the LPG reforms resulted in significant savings for the government exchequer? If so, how much, and what has been the contribution of different components? This apparently simple question has been the subject of an intense debate in India, one that continues until now. The impact of the reforms on customers' perceptions of the quality of service delivery is also an important question.

There is little doubt that the reforms have let to very substantial fiscal savings. The problem is to accurately estimate how large they are and to apportion them to several different factors that affect the volume of subsidies. As we see in Figure 9, the estimation of total savings involves calculations over a dynamic subscriber base where new connections are being added at a rapid rate while spurious connections are identified, blocked, and removed from the beneficiary list. It also requires estimating the effect of reforms on average cylinder use per connection. The reforms themselves involve several components—the elimination of duplicate and spurious connections; the imposition of maximum caps on annual consumption, shifting from price subsidies to direct benefit transfers, and encouraging richer households to give up subsidies followed by income-based targeting. It is not easy to establish the right counterfactual, and even harder to apportion savings to different components of the reforms. For example, one effect of the switch from subsidized cylinder prices to direct deposits of subsidy into the accounts of consumers will be to reduce the opportunities for dealer fraud and diversion, but it is difficult to estimate the precise magnitude of this saving especially if other parameters, such as the level of consumption caps, are changing at the same time.

In addition, savings per cylinder depend on world LPG prices as well as on the subsidized prices paid by consumers. Global energy prices fluctuate greatly and are not easily predicted, so that ex post or actual savings may be quite different from reasonably predicted ex-ante savings—or from savings in future years.

Figure 9: Progress of LPG subsidy reform and estimate of savings



Source: MicroSave; compiled from replies to Parliamentary Questions by the Government of India

Not surprisingly, there have been a range of savings estimates. Initial government estimates put the savings at Rs.12,700 crore ($2 billion approx.) for the financial year 2014-15 alone, on account of a reduction in domestic LPG consumption of nearly 24 per cent (George and Subramanian, 2016).[15] Other estimates have suggested that Rs.143 crore ($22 million) was saved between November and March of 2014-15 after PaHaL was introduced and rolled out across the country (IISD, 2015).[16] A report from the Comptroller and Auditor General (CAG) stated that over 90 per cent of the reduction in subsidy between April–December 2015 compared to the same period of the previous year was due to the reduction in the international price of LPG and that only Rs.1763 crore ($ 270 million) could be attributed to DBTL (CAG, 2016).

In response, the government clarified that per its calculations based on (a) the number of terminated connections, (b) the gains from capping consumption, and (c) the average subsidy per cylinder for each year of the reform, the savings were likely to be about Rs. 21,261 crore ($3.2 billion) for the two financial years between 2014-16. These estimates, which assumed averted consumption of 12 cylinders per blocked connection, would include savings from the different phases of reform (Lakshya as well as PaHaL) but would exclude savings from the cutoff from PDS kerosene subsidies to households receiving LPG.[17]

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[15] http://indianexpress.com/article/opinion/columns/clearing-the-air-on-lpg-direct-benefit-transfer-subsidies/

[16] http://www.iisd.org/blog/ghost-savings-understanding-fiscal-impacts-indias-lpg-subsidy

[17] For more discussion on estimates, including whether to use the counterfactual consumption of 12 or 6.7 cylinders per blocked connection, see http://www.thehindubusinessline.com/economy/pahal-savings-auditor-oil-ministry-on-different-page-in-calculation/article8981780.ece

It is certainly true that the decline in world energy prices has reduced subsidies relative to what they would have been had high prices continued. The retail sales price of an LPG cylinder, or RSP build-up, is calculated based on the FOB price of LPG at the Arabian Gulf, where most of the shipments to India originate. The import parity price is calculated by adding cost and freight and import charges, which determines the Refinery Transfer Price (RTP) for domestic LPG. The final retail selling price adds various input costs in the production and distribution chain as well as the distributor commission (Appendix 1). The total subsidy per cylinder before the reform was Rs.555.44 in January 2013 compared with only Rs.94.37 in March 2016, three months after the all-India rollout of PaHaL; this constituted a fall of 83 percent in the unit subsidy. While this validates the CAG's observation that international oil prices helped explain a major part of the reduction in LPG subsidies during the reform, it does not mean that the reform did not reduce subsidies. In addition, it does not provide a picture of what savings might have reasonably been expected at the time of 2012 prices or what they might be in future—when world LPG prices could be higher than today.

The difficulty in breaking down savings into components and phases of reform—which would require detailed counterfactuals—is further compounded by the lack of a reliable number of consumers during the early period of reform. As noted, harmonization and deduplication of LPG consumer information held by the three OMCs was the basis of the reforms (and a major source of savings), but due to merging of data on inactive and blocked connections it is difficult to establish the exact number of blocked connections over time. Detailed data on such connections is only available from April 2015, three months after the actual rollout of PaHaL (see Table 1). It is therefore difficult to say what would have happened if the initial stages of the reforms had not been followed up by DBTL and PaHaL and to quantify the impact of the direct benefit transfer on reducing the diversion of domestic LPG to commercial purposes.

Similarly, one can debate how to attribute the savings from "Give It Up" and the role of identifying users individually through Aadhaar as well as by other means; Give-It-Up also had some knock-on benefits in enabling income-based targeting to proceed without resistance. The role of the reforms in raising awareness of subsidies in general and helping to serve as a model for other subsidy reforms also cannot be discounted.

But fiscal savings is only a part of the story, and need to be looked at from the perspective of the overall objectives of the reform. One goal of such a reform should be to at least maintain, if not improve, the quality of service delivery as seen from the perspective of the customers. Have the reforms been successful in this respect? Market research surveys conducted by Nielsen and NetCore for the MoPNG suggested that 53 percent of respondents found service under PaHal satisfactory while only 14 percent did not; 72 percent strongly agreed that the reform was "a good government initiative" (Sharma 2016).

A recent survey in Rajasthan provides more feedback on the views of customers. Nearly half of the respondents preferred the DBTL approach to the previous arrangement. The most common reason cited was the improvement in the timeliness of delivery—with less opportunity to appropriate subsidies by diverting cylinders to the black market, consumer

sales were no longer at the bottom of the dealers' priority lists. Less than 5 per cent preferred the previous system. These cases generally cited the higher upfront cost of the cylinder and difficulty in withdrawing the subsidy from the bank account, as reasons for their negative perception of the reforms (Gelb et.al., 2017).

Finally, in the context of the Ujjwala program, better management of the LPG subsidies is only an instrument to achieve the goal of universal access to clean cooking fuel, especially by the rural poor. This is a desirable social goal in and of itself, generating significant spillover effect in terms of health outcomes, gender empowerment, livelihood security, and environmental benefits. To the extent that the reforms improve the efficiency and equity of the subsidy transfer mechanism and encourage popular support for the wider subsidy reform program, these will be additional benefits.

In the end, the success of India's cooking gas subsidy reform will be measured less by the extent of fiscal savings and more by the number of lives that it has changed for the better.

5. Perspectives and Lessons from LPG Subsidy Reform

What can we learn from the LPG subsidy reform program to help other nations plan and implement similar projects? One key lesson is that the implementation was neither smooth nor painless, as we have described in detail above. The success of the program depended less on anticipating all the difficulties and pre-empting the setbacks that a program of such magnitude would inevitably face—that would have been impossible. Instead, the reform process was a set of pragmatic steps that supported a broad vision—reducing the burden of subsidies on the exchequer, targeting them better and expanding access to clean cooking fuel, especially for the poor. Most importantly, the reform agenda created a value proposition which had a high degree of buy-in from the political establishment, the bureaucracy, and the people at large.

Clear articulation of the vision of the program was the single most important cause of its success. The Prime Minister promoted the scheme in the national interest as arresting the leakage of subsidies and releasing valuable resources for other social sector programs. The vision of the scheme was succinctly captured in the slogan "Apna Dhan Pao—Jan Dhan Bachao," translated as "Get your money - Save public money." The slogan simply and effectively conveyed the vision to the masses that the scheme would translate into rightful transfer of subsidy to them on one hand and would also save public resources by arresting subsidy leakage. Concomitantly, the message that the Prime Minister wanted to curb the leakage but not the subsidy helped to dispel doubts that this was a program intended to cut subsidies thereby causing hardship to deserving people.

We offer some perspectives on three ingredients: the process, the people, and the technology, to draw lessons from India's cooking gas subsidy reform over the past five years.

5.1. Process

5.1.1. Creating a shared understanding of the reform agenda to ease the pain of transition

In the wake of a burgeoning subsidy burden, the process of generating a shared understanding of the challenges commenced with the setting up of the Nilekani Task Force in 2010. This was followed by extensive public coverage of the initial pilot in Mysore. A series of external stakeholder consultations by the Dhande Committee with LPG consumers and consumer welfare associations, elected representatives, and internal stakeholders such as LPG distributors, bankers, and officials helped to neutralize adverse public opinion, including through its recommendations focusing on consumer problems.

5.1.2. High-level decision-making supported by an integrated project management structure

All policy decisions were taken at the level of the Cabinet or its committees. This required wide consultation with all associated departments, ownership, accountability of the targets and decisions taken during the implementation of reform. An integrated matrix program structure was devised to tie together the three tiers of governance, namely, federal, state and district and multiple ministries/departments implementing the program. This was essential in view of the independent accountability and reporting mechanisms across the tiers and across departments. The approach also involved a robust information sharing mechanism across all the stakeholders on a regular basis.

5.1.3. Core team that bridges policy and field level implementation

Field officers from the oil marketing companies were recruited as part of the policy making team to drive the implementation of the reform agenda. They were motivated, technology-savvy and had cross functional experience. They acted as a critical bridge between policy formulation and field experience ensuring that these were mutually consistent and reinforcing the trust between the two critical partners, namely the OMCs and the Ministry.

5.1.4. Inclusive enrolment providing choice to beneficiaries and reducing burden on distributors

Change is difficult, and a transformation of this magnitude is doubly so. The process of enrolment into the program was sought to be made as inclusive and easy as possible. Enrolment camps were the mainstay for on-boarding the 140 million consumers and were arranged over a period of several months, including holidays. For those who were not able to enroll at the camps (the sick and disabled, for example), the scheme allowed enrolment by post as well as by mobile and web enabled applications, interactive voice system or call center. These options also reduced the pressure of enrolment at LPG distributorships, enabling them to focus on the implementation of the new technology platform and grievance redressal.

5.1.5. Incremental rollout—pilots to test concepts

As noted above, the foundation for the project was conceived in the Report of the Nilekani Task Force. This was followed up by a pilot project in Mysore to test the constraints around direct cash transfer and design a program that would be feasible to implement on the ground. The pilot concluded that real-time biometric verification for cylinder delivery at the point of delivery would not be possible given the low penetration of Aadhaar and other technical constraints. The pilot also pointed to reluctance on the part of consumers to reveal their bank account information especially to the LPG distributors; this concern had motivated the earlier Aadhaar channel prescription. After the scheme was formulated, it was again launched in two districts followed by 18 others. This allowed testing of the new application software for direct cash transfer and its operations with the banking system and the National Payment Corporation of India. This system was therefore field tested before DBTL was stopped in January 2014, and could be scaled up quickly countrywide once PaHaL was launched in November 2014.

5.1.6. Allow for learning and mid-course corrections

For a program of this magnitude, it is not possible to anticipate all possible challenges and the process must provide for midcourse feedback and corrections. Program contours must be prepared to change in response to the public response and implementation feedback. For example, while initially the program allowed only those consumers who had an Aadhar number to enroll in the program, as soon as its availability became a constraint the program was quickly modified to allow enrolment even without it. Similarly, consumers were given the option of being cash transfer compliant both with and without Aadhaar. This minimized the impact on PaHaL of challenges in other ongoing processes, especially the issuance of Aadhaar and its seeding in bank accounts. Aadhaar became mandatory only after coverage was almost complete.

5.1.7. Expanding the scope of the program in a phased manner

The onboarding process covered over 140 million consumers listed with over 15 thousand LPG distributors locations and holding accounts in over thousands of bank branches of hundreds of banks spread over the entire country. It was therefore impractical to prescribe one single deadline for enrolment and subsidy transfer targets. The program design therefore allowed for a grace period during which subsidies were eligible to both types of consumers, that is, those who had joined (by transferring subsidy into a bank account) and those who had not (by continuing to supply subsidized cylinders). This period was phased out slowly by not allowing subsidy to those did not join the scheme after the grace period. As onboarding reached near saturation, the government expanded the scope of Aadhaar verification and made it mandatory for new consumers. This was aided in a large part by the success of Aadhaar enrolment which already covered over 80 percent all the adult population at the time PaHal was launched nationwide in early 2015.

5.2. People

5.2.1. Visible support by the top leadership

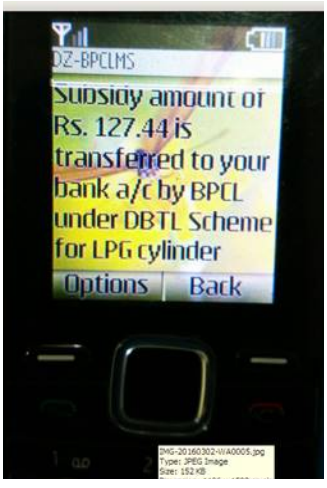
The LPG subsidy reform program received explicit political support and administrative guidance from the Prime Minister and his cabinet colleagues. The Prime Minister personally reviewed the project and this provided the impetus for accountability at all levels of project implementation. Top-level support was the primary force that sustained the momentum of the scheme through difficult political, social and operational challenges.

5.2.2. Training, innovation, and communication

Enrolling 140 million people into the scheme was the most challenging task. Field staff were encouraged to adopt innovative approaches to inform and cajole consumers to join the scheme. Multiple training sessions were organized for staff and especially for the LPG distributors who had to use completely new software interfaces as well as the traditional documentation processes. As instructions and forms changed during the scheme, a comprehensive Blue Book was updated and circulated to keep the current instructions handy. Forms were published in local languages and information disseminated through advertisements and around 1 billon mobile text messages sent in local languages. Success stories were shared across the country through a widely-circulated document as well as through workshops, WhatsApp groups and social media. This made the processes and the benefits of the reform clearer for the beneficiaries, helping to build popular support and sustain a coalition of the willing.

5.2.3. Incentivizing success and providing public recognition

There was an active effort on the part of the top management team to incentivize success and provide recognition for performance. This was done by linking performance appraisals to achievement of targets. LPG distributors were also congratulated by senior officials for their efforts, providing public recognition for their contributions to the scheme in the spirit of service to the nation. Those participating in the GiveItUp scheme were recognized through a message from the Prime Minister and inclusion in a "Scroll of Honour" posted in the website of the Ministry. The Prime Minister publicly commended the achievements of the PaHaL scheme.



5.3. Technology

5.3.1. Empowering the consumer and improving service delivery

A centralized portal www.mylpg.in was originally designed to provide access to LPG booking, delivery, and other aspects of customer relationships with the LPG distributors. This was modified to allow the LPG consumers to be able to also see data on enrolment and cash transfer. For the first time, it enabled consumers to see their enrolment status, cash transfer

notifications and progress on their cylinder bookings. Access to the web and mobile interfaces transformed their interactions with the cooking gas service delivery ecosystem and increased their agency over the LPG distributors. Technology facilitated this shift in power dynamics and created a sense of entitlement on the part of the consumers. This forced the delivery mechanism to become more client-centric, efficient, and responsive.

5.3.2. Leveraging new payment architecture to transfer funds

The transfer of subsidy directly to the bank accounts of consumers was greatly facilitated by the new channels for electronic transfers that was put in place by the central government as part of the wider DBT initiative. PaHaL could utilize the Aadhaar Payment Bridge (APB) and the Aadhaar Enabled Payment System (AePS) for the majority of beneficiaries who had linked their LPG and bank accounts with Aadhaar. The extension of the core banking network to cover almost all bank branches in the country meant that the electronic transfer of LPG subsidy was possible even for those who chose the non-Aadhaar channel to become cash transfer compliant. Finally, the rapid spread of mobile phones over the last decade provided the opportunity to use new technology to build in transparency and accountability as part of the subsidy reform process.

5.3.3. Using technology to de-duplicate customers

The LPG reforms show that there can be more than one way to de-duplicate beneficiary rolls. Electronic name and address-matching algorithms provided a first cut, followed up by Aadhaar. By embedding the LPG reform into the wider spectrum of reforms, the Aadhaar link also facilitates the linkage between LPG subsidies and the phase out of subsidies for kerosene. Looking forward, the prospective seeding of Aadhaar into tax and other data will facilitate further targeting of the LPG subsidy if this becomes necessary.

5.3.4. Access to real time data to monitor performance and fix targets

The data on LPG customers resided in the records of three different oil marketing companies. These were updated daily based on data uploaded by LPG distributors. A common "data view" was required for reporting purposes, and a Web service was developed to feed this data into an integrated MIS portal, pulling daily seeding and transaction data from the three OMC databases for consolidated reporting to all parties. Weekly targets were prescribed for each district, OMC nodal officer, bank and monitored. Monitoring included the levels of seeding achieved and carried out at transaction level in banks (branch level) and OMCs (distributor level). The availability of full daily data through the MIS made it possible to monitor trends and set appropriate targets, giving program managers essential tools needed to achieve the goals of the reform.

5.3.5. Using technology to enhance workflow and inter agency coordination

The deployed software was optimized to pre-populate screens with all available data to ensure that the adoption of technology helped to reduce workload. Special emphasis had to be given to ensure that data entry in critical fields (such as Aadhaar number / bank account) was pre-checked/entered blind to avoid erroneous data entry errors. Due care was taken in the design of the IT systems to ensure interoperability when data messages crossed

organizational boundaries, and efforts were made to maintain audit trails. Issues of privacy while sharing data, appropriate service levels across organizations and mechanisms to share down-time schedules, capacity constraints, fee schedules for services, and system upgradation requirements, are also critical elements and processes that must be developed. While the information about the consumer may have resided in different databases held by different agencies, it was critical to ensure that the consumer did not have to contact multiple agencies to find out the status of his enrolment and cash transfers.

5.3.6. Avoiding information overload but disseminating knowledge to guide action

The integrated MIS portal also allowed different views and reports for different officers depending upon their function in the scheme. It could generate reports for various managerial purposes and respond to program management queries. All the 640 districts and all the district level departments received daily progress on enrolment, cash transfer rates, and error rates. These reports highlighted progress made and the shortfall with respect to targets; they helped to identify hotspots, discuss solutions, and improve performance.

6. Concluding Remarks

As we have seen from the example of other countries, fuel subsidies are hard to reform. Operationalizing a vision as transformative as the one studied here is no easy task. It requires processes, people, and technology to come together to create a synergy that drives implementation and demonstrates positive change to a range of constituents, especially the beneficiaries of the subsidy. The integration and calibration of these intersecting sets of actors and activities is what separates successes from failures. This is the key lesson that India's experience has to offer for policymakers and implementers of subsidy reform efforts across the world.

While acknowledging that the reforms have been able to address inefficiencies and inequities in the existing system, it needs to be kept in mind that the mode of delivery of LPG remains the same. This will certainly change of the next decade. With rapid urbanization and modernization of infrastructure, a large section of consumers will be able to access cooking gas through direct piped connections as is the norm in almost all developed countries. The success of PaHaL will be further amplified if it can be applied to new technologies and delivery mechanisms of the future.

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Appendix 1

Table A1: Price Buildup of Subsidized Domestic LPG (Delhi), January 2013 and March 2016

Sr. No.	Elements	Rs./Cylinder (January 2013)	Rs./Cylinder (March 2016)
1	FOB Price at Arab Gulf of LPG	859.76	305.95
2	Import Parity Price	832.58	326.40
3	Refinery Transfer Price (RTP) for Domestic LPG (Price Paid by the Oil Marketing Companies to Refineries)	832.58	326.40
4	Total Desired price (incl. inland freight, marketing cost and bottling charges)	928.85	410.07
5	**Subsidy by Central Government**	**22.58**	-
6	**Subsidy by OMC (under recoveries)**	**532.86**	-
7	**Bottling Plant Price (4-5-6)**	**373.41**	**410.07**
8	Retail Selling Price (including delivery charges and distributor's commission)	410.50	513.50
9	**Cash compensation on LPG by Govt. under Direct Benefit Transfer)**		**94.37**
10	Subsidized Retail Selling Price (Effective Cost to Consumer after Subsidy on 12 cylinders/year)	410.50	419.13

Source: Petroleum Planning and Analysis Cell, Ministry of Petroleum and Natural Gas, Government of India
(Exchange rate = 53.32 Rs. : 1 USD for January 2013; exchange rate = 66.26 Rs. : 1 USD for March 2016)