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A Study of LPG Coverage in India: State-wise Analysis

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Abstract
India is the seventh largest country in the world by size and second largest country by the population. Most of Indian people are live in rural areas and are use traditional fuel for cooking. Traditional fuels are hazardous in nature but at low or zero cost, the availability of traditional fuels is a major cause of use by Indian households. This paper is an attempt to analyze the state-wise variation in LPG coverage, try to examine the effect of PMUY on LPG coverage in India and to find out growth from 2016 to 2021 related to LPG coverage in India. This study is descriptive and analytical in the nature and based on the secondary data which are published by government of India and other organization. Data Analysis results show that after implementation of the Pradhan Mantri Ujjwala Scheme, LPG coverage in India has sharply increased. In the year 2016, LPG connections were only 166 million, but after implementation of the PMUY scheme, the number of LPG connections has increased to 199 million in year 2017, 224 million in year 2018, 265 million in year 2019, 279 million in year 2020 and 289 million in year 2021. Another results show that in India, some states are rich in forest wood and agricultural waste, which have a low level of LPG coverage, and some states are poorest in forest wood and agricultural waste, which have higher levels of LPG coverage. It shows an inverse relationship between availability of traditional fuel and LPG usage.

Keyword: LPG, Traditional Cooking Fuel, PMUY, Clean Cooking Fuel

1.0 Introduction

India is the seventh largest country in the world by size and second largest country by the population. Most of Indian people are live in rural areas and are use traditional fuel for cooking. Traditional fuels are hazardous in nature but at low or zero cost, the availability of traditional fuels is a major cause of use by Indian households. Use of traditional cooking fuel like; cow dung cake, agricultural waste, wood, grass, coal etc are very harmful to human health. Due to this cooking fuel, four out of five major reasons for death are related to domestic air pollution in India. Unclean cooking fuel is the cause of eye related disease, respiratory disease, lung cancer, illness as well as environmental degradation also. In the Indian scenario, cooking work is mainly done by women, so the most harmful impact has been seen on women's health and also on the health of the environment. In this limelight, after independence, the Indian government or central government and many other state governments launched the various clean

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cooking fuel adaptation schemes, such as the National Biomass Cook Stove Programme (1984), National Biomass and Manure Management Programme (2002-03), National Project on Biogas Development (1981-82), Unnat Chulha Abhiyan (2013) and New National Biogas and Organic Manure Programme (2018). All these schemes were very important to adapt the clean cooking fuel but all these schemes were non- LPG and limited impactful in adaptation of clean cooking fuel because of the high cost of clean cooking fuel and low level of awareness regarding the benefits of using clean cooking fuel. LPG coverage or clean cooking fuel is a very important goal of the United Nations known as SDG 7, which is related to accessibility and affordability of clean energy and in MDG (Millennium Development Goal), goals 3 and 7 are also related to the empowerment of women and environmental sustainability, which can be attained by the use of clean energy because according to W.H.O report 2013, millions of people suffering from problem of unclean cooking fuel in women are more. Indian government address the problem of unclean cooking fuel with launched the very important clean cooking adaptation scheme on 01 may 2016 named Pradhan Mantri Ujjwala Yojana (PMUY) from Ballia district of Uttar Pradesh. This scheme is central government sponsored scheme. This scheme is very important in achieving 100% clean cooking energy access by 2030. This scheme is based on Gandhian ideology which is focused that the Soul of India live in villages and this scheme is especially for BPL family and maximum BPL family in India lives in rural areas as well as focused on health and empowerment of women.

Before implementation of Pradhan Mantri Ujjwala Yojana (PMUY), LPG coverage in India on 01 may 2016 was 61.9% but after implementation of the PMUY scheme, LPG coverage in India rose 24*7. LPG coverage in India on 30 January 2023 was reached at 104% because of the government providing subsidized gas connection to the women head of BPL family for adapting clean cooking energy. With maximum accessibility to all over India's households for reducing diseases which are associated with unclean cooking fuel like eye-related disease, lung cancer, illness, respiratory disease, illness in new born baby and enhance to women empowerment, this scheme is milestone. In this scheme, the government provides half of the total cost of LPG gas connection and first refill. The total cost of the LPG gas connection on 01 may 2016 was 3107 rupees and the government provides a subsidy of rupee 1600 and oil marketing companies provide loan to consumer which are not afford 1507 rupee. This loan amount is recovered by companies by cutting the subsidies by government on refill to the PMUY beneficiaries. Under the PMUY scheme, 9.58 crore LPG connections were provided as of January 30, 2023. Poverty is the major challenge to adapting to the clean cooking energy for the Indian household because of the low level of per capita income and in that situation, this scheme is important. The report of the planning commission of India for 2017 on the basis of the 2013 poverty estimates that 29% of the rural and 9 % of the urban population were living below poverty line. Before the PMUY scheme, the number of LPG distributors was very low, so the government commissioned 600 new LPG distributors and the booking of LPG systems, making it comfortable for common service and new additional bottling plants are also major changes in LPG coverage. Many studies show that in the rural areas, LPG penetration is very low because of low level of awareness (regarding the benefits of using LPG, safety, time and health), low level of education and low or zero cost and easy availability of traditional cooking fuel.

2.0 Literature Review:

A study done by Singh, A, Utlarsh (2019) in Rural Karnataka and examined that maximum domestic

work is done by female, so that maximum rural female facing respiratory, eye and cardiac problem. This scheme is least successful because of higher level of availability of free of cost traditional fuel and second cause of least success is low level of refill subsidy. So government should hike subsidy level on refill of LPG cylinder for success of this Scheme. Another study done by Mani Sunil (et.al) (2018) on Clean Energy Access in India and find out the problem of door step delivery of LPG in UP, Bihar, Jharkhand, West Bengal, MP and Odisha between 2015 to 2018. According to the finding of study LPG connection has increased two times from 2015 to 2018 due to implementation of PMUY. A study done by Suppler, Mathyus (2020), related to LPG Consumption in Kenya during Covid-19 and find out that in the period of covid19 domestic LPG consumption is rise because of lockdown but commercial LPG consumption is decline because of heavy industry and market was closed in lockdown. A Study conducted on Effect of Education on Adaptation & Sustainability of Pradhan Mantri Ujjawala Yojana by Mall, Ranjana (2018), find out positive correlation between Literacy and LPG penetration. Upper class, using LPG before several years because of awareness regarding health and time saving but lower class using traditional fuel for cooking because of illiteracy. Many other studies show that LPG connection increases due to implementation of PMUY scheme. Number of LPG consumer in 2014 was 14.52 crore but after implementation of PMUY number of LPG consumer is raised to 31.36 crore in year 2023. This figure is approximately doubled comparatively 2014. This is because of most popular Free LPG Connection scheme PMUY. This scheme hiked to the number of LPG consumer from 62% in year 2016 to 99.8% in April 2021 and 104% in year 2022[3]. Keeping above literature in mind the objectives of this paper is following;

3.0 Objectives:

- To analyze the state-vise variation in LPG coverage
- To examine the effect of PMUY on LPG coverage in India
- To know the growth from 2016 to 2021 related to LPG coverage

4.0 Methodology:

This study is descriptive and analytical in the nature and based on the secondary data which are published by government of India and other organization such as PPAC, MOPNG, NFHS-5, Data published on official websites which are related with LPG. Data are collected mainly from 2016 to 2021. In this study various statistical tools and technique, graph, chart, diagram, growth rate have been used to reach the valid conclusion.

5.0 Data analysis:

5.1 Growth in LPG coverage in India during 2016 to 2021

Table number: 01

Year	Active LPG connection in India (in Crore)	Growth percentage
2016	16.6	-

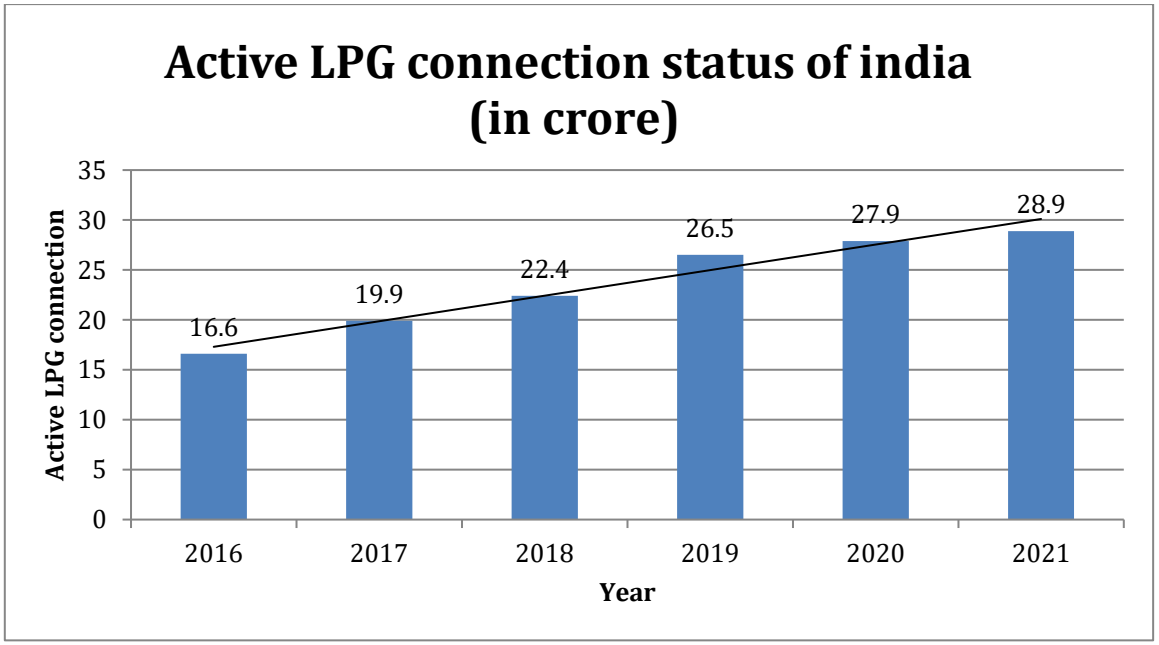
[3] The Economic Times,(April 20, 2023) " LPG Revolution: 17 crore new connections double customer base in 9 years" https://economictimes.indiatimes.com/industry/energy/oil-gas/lpg-revolution-17-crore-new-connections-double-customer-base-in-9-years/articleshow/99641712.cms

2017	19.9	19.87
2018	22.4	12.56
2019	26.5	18.30
2020	27.9	5.28
2021	28.9	3.58

Data source- petroleum planning and analysis cell (14/04/2023)

5.2 Active LPG Connection Status of India

Graph No:01



Based on Table 01.

Table 01 and Graph 01 show that after implementation of the Pradhan Mantri Ujjwala Scheme, LPG coverage in India has sharply increased. In the year 2016, LPG connections were only 166 million, but after implementation of the PMUY scheme, the number of LPG connections has increased to 199 million in year 2017, 224 million in year 2018, 265 million in year 2019, 279 million in year 2020 and 289 million in year 2021. From this data we say that a direct relationship between income and LPG penetration, because of the PMUY scheme, provides a 1600 rupee subsidy on every LPG connection to poor households in India. In India, 56% of total households used LPG or clean cooking fuel in the year 2014. This growth of LPG penetration is because of another guideline given by the central government in the year 2009 to the LPG distributor for enhancing the LPG connection in rural areas.

5.3 State-wise LPG Coverage Status of India

Table No: 02

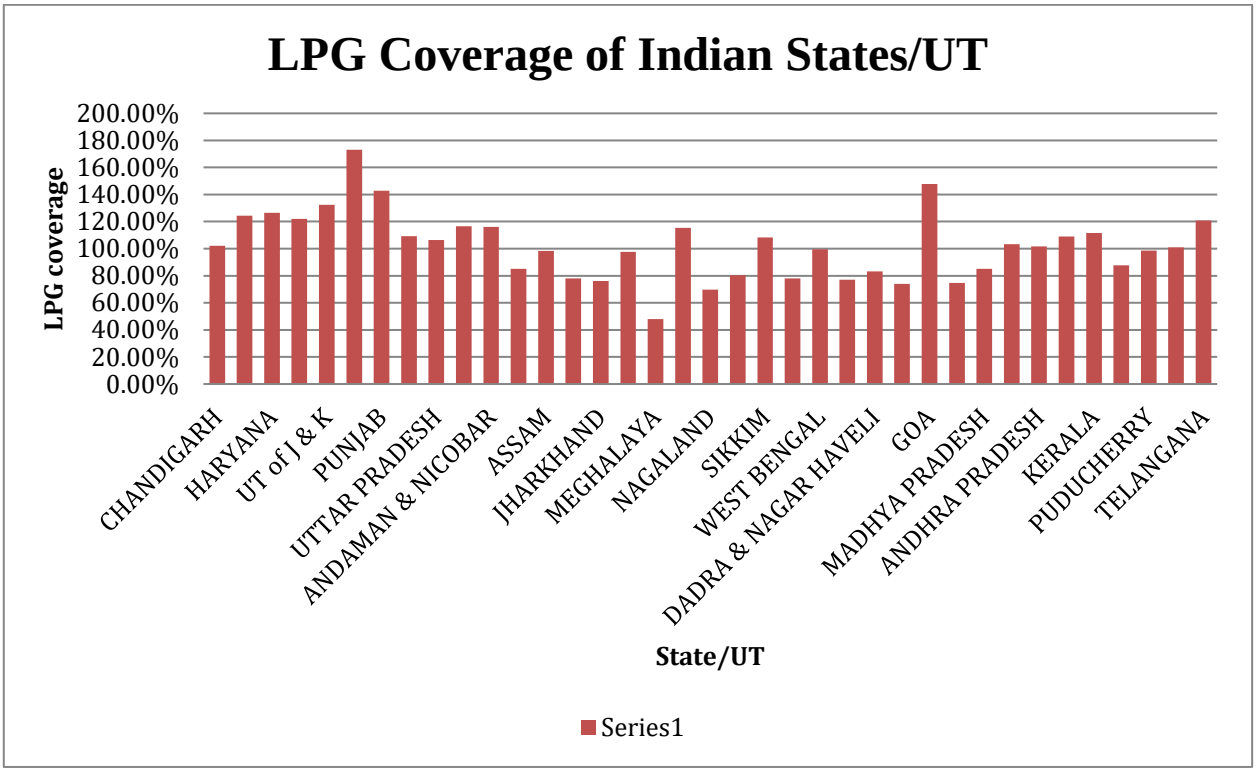
STATE/UT	LPG Coverage
Chandigarh	102.00%
Delhi	124.40%
Haryana	126.50%

Himachal Pradesh	122.10%
J & K	132.30%
Ladakh	173.00%
Punjab	142.90%
Rajasthan	109.30%
Uttar Pradesh	106.40%
Uttrakhand	116.50%
Andaman & Nicobar	116.20%
Arunachal Pradesh	85.20%
Assam	98.40%
Bihar	78.10%
Jharkhand	76.10%
Manipur	97.60%
Meghalaya	48.00%
Mizoram	115.50%
Nagaland	69.80%
Odisha	80.30%
Sikkim	108.30%
Tripura	78.00%
West Bengal	99.50%
Chattisgarh	77.10%
Dadra & Nagar Haveli	83.10%
Daman & Diu	74.10%
Goa	147.70%
Gujarat	74.70%
Madhya Pradesh	85.20%
Maharashtra	103.40%
Andhra Pradesh	101.60%
Karnataka	109.00%
Kerala	111.70%
Lakshadweep	87.70%
Puducherry	98.60%
Tamilnadu	101.00%
Telangana	120.90%
ALL INDIA	**99.50%**

Data on date 1.1.2021

5.4 LPG coverage of Indian states

Graph No: 02



Data source- https://pib.gov.in/PressReleasePage.aspx?PRID=1694710 access date (14/04/2023)

After analysis of Table 2 and Graph 2, it is clear that the union territories of J&K, Goa and Punjab are the best performers in LPG coverage and Meghalaya, Nagaland, Gujarat, Daman and Div are the poorest performers in LPG coverage. In India, there are many more disparities between states regarding LPG coverage for various reasons, like different levels of adaptability, affordability and accessibility in different regions of India. Free availability of cow dung cake, forest wood, agricultural waste is the major cause of using unclean cooking fuel in India. In India, some states are rich in forest wood and agricultural waste, which have a low level of LPG coverage, and some states are poorest in forest wood and agricultural waste, which have higher levels of LPG coverage. It shows an inverse relationship between availability of traditional fuel and LPG usage.

5.5 State-wise LPG Coverage on Per Lakh Population

Table No: 03

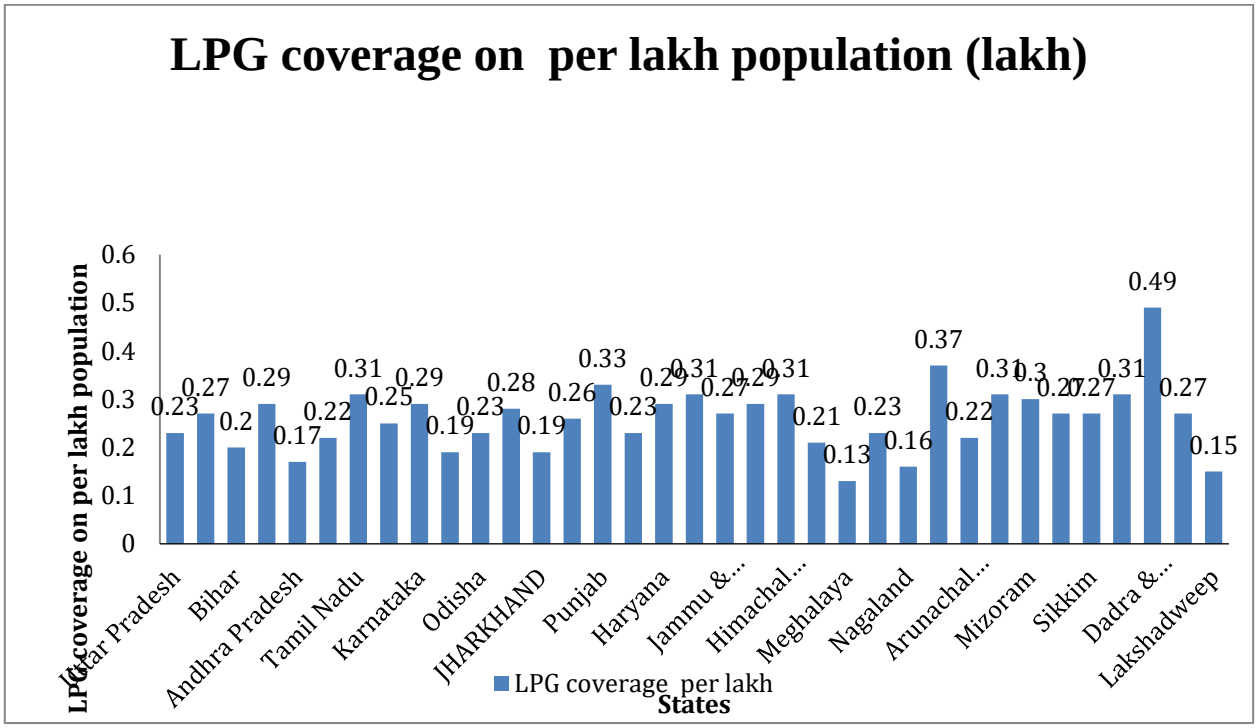
State/Union Territory	Total population (lakh)	LPG Connection (Lakh)	LPG coverage per lakh
Uttar Pradesh	1998.12	462.8	0.23
Maharashtra	1123.74	304.1	0.27
Bihar	1040.99	214.7	0.2
West Bengal	912.75	267.4	0.29
Andhra Pradesh	845.8	149.3	0.17
Madhya Pradesh	726.26	166.8	0.22
Tamil Nadu	724.47	226.1	0.31

Rajasthan	685.48	175.8	0.25
Karnataka	610.95	178.4	0.29
Gujrat	604.39	120.5	0.19
Odisha	419.74	97	0.23
Kerala	334.06	94.9	0.28
Jharkhand	329.88	62.7	0.19
Assam	312.05	83.5	0.26
Punjab	277.43	93.1	0.33
Chhattisgarh	255.45	59	0.23
Haryana	253.51	75.9	0.29
NCT of Delhi	167.88	52.7	0.31
Jammu & Kashmir	125.41	35.1	0.27
Uttrakhand	100.86	29.9	0.29
Himachal Pradesh	68.64	21.4	0.31
Tripura	36.74	7.9	0.21
Meghalaya	29.67	4	0.13
Manipur	27.27	6.5	0.23
Nagaland	19.78	3.3	0.16
Goa	14.58	5.5	0.37
Arunachal Pradesh	13.83	3.1	0.22
Puducherry	12.48	3.9	0.31
Mizoram	10.97	3.4	0.3
Chandigarh	10.55	2.9	0.27
Sikkim	6.1	1.7	0.27
Andaman&Nikobar	3.8	1.2	0.31
Dadra & Nagar Haveli	3.43	1.7	0.49
Daman & Diu	2.43	0.68	0.27
Lakshadweep	0.64	0.1	0.15

Source: PSU OMCs (IOCL, BPCL & HPCL), PPAC (Daman & Diu 01.04.2021)

5.6 LPG Coverage on Per Lakh Population

Graph No: 03



Source: This Graph is based on table number 03

Table 3 & Graph 3 indicate the different levels of LPG coverage in different Indian states. On the basis of the above data, we say that the maximum level of LPG coverage per lakh population is in Dadar and Nagar Haveli, Goa, Punjab and Andman & Nikobar and the lower level of LPG coverage per lakh population is in Meghalaya, Lakshadweep, Nagaland and Andhra Pradesh. Differentiation in LPG coverage between Indian states for different reasons, like population size, geographical size of the state, number of plants in the state, urbanization condition of the state, education level of the state, level of awareness in people regarding LPG usage. Before 2016, state and central governments also launched various types of state-sponsored clean cooking fuel scheme for the Indian household, but all previous clean cooking fuel schemes are non-LPG schemes which are not very impactful on LPG penetration. But after 2016, the government launched the PMUY, which is a free LPG gas connection scheme for every poor Indian household. After implementation of the PMUY scheme, LPG coverage in India has been rising year by year continuously till now.

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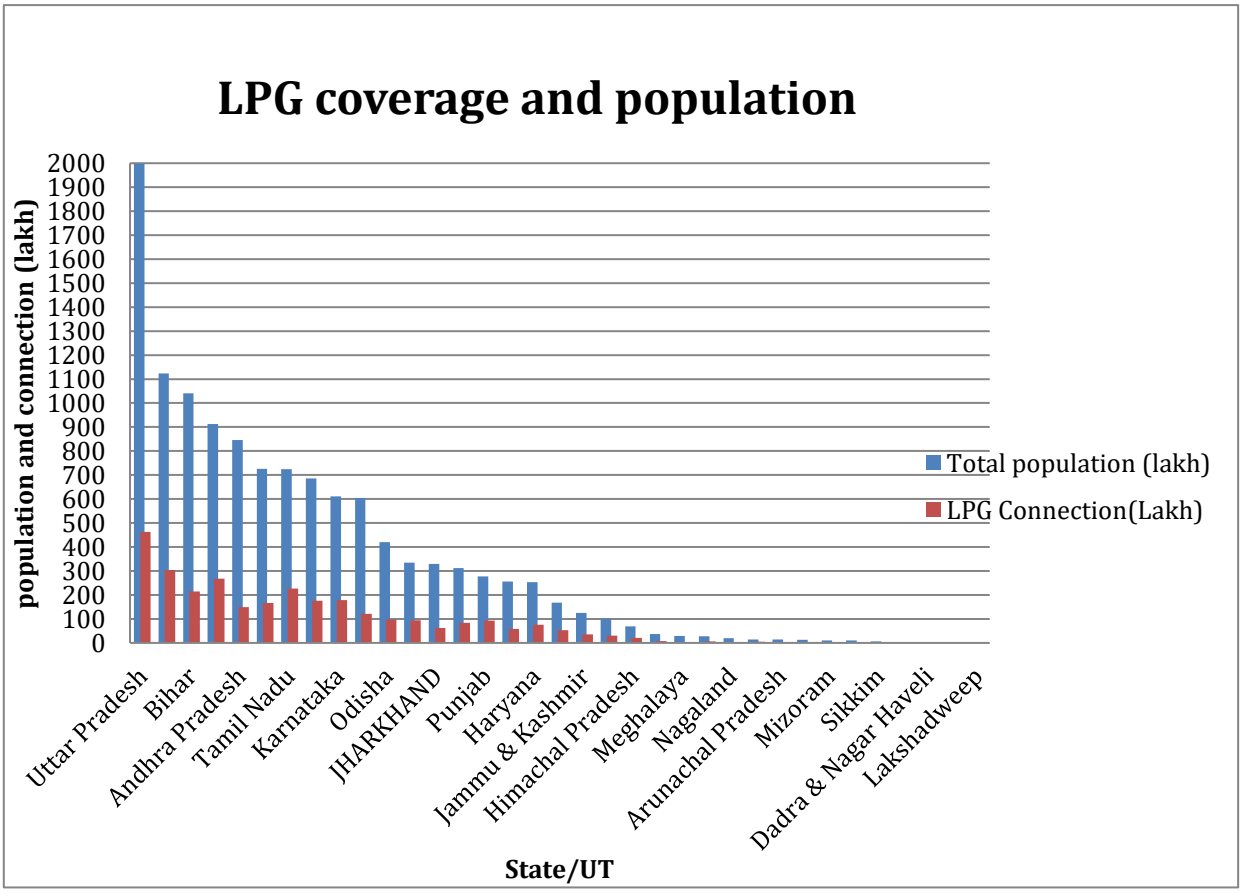
5.7 Overall Population and LPG coverage

Graph No: 04



Data Source- Source: PSU OMCs (IOCL, BPCL & HPCL

According to Graph 04, UP, Bihar, West Bengal, Andhra Pradesh, Maharashtra, Tamilnadu have the largest population in the country and Lakshadweep, Daman Diu, Dadar and Nagar Haveli, Andaman and Nikobaar and Sikkim have the lowest population of the country. The number of LPG connections is higher in Uttar Pradesh, Maharashtra, West Bengal and Bihar, but Lakshadweep, Daman diu, Dadar and Nagar Haveli, Andaman and Nikobaar are lowest in LPG connections.

Conclusion

LPG coverage in the year 2016 was around 56% in India. But after implementation of the PMUY scheme, LPG coverage has increased to 99.8% in the year 2021. LPG coverage in the Indian context is a very challengeable task to achieve a higher level of LPG penetration because, free of cost, higher level of availability of agricultural waste, cow dung, forest wood, and other different causes. In this context, LPG Panchayat is designed for a community awareness programme for safe handling of LPG over traditional fuel for first time users. This Panchayat is very important to PMUY users because PMUY users are also poor and poor households do not afford school fees for better education, so poor families are not aware of using the process and the benefits of LPG usage. The PMUY scheme plays an important role in achieving a higher level of LPG coverage due to financial assistance provided in this scheme. Union territories Jammu & Kashmir, Goa and Punjab are the best performers in LPG coverage and Meghalaya, Nagaland, Gujarat, Daman Div are the poorest performers in LPG coverage. Dadar

Nagar Haweli has a higher density of LPG connections on the basis of the population. In Dadar Nagar Haweli, LPG connection on the basis of per lakh population is highest in all Indian states and union territories. Meghalaya is maintaining lower density of LPG connection on the basis of per lakh population. On the basis of the above analysis, it is clear that the relationship between the LPG connection and other variables is very crucial. On the basis of the above analysis, we say that larger populated states have larger number of LPG connections and lower populated states have lower number of LPG connections. The density of the LPG connection is fluctuating between different states. Uttar Pradesh has the largest number of LPG connections in all Indian states, but it is very obvious that after implementation of the PMUY scheme, LPG coverage in all Indian states is sharply increasing.

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