

AT A GLANCE

- ❖ As per the energy balance compiled by International Energy Agency for 2011, India has a total residential consumption of 178 453 thousand tonnes of oil equivalent (KTOE) on a net calorific value; which is 8.6% of the world's total residential consumption.
- ❖ According to Census of India 2011, 55.3% of rural households and 92.7% of urban households, respectively, depend on electricity as primary energy source for lighting.
- ❖ According to Census of India 2011, 86.7% of rural households and 26.3% of urban households depend on solid biomass as primary energy source for cooking.
- ❖ While the Census of India 2001 reported that 55.6% of rural households used kerosene as primary energy source for lighting, the Census of India 2011 data reports a decline of 12.4 in terms of households dependent on kerosene for lighting. In urban India also kerosene use in households observed a declining trend.
- ❖ As per Census of India 2001, 43.6% of the rural households were dependent on electricity as energy source for lighting; this number has increased to 55.3%, as reported in Census of India 2011. In urban India, electricity remains as the primary energy source for lighting in majority of households for each of the above census periods.
- ❖ The overall subsidy and under-recoveries for public distribution system (PDS) superior kerosene oil (SKO) and domestic liquefied petroleum gas (LPG) together amounts to over ₹71 000 crores for 2012–13.

Introduction

Universal energy access to modern energy services is essential for socio-economic development including poverty alleviation. However, globally over 1200 million people lack access to affordable basic energy services, such as effective lighting and clean cooking. India alone is home to over 300 million people deprived of electricity and more than 800 million people who depend on solid biomass as fuel for cooking (see Table 1). Hence, there is a growing focus on energy poverty which implies lack of access to modern energy services. These services are defined as household's access to electricity and clean cooking solutions, such as fuels and improved cook stoves that are not detrimental to health and the environment (IEA 2013a).

Recognizing the feasibility of addressing the energy access challenge, the United Nations' Secretary-General called for the international community to commit to the goal of reaching universal energy access by 2030 (AGECC 2010). Subsequently, the UN General Assembly declared 2012 as the International Year of Sustainable Energy for All (SEFA) in an effort to catalyze engagement to eliminate energy poverty, and a High-Level Group on Sustainable Energy for All (SE4ALL) has been formed to address the pressing issues. Further, SEFA also acts in support of the (2014–24) Decade of Sustainable Energy for All (UN 2014).

While international attention has increased of late, countries suffering from acute energy poverty have been addressing the issue for decades. Still, globally over 1200 million people lack access to affordable basic energy services, such as effective lighting and clean cooking. India alone is home to over 300 million people deprived of electricity and more than 800 million people depend on solid biomass as fuel for cooking (see Table 1).

Table 1 Population without access to electricity and population dependent on biomass for cooking for 2011

Country	Without access to electricity		Traditional use of biomass for cooking	
	Population (in million)	Share of population (in %)	Population	Share of population (in %)
India	306	25	818	66
World**	1258	18	2642	38

**Includes OECD countries and Eastern Europe/Eurasia

Source IEA (2013b)

In context to above, this chapter will provide an overview of the household level energy access scenario in India. Statistics about household energy consumption is available in the form of the National Sample Survey Organization (NSSO) consumer expenditure data. The chapter specifically discusses the household level consumption of various energy sources for cooking and lighting. Further, it highlights the key ongoing policies and schemes of the government for domestic energy access. In addition, the chapter briefly discusses the opportunity that the newly endorsed Companies Act, 2013 (2013 Act) presents for financing domestic energy access through Corporate Social Responsibility (CSR) funds.

Household energy consumption

The energy balance compiled by International Energy Agency (IEA 2013c) indicates a total residential consumption of 178 453 thousand tonnes of oil equivalent (KTOE) on a net calorific value basis during 2011 in India. This is 8.6% of the world's total residential consumption on a net calorific value basis during 2011 (Table 2). At the household level in India, two major uses of energy

Table 2 Total residential consumption of energy in thousand tonnes of oil equivalent (KTOE) on a net calorific value basis during 2011

Country	Total residential consumption (KTOE) on a net calorific value basis
India	178 453
Japan	47 468
People's Republic of China	367 517
United Kingdom	35 792
United States	263 588
World	2 072 808

Source IEA (2013c)

for basic access are lighting and cooking. Table 3 highlights per household per month consumption of energy and the expenses incurred in rural and urban India.

Access to energy: household level

Limited access to modern and clean energy for cooking and lighting has an economic, social, and environmental dimension. Inability to access adequate amount of clean and modern basic energy for domestic usage bounds the household to depend on traditional, inefficient, polluting, or poor quality energy sources.

Distribution of households based on energy source for lighting: rural and urban

An analysis of census data indicates that while in 2001, 55.6% of rural households used kerosene as primary energy source for lighting, the number declined to 43.2% in 2011. In urban India, households using kerosene also show a declining trend in percentage terms. Similarly, for electricity access, 43.6% of the rural households were dependent on electricity as energy source for lighting in 2001; this number witnessed an increase in 2011 with 55.3% of the rural households using electricity as their primary energy source for lighting. In urban India, electricity remains the primary energy source for lighting in majority of the households (Table 4).

Table 3 All India per household per month consumption of energy

Energy sources	Rural			Urban		
	Quantity	No. of sample HHS responding	Value (₹)	Quantity	No. of sample HHS responding	Value (₹)
Coke (kg)	69.78	262	224.7	60.7	298	250.13
Firewood and chips (kg)	118.02	49 221	307.57	89.42	12 448	281.07
Electricity (kWh)	60.35	49 022	176.04	124.62	40 013	435.29
Dung cake (unit)	-	-	155.8	-	-	149.78
Kerosene- PDS (litre)	2.8	40 891	44.41	3.27	14 750	49.89
Kerosene- other sources (litre)	2.3	13 301	65.96	4.72	7 097	161.8
Matches (box)	8.38	57 986	8.26	6.35	39 099	6.38
Coal (kg)	55.1	940	177.74	65.95	957	285.94
LPG (excl. conveyance, in kg)	8.69	20 354	259.39	12.37	30 396	363.76
Charcoal (kg)	21.35	595	141.22	17.29	561	170.24
Candle (number)	6.46	18 640	16.27	5.77	18 668	16.3
Gobar gas (kg)	-	-	284.83	-	-	95.64
Petrol (litre)	5.26	101	355.68	11.2	63	746.02
Diesel (litre)	3.03	121	127.48	3.73	53	155.36
Other fuel (kg)	-	-	94.73	-	-	65.79

HHS - Households; LPG - Liquefied Petroleum Gas; PDS - public distribution system

Source MoSPI (2012)

Table 4 Distribution of household on the basis of energy source for lighting

Energy source	Census of India 2001		Census of India 2011	
	Per cent of rural HHS dependent on energy source	Per cent of urban HHS dependent on energy source	Per cent of rural HHS dependent on energy source	Per cent of urban HHS dependent on energy source
Electricity	43.6	87.6	55.3	92.7
Kerosene	55.6	11.6	43.2	6.5
Solar energy	0.3	0.2	0.5	0.2
Any other source	0.3	0.2	0.5	0.3
No lighting	0.3	0.4	0.5	0.3

HHS - Households

Note CensusInfo 2011 (version 2.0) reports 43.6% of rural households as dependent on electricity. However, the official Census website reports this figure as 43.5% households.

Source Census of India (2011a)

Distribution of households based on energy source for cooking: rural and urban

In rural India, 86.5% of households depend on solid biomass including firewood, crop residue, cowdung, coal, lignite, and charcoal as primary fuel for cooking (Table 5). 12.1% of the rural

households depend on modern fuels including kerosene and Liquefied Petroleum Gas (LPG)/Petroleum and Natural Gas (PNG) as primary fuel for cooking and the rest depend on other fuel sources including biogas for the purpose of cooking. Unlike rural India, in urban India 65.8% of the households depend primarily on LPG/PNG

Table 5 Source of energy for domestic cooking in India

Energy source	Census of India 2001		Census of India 2011	
	Per cent of rural HHs	Per cent of urban HHs	Per cent of rural HHs	Per cent of urban HHs
Firewood	64.1	22.7	62.5	20.1
Crop residue, cowdung, coal, lignite, charcoal	26.9	8.7	24.0	6.1
Kerosene	1.6	19.2	0.7	7.5
LPG/PNG	5.7	48	11.4	65
Any other	1.4	0.9	1.1	0.8

HHs - Households

Source Census of India (2011b)

and 7.5% of the households depend on kerosene as fuel for cooking. Another 26.3% of the urban households depend primarily on solid biomass fuel sources such as firewood, crop residue, cowdung, coal, lignite, and charcoal. The rest of the urban households depend on other fuel sources like biogas as primary energy source for cooking.

State-wise distribution of households based on energy source for lighting and cooking

Census of India 2011 data reveals that in India, over 31% of the households still depend on kerosene as energy source for lighting (see Table 6). Tables 7 and 8 highlight the rural–urban divide in terms of access to clean and modern energy for lighting.

Tables 7 and 8 give insights on rural–urban divide; indicating that while 92.7% of the urban households depend on electricity as primary energy source for lighting, electricity happens to be the primary energy source for lighting in only 55.3% of the rural households in India. Among all the states and union territories in India, Bihar has the highest percentage, that is 82.4% of households depend on kerosene as the primary energy source for lighting. In this context, it is noteworthy that the national average for the percentage of households dependent on kerosene as primary fuel for lighting is 31.4%. See Map 1.

Inefficient burning of biomass in traditional cookstoves in poorly ventilated kitchen exposes the women and accompanying children to health risks. However, a closer look at the Census of India 2011 data (see Table 9) indicates that over

31% of households in India do not have a kitchen and undertake cooking inside the house. In Bihar, Jharkhand, Madhya Pradesh, and Uttar Pradesh over 50% of the households undertake cooking inside the house (Map 2). Further, Table 10 shows that 67.4% of households in the country depend on solid biomass¹ as fuel for cooking and firewood is the fuel used by a majority, 49% of households. Incidentally, a summary of report of United Nations Secretary-General's Advisory Group on Energy and Climate Change (AGECC 2010) highlights that finding sufficient biomass for cooking is becoming increasingly difficult in some parts of India. Altogether, on the one hand, woman and children are exposed to health risks and, on the other hand, access to affordable modern and clean fuel for cooking is a challenge in India.

The distribution of households by primary energy source for cooking and lighting during the decade (2001/02–2011/2012) is highlighted in Tables 11(a) and 11(b), respectively.

Consumption of electricity, kerosene, and LPG by the domestic sector

Electricity

Out of the total electricity from utilities consumed during 2011–12, 22% was utilized by the domestic sector in India (Figure 1). In terms of rural electrification, over 593700 villages have been electrified by the end of first year of the Twelfth Five-Year Plan of the Government of India (Figure 2). In the same period, per capita

¹ Solid biomass includes firewood, crop residue, cowdung cake, coal, lignite, and charcoal

Table 6 State-wise distribution of households based on source of energy for lighting

State code	India/state/ union territory	Distribution of households by source of lighting						
		Total number of households (excluding institutional households*)	Electricity	Kerosene	Solar energy	Other oil	Any other	No lighting
1	2	3	4	5	6	7	8	9
00	INDIA	246 692 667	67.3	31.4	0.4	0.2	0.2	0.5
01	Jammu and Kashmir	2 015 088	85.1	9.7	1.0	0.2	2.0	2.0
02	Himachal Pradesh	1 476 581	96.8	2.8	0.1	0.1	0.1	0.1
03	Punjab	5 409 699	96.6	2.2	0.1	0.2	0.3	0.7
04	Chandigarh	235 061	98.4	1.2	0.1	0.1	0.1	0.2
05	Uttarakhand	1 997 068	87.0	11.1	1.2	0.2	0.2	0.3
06	Haryana	4 717 954	90.5	8.1	0.2	0.3	0.5	0.5
07	NCT of Delhi	3 340 538	99.1	0.7	0.1	0.0	0.1	0.1
08	Rajasthan	12 581 303	67.0	30.9	0.6	0.3	0.3	0.8
09	Uttar Pradesh	32 924 266	36.8	61.9	0.5	0.3	0.3	0.2
10	Bihar	18 940 629	16.4	82.4	0.6	0.3	0.3	0.1
11	Sikkim	128 131	92.5	6.6	0.2	0.1	0.1	0.5
12	Arunachal Pradesh	261 614	65.7	18.5	2.9	0.3	2.1	10.5
13	Nagaland	399 965	81.6	15.6	0.3	0.2	1.1	1.1
14	Manipur	507 152	68.4	25.1	1.9	0.4	3.6	0.6
15	Mizoram	221 077	84.2	13.5	1.3	0.3	0.3	0.3
16	Tripura	842 781	68.4	29.1	1.9	0.2	0.0	0.3
17	Meghalaya	538 299	60.9	37.0	0.8	0.3	0.2	0.8
18	Assam	6 367 295	37.1	61.8	0.8	0.1	0.1	0.2
19	West Bengal	20 067 299	54.5	43.5	1.2	0.2	0.1	0.5
20	Jharkhand	6 181 607	45.8	53.1	0.7	0.2	0.1	0.1
21	Odisha	9 661 085	43.0	55.3	0.4	0.1	0.1	1.1
22	Chhattisgarh	5 622 850	75.3	23.2	0.9	0.2	0.1	0.3
23	Madhya Pradesh	14 967 597	67.1	32.1	0.3	0.2	0.1	0.2
24	Gujarat	12 181 718	90.4	8.1	0.1	0.2	0.2	1.0
25	Daman & Diu	60 381	99.1	0.8	0.0	0.0	0.1	0.1
26	Dadra & Nagar Haveli	73 063	95.2	4.4	0.0	0.0	0.0	0.3
27	Maharashtra	23 830 580	83.9	14.5	0.2	0.2	0.3	0.9
28	Andhra Pradesh	21 024 534	92.2	6.9	0.3	0.2	0.1	0.4
29	Karnataka	13 179 911	90.6	8.6	0.2	0.1	0.1	0.4
30	Goa	322 813	96.9	2.4	0.2	0.1	0.1	0.4
31	Lakshadweep	10 703	99.7	0.2	0.0	0.0	0.1	0.0
32	Kerala	7 716 370	94.4	5.2	0.2	0.1	0.1	0.0

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Energy demand

Table 6 <i>Contd...</i>								
State code	India/state/ union territory	Distribution of households by source of lighting						
		Total no. of households (excluding institutional households*)	Electricity	Kerosene	Solar energy	Other oil	Any other	No lighting
1	2	3	4	5	6	7	8	9
33	Tamil Nadu	18 493 003	93.4	5.9	0.1	0.2	0.1	0.4
34	Puducherry	301 276	97.7	2.1	0.0	0.1	0.0	0.2
35	Andaman and Nicobar Islands	93 376	86.1	12.9	0.2	0.3	0.1	0.5

*Census defines institutional households as a premise where group of unrelated persons live and take their meals from a common kitchen. Examples of institutional households include boarding houses, messes, hostels, hotels, rescue homes, jails, ashrams, and orphanages.

Source Census of India (2011c)

Table 7 Source of energy for domestic lighting in rural India											
State code	India/state/ union territory*	Total households		Rural							
				Percentage of households having							
		2011	2001	Electricity		Kerosene		Other sources		No lighting	
1	2	3	4	2011	2001	2011	2001	2011	2001	2011	2001
00	INDIA	167 826 730	138 271 559	55.3	43.5	43.2	55.6	1.0	0.6	0.5	0.3
01	Jammu and Kashmir	1 497 920	1 161 357	80.7	74.8	12.6	19.2	4.1	5.4	2.6	0.6
02	Himachal Pradesh	1 310 538	1 097 520	96.6	94.5	3.0	4.9	0.3	0.4	0.1	0.2
03	Punjab	3 315 632	2 775 452	95.5	89.5	2.9	8.9	0.7	0.5	0.9	1.1
04	Chandigarh	6 785	21 302	97.3	97.4	2.4	2.1	0.2	0.3	0.1	0.2
05	Uttarakhand	1 404 845	1 196 157	83.1	50.3	14.5	46.7	2.1	2.7	0.3	0.3
06	Haryana	2 966 053	24 544 63	87.2	78.5	11.3	20.6	1.0	0.5	0.5	0.4
07	NCT of Delhi	79 115	169 528	97.8	85.5	1.4	13.0	0.6	0.9	0.2	0.6
08	Rajasthan	9 490 363	7 156 703	58.3	44.0	39.3	54.7	1.5	0.8	1.0	0.5
09	Uttar Pradesh	25 475 071	20 590 074	23.8	19.8	75.0	79.5	1.1	0.6	0.1	0.1
10	Bihar	16 926 958	12 660 007	10.4	5.1	88.4	94.5	1.2	0.4	0.1	0.0
11	Sikkim	92 370	91 723	90.2	75.0	8.7	24.3	0.5	0.3	0.6	0.4
12	Arunachal Pradesh	195 723	164 501	55.5	44.5	23.6	37.9	7.0	7.1	14.0	10.5
13	Nagaland	284 911	265 334	75.2	56.9	21.1	37.5	2.2	2.4	1.5	3.2
14	Manipur	335 752	296 354	61.2	52.5	32.2	45.1	5.9	1.2	0.7	1.1
15	Mizoram	104 874	79 352	68.8	44.1	26.9	52.8	3.9	2.3	0.5	0.7
16	Tripura	607 779	539 580	59.5	31.8	37.7	67.6	2.5	0.5	0.4	0.2

Contd...

Table 7 *Contd...*

State code	India/state/union territory	Rural									
		Total households		Percentage of households having							
				Electricity		Kerosene		Other sources		No lighting	
		2011	2001	2011	2001	2011	2001	2011	2001	2011	2001
1	2	3	4	5	6	7	8	9	10	11	12
17	Meghalaya	422 197	329 678	51.6	30.3	45.9	68.2	1.6	0.8	0.9	0.8
18	Assam	5 374 553	4 220 173	28.4	16.5	70.4	83.1	1.1	0.3	0.2	0.1
19	West Bengal	13 717 186	11 161 870	40.3	20.3	57.8	79.2	1.5	0.5	0.4	0.1
20	Jharkhand	4 685 965	3 802 412	32.3	10.0	66.4	89.6	1.2	0.3	0.0	0.0
21	Odisha	8 144 012	6 782 879	35.6	19.4	62.8	79.8	0.6	0.5	1.1	0.4
22	Chhattisgarh	4 384 112	3 359 078	70.0	46.1	28.2	52.9	1.5	0.6	0.3	0.4
23	Madhya Pradesh	11 122 365	8 124 795	58.3	62.3	40.9	37.2	06	0.3	0.2	0.2
24	Gujarat	6 765 403	5 885 961	85.0	72.1	12.8	26.2	0.8	0.7	1.4	1.0
25	Daman & Diu	12 750	22 091	98.3	97.5	1.5	2.0	0.1	0.2	0.2	0.4
26	Dadra & Nagar Havell	35 408	32 783	91.7	82.6	7.6	16.0	0.1	0.3	0.6	1.0
27	Maharashtra	13 016 652	10 993 623	73.8	65.2	23.9	33.6	10	0.7	1.3	0.6
28	Andhra Pradesh	14 246 109	1 26 76 218	89.7	59.7	9.2	39.7	0.6	0.4	0.5	0.3
29	Karnataka	7 864 195	66 75 173	86.7	72.2	12.3	27.2	0.5	0.3	0.5	0.3
30	Goa	124 574	1 407 55	95.6	92.4	3.4	6.9	0.3	0.3	0.6	0.4
31	Lakshadweep	2 523	5 351	99.8	99.7	0.2	0.1	0.0	0.1	0.0	0.0
32	Kerala	4 095 574	4 942 550	92.1	65.5	7.4	33.8	0.4	0.7	0.0	0.0
33	Tamil Nadu	9 563 899	8 274 790	90.8	71.2	8.3	28.2	0.3	0.3	0.6	0.4
34	Paunducherry	95 133	72 199	95.8	81.0	3.6	18.6	0.2	0.2	0.5	0.1
35	A&N Islands	59 030	49 653	79.4	68.1	19.3	29.9	0.8	1.2	0.6	0.8

Source Census of India (2011c)

Table 8 Source of energy for domestic lighting in urban India

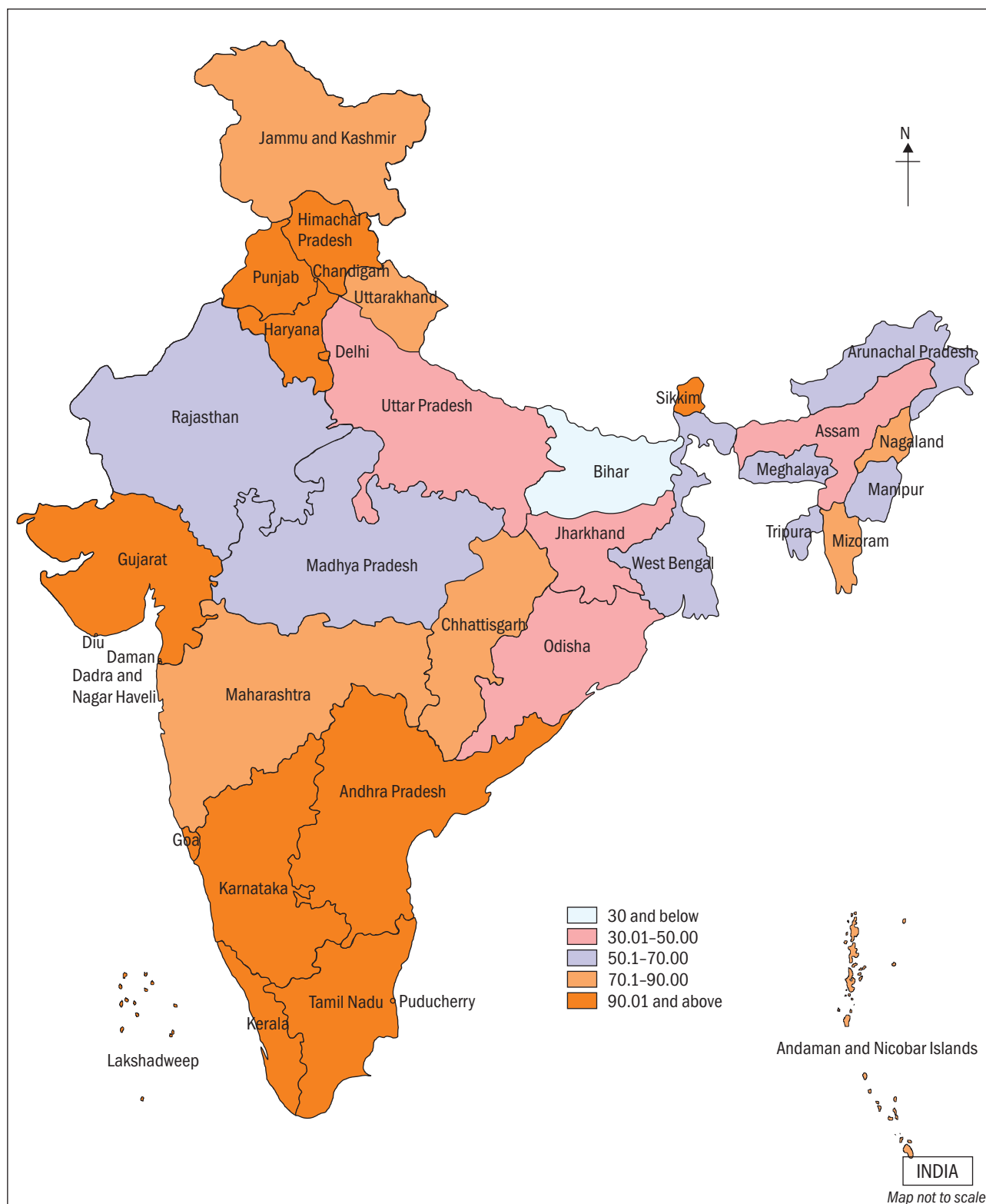
State code	India/state/union territory	Urban									
		Total households		Percentage of households having							
				Electricity		Kerosene		Other source		No lighting	
		2011	2001	2011	2001	2011	2001	2011	2001	2011	2001
1	2	3	4	5	6	7	8	9	10	11	12
00	INDIA	78 865 937	53 692 376	92.7	87.6	6.5	11.6	0.5	0.5	0.3	0.4
01	Jammu and Kashmir	517 168	390 411	98.0	97.9	1.2	1.6	0.6	0.4	0.2	0.1
02	Himachal Pradesh	166 043	143 113	98.1	97.4	1.6	2.2	0.2	0.3	0.1	0.1
03	Punjab	2 094 067	1 489 694	98.3	96.5	1.0	2.6	0.3	0.4	0.3	0.5
04	Chandigarh	228 276	180 576	98.4	96.7	1.1	2.9	0.2	0.2	0.2	0.2

Contd...

Energy demand

Table 8 Contd...											
State code	India/state/union territory	Urban									
		Total households		Percentage of households having							
				Electricity		Kerosene		Other source		No lighting	
		2011	2001	2011	2001	2011	2001	2011	2001	2011	2001
1	2	3	4	5	6	7	8	9	10	11	12
05	Uttarakhand	592 223	390 164	96.5	90.9	2.9	8.4	0.4	0.4	0.3	0.3
06	Haryana	1 751 901	1 075 179	96.2	92.9	2.7	6.1	0.7	0.5	0.4	0.4
07	NCT of Delhi	3 261 423	2 384 621	99.1	93.4	0.6	5.7	0.2	0.7	0.1	0.2
08	Rajasthan	3 090 940	2 185 591	93.9	89.6	5.2	9.6	0.5	0.4	0.5	0.4
09	Uttar Pradesh	7 449 195	5 170 527	81.4	79.9	17.2	19.3	0.9	0.5	0.4	0.3
10	Bihar	2 013 671	1 322 583	66.7	59.3	32.2	39.9	0.8	0.7	0.2	0.2
11	Sikkim	35 761	13 015	98.7	97.1	0.9	2.8	0.1	0.1	0.3	0.0
12	Arunachal Pradesh	65 891	48 114	96.0	89.4	3.2	9.4	0.4	0.5	0.4	0.7
13	Nagaland	115 054	66 716	97.4	90.3	2.1	8.3	0.3	0.5	0.2	0.9
14	Manipur	171 400	101 302	82.4	82.0	11.2	17.3	5.9	0.5	0.5	0.3
15	Mizoram	116 203	81 604	98.1	94.4	1.5	5.2	0.3	0.2	0.1	0.2
16	Tripura	235 002	122 343	91.6	86.4	7.0	13.0	1.2	0.4	0.2	0.2
17	Meghalaya	116 102	90 568	94.9	88.1	4.4	10.9	0.3	0.5	0.3	0.5
18	Assam	992 742	715 185	84.1	74.3	15.2	25.0	0.5	0.6	0.3	0.2
19	West Bengal	6 350 113	4 554 045	85.1	79.6	12.7	19.5	1.6	0.6	0.6	0.3
20	Jharkhand	1 495 642	1 060 178	88.0	75.6	11.4	23.8	0.5	0.5	0.1	0.1
21	Odisha	1 517 073	1 087 248	83.1	74.1	15.3	24.3	0.4	0.7	1.2	1.0
22	Chhattisgarh	1 238 738	789 440	93.7	82.9	5.7	16.5	0.3	0.3	0.2	0.3
23	Madhya Pradesh	3 845 232	2 794 858	92.7	92.3	6.6	7.1	0.4	0.3	0.2	0.2
24	Gujarat	5 416 315	3 758 028	97.2	93.4	2.1	5.5	0.2	0.5	0.5	0.7
25	Daman & Diu	47 631	12 251	99.3	98.3	0.6	1.3	0.1	0.1	0.1	0.3
26	Dadra & Nagar Haveli	37 655	11 190	98.5	95.8	1.4	3.8	0.0	0.3	0.1	0.0
27	Maharashtra	10 813 928	8 069 526	96.2	94.3	3.1	5.1	0.3	0.3	0.4	0.3
28	Andhra Pradesh	6 778 225	4 173 639	97.3	90.0	2.0	9.2	0.5	0.5	0.2	0.3
29	Karnataka	5 315 715	3 556 960	96.4	90.5	3.1	8.8	0.3	0.4	0.2	0.3
30	Goa	198 139	138 461	97.7	94.7	1.8	4.6	0.3	0.3	0.3	0.4
31	Lakshadweep	8 180	3 889	99.7	99.7	0.2	0.3	0.1	0.0	0.0	0.0
32	Kerala	3 620 696	1 652 656	97.0	84.3	2.8	15.1	0.2	0.5	0.0	0.0
33	Tamil Nadu	8 929 104	5 898 836	96.1	88.0	3.4	11.1	0.2	0.4	0.3	0.4
34	Paunducherry	206 143	136 456	98.5	91.4	1.3	8.2	0.1	0.2	0.1	0.1
35	A&N Islands	34 346	23 409	97.7	95.2	1.9	4.3	0.1	0.2	0.2	0.2

Source Census of India (2011d)

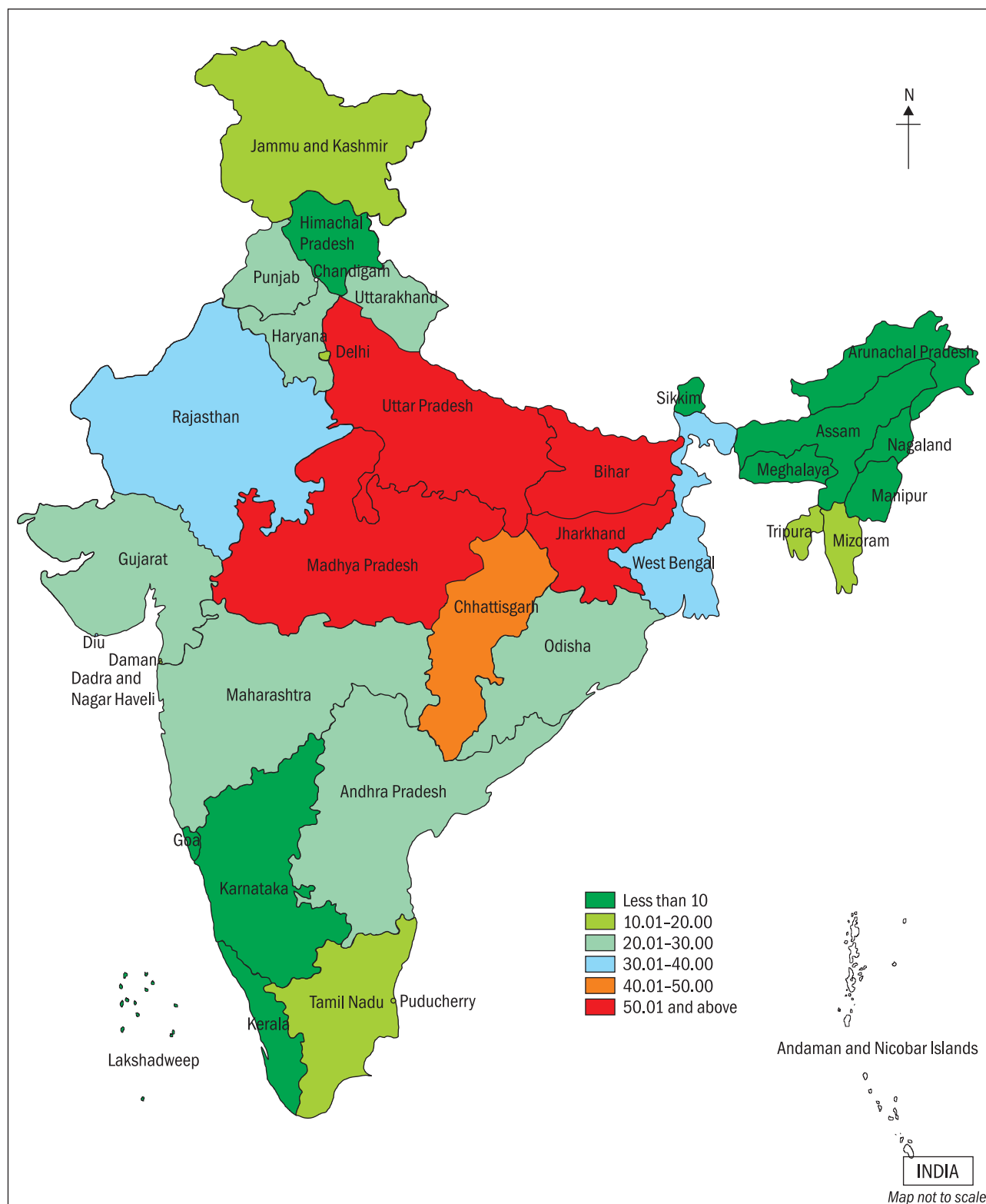


Map 1 Lighting: percentage of households using electricity for lighting
 Source Census of India (2011c)

Energy demand

Table 9 Distribution of households in India by availability of kitchen						
State code	India/state/union territory	Distribution of households by availability of Kitchens				
		Total number of household (excluding institutional households)	Kitchen available	Cooking inside house, does not have kitchen	Cooking in open	No cooking
1	2	3	4	5	6	7
00	INDIA	246 692 667	61.3	31.5	6.8	0.3
01	Jammu and Kashmir	2 015 088	85.7	10.3	3.8	0.2
02	Himachal Pradesh	1 476 581	88.2	8.5	3.0	0.3
03	Punjab	5 409 699	72.0	24.5	3.2	0.3
04	Chandigarh	235 061	73.6	23.0	2.2	1.1
05	Uttarakhand	1 997 068	70.1	24.1	5.5	0.3
06	Haryana	4 717 954	66.5	27.1	6.2	0.2
07	NCT of Delhi	3 340 538	79.1	19.5	1.1	0.3
08	Rajasthan	12 581 303	50.8	40.0	9.0	0.2
09	Uttar Pradesh	32 924 266	40.7	53.8	5.3	0.2
10	Bihar	18 940 629	33.5	57.5	8.9	0.2
11	Sikkim	128 131	90.2	7.8	1.5	0.6
12	Arunachal Pradesh	261 614	89.2	9.5	1.0	0.3
13	Nagaland	399 965	96.0	2.9	0.9	0.2
14	Manipur	507 152	93.3	5.4	1.2	0.1
15	Mizoram	221 077	83.8	15.5	0.6	0.1
16	Tripura	842 781	85.9	12.8	1.3	0.1
17	Meghalaya	538 299	90.7	7.3	1.8	0.2
18	Assam	6 367 295	88.3	7.8	3.5	0.4
19	West Bengal	20 067 299	60.9	33.2	5.5	0.3
20	Jharkhand	6 181 607	39.4	56.9	3.6	0.1
21	Odisha	9 661 085	62.9	28.5	8.3	0.3
22	Chhattisgarh	5 622 850	56.1	40.7	3.0	0.2
23	Madhya Pradesh	14 967 597	46.8	50.4	2.6	0.2
24	Gujarat	12 181 718	72.3	21.2	6.1	0.4
25	Daman & Diu	60 381	65.9	30.7	1.0	2.4
26	Dadra & Nagar Haveli	73 063	84.4	13.7	1.1	0.8
27	Maharashtra	23 830 580	72.7	22.3	4.2	0.8
28	Andhra Pradesh	21 024 534	54.2	23.2	22.2	0.3
29	Karnataka	13 179 911	89.3	7.7	2.6	0.3
30	Goa	322 813	92.9	4.7	1.7	0.7
31	Lakshadweep	10 703	95.5	0.8	1.2	2.5
32	Kerala	7 716 370	96.7	1.5	1.5	0.3
33	Tamil Nadu	18 493 003	76.5	13.7	9.4	0.4
34	Puducherry	301 276	77.5	16.6	5.3	0.6
35	A & N Islands	93 376	94.1	3.5	1.1	1.4

Source Census of India (2011c)



Map 2 Cooking: percentage of households undertaking cooking inside the house and do not have kitchen
 Source Census of India (2011c)

Energy demand

Table 10 State-wise distribution of households by type of fuel used for cooking												
State code	India/state/union territory	Distribution of households by type of fuel used for cooking										
		Households (excluding institutional households)	Firewood	Crop residue	Cowdung cake	Coal, lignite, charcoal	Kerosene	LPG	Electricity	Biogas	Any other	No cooking
1	2	3	4	5	6	7	8	9	10	11	12	13
00	INDIA	246 692 667	49.0	8.9	8.0	1.5	2.9	28.6	0.1	0.4	0.5	0.3
01	Jammu & Kashmir	2 015 088	58.9	2.5	4.2	0.0	1.3	31.6	0.4	0.8	0.2	0.2
02	Himachal Pradesh	1 476 581	57.5	1.1	0.2	0.0	2.1	38.6	0.2	0.1	0.0	0.3
03	Punjab	5 409 699	13.4	6.5	20.4	0.2	3.2	54.5	0.0	1.4	0.1	0.3
04	Chandigarh	235 061	4.6	0.3	0.2	0.1	21.9	71.6	0.0	0.1	0.1	1.1
05	Uttarakhand	1 997 068	48.7	1.3	3.2	0.1	1.8	44.2	0.0	0.5	0.0	0.3
06	Haryana	4 717 954	26.1	14.1	14.2	0.1	1.0	44.0	0.0	0.3	0.1	0.2
07	NCT of Delhi	3 340 538	3.4	0.3	0.6	0.1	5.3	89.9	0.0	0.1	0.1	0.3
08	Rajasthan	12 581 303	61.8	11.0	3.0	0.1	0.9	22.8	0.0	0.1	0.1	0.2
09	Uttar Pradesh	32 924 266	47.7	8.7	23.1	0.3	0.7	18.9	0.1	0.2	0.1	0.2
10	Bihar	18 940 629	34.7	32.5	21.7	1.0	0.3	8.1	0.1	0.3	1.2	0.2
11	Sikkim	128 131	52.5	0.6	0.2	0.1	4.4	41.3	0.3	0.1	0.0	0.6
12	Arunachal Pradesh	261 614	68.7	0.7	0.1	0.0	0.7	29.2	0.1	0.1	0.1	0.3
13	Nagaland	399 965	77.9	0.8	0.1	0.0	0.6	20.0	0.1	0.1	0.1	0.2
14	Manipur	507 152	65.7	1.1	0.2	2.1	0.2	29.7	0.1	0.2	0.6	0.1
15	Mizoram	221 077	44.5	0.3	0.1	0.4	1.8	52.6	0.2	0.1	0.1	0.1
16	Tripura	842 781	80.5	0.8	0.1	0.1	0.6	17.6	0.0	0.1	0.1	0.1
17	Meghalaya	538 299	79.0	0.9	0.3	2.3	3.7	11.9	1.6	0.2	0.1	0.2
18	Assam	6 367 295	72.1	6.4	0.9	0.1	0.6	19.0	0.1	0.1	0.4	0.4
19	West Bengal	20 067 299	33.1	25.6	10.0	7.9	2.1	18.0	0.1	0.3	2.7	0.3
20	Jharkhand	6 181 607	57.6	4.0	7.2	18.1	0.2	11.7	0.3	0.1	0.6	0.1
21	Odisha	9 661 085	65.0	10.2	9.4	1.6	1.1	9.8	0.4	0.2	2.0	0.3
22	Chhattisgarh	5 622 850	80.8	0.9	3.7	2.3	0.5	11.2	0.1	0.2	0.1	0.2
23	Madhya Pradesh	14 967 597	66.4	5.6	7.7	0.2	1.3	18.2	0.1	0.4	0.1	0.2
24	Gujarat	12 181 718	44.0	5.7	2.6	0.5	7.6	38.3	0.0	0.9	0.1	0.4
25	Daman & Diu	60 381	10.8	1.5	0.2	0.2	30.8	53.0	0.1	0.9	0.1	2.4
26	Dadra & Nagar Haveli	73 063	40.4	0.4	0.2	0.1	17.8	39.8	0.0	0.4	0.0	0.8
27	Maharashtra	23 830 580	42.6	4.5	1.2	0.2	6.5	43.4	0.1	0.7	0.1	0.8

Contd...

Table 10 Contd...

State code	India/state/union territory	Distribution of households by type of fuel used for cooking										
		Households (excluding institutional households)	Firewood	Crop residue	Cowdung cake	Coal, lignite, charcoal	Kerosene	LPG	Electricity	Biogas	Any other	No cooking
28	Andhra Pradesh	21 024 534	56.8	1.4	0.6	0.3	3.9	35.8	0.1	0.7	0.1	0.3
29	Karnataka	13 179 911	57.5	2.9	0.2	0.1	5.4	32.5	0.1	0.9	0.1	0.3
30	Goa	322 813	20.7	0.9	0.2	0.1	4.1	72.7	0.1	0.4	0.1	0.7
31	Lakshadweep	10 703	54.8	10.7	0.1	0.1	13.7	16.6	1.2	0.2	0.0	2.5
32	Kerala	7 716 370	61.9	0.8	0.1	0.1	0.4	35.8	0.0	0.6	0.0	0.3
33	Tamil Nadu	18 493 003	43.5	0.6	0.2	0.1	6.9	47.9	0.1	0.3	0.1	0.4
34	Puducherry	301 276	18.0	0.3	0.1	0.0	10.3	70.5	0.1	0.1	0.0	0.6
35	A & N Islands	93 376	33.8	0.4	0.0	0.0	19.8	44.5	0.0	0.0	0.1	1.4

Source Census of India (2011c)

Table 11 (a) Percentage distribution of households by primary energy source for cooking (2001/02–2011/12)

NSS round/year		Coke, coal, and charcoal (%)	Firewood and chip (%)	LPG (%)	Dung cake (%)	Kerosene (%)	No cooking/others (%)
Rural							
68	2011/12	1.16	67.35	13.94	11.95	0.6	4.78
66	2009/10	0.8	75.9	12.1	6.1	0.8	4.3
64	2007/08	0.8	77.6	9.1	7.4	0.6	4.5
63	2006/07	0.8	75.4	8.9	9.1	0.8	5
62	2005/06	1.1	74	9.3	9	1	5.6
61	2004/05	0.8	75	8.6	9.1	1.3	5.2
59	2003	0.9	74.9	9.1	9.3	1.9	3.9
57	2001/02	1.2	73.4	8.1	10.5	2	4.8
Urban							
68	2011/12	2.53	17	70.6	1.85	4.54	3.15
66	2009/10	2.2	17.6	64.6	1.4	6.4	7.8
64	2007/08	2.1	20.1	61.8	1.4	7.6	7.1
63	2006/07	2.3	22.1	59.2	1.7	7.5	7.1
62	2005/06	3.5	20.9	57.1	1.7	9.2	7.6
61	2004/05	2.8	21.7	57.1	1.7	10.2	6.5
59	2003	3.3	20	55.4	1.8	13	6.6
57	2001/02	3	23.3	49.9	1.6	15.3	7.1

NSS - National Sample Survey; LPG - Liquefied Petroleum Gas

Source Compiled from various NSSO rounds

Table 11 (b) Percentage distribution of households by primary energy source for lighting (2001/02–2011/12)

NSS round/year	Period	Kerosene	Electricity	Other/no lighting arrangement
Rural				
68	2011–12	27.97	71.24	0.78
66	2009/10	33.54	65.61	0.86
64	2007/08	38.6	60.2	1.2
63	2006/07	42.3	56.1	1.6
62	2005/06	42	56.3	1.5
61	2004/05	44.4	54.9	0.6
59	2003	46.6	51.6	1.7
57	2001/02	47.2	51.9	0.9
Urban				
68	2011–12	3.27	96.29	0.45
66	2009/10	4.9	93.8	1.3
64	2007/08	5.1	93.8	1.2
63	2006/07	6.4	92.7	0.9
62	2005/06	7.2	92	0.8
61	2004/05	7.1	92.3	0.6
59	2003	8.3	90.8	1
57	2001/02	7.8	91.4	0.8

NSS-National Sample Survey; LPG-Liquefied Petroleum Gas

Source Compiled from various NSSO rounds

consumption of electricity in the country is over 900 KWh (Figure 3). Figure 4 shows the plan-wise growth of electricity consumption in India for the domestic sector.

While the per capita consumption of electricity in India during 2011 stood at 684 kWh, it

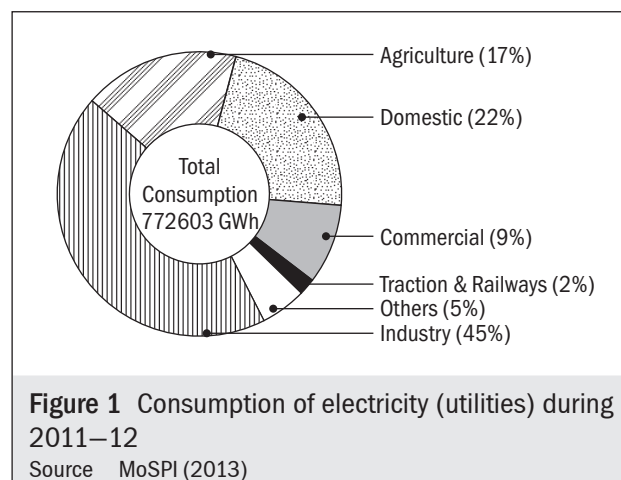
was 2438 kWh, 3298 kWh, 5516 kWh, and 13246 kWh in Brazil, China, United Kingdom, and United States, respectively (World Bank 2014).

Kerosene

While kerosene is a modern fuel, it is not a clean fuel. Yet, it is consumed for both lighting and cooking by households in India. Table 12 shows the consumption of superior kerosene oil across different years.

Liquefied Petroleum Gas

Liquefied Petroleum Gas is a modern and clean fuel for cooking. To accelerate access to modern fuel for cooking, the government focuses on both rural and urban areas. Over the years, consumption of LPG for domestic and non-domestic purposes has increased (see Table 13). Table 14 lists the state-wise total number of LPG distributors and consumers. To encourage uptake, government



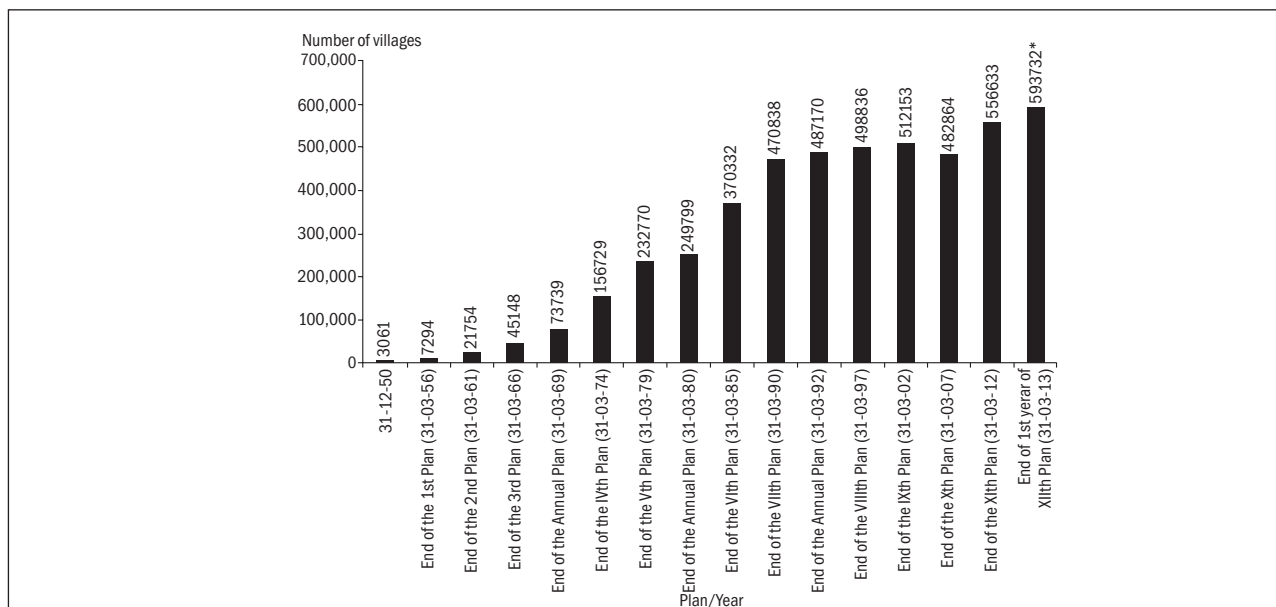


Figure 2 Plan-wise number of villages electrified in India

*Provisional

Source CEA (2013)

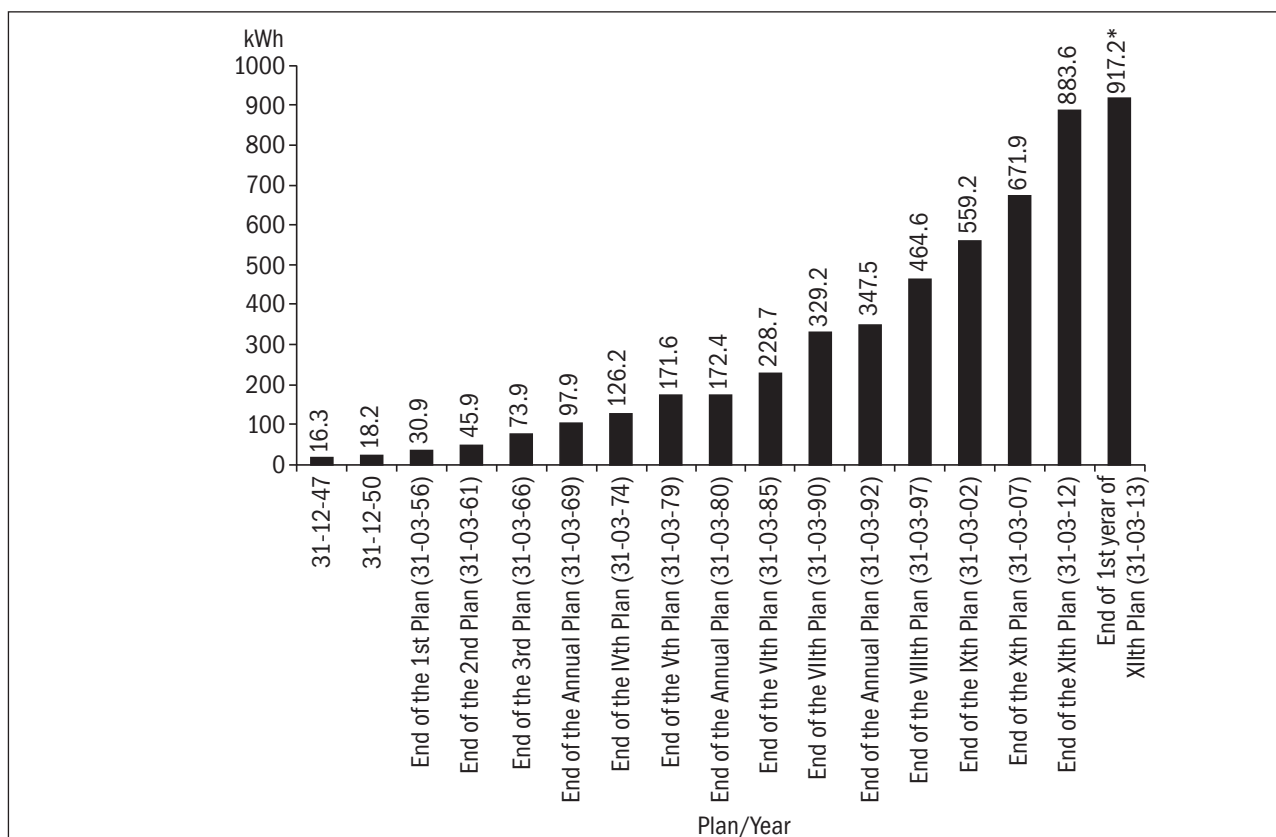


Figure 3 Plan-wise growth of per capita consumption of electricity in India

*Provisional

Source CEA (2013)

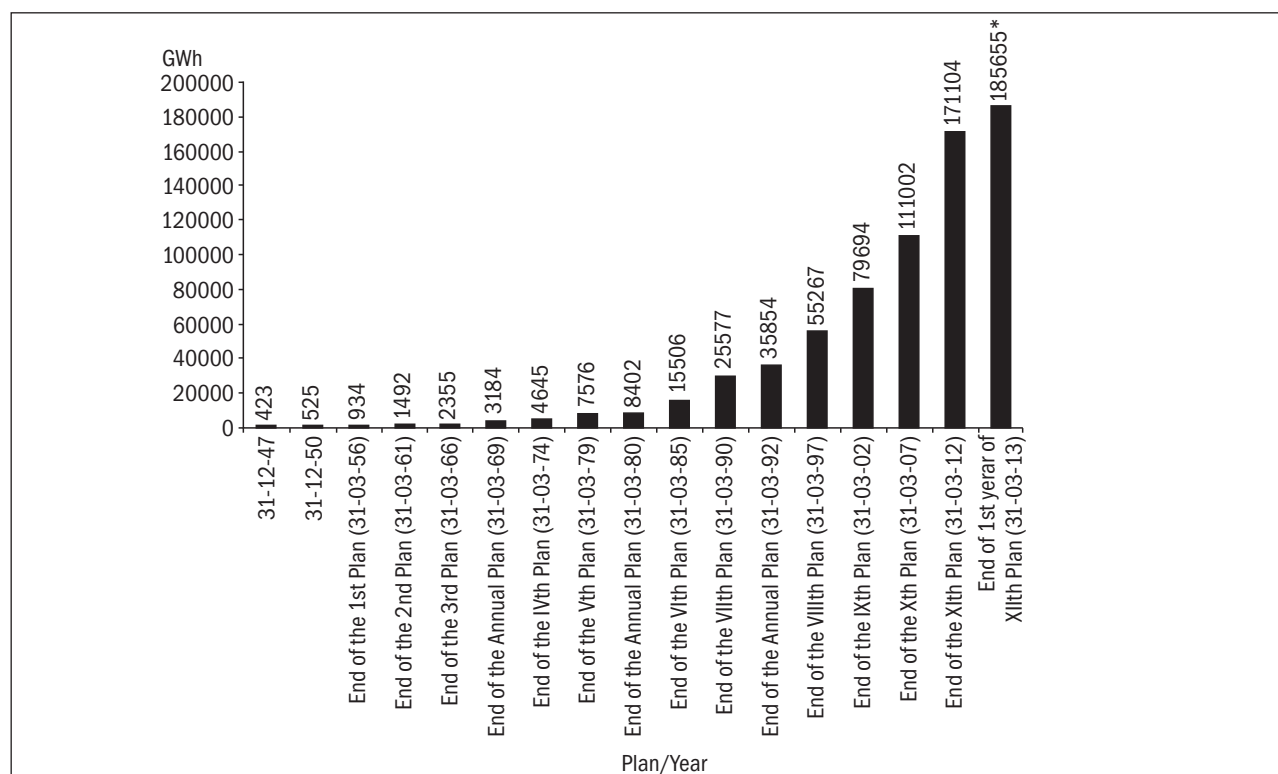


Figure 4 Plan-wise growth of electricity consumption in India for domestic sector

*Provisional

Source CEA (2013)

Table 12 Consumption of superior kerosene oil (SKO) in residential sector (2005/06–2012/13) (in '000 tonnes)

Year	Consumption	Per cent to total consumption
2012/13*	7 349	98.0
2011/12	8 045	97.8
2010/11	8 722	97.7
2009/10	9 101	97.8
2008/09	9 131	98.2
2007/08	9 163	97.8
2006/07	9 203	96.8
2005/06	9 267	97.1

*Provisional

Source MoPNG (2011); MoPNG (2013)

also provides subsidy on PDS SKO & Domestic LPG. The overall subsidy and under-recoveries for both PDS SKO & Domestic LPG amount to over ₹71 000 crores for 2012–13 (see Table 15). The

Table 13 Consumption of LPG for domestic distribution/non-domestic use for the period of 2005/06–2012/13 (in '000 tonnes)

Year	Consumption	Per cent to total consumption
2012/13*	13 568	86.9
2011/12	13 319	86.7
2010/11	12 369	86.3
2009/10	11 364	86.6
2008/09	10 637	93.6
2007/08	11 173	91.8
2006/07	10 427	96.1
2005/06	9 820	93.9

*Provisional

Source MoPNG (2011); MoPNG (2013)

total number of LPG consumers of public sector oil marketing companies as on 1st April, 2013 was 150.391 million (MoPNG 2013).

Table 14 Total number of LPG and SKO distributors/dealers and LPG domestic consumers (in '000 number)

S.No	State/UT	Total SKO/LDO dealerships	Total LPG distributors	Total LPG domestic consumers
01	Andhra Pradesh	603	1231	17 126
02	Arunachal Pradesh	33	37	203
03	Assam	359	303	2 772
04	Bihar	373	627	4 568
05	Chhattisgarh	109	211	1 517
06	NCT of Delhi	116	317	5 423
07	Goa	21	53	522
08	Gujarat	493	598	7 206
09	Haryana	143	350	4 514
10	Himachal Pradesh	26	136	1 658
11	Jammu and Kashmir	47	168	1 796
12	Jharkhand	86	248	1 652
13	Karnataka	325	616	8 885
14	Kerala	242	448	7 449
15	Madhya Pradesh	279	741	6 196
16	Maharashtra	775	1 303	18 743
17	Manipur	36	47	317
18	Meghalaya	35	37	176
19	Mizoram	19	39	265
20	Nagaland	19	37	202
21	Odisha	177	323	2 246
22	Punjab	242	521	6 239
23	Rajasthan	251	710	6 988
24	Sikkim	12	8	127
25	Tamil Nadu	465	924	15 295
26	Tripura	40	38	372
27	Uttar Pradesh	695	1 287	16 594
28	Uttarakhand	72	541	2 156
29	West Bengal	469	652	8 266
30	A & N Islands	1	5	68
31	Chandigarh	12	27	376
32	Dadra & Nagar Haveli	2	2	60
33	Daman & Diu	5	2	60
34	Lakshadweep	0	1	3
35	Puducherry	8	22	355
Total		6 590	12 610	150 391

SKO - Superior Kerosene Oil; LPG - Liquefied Petroleum Gas; LDO - Light Diesel Oil

Source MoPNG (2013)

Table 15 Subsidy by government and under recovery by oil companies on PDS SKO and domestic LPG (in ₹ crores)

Years	PDS SKO			Domestic LPG			Total (subsidy-under recoveries)
	Fiscal subsidy*	Under recoveries to oil company	Total	Fiscal subsidy*	Under recoveries to oil company	Total	
2005-06	1057	14384	15441	1605	10246	11851	27292
2006-07	970	17883	18853	1554	10701	12555	31108
2007-08	978	19102	20080	1663	15523	17186	37266
2008-09	974	28225	29199	1714	17600	19314	48513
2009-10	956	17364	18320	1814	14257	16071	34391
2010-11	931	19485	20416	1974	21772	23746	44162
2011-12	863	27352	28215	2137	29997	32134	60349
2012-13*	741	29410	30151	1989	39558	41547	71698

*Subsidy on PDS SKO and Domestic LPG (Under Scheme 2002)

Source MoPNG (2013)

Household energy consumption pattern across MPCE classes

NSSO data (MoSPI 2012), unit-level consumer expenditure survey identifies decile ranges of Monthly Per Capita Expenditure (MPCE) classes for rural and urban India. The MPCE classes for the 68th round of NSSO survey are listed in Table 16. Table 17 highlights household-level quantity consumed by expenditure deciles in rural and urban areas for cooking and lighting.

Policies, programmes, and regulations for modern energy access in households

Electricity Act, 2003

The Electricity Act, 2003 mandated legitimization of a national electricity policy and tariff policy. Further, this umbrella act, in the context of rural India, stressed on preparation and notification of a national policy permitting standalone systems including those based on renewable sources of energy and non-conventional sources of energy. In addition, the Act established that the Central Government shall formulate a national policy in consultation with the State Governments and the State Commissions, for rural electrification and for bulk purchase of power and management of local distribution in rural areas through Panchayat Institutions, users associations, co-operative

societies, non-governmental organizations or franchisees. The Act also set an obligation that the government shall endeavour to supply electricity to all areas including villages and hamlets. The Act was amended twice and the Electricity (Amendment) Act, 2007 came into force from 15 June 2007.

National Electricity Policy, 2005

In compliance with Section 3 of the Electricity Act, 2003, the government notified the National Electricity Policy. This policy aimed at a five-year timeline to ensure availability of electricity to all households in India. Apart from other areas of focus, the policy targeted per capita availability of electricity to be increased to over 1000 units by 2012 and a minimum lifeline consumption of 1 unit/household/day as a merit good by 2012. The policy set a five-year target for securing electricity access to all households and also for ensuring that electricity reaches the poor and marginal sections of the society at reasonable rates.

Rural Electrification Policy, 2006

As per Section 4 & 5 of the Electricity Act, 2003, the Central Government notified the Rural Electrification Policy, 2006. The policy aimed at

- Provision of access to electricity to all households by 2009.
- Quality and reliable power supply at reasonable rates.

Table 16 Monthly per capita consumption expenditure classes and their codes: 68th round of NSSO survey

MPCE class limits	Rural		Urban	
	LL	UL	LL	UL
1	-	598.79	-	861
2	598.83	721.63	861.17	1 089
3	721.66	826	1 089.13	1 296
4	826.2	923.25	1 296.17	1 510.25
5	923.33	1 035.5	1 510.33	1 758
6	1 035.59	1 167.19	1 758.17	2 070
7	1 167.2	1 335.85	2 070.2	2 459.33
8	1 335.88	1 582.69	2 459.75	3 068
9	1 582.7	2 053.66	3 068.25	4 280.6
10	2 053.75	-	4 280.6	-

LL - lower limit; UL - upper limit

Source MoSPI (2012)

Table 17 Household-level fuel quantity consumed by expenditure deciles in rural and urban areas for 2011/12

Rural					
MPCE classes	Firewood and wood chips (in Kgs)	Electricity in kWh (litres)	Kerosene (PDS) (litres)	Kerosene (others) (litres)	LPG (excluding conveyance)
0-599	111.72	34.59	2.73	2.13	5.63
599-722	07.83	39.65	2.77	2.19	6.69
722-826	108.75	44.45	2.77	2.31	9.11
826-923	114.37	46.66	2.78	2.17	7.59
923-1036	112.37	53.78	2.67	2.28	7.86
1036-1167	117.04	55.11	2.77	2.18	7.92
1167-1336	113.73	59.11	2.72	2.36	8.54
1336-1583	119.62	64.44	2.77	2.44	9.12
1583-2054	119.09	73.87	2.63	2.54	9.08
above 2054	119.66	95.35	2.50	2.80	9.32
Urban					
MPCE classes	Firewood and wood chips (in Kgs)	Electricity in kWh (litres)	Kerosene (PDS) (litres)	Kerosene (others) (litres)	LPG (excluding conveyance)
0-861	95.85	55.40	2.98	2.97	
861-1089	87.49	71.93	3.17	4.85	
1089-1296	86.99	81.50	2.97	4.70	
1296-1510	77.32	94.37	3.15	4.69	
1510-1758	85.50	105.10	3.14	6.15	
1758-2070	73.67	112.83	3.10	4.99	
2070-2459	86.80	124.43	2.90	5.60	
2459-3068	76.08	136.62	3.00	7.58	
3068-4279	84.84	162.73	2.71	5.74	
above 4279	77.99	250.40	2.50	4.71	

Source MoSPI (2012)

- Minimum lifeline consumption of 1 unit per household per day as a merit good by 2012.

The policy document mentions that under the National Common Minimum Programme, provision of access to electricity for all households is envisaged within five years and in order to achieve this objective, the government launched its ambitious Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY).

Rajiv Gandhi Grameen Vidyutikaran Yojana

In early 2001–02, Ministry of New and Renewable Energy launched the Village Electrification programme. Later, Rural Electricity Supply Technology Mission was launched, which aimed at electrification of villages with local renewables and decentralized technologies alongside grid (where feasible). In 2005, the Government of India launched its ambitious rural electrification programme, RGGVY by merging all its ongoing schemes. As part of the programme, the central government provides 90% grant and the rest 10% is provided by Rural Electrification Corporation Limited (REC Ltd) as loan to the respective state governments. Table 11.1 highlights the achievements of RGGVY programme at an all-India level. RGGVY aims at electrifying all villages and habitations as per definition of village electrification in India. It also aims to provide electricity connection to Below Poverty Line (BPL) families free of charge. Apart from other components, RGGVY focuses on decentralized distributed generation (DDG) systems based on conventional and non-conventional energy sources for regions where grid supply is not feasible or is not cost-effective.

Remote Village Electrification programme

The Rural Electrification Policy, 2006 of the government laid foundation stone for emphasis on Remote Village Electrification (RVE) programme. RVE aims at electrification of those remote un-electrified census villages and un-electrified hamlets of electrified census villages where grid-extension is either not feasible or not cost-effective and are not covered under RGGVY. Table 11.2 indicates about the progress made so far as part of RVE.

The Government of India has also been promoting both decentralized systems and

off-grid power systems to facilitate energy access to households. Decentralized systems include the following:

- Family-size biogas plants
- Solar street lighting systems
- Solar lanterns and solar home lighting systems
- Solar water heating systems
- Solar cookers
- Standalone solar/biomass-based power generators
- Akshay Urja/Aditya Solar Shops
- Wind pumps
- Micro-Hydel plants

The off-grid technologies for domestic energy access include the following:

- Biomass gasifiers for rural energy applications
- Watermills/micro hydro projects — for meeting electricity requirement of remote villages
- Small Wind Energy & Hybrid Systems — for mechanical and electrical applications, mainly where grid electricity is not available.
- Solar PV Roof-top Systems for abatement of diesel for power generation in urban areas.

National Biogas and Manure Management Programme

The government also launched National Biogas and Manure Management Programme (NBMMMP) which is active since 1981–82. It caters mainly to setting up of family-type biogas plants. Table 11.3 highlights the state-wise estimated potential and cumulative achievements for family-type biogas plants.

Jawaharlal Nehru National Solar Mission

Launched in 2010, Jawaharlal Nehru National Solar Mission (JNNSM) is an ambitious programme of the Government of India. It is one of the eight missions under the National Action Plan on Climate Change (NAPCC). The mission has brought in tremendous thrust on renewable energy and particularly solar energy. The overall target of the mission is deployment of 20 000 MW of grid connected solar power by 2022. Phase 1 of JNNSM aimed at commissioning of 1000 MW of grid-connected solar power projects by 2013. Table 11.4 shows the progress made so far for installation of off-grid/decentralized renewable energy systems.

Solar/green cities

With rapid urbanization, the energy demand in cities has been rising. Shortage of electricity supply is a critical challenge. In this context, “Development of Solar Cities” programme is designed to support/encourage urban local bodies to prepare a road map to guide their cities in becoming ‘renewable energy cities’ or ‘solar cities’. The government has provided sanction to 31 cities which have received in-principle approvals and they have engaged consultants for preparing the master plan.

These cities are: Agra, Moradabad, Rajkot, Gandhinagar, Nagpur, Kalyan-Dombivali, Kohima, Dehradun, Chandigarh, Gurgaon, Faridabad, Thane, Panaji City and Environs, Bilaspur, Raipur, Imphal, Itanagar, Jodhpur, Jorhat, Guwahati, Agartala, Ludhiana, Amritsar, Shimla, Hamirpur, Haridwar and Rishikesh, Vijaywada, Aizawl, Mysore, Hubli, and Gwalior.

Akshay Urja shops

To encourage retail sales of solar energy-based products and to facilitate access to after-sales-service, the Ministry of New and Renewable Energy (MNRE) has been promoting establishment of Akshay Urja shops in major cities of the country since 1995. Table 11.5 lists out the state-wise number of such shops institutionalized.

MNRE started “Biogas based Distributed / Grid Power Generation Programme” from 2005–06 with a view to promoting biogas-based power generation, especially in the small capacity range, based on the availability of large quantity of animal wastes and wastes from forestry, rural-based industries (agro/food processing), and kitchen waste. Table 11.6 lists the state-wise installed capacity.

National Biomass Cookstoves Initiatives

To encourage use of efficient biomass cookstoves, MNRE launched National Biomass Cookstoves Initiative (NBCI) in 2009. The initiative builds largely on the previous National Programme on Improved Chulhas (NPIC) of the ministry. The initiative focuses on both community cookstoves and family-sized/portable biomass cookstoves. The Planning Commission of India has approved in principle the setting up of a Section 25 Company primarily for promoting cookstoves in the country. The MNRE is in the process of setting up the “Bioenergy Corporation of India” for promoting bioenergy technologies such as cookstoves, gasifiers, and waste to energy and biogas plants.

Rajiv Gandhi Gramin LPG Vitaran Yojana

In order to enhance the LPG penetration, the government launched “Rajiv Gandhi Gramin LPG Vitaran Yojana (RGGLVY)” in 2009. RGGLVY aims at setting up small-size LPG distribution agencies in order to reach out to remote as well as low potential areas [locations having potential of 600 cylinders (refill sales) per month].

Subsidy on superior kerosene oil allocated through public distribution systems and on domestic LPG

The Government of India provides SKO through public distribution systems (PDS) for cooking and lighting to all the states and union territories on a quarterly basis. The government also provides subsidy on domestic LPG cylinders (see Table 15). In 2012, the government had put a cap of nine on the number of subsidized cylinders that a household can access annually.



CSR fund: an opportunity to address the challenge of energy access

One of the serious hurdles in addressing the challenge of energy access in rural India is finance. On the one hand, financing large projects is difficult and, on the other hand, obtaining easy consumer finance is a critical task. Under such circumstances the poorest of the poor suffer the most. For such target groups lack of sustained source of income emerges as one of the key reasons leading to poor willingness to secure modern energy sources for basic lighting and cooking. At the same time limited affordability for both the fuel and the relevant efficient and safe equipment/instrument appears to be a difficult proposition for the poorest of the poor. The rising inflation only limits the disposable income that a below poverty line (BPL) family can spare for securing access to modern fuel for domestic usage.

Incidentally the recent "Guidelines on Corporate Social Responsibility and Sustainability for Central Public Sector Enterprises" that came into effect on 1 April 2013 stands as an opportunity for addressing the challenge of financing rural energy access. Section 1.4.11 of the guideline established that Central Public Sector Enterprises (CPSEs) must plan for environmental sustainability and take up projects including energy management and promotion of renewable sources energy. The section also mentions that the projects that result in reduction of carbon emissions through energy efficient and renewable energy technologies and which have a clear and tangible impact on environmental sustainability fall under this category of activities. The Companies Act, 2013 (2013 Act) assented by the President of India on 29 August 2013 and published in Official Gazette on 30 August 2013, specifies in Section 135 that every company having net worth of ₹ 500 crore or more, or turnover of ₹1000 crore or more or a net profit of ₹5 crore or more during any financial year shall constitute a Corporate Social Responsibility Committee of the Board consisting of three or more directors, out of which at least one director shall be an independent director. Sub-section 5 of Section 135 mentions that the Board of every company referred to in sub-section (1) of Section 135, shall ensure that the company spends, in every financial year, at least 2% of the average net profits of the company made during the three immediately preceding financial years, in pursuance of its Corporate Social Responsibility Policy (MCA 2013).

On the above lines, some of the CPSEs have already been undertaking projects for facilitating access to clean and modern energy for domestic usage and productive uses in rural areas. Leveraging CSR funds for projects that bring tangible results can prove to be effective if the projects address needs of the communities and inculcate a participatory bottom-up approach. In addition all such projects for productive use must be designed with an estimate for escalation in power requirements once the project is commissioned. The opportunity presents a win-win situation for both CPSEs and rural communities.

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